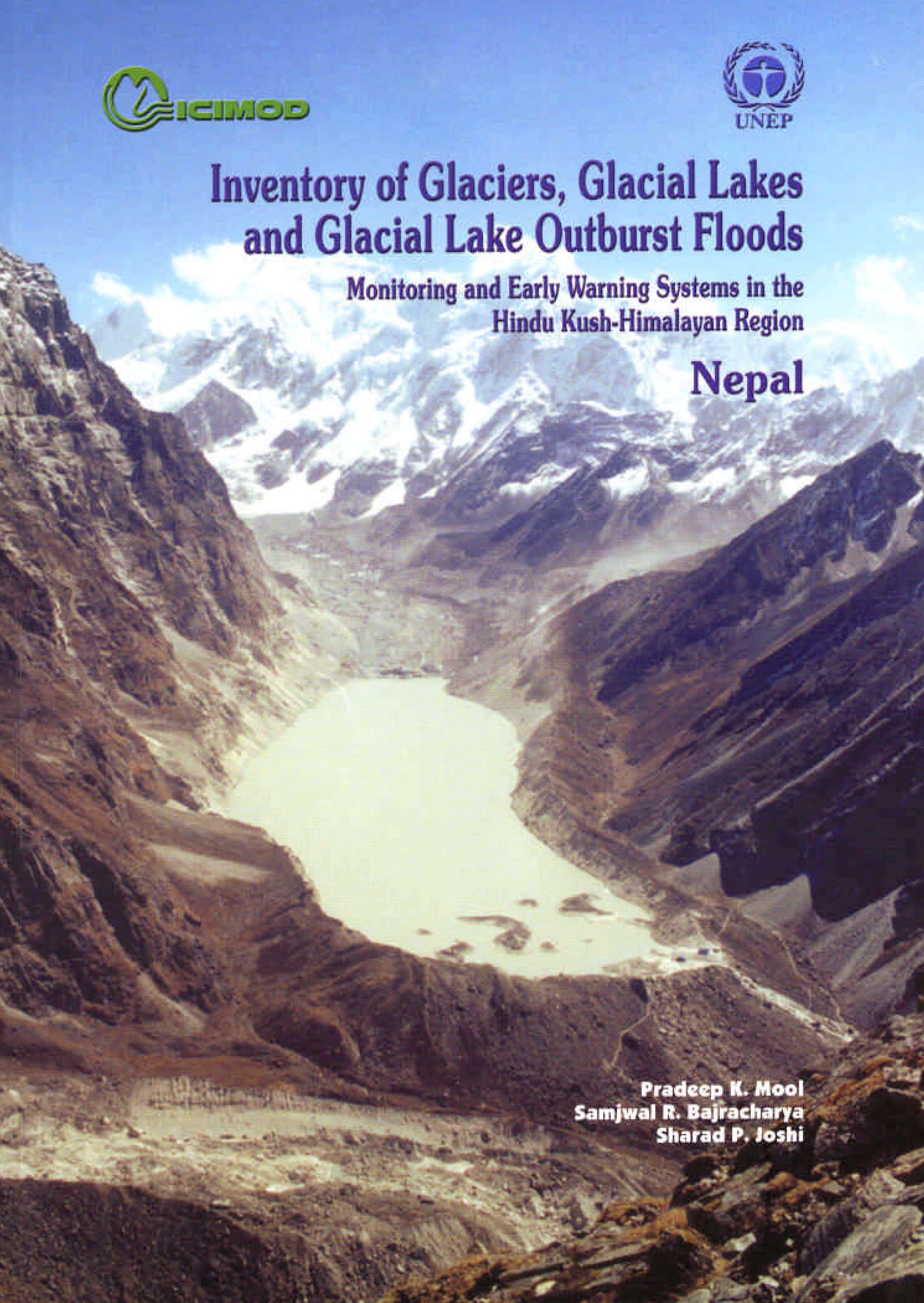

ICIMOD

UNEP

Inventory of Glaciers, Glacial Lakes and Glacial Lake Outburst Floods

Monitoring and Early Warning Systems in the Hindu Kush-Himalayan Region

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In cooperation with
United Nations Environment Programme
Regional Resource Centre — Asia and the Pacific
(UNEP/RRC-AP)

International Centre for Integrated Mountain Development
Mountain Environment and Natural Resources' Information Systems
August 2001

Cover plate:

Front: Tsho Rolpa Glacial Lake, October 2000
— *Pradeep K. Mool*

Back plates:

Tsho Rolpa Glacial Lake Rolwaling Valley, Nepal

Top: Discharge from the recently constructed, gated canal has reduced the lake water level by three metres
— *Pradeep K. Mool*

Bottom clockwise:

View of the lake, June 1993
— *Pradeep K. Mool*

Glaciers (green) and lakes (blue) based on topographic maps published by the Survey of India (1960s–1970s) on a scale of 1:63,360 and draped over a digital elevation model (DEM) generated from the maps

Trakarding glacier, the source of the lake, October 1995

LANDSAT 4 TM image of 22 September 1992 draped over the DEM generated from the topographic map of the area

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Foreword

The glaciers of the Hindu Kush-Himalayas (HKH) are nature's renewable storehouse of fresh water from which hundreds of millions of people downstream benefit just when it is most needed – in the dry hot season before the monsoons. While the total number of glaciers in the region is still unknown, this study has for the first time documented that there are 3,252 glaciers in Nepal alone. Covering a large area of 5,324 square kilometres, these high frozen reservoirs release their water at the top of their watersheds. They serve as the perennial sources of the Ganges tributaries that wind their way through thousands of kilometres of grazing, agricultural, and forest lands and are used as renewable sources of irrigation, drinking water, energy, and industry.

However, these glaciers are retreating in the face of accelerating global warming. They are particularly vulnerable to climate change, and the resultant long-term loss of natural fresh water storage will have as yet uncalculated effects on communities downstream. More immediately, as glaciers retreat, glacial lakes form behind some of the now exposed terminal moraines. Rapid accumulation of water in glacial lakes, particularly in those adjacent to receding glaciers, can lead to a sudden breaching of the unstable 'dam' behind which they have formed. The resultant discharges of huge amounts of water and debris – a **glacial lake outburst flood** or **GLOF** – often have catastrophic effects downstream.

Many glacial lakes are known to have formed in the HKH in the last half century and a number of GLOFs have been reported in the region, including in Nepal in the last few decades. These GLOFs have resulted in many deaths, as well as the destruction of houses, bridges, fields, forests and roads. The lakes at risk, however, are situated in remote and inaccessible areas. When they burst, the local communities may have been devastated, while those in far away cities were largely unaware of the event.

In Nepal, this lack of awareness changed dramatically in 1985 following the catastrophic Dig Tsho glacial lake flood in 1985. As described in this publication, this lake high in the valley next to Mt. Everest, caused some deaths, wiped out 14 bridges, and swept away the newly constructed small hydel project in which US$ 1.5 million had just been invested. Following this some other glacial lakes were identified - such as the Tsho Rolpa that threatens the much larger Khimti hydel project as well as the local communities - and efforts, also described in detail in this publication, have been undertaken to mitigate the chances of such lakes also coming down in a wall of water and rocks.

Despite numerous studies of individual cases, there is still no detailed inventory of glaciers and glacial lakes, of GLOF events or of potential GLOF sites, in the HKH region – let alone of their impact on downstream populations and investments. This publication, along with the sister publication on the glaciers and glacial lakes of Bhutan, is designed to begin filling this pressing need. The research upon which it is based started in 1999, when the United Nations Environment Programme Regional Resource Centre for Asia and the Pacific (UNEP/RRC-AP) provided ICIMOD with the opportunity of using its expertise in the area of geographic information systems (GIS) to create a comprehensive inventory and GIS database of glaciers and glacial lakes in Nepal and Bhutan using available maps, satellite images, aerial photographs, reports, and field data on different scales. It built on ICIMOD's experience and long-standing concern with collecting and distributing material on the means to identify and mitigate mountain disasters and safeguard the livelihoods of vulnerable mountain people and their downstream neighbours.

One of the study's major objectives was to identify areas where GLOF events had occurred and lakes that could pose a potential threat of a GLOF in the near future. Out of a surprisingly large total of 2,323 glacial lakes, the researchers found 20 lakes that are potentially dangerous, including 17 that appear not to have experienced a prior GLOF. These results thus provide the basis for development of a monitoring and early warning system and for the planning and prioritisation of disaster mitigation efforts that could save many lives and properties situated downstream, as well as guide infrastructure planning. In addition, it is anticipated that this study will provide useful information for many of those concerned with water resources and land-use planning.

As a presentation of the first results of the UNEP/RRC-AP supported study, this publication also includes a description of the methods used to identify glaciers, glacial lakes, and glacial lakes that may pose a threat; as well as an inventory (and maps) of the glaciers and glacial lakes in Nepal. It includes a summary of the results of studies of various glacial lakes, and a brief review of the causes and effects of known GLOF events in Nepal. The database and analysis are the first to cover the whole of the country on a large scale.

We are thus confident that this comprehensive report and digital database will be of service to scientists, planners, and decision-makers in many areas. Through their informed actions, we hope it will contribute to improving the lives of those living in the mountains, and help safeguard future investments for the benefit of many people in the region.

ICIMOD is grateful to UNEP/RRC-AP for its support to this work and the strong support and advice given while carrying out the project. We are also pleased that this project has enabled us to continue to strengthen our collaboration with the Government of Nepal's Department of Hydrology and Meteorology and to continue to assist in developing regional capacity and co-operation.

J. Gabriel Campbell
Director General
ICIMOD

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We thank Dr. Arun Shrestha and Dr. Birbal Rana of the Department of Hydrology and Meteorology of HMG/Nepal for their assistance in drafting parts of the report on the hydrological, glaciological, and GLOF mitigation studies for Nepal, and Dr. Hari Man Shrestha, the former executive secretary of WECS, who carried out a technical review of the study. We are also grateful to Dr. V. Galay and Dr. M. Zimmerman for their valuable comments and suggestions on the draft report. Mr. Basanta Shrestha, Acting Head, MENRIS, coordinated and made valuable inputs to the study. Other ICIMOD staff members who have assisted in the study include Ms. Monica Moktan, Ms. Rajani Bajracharya, Prof. Li Tianchi, Mr. Sushil Pradhan, Mr. Birendra Bajracharya, Mr. Sushil Pandey, Mr. Saisab Pradhan, Mr. Anirudra M. Shrestha, and Mr. Govinda Joshi. We would like to thank them all for their contributions. We would also like to thank Mr. Dharma Ratna Maharjan for the layout design and Mr. Asha Kaji Thaku for cartographic work. Mr. Pramod Pradhan, former Head of the MENRIS division of ICIMOD, is thanked for his valuable inputs and for coordinating the project process. Last but not least we wish to thank Mr. Surendra Shrestha, Regional Coordinator, Mr. Dola Govinda Pradhan, Dr. Chandra Giri, Mr. Mylvakanam Iyngarararasan, Ms. May Ann E. Mamicpic, and Ms. Kritiya Gajesani of UNEP/RRC-AP for their timely and strong support and advice while implementing the project.

The terms glacier lake and glacial lake are often used interchangeably to refer to any lake associated with a glacier, regardless of the means of formation, although some investigators restrict their definitions to particular types of lake. For the purposes of this document, all lakes in contact with or near a glacier, or formed by recent glacial morphology, are referred to as 'glacial lakes'. In practice, most are of the type produced on a glacier's perimeter by meltwater from the glacier, by many termed a 'proglacial lake'.

The terms 'Himalaya' and 'Himalayas' are use to refer to the geological formation and the geographical region, respectively.

Acronyms

ADB	Asian Development Bank
AP	aerial photograph
AVNIR M	Advance Visible and Near Infrared Radiometer Multispectral
BPC	Butwal Power Company
CBS	Central Bureau of Statistics
CD	compact disk
CIDA	Canadian International Development Agency
DEM	digital elevation model
DHM	Department of Hydrology and Meteorology
DIHM	Department of Irrigation, Hydrology and Meteorology
EAP-AP	Environment Assessment Programme – Asia Pacific (UNEP)
ELOS	Extended Line of Site
EMS	electromagnetic spectrum
ERTS	Earth Resources Technology Satellite
ESCAP	Economic and Social Commission for Asia and the Pacific
ETH	Swiss Federal Institute of Technology
FCC	false colour composite
FINNIDA	Finnish International Development Agency
FMDP	Forest Development Master Plan
GEN	Japanese Glaciological Expedition to Nepal
Gl	glacial lake
GIS	geographic information system
GLOF	glacial lake outburst flood
Gr	glacier
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
HKH	Hindu Kush-Himalayas
HMG/N	His Majesty's Government of Nepal
HRV	High Resolution Visible (SPOT)
ICIMOD	International Centre for Integrated Mountain Development
ILWIS	Integrated Land and Water Information Systems
IR	infrared
IRS1C	Indian Remote Sensing Satellite series 1C
IRS1D	Indian Remote Sensing Satellite series 1D
ITC	International Institute for Aerospace Survey and Earth Sciences
ITCZ	Inter-tropical Convergence Zone
JERS	Japanese Earth Resources Satellite
JICA	Japan International Cooperation Agency
Landsat	Land Resources Satellite
LIGG	Lanzhou Institute of Glaciology and Geocryology
LISS	Linear Imaging and Self Scanning Sensor (IRS)

masl	metres above sea level
MBRWS	Meteor Burst Remote Warning System
MBT	Main Boundary Thrust
MCC	Meteor Communication Corporation
MCT	Main Central Thrust
MENRIS	Mountain Environment and Natural Resources' Information System
MESSR	Multispectral Electronic Self Scanning Radiometer
MFT	Main Frontal Thrust
MOS	Marine Observation Satellite
MSS	Multi Spectral Scanner (Landsat)
NEA	Nepal Electricity Authority
NKAVH	Nepal-Kartenwerk der Arbeitsgemeinschaft für vergleichende Hochgebirgsforschung
NMS	Nepal Meteorological Service
NRSA	National Remote Sensing Agency
PAN	Panchromatic Mode Sensor System (SPOT)
RRC	Regional Resource Centre
RGB	red green blue
RS	remote sensing
SGHP	Snow and Glacier Hydrology Project
SGHU	Snow and Glacier Hydrology Unit
SPOT	Système Probatoire d'Observation de la Terre / Satellite Pour l'Observation de la Terre
SWIR	Short Wave Infra Red (JERS)
TM	Thematic Mapper (Landsat)
TTS	Temporary Technical Secretary
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
VNIR	Visible and Near Infra Red instrument
WECS	Water and Energy Commission Secretariat
WERDEP	Water and Energy Resources Development Project
WGI	World Glacier Inventory
WGMS	World Glacier Monitoring Service
WIDP	WECS Institutional Development Project
WISP	WECS/ NEA Institutional Support Project
WMO	World Meteorological Organisation
WWW	World Wide Web
XS	Multispectral Mode Sensor System (SPOT)

Contents

Chapter 1

Introduction to Inventory of Glaciers and Glacial Lakes

1.1 Introduction

Nepal is a mountainous country, where mountains and hills occupy most of the area. The country is vulnerable to various hazards due to fragile geological conditions, great elevation differences and steeply sloping terrain. Apart from landslides and river erosion, the mountainous region is also quite susceptible to disastrous hazards due to glacial lake outburst floods (GLOF). In general, the area higher than 4,000 metres above sea level (masl) is mostly covered by snow and ice throughout the year. The glaciers, some of which consist of a huge amount of perpetual snow and ice, are found to create many glacial lakes. These glaciers as well as glacial lakes are the sources of the headwaters of many great rivers in the region. Most of these lakes are located in the down valleys close to the glaciers. They are formed by the accumulation of vast amounts of water from the melting of snow and ice cover and by blockage of end moraines. The sudden break of a moraine may generate the discharge of large volumes of water and debris causing floods.

In the last half century, several glacial lakes have developed in the Hindu Kush-Himalayas and the Tibetan Himalayas. This may be attributed to the effect of recent global warming. The glacial lakes are formed on the glacier terminus due to the recent retreating processes of glaciers. The majority of these glacial lakes are dammed by unstable moraines, which were formed by the glaciation of the Little Ice Age. Occasionally a lake bursts releasing an enormous amount of its stored water, which causes serious floods downstream along the river channel. This phenomenon, generally known as GLOF, is recognised to be a common problem in Hindu Kush-Himalayan countries such as Nepal, India, Pakistan, Bhutan, and China (Tibet).

There have been several occurrences of GLOF events in different parts of the Hindu Kush-Himalayan region. After the severe impact of the 1985 Dig Tsho GLOF, glacial lakes and the GLOF phenomenon in the Nepal Himalayas drew great attention and led to study and field investigation of several glacial lakes such as the Dig Tsho, Imja, Lower Barun, Tsho Rolpa, and Thulagi.

The study of satellite images indicates the presence of glaciers and glacial lakes and occurrences of GLOFs in the Himalayas. Downstream impacts of these GLOFs are reported to be highly destructive in nature and to lead to long-term secondary environmental degradation in the valleys, both physically and socioeconomically.

For the mapping and writing of the inventory of glaciers and glacial lakes, the methodology in this study is based on the research study of the Temporary Technical Secretary (TTS) for the World Glacier Inventory (WGI) of the Swiss Federal Institute of Technology (ETH), Zurich (Muller et al. 1977; World Glacier Monitoring Service [WGMS] 1989).

1.2 Objectives

- To understand the GLOF phenomenon by creating an inventory of existing glacial lakes and monitoring the GLOF events on a regular basis
- To establish an effective early warning mechanism to monitor GLOF hazards using remote sensing (RS) and geographic information systems (GIS) in the Hindu Kush-Himalayan region
- To develop the capacity building of national institutions to assess and monitor the GLOF phenomenon
- To disseminate the results and outputs to the relevant organisations in the region that could make use of this information for GLOF hazard prevention and mitigation planning

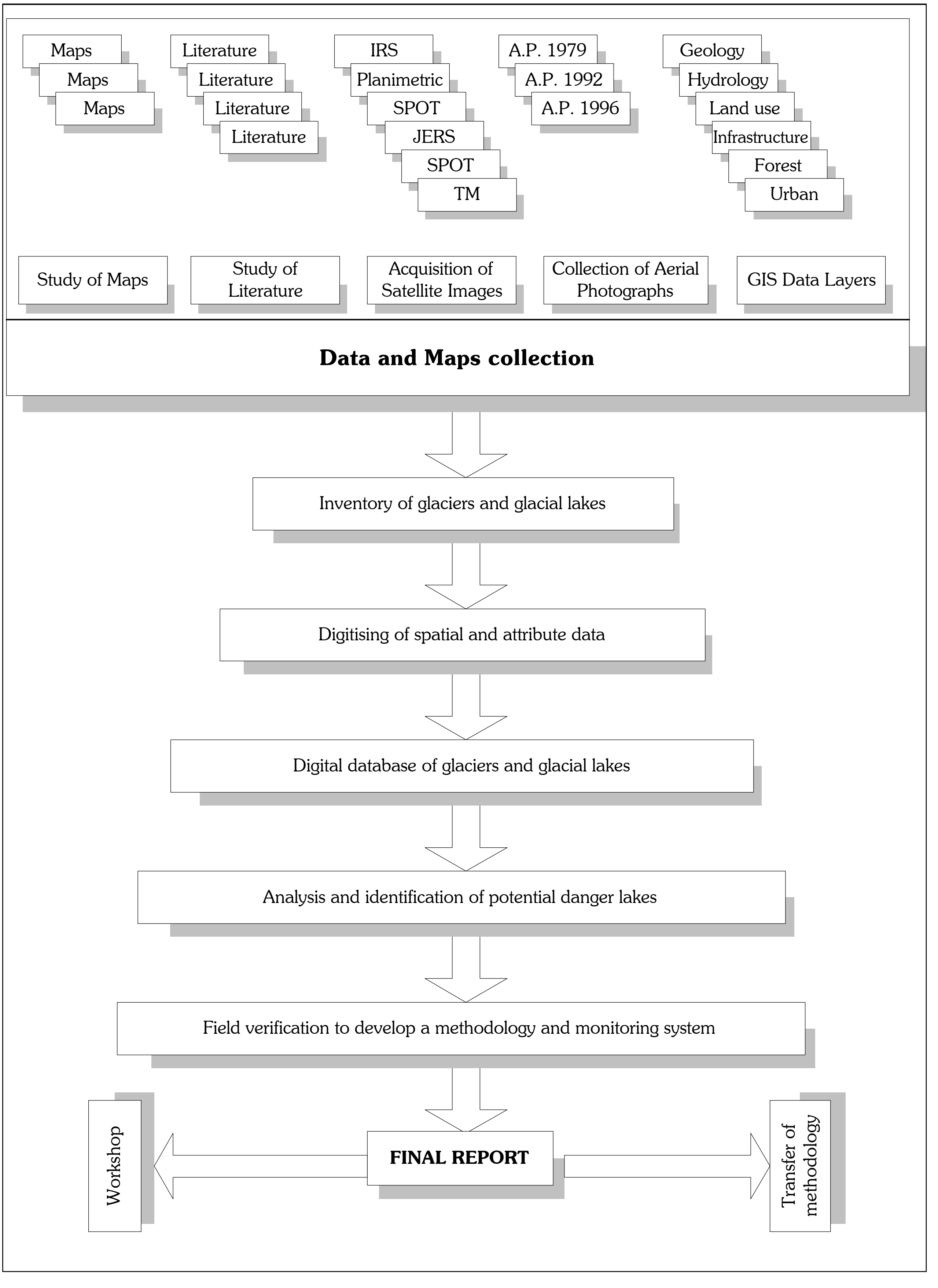
1.3 Outputs

- An inventory of glaciers and glacial lakes of Nepal
- Identification of potential risk lakes
- Recommendations for the establishment of a system for monitoring potential risk lakes using RS and GIS
- Strengthening of capabilities of the national institutions to implement an early warning system for GLOF hazard monitoring
- Dissemination of the results and outputs to relevant institutions

1.4 Activities

- Glacier and glacial lake inventory
  - Acquisition of Land Observation Satellite (LANDSAT) Thematic Mapper (TM) images of 1999 covering the northern part of Nepal
  - Collection of GIS data layers including Digital Elevation Models (DEM), geology, soils, hydrology (rivers), land use, infrastructure (roads), settlements, forest, administrative boundaries (districts and villages), urban areas, and tourist spots on a scale of 1:50,000
  - Data analysis and report writing
- Monitoring potential risk lakes
  - Acquisition of LANDSAT TM/ Stéréo Système Probatoire d' Observation de la Terre (SPOT)/RS images from 1990 and 1995 for four glacial lakes
  - Acquisition of time series satellite images for 1990 and 1995
  - Field checking and validation of results
  - Report writing
- Establishment of an early warning system
  - Developing the methodology using RS and GIS techniques for the inventory of glaciers and glacial lakes and for the GLOF monitoring and early warning system
  - Training two participants each from Nepal and Bhutan
- Results dissemination/publication
  - Publication of a comprehensive report including (1) to (3) above
  - Dissemination of results and outputs in the form of reports, on CD, and through the Internet
  - Organisation of a workshop to release the results and outputs

1.5 FLOW CHART



Chapter 2
General Characteristics of the Country

2.1 Physical Features

The kingdom of Nepal is situated in the central part of the Himalayan Arc separating the Gangetic plains of India from the Tibetan plateau of China. The Himalayan belt extends over 2,400 km from the Punjab Himalayas in the west to the Bhutan and Assam Himalayas in the east. The Nepal Himalayas, situated between 26° 15’ to 30° 30’ N latitude and 80° 00’ to 88° 15’ E longitude, stretch from over 800 km northwest to southeast. Their total area of 147 181 sq.km spans the mountainous region with varying widths of between 90 and 230 km. Within an average width of only about 150 km the altitude range varies from less than 100 masl to 8,848 masl. About 83% of the national land is covered by the rugged terrain of the hills and mountains and the land above 4,500 masl is approximately 14.7% of the total land.

2.2 Climate

Nepal has a monsoon climate characterised by relatively wet summers and dry winters. Every summer, between June and July, the sun moves northwards and heats up the mountains creating a massive convection cell. The subsequent rising air produces a vacuum that draws the moisture-laden air off the Bay of Bengal. This air runs into the Himalayan barriers, cools as it rises and condenses in the form of rain. Thus begins the monsoon season, which brings three to four months of high humidity with overcast skies and gentle rain. About 70–80% of annual precipitation falls during this period.

The eastern Himalayas receive the brunt of the monsoon, which loses its effect as it moves west along the mountains. Consequently, there is a distinct moisture gradient from east to west.

In winter, western Nepal experiences a reverse monsoon caused by a shift in the jet stream. This phenomenon, which drags weather patterns from the west of the Arabian Sea, brings moisture to the region in the form of snow and is essential for agriculture. The oscillation of the jet stream lasts between November and March and is not only responsible for Everest’s snow plume and black appearance but also renders mountaineering difficult.

2.3 River Systems

The country receives almost 80% of its annual rainfall within the short period of time of the monsoon season and as such produces a large number of small and big rivers in its mountains. The generation of big and small rivers fed by rainwater, snow melt water, and groundwater leads to the assumption that Nepal is one of the richest countries in the world in terms of hydropower potential. To date, a complete inventory of rivers in Nepal is not available. A study conducted in 1964–65 (Shrestha 1965) indicates that there are over 6,000 rivers in Nepal, of which 960 are more than 10 km long and about 24 of them exceed 100 km in length. The longest river flowing inside Nepal is the Karnali River. Measured along the Mugu branch, the Karnali has a length of 507 km. The average drainage density in Nepal is about 0.3 km km^{-2}.

Generally, the rivers in Nepal are classified into three groups on the basis of the source. The first group of rivers is fed by snow and ice melt water as their headwaters are in the snow covered and glaciated region of the High Himalayas. The Koshi, Gandaki, Karnali, and Mahakali rivers fall into this group (Figure 2.1). These rivers maintain a sustained flow during the dry season and therefore are very important for the development of the nation's water resources. In addition, these rivers contribute a major portion of the flow to the Ganges River during the lean flow period. The second group of rivers originates in the Mahabharat region. They are fed by groundwater during the dry season and therefore do not dry up. The Bagmati, Kamala, Rapti, Mechi, Kankai, and Babai rivers fall into this group. Rivers originating in the Siwalik range fall into the third group, and this includes the Tinau, Banganga, Tilawe, Sirsia, Manusmara, Hardinath, Sunsari and other smaller rivers of the south. The flow in these rivers is significantly low during the dry season, while some of the smaller rivers may dry up completely during the non-monsoon season.

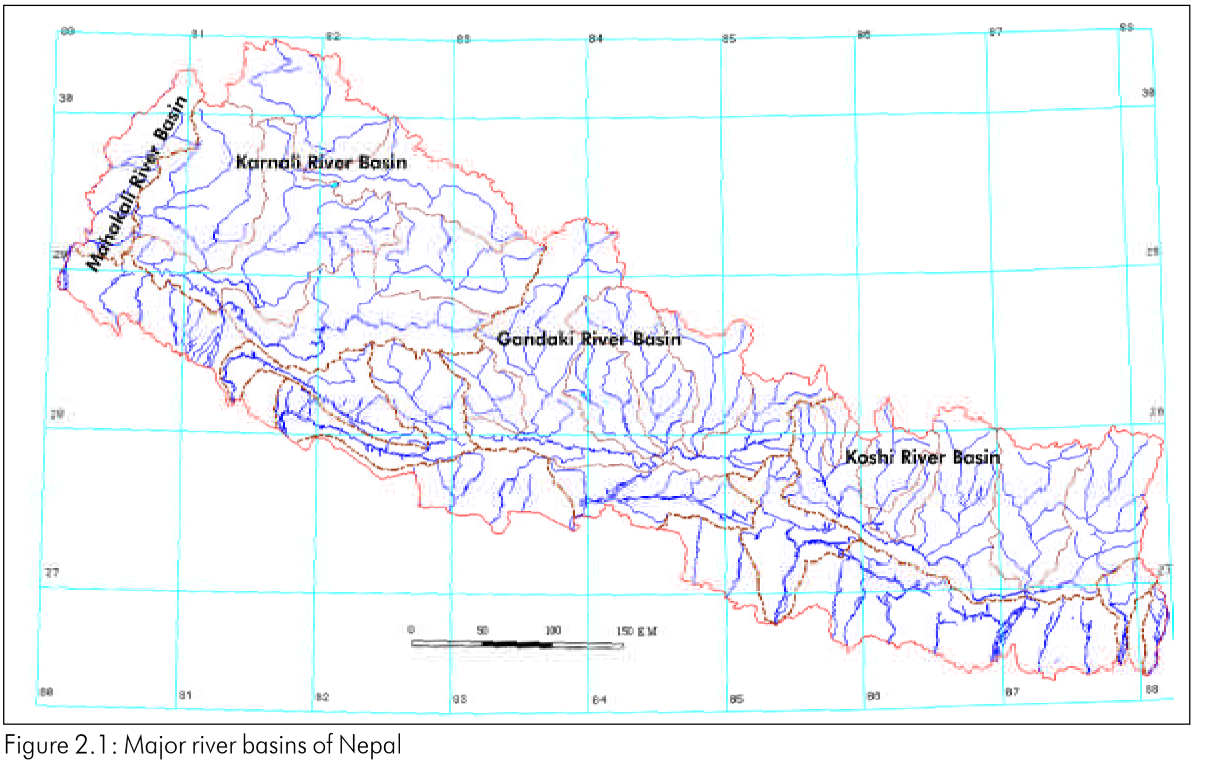


Figure 2.1: Major river basins of Nepal

2.4 GEOLOGY AND GEOMORPHOLOGY

A simple geo-tectonic zonation, which is applicable to all of the Himalayan belt, is valid for Nepal too. It is also found that the geomorphic divisions are well correlated with the distribution of the geologic formations and structural arrangements along the Himalayan trend. The grouping of similar patterns of landforms has led to the recognition of five geomorphic divisions in the Himalayas: the Terai, Siwaliks, Middle Mountains, High Mountains, and High Himalayan regions (Figure 2.2). Bedrock and surface geology are the primary differentiating criteria for the geomorphic boundaries of land system mapping. The geomorphic cross section in the north–south direction is almost similar throughout the Himalayas.

The geological sub-divisions of the Nepal Himalayas arranged longitudinally from south to north are given in Table 2.1

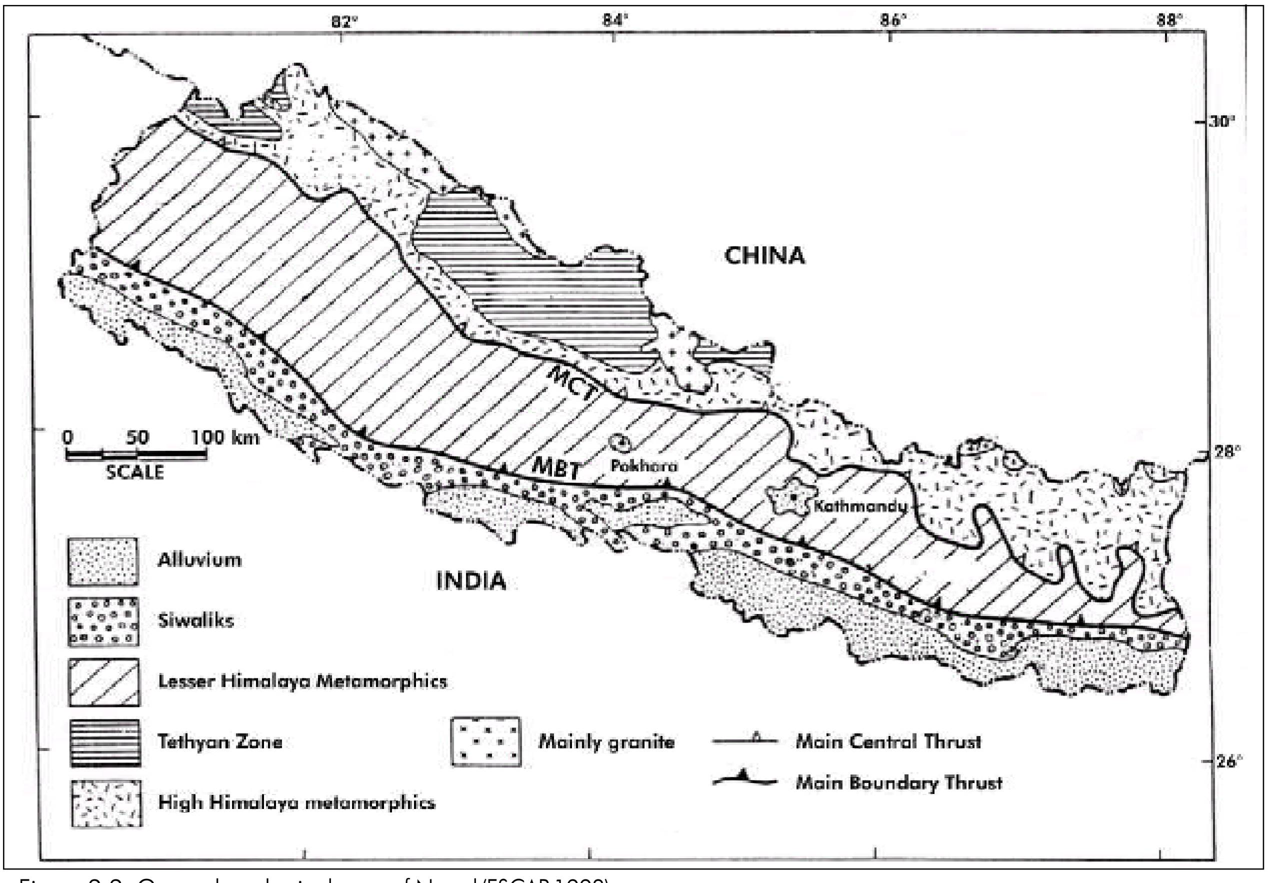


Figure 2.2: General geological map of Nepal (ESCAP 1993)

The Terai plain

Nepal, located in the central portion of the Himalayan Arc, occupies only 17% of the alluvial plain in the south of the mountainous terrain. The northern continuation of the Gangetic Plain in Nepal is called the Terai. The Terai Plain ranges in elevation from less than 100 to 200 masl. Its width varies between 10 and 50 km and forms a nearly continuous belt from east to west. It is an alluvial deposit of Gangetic sediments and composed mainly of sand, silt, and gravel. The main feature of the Terai Plain is the abrupt shifting of river channels. This zone is the extension of the fertile Gangetic Plain that comes to a sudden halt as it rises into mountainous relief in the north. The Terai Plain is divided into three parts: the Bhabar zone, the middle Terai, and the southern Terai.

This zone lies south of the Churia Range and is made up of alluvial fan deposits of boulder and pebble sloping to the south. The southern margin of the Bhabar zone is marked by a spring line, which generates many streams. The water table in the Bhabar zone lies at a greater depth, and hence the exposed stream valleys are dry except in the monsoon season.

The Middle Terai

This area lies south of the Bhabar zone immediately after the alluvial fan deposits. The area is composed of cobbles and a sand zone on undulating terrain with isolated pockets of waterlogged and marshy conditions.

The Southern Terai

This area lies south of the Middle Terai and stretches along the Nepal– India border. It is the lowest terrain of Nepal with an altitude of less than 100 masl. It contains clay and silt zones with sand layers.

Churia range or Siwaliks

The Churia Range, known as the Siwalik Hills in India, comprises the foothills of the Himalayan ranges and it runs along the length of the Great Himalaya. The Churia has an average height of 900 masl, but the range is as high as 1,350 masl in many places. This range separates the Terai from the steep slopes of the Mahabharat Range. The soils of this region are immature and are unsuitable for agriculture and therefore large tracts of undisturbed tropical forest remain. The Churia Range consists of longitudinal basins formed by east–west flowing rivers and this area is called the Inner Terai or Dun Valley. The soils of these basins are fertile.

The Siwalik zone is limited by the main boundary thrust (MBT) to the north along the southern foot of the Mahabharat Range and the main frontal thrust (MFT) to the south at the southern edge of the Siwalik Group. The Lesser Himalayan rocks thrust over the sediments of the Siwalik. The Siwalik zone, a distinct foothill zone, is occupied by molasse deposits resulting from the rapid upheaval of the Higher Himalaya from the late Tertiary to the early Quaternary. Trellis, parallel, sub-parallel, and rectangular drainage patterns plus flash floods are characteristic of this region. Furthermore, the topography is rugged with numerous gullies and mounds of talus and scree. The streams are found to be dry most of the time but become hazardously active during the monsoon season, which causes intense erosion, flash floods, and debris flows. The Siwalik Group is divided into three major units, the Upper, Middle, and Lower Siwaliks.

The Lower Siwaliks (LS)

The Lower Siwaliks consist of irregularly alternating beds of fine-grained, grey sandstones, variegated mudstones, and pseudo-conglomerates. Sandstones are moderately indurate, and cemented mostly by calcite. The upper part of this unit is composed of sandstones and variegated mudstones in roughly equal amounts. The thickness of individual beds of sandstones and mudstones varies from 1 to 10m and 1 to 2m respectively.

The Middle Siwaliks (MS)

This Middle Siwaliks are further sub-divided into two subunits, the Lower Member (MS_1) and the Upper Member (MS_2). The MS_1 is represented by fine- to medium-grained, thick-bedded, compact, fairly hard, greenish grey to light brownish grey, micaceous sandstones interbedded with greenish grey or brownish yellow to purplish gray mudstones and shales. In some places, especially in the upper horizons, thin lenses of pseudo-conglomerates are recorded. The size of the pebbles varies from 5 to 20 cm. Plant and animal fossils are preserved in mudstones as well as in sandstones. The MS_2 is composed of medium- to coarse-grained, pebbly sandstones with rare grey to dark grey mudstones and occasionally silty sandstones and conglomerates. The thickness of individual beds varies from 1 to 15m.

The Upper Siwaliks (US)

These are composed predominantly of gravel and conglomerate beds. Individual conglomerate beds of from 2–8m thick lie in between the medium- to coarse-grained, brownish grey sandstones and, occasionally, siltstones. The size of the pebbles varies from several millimetres to ten centimetres. The rock is loosely packed and consists of pebbles of quartzite, dolomite, marble, limestone, granite, and Lower Siwalik sandstone and shale. The matrix is calcareous or clayey.

The Lesser Himalaya

The Lesser Himalayan zone lies to the south of the Higher Himalayan zone. It is bordered by the main central thrust (MCT) in the north and in the south by the MBT. This zone is characterised by medium to low-grade metamorphic rocks, igneous rocks, and sedimentary rocks. It can be further sub-divided physiographically into the Midland and Mahabharat Range from north to south.

The Mahabharat range

The outstanding steep sloping mountains to the north of the Churia hills are often referred to as the Mahabharat Range or Middle Hills. Their altitude varies between 1,500 and 2,700 masl. Quite steep sloping mountains are characterised by water-retentive soils allowing for terrace cultivation. On the lower slopes remnants of sub-tropical forests can be found, whereas on the upper reaches, above cultivation, temperate forest begins. The rock type consists mainly of quartzite, granite, schist marble, and limestone. Most of the high peaks are found either on granite or limestone. The range is characterised by dendritic, radial, and rectangular drainage patterns.

The Midland

This zone lies north of the Mahabharat Range and forms no sharp boundary with the Mahabharat Range. The landforms of this zone are the reflection of the rock and comparatively low lying hills between the Mahabharat and the Himalayan ranges. The Midland is represented by a rather dissected topography with predominantly dendritic, centripetal, and sub-parallel drainage patterns. Additionally, residual soils are observed on the ridges while colluvial soil and talus deposits are present along the slopes. It consists mainly of metamorphic and igneous rocks. Due to the presence of soft rock, such as phyllite, the Midland is found to be amenable to terrace cultivation. Furthermore, this zone is characterised by a temperate climate. Therefore, this zone is favourable for cultivation and shelter and includes fertile valleys like Kathmandu, Banepa, and Pokhara. This area, which has been inhabited for centuries, supports nearly half of Nepal’s population. As a result, the central and eastern parts of this zone have been cultivated extensively. Due to altitudinal ranges of between 1,000 and 2,000m, sub-tropical and lower temperate forests are found here.

The Higher Himalaya

The Higher Himalayan zone ranges from 3,000m to more than 8,000m and is mostly covered with snow and glaciers. Out of the 14 peaks in the world higher than 8,000m, The Nepal Himalaya host the eight highest peaks, i.e., Mount Everest, Kanchanjunga, Lhotse, Makalu, Dhaulagiri, Manaslu, Cho-Oyu, and Annapurna I. There are many more higher peaks in the eastern part of Nepal than in the western part. The upper parts of these mountains are formed by Tethys sediments, which are underlain by the central crystalline rocks. The whole range consists mainly of high grade metamorphic rocks like schist and gneiss. Sharp peaks and vertical walled valleys characterise the landforms of this zone.

Both the crystalline basement rock of the Higher Himalaya and the Tibetan Tethys sediments thrust on the Lesser Himalayan rocks along the MCT.

The Tibetan Tethys Himalaya

The north of the Himalayas is comprised of a generally arid region similar to the Tibetan Plateau. This area encompasses the arid valleys of Mustang, Manang, and Dolpa. The Trans-Himalaya is in the rainshadow area and receives significantly less precipitation than the southern region. Some of the glaciers and glacial lakes studied lie within this zone.

The Tibetan Tethys Himalaya rise up to an altitude of 5,000 masl. In this zone, the Tethys sediments of the Paleozoic to the early Cenozoic age are found spread over the area, which is underlain by a vast amount of granite bodies. The sedimentary rocks are highly fossiliferous. The Tibetan Tethys zone is bordered on the north by the Indus-Tsangpo Suture, which stretches along the Indus and Tsangpo rivers. This fault zone, about 40 km wide, signifies the collision trace of the Indian sub-continent with Eurasia. The Thak Khola area in Mustang is considered as the type area in Nepal.

2.5 Seismicity

The Himalayan Arc was formed due to the convergence of the Indian plate northwards into the Eurasian plate. Initial convergence between India and Eurasia involved the closing of an ancient sea located between the two land masses. During this stage in the evolution of the Himalayas, the Indus-Tsangpo suture acted as the primary locale of plate interaction and convergence. The sea between the Indian and Eurasian continent had been completely closed between 40 and 50 million years ago. At or shortly following this line, the Indus-Tsangpo suture ceased to be the active plate boundary. Most investigators propose that since the closing of the Indus-Tsangpo suture, the active plate boundary has 'jumped' progressively southward, first to the MCT, and more recently to the MBT.

Rocks between the Indus-Tsangpo suture and the MCT, and the rocks between the MCT and the MBT, represent successive 'slices' of the Indian plate that have been accreted on to the Eurasian plate. During the last 100 years, five great earthquakes have occurred along the Himalayan Arc (Figure 2.3). Inferred rupture length for four of these great events extends 300 km along the strike of the Himalayan Arc. In the case of the 1897 Assam earthquake, the rupture is somewhat longer. Between the 1934 Bihar rupture and the 1905 Kangra rupture, there is a gap where no great earthquake has been reported during the last 100 years.

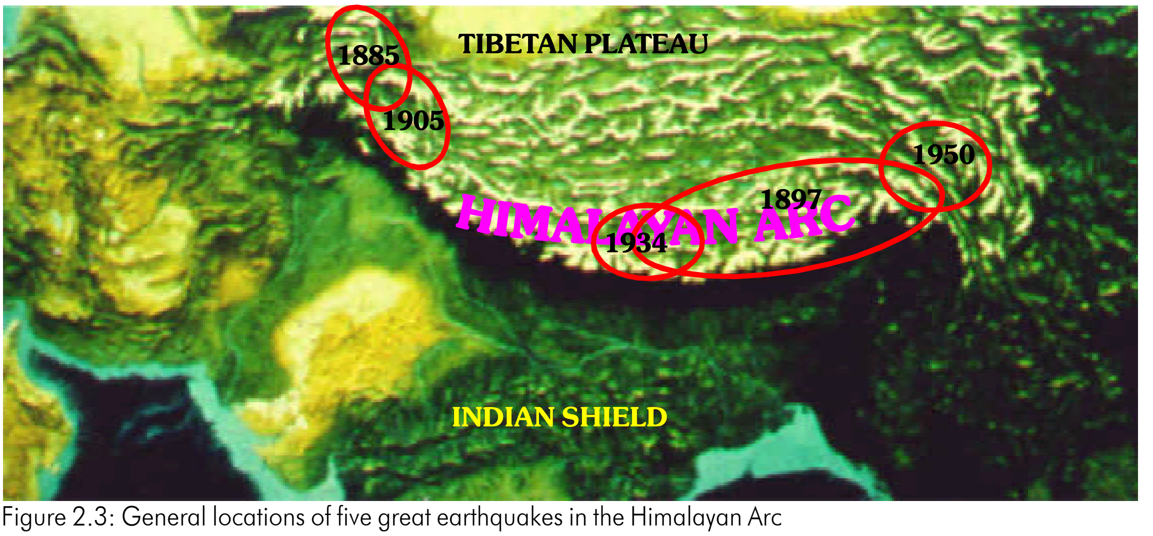


Figure 2.3: General locations of five great earthquakes in the Himalayan Arc

2.6 Land Use/Land Cover

The geomorphic divisions are well correlated with the distribution of the geologic formations and structural arrangements along the Himalayan trend. The grouping of similar patterns of landforms has led to the recognition of five land use/land cover divisions in the Himalayas which include the Terai, Siwaliks, Middle Mountains, High Mountains, and High Himalayan regions. The geomorphic cross section in the north–south direction is almost similar throughout the Himalayas.

In general, the land use/land cover category includes cultivated land, non-cultivated land, grassland, forest, shrubland, and other land covering 21, 7, 12, 37, 5, and 18% respectively (Table 2.2). Ice cover occupies 3.6% of the present study area, which is a part of the 'other land' category in Table 2.2.

2.7 Economy

Nepal's economy is dominated by agriculture. The majority of the population (81%) depends on agriculture for their livelihood. In the fiscal year 1996/97 (i.e., by the end of the eighth five-year plan) the contribution to the gross domestic product (GDP) from agriculture was 41.7%. The trade and commercial sector contributed 11.2%, the construction sector 10%, and the industrial and social services' sectors 9.7 and 9.1% respectively. The other sectors that contributed significantly are the financial and real estate sector and the transport and communication sector. Their contributions to GDP were 10.1

Table 2.2: Land-use pattern ('000 ha)							
Land use	Cultivated land	Non-cultivated land inclusions	Grass-land	Forested land/forest plantation	Shrubland/degraded forest	Other land	Total
High Himalaya	8	1	885	155	67	2,234	3,350
High Mountains	244	148	508	1,639	176	245	2,960
Middle Mountains	1,223	667	278	1,811	404	59	4,442
Siwaliks	269	59	16	1,438	29	75	1,886
Terai	1,308	123	58	475	30	116	2,110

and 6.8% respectively. The energy and water sector made a contribution of only 1.5%. The expected GDP growth rate in factor cost during the ninth five-year plan period is 6% from NRs 267 billion to 357 billion with an increase in non-agricultural GDP from 58.3 to 62.1% (see Table 2.3).

Table 2.3: The expected change in sector-wise share of GDP in the plan period from 1996/97 to 2001/02

(in billion NRs)

Sector	1996/97		Estimated for 2001/02		Annual growth rate (%)
	Product	%	Product	%	
Agriculture, irrigation, and forest	111.2	41.7	135.2	37.9	4.0
Industry	25.9	9.7	40.1	11.2	9.1
Electricity, gas, and water	4.0	1.5	6.5	1.8	10.4
Construction	26.6	10.0	35.4	9.9	5.9
Trade, hotel, and restaurant	30.0	11.2	42.8	12.0	7.4
Transport and communication	18.0	6.8	27.3	7.7	8.7
Financial and real estate	26.9	10.1	35.6	10.0	5.8
Social services	24.4	9.1	24.2	9.6	7.0
Total GDP	267.0	100	357.0	100	6.0

Source: Ninth five-year plan (NPC 1998)

2.8 Natural Resources

Forest resources

Forests form one of the major natural resources of Nepal. About 37% of the country's area is covered by forest (Forest Development Master Plan 1988), of which 277.28 sq.km comprises national parks, wildlife reserves, conservation areas, hunting reserves, and buffer zones. The forests supply fuelwood to meet about 79% of the energy consumption of the country. Similarly, they provide more than 50% of the fodder for livestock. The raw materials for several industries in the country are based on forest products. Revenue from forest products has been estimated to be NRs 242.8 million for the year 1997/98 (Central Bureau of Statistics [CBS] 1999).

Mineral resources

The endowment of Nepal in metallic minerals is poor, though both base and precious metal deposits are known. However, Nepal possesses commercially viable non-metallic mineral resources like limestone, dolomite, marble, magnesite, and talc. Exploration activities have also revealed the existence of ruby, sapphire, aquamarine, tourmaline, and quartz. Impure limestone and dolomites of chemically inferior quality but of high strength constitute construction materials. Such construction minerals, including slate, boulder, gravel, sand, and clay, occur extensively. They are produced on different scales to fulfil mainly domestic demand and for export to India. The existence of fuel minerals is also being explored and peat, lignite, and coal are known to occur in different parts of the country. Among the various occurrences, the coal seams identified in Dang Valley and the surrounding area seem to be the most significant, though the reserve is very small. Natural gas associated with groundwater exists in the lake sediment of Kathmandu Valley—exploration proved the presence of 300 million m^3 over an area of 26 sq.km. For petroleum, one drill hole was made in eastern Nepal up to a depth of 3,520m and the borehole was recorded dry. At present, activities have been initiated to carry out seismic and geological studies for petroleum exploration in the central part (Chitwan) and western part (Nepalgunj) of the country. The cumulative revenue from various minerals was NRs 909.3 million in the fiscal year 1997/98.

Hydropower potential

Most of the major rivers of Nepal are fed by glaciers and glacial lakes located at the sources of these rivers. The altitude difference provides huge scope for hydropower development. The theoretical potential estimated for Nepal based on average flow is as follows (Shrestha 1985).

- Overall basin potential surface of flow = 126.4 GW
- Potential concentrated on river courses having a catchment of more than 300 sq.km = 83.3 GW

Altogether 122 sites have been identified so far for development. Of these, 23 projects have been covered by studies at least to the pre-feasibility level. These projects alone are capable of producing about 43,000 GWh of average energy per annum with a total installation of 14.742 GW. Inclusive of all the identified sites, the total generating capacity would be 43.442 GW with an annual energy generation potential of more than 177,000 GWh (Shrestha 1995). However, present installed hydropower capacity is only about 0.370 GW. By the end of the ninth plan period the developed capacity is expected to reach 0.534 GW. This shows the enormous scope for future development.

2.9 Population

From figures published in 1999, Nepal's population is estimated to be 22,367,048. The population is growing at 2.3% annually. Over 85% of the population live in rural areas (CBS 1999).

The literacy rate for six years and above is 48%. There are five universities and over 26,000 schools of various levels. Tribhuvan University (the oldest one) has 166 campuses inclusive of private campuses affiliated to it. The total number of students enrolled in education was 4,753,803 in 1996/97.

Public health services are provided by 74 hospitals, 17 health centres, 200 ayurvedic dispensaries and 754 health posts. Sixty-one per cent of the total population has drinking water supply facilities. The infant mortality rate was 7.9% in 1996/97. Average life expectancy is 55.9 years for men and 53.4 years for women.

There are 3,836 post offices. The density of telephone services is one line per 100 people on average. Various parts of the country are connected by 13,223 km of roads including 4,080 km of black-topped. Ropeway and railway facilities are limited to 42 and 51 km respectively. International airways' route coverage is 36,044 km (CBS 1999).

2.10 Glaciers

A glacier is a huge flowing ice mass. The flow is an essential property in defining a glacier. Usually a glacier develops under conditions of low temperature caused by the cold climate, which in itself is not sufficient to create a glacier. There are regions in which the amount of the total depositing mass of snow exceeds the total mass of snow melting during a year in both the polar and high mountain regions. A stretch of such an area is defined as an accumulation area. Thus, snow layers are piled up year after year in the accumulation area because of the fact that the annual net mass balance is positive. As a result of the overburden pressure due to their own weight, compression occurs in the deeper snow layers. As a consequence, the density of the snow layers increases whereby snow finally changes to ice below a certain depth. At the critical density of approximately 0.83g cm^{-3}, snow becomes impermeable to air. The impermeable snow is called ice. Its density ranges from 0.83 to a pure ice density of 0.917g cm^{-3}. Snow has a density range from 0.01g cm^{-3} for fresh snow layers just after snowfall to ice at a density of 0.83g

cm^{-3}. Perennial snow with high density is called firn. When the thickness of ice exceeds a certain critical depth, the ice mass starts to flow down along the slope by a plastic deformation and slides along the ground driven by its own weight. The lower the altitude, the warmer the climate. Below a critical altitude, the annual mass of deposited snow melts completely. Snow disappears during the hot season and may not accumulate year after year. Such an area in terms of negative annual mass balance is defined as an ablation area. A glacier is divided into two such areas, the accumulation area in the upper apart of the glacier and the ablation area in the lower part. The boundary line between them is defined as the **equilibrium line** where the deposited snow mass is equal to the melting mass in a year. Ice mass in the accumulation area flows down into the ablation area and melts away. Such a dynamic mass circulation system is defined as a glacier.

A glacier sometimes changes in size and shape due to the influence of climatic change. A glacier advances when the climate changes to a cool summer and a heavy snowfall in winter and the monsoon season. As the glacier advances, it expands and the terminus shifts down to a lower altitude. On the contrary, a glacier retreats when the climate changes to a warm summer and less snowfall. As the glacier retreats, it shrinks and the terminus climbs up to a higher altitude. Thus, climatic change results in a glacier shifting to another equilibrium size and shape.

The present study on the glaciers of the Nepal Himalayas divided the area into four major river basins from east to west and revealed 3,252 glaciers with a coverage of 5,323 sq.km in area (Figure 2.4) and an estimated ice reserve of 481 km^3. The Koshi River Basin comprises 779 glaciers with an area of 1,409.84 sq.km and has an estimated ice reserve of 152.06 km^3. There are altogether 1,025 glaciers in the The Gandaki River Basin which covers an area of 2,030.15 sq.km and has an estimated ice reserve of 191.39 km^3. The Karnali River Basin consists of 1,361 glaciers with an area of 1,740.22 sq.km and an estimated ice reserve of 127.72 km^3. Only 35% of the Mahakali River Basin, comprising 87 glaciers, lies within the territory of Nepal. The area covered by these glaciers is 143.23 sq.km, and the estimated ice reserve is 10.06 km^3.

2.11 Glacial Lakes

The study of glacial lakes is very important for the planning and implementation of any water resources development project. Past records show that glacial lakes have produced devastating floods and damage to major constructions and infrastructure.

Prior to the present study, there was hardly any inventory of lakes in the country. All the lakes at elevations higher than 3,500 masl are considered to be glacial lakes by the present study. Some of the lakes are isolated and far behind the ice mass, which may or may not be the glacial origin. The inventory of glacial lakes revealed 2,323 lakes with a coverage of 75 sq.km in Nepal (Figure 2.4). The Koshi River Basin contains 1,062 lakes, the Gandaki River Basin 338 lakes, the Karnali River Basin 907 lakes, and the Mahakali River Basin in Nepalese territory contains 16 lakes.

2.12 Glacial Lake Outburst Flood Events

In Nepal, several GLOF events have occurred over the past few decades incurring extensive damage to roads, bridges, trekking trials, villages, as well as incurring loss of human life and other infrastructures (Fushimi et al. 1985; Galey 1985; Vuichard and Zimmerman 1986, 1987; Ives 1986; Water and Energy Commission Secretariat [WECS] 1996).

In Nepal at least 12 GLOF events have been reported to date. The GLOFs have caused extensive damage to major infrastructures. The government has undertaken some mitigation steps to minimise the risk by establishing a telemetric early warning system in Tsho Rolpa and the lower areas that could probably be affected. The open canal constructed to lower the lake level of Tsho Rolpa Glacial Lake has been operating since June 2000.

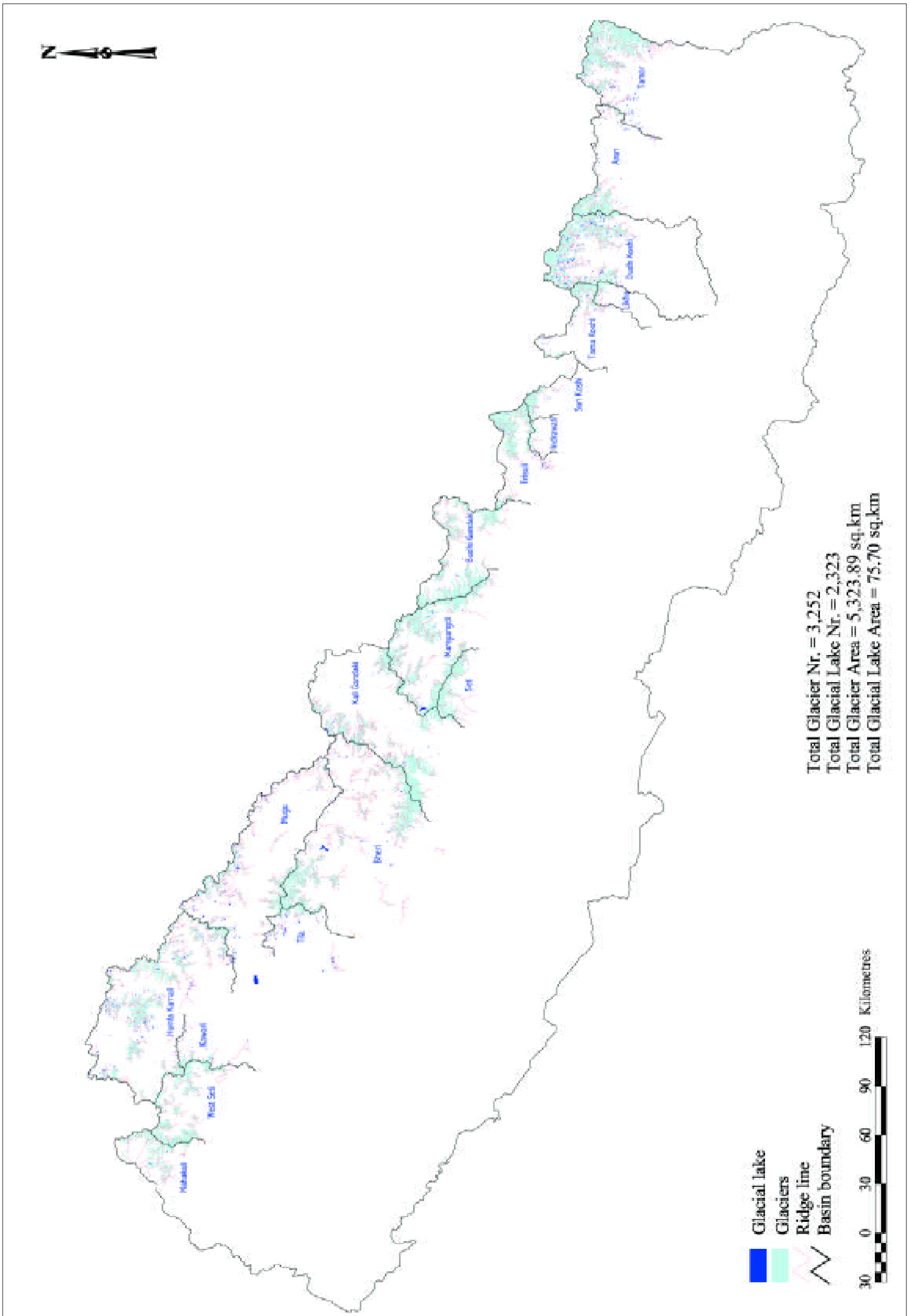


Figure 2.4: Glaciers and glacial lakes of Nepal

Chapter 3
Hydro-Meteorology of the Country

3.1 River Basins

For hydrological studies, Nepal is divided into seven drainage basins: the Kankai Mai River Basin, the Koshi River Basin, the Bagmati River Basin, the Narayani River Basin, the West Rapti River Basin, the Karnali River Basin, and the Mahakali River Basin. Among them only the four basins described below contain glaciers and glacial lakes.

The Koshi River basin

The river system of eastern Nepal is occupied by the Koshi River Basin, which is also known as the Sapta Koshi River, i.e., a network of seven major rivers flowing through the Koshi River Basin. All these seven rivers, namely, the Tamor River, the Arun River, the Dudh Koshi River, the Likhu River, the Tama Koshi River, the Sun Koshi River, and the Indrawati River, from east to west, originate from the High Himalaya. Among the tributaries, the Sun Koshi-Bhote Koshi, the Tama Koshi, and the Arun River originate in Tibet.

The Gandaki River basin

The river network of central Nepal is occupied by the Gandaki River system, which is popularly known as Narayani. The river network forming Narayani comprises the Trishuli River, the Budhi Gandaki River, the Marsyangdi River, the Seti Gandaki River, and the Kali Gandaki River. Among these rivers, some parts of the Kali Gandaki River and the Budhi Gandaki River and major parts of the Trishuli River lie in Tibetan territory and flow down through the Himalayan range to Nepal.

The Karnali River basin

The Karnali River is about 507 km in length and is formed by the joining of Mugu Karnali and Humla Karnali at Galwa. The West Seti River and the Bheri River are the main tributaries of the Karnali River. The Kawari River and the Tila River are other minor tributaries of the Karnali River, which originate from the glaciated region of Nepal, whereas the Humla Karnali River originates in Tibet.

The Mahakali River basin

The Mahakali River is about 223 km long and originates from Api Himal. This western border river has two main tributaries on the Nepalese side. They are the Chamelia River and the Surnagad River. The Mahakali River has a total catchment area of 15,260 sq.km at Banbasa barrage, of which 35.4% lies within Nepal.

3.2 Hydro-meteorological Observation

Precipitation observation

Prior to 1964, the Indian Meteorological Department operated a network of four climatological and about a hundred precipitation stations in Nepal. The Nepal Meteorological Service (NMS) was established in 1965, with technical assistance from The United Nations Development Programme (UNDP) and The World Meteorological Organization (WMO). Since then, a number of WMO projects have assisted NMS in establishing its own network of meteorological stations, which consist of precipitation, climatological, agrometeorological, synoptic, and aeronautical stations. These networks came under the Department of Irrigation, Hydrology, and Meteorology (DIHM) in 1971. In 1988, the Department of Hydrology and Meteorology (DHM) was separated from DIHM and currently operates 267 stations which measure precipitation (DHM 1999a). The existing network of stations is based towards the central part of the country, mainly the Kathmandu Valley and extends towards the eastern part. Stations are sparse in the mountainous regions and the western part of the country. With the exception of 14 stations, precipitation measurements are made using ordinary rain gauges. Rain gauges with an 8 inch orifice, 1m above ground, consisting of an overflow can, measuring rod or tube, mounted on three-legged stands are standard equipment used to measure precipitation. Precipitation data were traditionally published in a monthly format. Monthly precipitation data are available up to 1996 (DHM 1968–1999). Recently, DHM published daily precipitation values for selected administrative zones of Nepal and intends to extend this to other parts of the country in the future (DHM 1999b).

Hydrological observation

The systematic collection of hydrological data was started in the Karnali Basin in 1961 by the of the United Nations (UN) special fund for the feasibility study of hydropower projects (DHM 1998a). A project of the United States Agency for International Development (USAID) established a priority network of river gauging stations between 1962 and 1968. The 120 stations in this network typically consisted of substantial structures such as cableways, stilling wells, and sediment sampling facilities. After 1968 the station numbers increased to more than 300, and these included regular stations and partial recording stations. In 1988 all partial recording stations were closed due to operational difficulties. At present a total of 120 water-level gauging stations are in operation under the management of DHM (DHM 1998a). The network of stations is relatively dense in the middle hills, and is sparser near the northern and southern borders. The number of gauging stations is far from adequate for the drainage density of Nepal. Hydrological data publication has not been regular in the past. Monthly discharge data have been published up to the year 1995 (DHM 1998a).

High altitude hydrometeorological observation

Although some hydrometeorological observations at high altitudes were carried out in the past and are continued by various national and international institutions in the form of short-term studies, organised observations began in Nepal in 1987 with the establishment of the Snow and Glacier Hydrology Unit (SGHU) within DHM. The unit began its work with the collection of meteorological (surface air temperature, relative humidity, solar radiation, precipitation, and wind speed/direction) and hydrological (stage and stream discharge) data in three Himalayan catchments: Imja Khola (Dingboche, Khumbu), Langtang Khola (Kyangjing, Langtang), and Modi Khola (Machhapuchhre Base Camp, Annapurna). Later the network was extended to six stations under the Snow and Glacier Hydrology Project (SGHP 1989–1994) assisted by the Gesellschaft für Technische Zusammenarbeit (GTZ) by adding Makalu (Tashigaon/Phematan Kharka/Sipton La), Kanjiroba (Hurikot/Kaigaon/Singha Chaur), and Humla (Takche/Halji) stations (Grabs and Pokhrel 1992). Several problems, mainly of a logistical nature, prevented regular collection and publication of data. More or less regular data have been collected from

Khumbu, Langtang, Annapurna, and Kanjiroba stations. Daily meteorological and hydrological data have been published up to 1995 (DHM 1997a). A snow and glacier melt runoff model using data from this network was developed and tested for the Langtang Basin.

3.3 Climatological Characteristics

The climate of Nepal is characterised by monsoon circulation, principally easterly winds during the summer, and westerlies from October to May. The summer monsoon, which lasts from June to September, involves a large amount of precipitation. However, the monsoon does not begin abruptly. There is a gradual transition from the dry winter season to the summer monsoon as a result of the pre-monsoon convective rains, which are frequently accompanied by thunderstorms (Kraus 1988). Nepal can be divided into five characteristic climate zones roughly parallel to each other and showing a trend from east to west.

- Hot monsoon climate in the Terai, Inner Terai, and Siwilak regions with a hot and wet summer, and mild and dry winter
- Warm temperate monsoon climate in the Middle Mountains up to a height of about 2,100 masl
- Cool temperate monsoon climate in the Middle Mountains and the High Mountains between 2,100 and 3,300 masl
- Alpine climate in the High Mountain region up to a height of about 4,800 masl
- Tundra type of climate above the snow line where there is perpetual frost and cold desert conditions (Shankar and Shrestha 1985a)

Precipitation, air temperature, evaporation, and relative humidity play an important role in building the climate of a particular place. Characteristics of these parameters in the context of Nepal are discussed in the following paragraphs.

Precipitation

Being located in the northern limit of the tropics, Nepal gets both summer precipitation and winter precipitation (Singh 1985). The thermal regime in the vast Eurasian region, the location of the Inter-Tropical Convergence Zone (ITCZ), and the resulting general atmospheric circulation dominates the precipitation regime of Nepal. The onset and retreat of the southeasterly summer monsoon is associated with the movement northwards and southwards of the ITCZ (Nayava 1980). During the monsoon, depressions form in the Bay of Bengal and move northwest causing heavy rain in their path. Nepal receives the first monsoon showers in the southeastern part of the country and they spread slowly towards the northwestern part of the country with diminishing intensity. The retreat of the summer monsoon begins from the northwestern part of the country. The amount of summer monsoon precipitation, therefore, shows marked variation from south to north and east to west. Further the contribution of the summer monsoon precipitation to the annual total is substantially greater in the southeastern part of the country compared to the northwestern end (Figure 3.1). In addition, there is also the altitudinal dependence of monsoon precipitation. Maximum precipitation occurs around 1,000 masl in the Narayani Basin and around 1,500 masl in the Sapta Koshi Basin, whereas for the Karnali Basin, the maximum precipitation altitude is not unambiguous (Alford 1992).

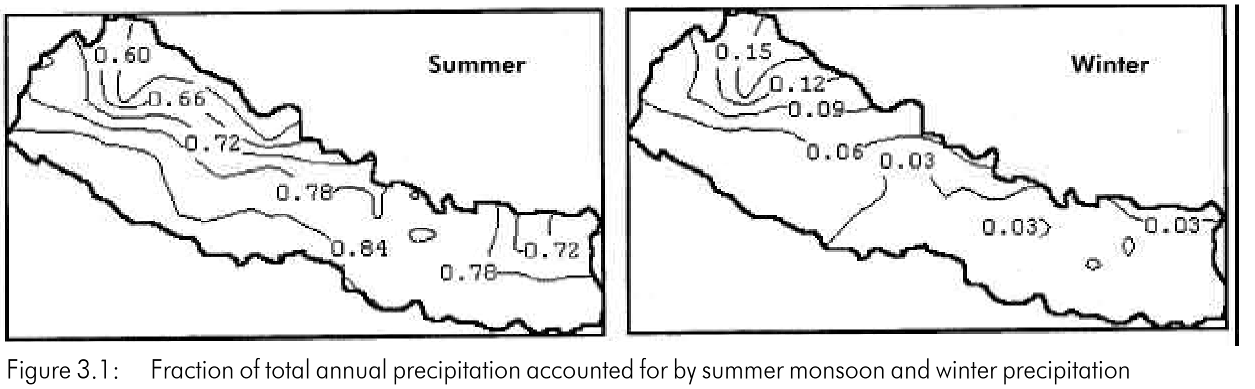


Figure 3.1: Fraction of total annual precipitation accounted for by summer monsoon and winter precipitation (Shrestha et al. 2000)

Summer monsoon precipitation occurs in solid form at high altitude and plays an important role in the nourishment of numerous glaciers of the Himalayas as most of the glaciers in the central and eastern parts of the country are of the summer accumulation type. While general circulation models predict a significant increase in monsoon precipitation with the increase of atmospheric greenhouse gases, amounting to a 15% increase with double carbon dioxide concentration, no long-term trend in precipitation is yet apparent in Nepal. On the other hand, monsoon precipitation in Nepal is found to be related to El Niño and other large-scale climatological parameters (Shrestha et al. 2000).

Winter precipitation is caused by westerly disturbances having their origin in the Mediterranean. The lows formed here are steered and swept eastwards by the westerly aloft. Westerly disturbances affect northern and western parts of Nepal (Singh 1985). Winter precipitation contributes significantly to the annual total precipitation in the northwestern part of the country (Figure 3.1). It plays a major role in the mass balance of glaciers in western Nepal, while it plays a secondary role in glaciers of eastern and central Nepal (Seko and Takahashi 1991).

Air temperature

Air temperature is a parameter with both temporal and spatial dependence. Annual temperatures in 1995 at some selected stations representing a wide range of elevation of the country from south to north are illustrated in Figure 3.2. Spatial distribution of air temperature over Nepal is displayed in Figure 3.3. As can be seen in Figure 3.2, the air temperatures at high altitude are relatively lower than those at low altitude. The environmental lapse rate is around $-0.005°C\ m^{-1}$ (Alford 1992).

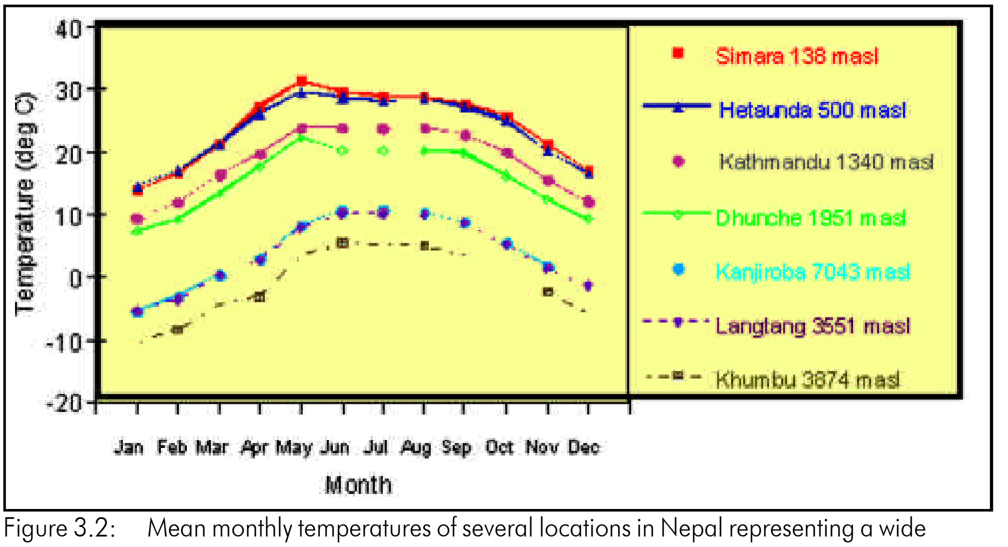


Figure 3.2: Mean monthly temperatures of several locations in Nepal representing a wide range of elevation (DHM 1997a and 1999a)

Air temperature is perhaps the most important single parameter when evaluating the climatic fluctuation of a location. An analysis of records from 49 stations distributed throughout Nepal reveals a clear increase in temperature after the mid-1970s (Figure 3.4, Shrestha et al. 1999). The trends are high in higher altitude regions of the country (Figure 3.4). This result is in agreement with global temperature trends (Hansen et al. 1996; Shrestha et al. 1999). The increase in temperature can have a two-fold impact on the condition of glaciers. Higher temperatures can cause rapid melting of glacier ice on the one hand, on the other hand precipitation will take liquid form rather than solid even at higher altitude. Without a layer of blanketing snow on the surface, the ice with lower surface albedo will be more prone to radiative melting. While many studies report a rapid decrease in the size of glaciers (Ageta and Kadota 1992; Kadota and Ageta 1992; Yamada et al. 1992; Shiraiwa 1993; Pender 1995; Nakawo et al. 1997), linking temperature increase and glacier fluctuation in the Nepal Himalayas is still premature and requires detailed investigations.

Evaporation

Evaporation is a variable that accounts for temperature, humidity, solar radiation, and windspeed. It is the balance between precipitation and evaporation that eventually determines the streamflow. There are

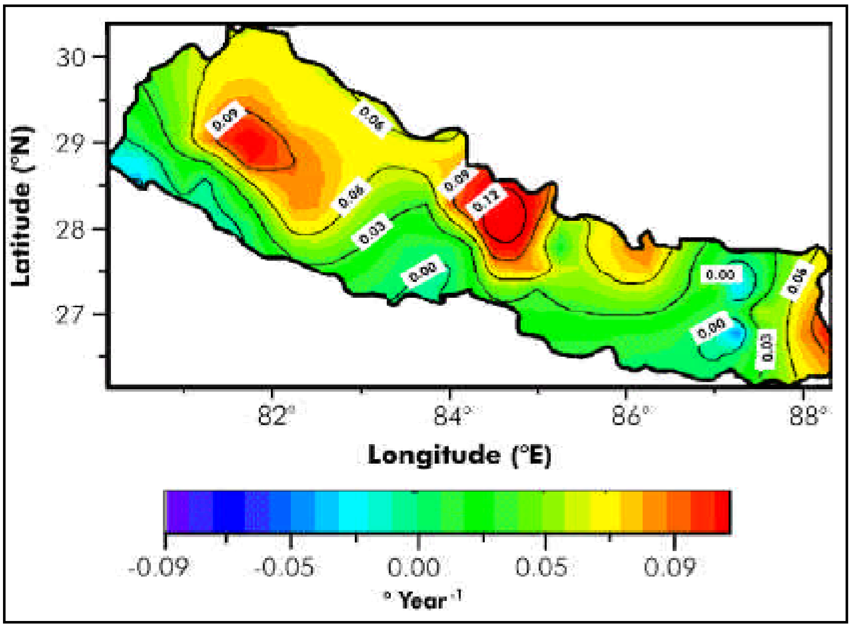


Figure 3.3: Spatial distribution of annual temperature change trends in Nepal from 1977 to 1994 (Shrestha et al. 1999)

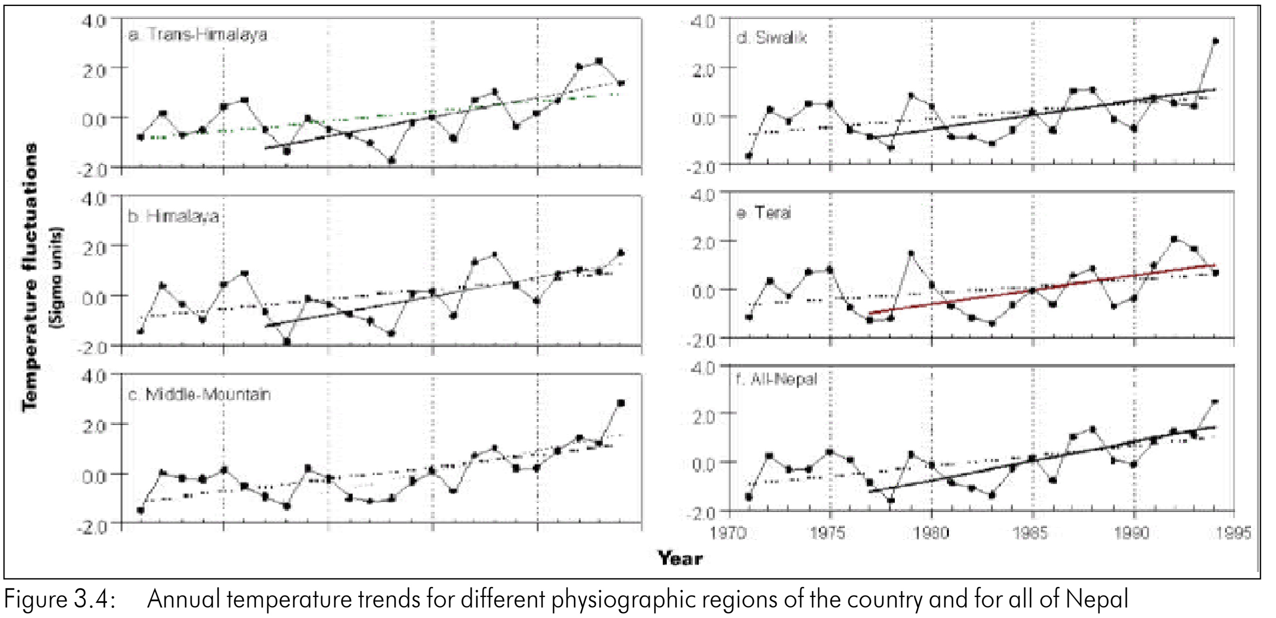


Figure 3.4: Annual temperature trends for different physiographic regions of the country and for all of Nepal (Shrestha et al. 1999)

a limited number of stations measuring evaporation in Nepal, they are mainly located below 2,000 masl. Measured values range from 800 mm to slightly more than 1,300 mm. Evaporation in Nepal has been derived using the methods of Penman (1956), Thornthwaite (1948) and Morton (1983). Both measured and derived values are far from adequate to characterise the spatial variation of evaporation in Nepal.

3.4 Runoff Characteristics

River discharge

Discharge data of major rivers of Nepal are given in Table 3.1. The timing of discharge coincides closely with seasonal maxima and minima of precipitation at basin scales (Figure 3.5). Discharge maxima generally occur in August coinciding with the peak of the monsoon. About 75% of the annual volume of water leaves the respective watershed during the monsoon season (June–September). Minimum values occur during the months of January–May (Alford 1992).

Table 3.1: Discharge data of the major rivers of Nepal#															
Rivers and location	Drainage area (km^2 in '000)	Average discharge (m^3 s^{-1} in thousands)													Period of observation
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean	
Mahakali** at Pancheswor	12.60	0.165	0.148	0.156	0.203	0.335	0.634	1.338	1.798	1.198	0.534	0.277	0.195	0.582	1984–92
Karnali at Chisapani	42.89	0.373	0.337	0.354	0.455	0.734	1.490	3.270	4.330	2.980	1.270	0.628	0.447	1.400	1962–93
Narayani at Narayangh	31.10	0.369	0.304	0.285	0.360	0.595	1.650	4.230	5.020	3.410	1.530	0.779	0.495	1.600	1963–95
Sapta Koshi at Chatara	54.10	0.383	0.338	0.340	0.416	0.684	1.590	3.490	4.020	2.980	1.330	0.743	0.501	1.400	1979–95
Babai at Bargadh	3.000	0.019	0.016	0.013	0.011	0.016	0.059	0.243	0.259	0.251	0.098	0.036	0.235	0.087	1967–86
W. Rapti at Jalkundi	5.150	0.029	0.024	0.019	0.015	0.016	0.095	0.296	0.396	0.334	0.135	0.055	0.035	0.123	1964–95
Bagmati at Karmaiya	2.700	0.033	0.029	0.028	0.023	0.044	0.107	0.413	0.420	0.365	0.118	0.043	0.028	0.137	1979–90
Kamala*	1.450	0.007	0.005	0.003	0.003	0.009	0.044	0.130	0.157	0.109	0.045	0.017	0.011	0.045	1957–70
Kankai at Mainachuli	1.148	0.129	0.010	0.009	0.012	0.023	0.067	0.182	0.180	0.123	0.057	0.027	0.018	0.060	1972–90

Source: DHM (1998a).
* Source: Koshi Basin Master Plan (Japenese International Co-operation Agency [JICA] 1985).
** Source: Pancheswor Multipurpose Project (1994).

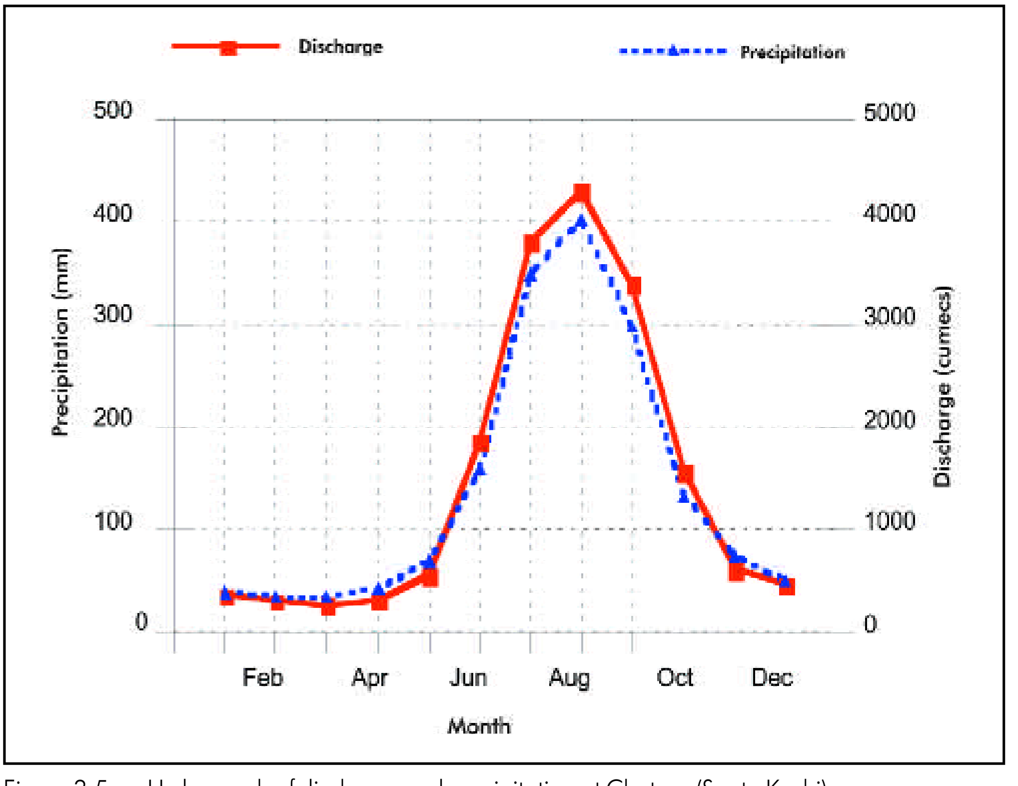


Figure 3.5: Hydrograph of discharge and precipitation at Chatara (Sapta Koshi) (Bhusal 1999; Alford 1992)

Despite general coincidence in the maxima and the minima in precipitation and streamflow hydrograph, owing to great environmental diversity within the basin, correlation between point-measured precipitation and discharge values is not found. Similarly, the general rule of linear relationship between discharge and basin area is not followed in Nepal.

In addition to intra-annual variations in discharge, rivers in the Himalayan headwaters show diurnal variation. The increase in discharge in the afternoon is due to daytime melting of snow and glacier ice in the catchment. There is an increasing interest in understanding the role played by snow and ice melt in the flow of Himalayan rivers. Particularly, it is important to know the effect of global warming on the regional hydrology. While the country is just beginning to harness the vast hydropower potential estimated at 83 x 10^6 kW (Shrestha 1985, 1996), changes in the streamflow regimes could negatively impact planning and implementation of hydropower and other water-related structures.

It is expected that the streamflow will increase initially due to rapid melting of snow and glaciers but will drastically decline as the glacier volumes decrease. Nevertheless, any trend in annual volume of water is not yet detected in the rivers of Nepal (Alford 1992). This could be mainly because of large inter-annual variations owing to similar variations in precipitation.

The Himalayan headwaters contain a plethora of glacial lakes, several of them vulnerable to outbursts. The normal flow pattern of these rivers can be significantly altered by a glacial lake outburst flood (GLOF) event. Depending on the nature of the breach and the volume of water released the stream discharge can experience a manifold increase during a GLOF surge.

The nature of the basin, geology, and stream topography plays an important role in the surge propagation, which might extend several tens of kilometres downstream. A detailed discussion on hydrological aspects of GLOFs is given in Chapter 9.

Sediment transport

The topography and geology of Nepal is favourable to soil erosion and mass wasting. Erosion rates vary largely and range between 800 and 57,000 t km^{-2} (Bhusal 1998). Sediment transport measurement in Nepal is limited to daily sampling for suspended sediment at 20 stations. Samples are collected by an integration method using 500 ml bottles and the sediment concentration is determined in the laboratory by an evaporation method (Bhusal 1998). Average monthly sediment yields of selected rivers of Nepal are given in Table 3.2. The monsoon is mainly responsible for surface erosion, hence sediment yield closely follows river discharge, peaking in August (Figure 3.6).

The sediment delivered by rivers of Nepal is expected to increase due to land use and climatic changes. However, there is no clear indication on the contribution of land use and climatic changes on the sediment load. Sediment yield from Nepal is still considered to be due to geomorphic and climatic characteristics of the country. Massive amounts of sediment can be delivered occasionally to downstream regions due to GLOF (Water and Energy Commission Secretariat [WECS] 1987a). The one sample a day routine of sediment sampling in the far downstream areas is not capable of measuring sediment load due to GLOF and, therefore, there is not much quantitative knowledge about sediment load caused by GLOF. Electrowatt Engineering Service Ltd. (1982) took regular sediment samples between June 1978 and January 1981. Extremely high concentrations of sediment were measured in the summer of 1980 (Figure 3.7). Various indirect evidence suggests that this was caused by a GLOF at Nagma. Sediment concentration during the GLOF was around 100,000 mg l^{-1}.

Table 3.2: Sediment transport in Nepalese rivers

Rivers and location	Area (km^2)	Annual sediment transport (suspended only, tonnes)	Specific sediment yield (t km^{-2} $year^{-1}$)	Data period	Sources
Sapta Koshi Barahshetra	54,100	133.56	2417	1948–77	Feasibility Report of Koshi High Dam Project (GOI 1981)
Tamor Mulghat	5640	39.9	7074	June 1978–January 1981	Feasibility Report of Mulghat Hydro-electric Project (Electrowatt Engineering Service Ltd 1982)
Arun Arun-3 dam site	29 310	6.72	229	Computed based on 10 samples measured March–July 1986 and the developed sediment and discharge relationship	Feasibility Report of Arun-3 (JICA 1987)
Sapa Gandaki Naranghat	31,100	106.9	3437	Computed for 1964–80 based on DHM sediment data of 1975–78 and 16 sample measurements taken between 5 March and 20 October 1981	Feasibility Report of Sapta Gandaki Hydro-electric Project (JICA 1983)
Karnali Chisapani	43,000	91.98	2139	May 1963–October 1964	Feasibility Report of Karnali Chisapani Hydro electric Project (Nippon Koei 1966)
Karnali Chisapani	43,000	105	2442		Feasibility Report of Karnali Hydro-electric Project (Electrowatt-Norconsult 1976)
Karnali Chisapani	42,890	92.84	2165	403 samples in the wet season of 1987 with 10% addition for the unmeasured dry season (9 months). It is stated that 1987 was a low flow year	Feasibility Report of Karnali Multipurpose Project (HPC 1989)
Mahakali Pancheswor	12,600	55	4365	June to November 1990. Samples were taken and 10% added for non-monsoon	Feasibility Report (EDC 1994)

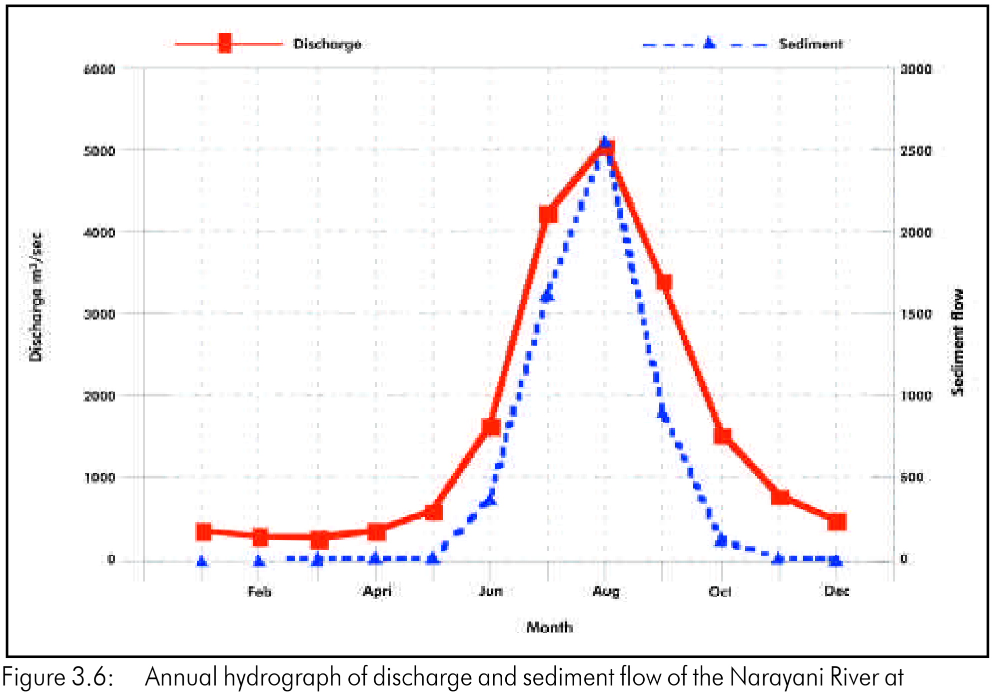


Figure 3.6: Annual hydrograph of discharge and sediment flow of the Narayani River at Narayanghat (Bhusal 1998)

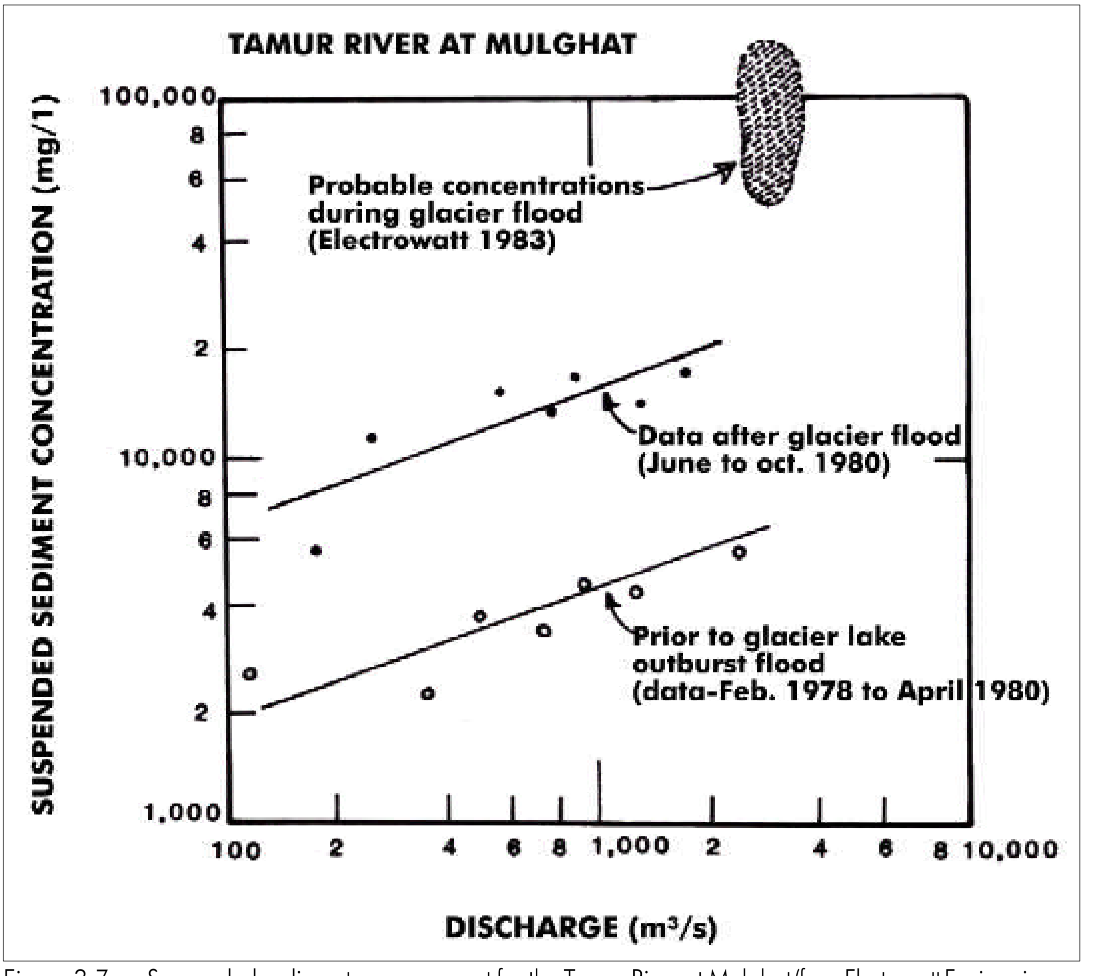


Figure 3.7: Suspended sediment measurement for the Tamor River at Mulghat (from Electrowatt Engineering Service Ltd 1982, in WECS 1987a)

Chapter 4
Materials and Methodology

The basic materials required for the compilation of an inventory of glaciers and glacial lakes are large-scale topographic maps and aerial photographs. Remote-sensing data like those from the land observation satellite (LANDSAT) thematic mapper (TM), Indian Remote Sensing satellite series 1D (IRS1D) Linear Imaging and Self Scanning Sensor (LISS3), and the Stéréo Système Probatoire de l'Observation de la Terre (SPOT) Multispectral (XS) for different dates are also used to study the activity of glaciers and for the identification of potentially dangerous glacial lakes. The combination of digital satellite data and the Digital Elevation Model (DEM) of the area is also used for better and more accurate results for the inventory of glaciers and glacial lakes.

4.1 Topographic Maps

Glaciers and glacial lakes are mostly concentrated in the northern part of Nepal. The spatial distribution of glaciers and glacial lakes was identified from topographic maps and verified by satellite images for the activity of the glaciers and glacial lakes. The topographic maps used were published by the Survey of India in the period from the 1950s to the 1970s on a scale of 1 inch to 1 mile (i.e. 1:63,360) and by the Survey Department of His Majesty's Government of Nepal (HMGN) in 1996 on a scale of 1:50,000. The topographic maps of the Survey Department were based on aerial photographs from 1992 and field verification in 1996. New topographic maps of the glaciated region of western Nepal were not published in the period of the study. As such, the topographic maps of the period from the 1950s to 1970s were used as a base map (Tables 4.1 and 4.2).

Table 4.1: List of used topographic maps published by the Survey of India

Grid number	Sheet number (total 92 sheets)
78A	1, 2 and 3
72M	1, 2, 5, 6, 9, 10, 13 and14
71L	4, 12 and 16
72I	1, 5, 6, 9, 10, 13 and 14
71H	2,3,4,7,8,11,12 and 16
71D	1, 2, 3, 5, 6, 7, 10, 11, 14 and 15
62O	2, 3,4,6, 7, 8, 12,15 and 16*
62P	1, 2, 5, 6, 9,10, 13 and 14
62J	3, 4 and 8
62K	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15 and 16
62L	9, 10, 13 and 14
62 F	4, 7, 8*, 11*12,15 and 16
62 G	1, 5, 6, 9, 10 and 13
62B	14*
62 C	13

Table 4.2: List of used topographic maps published by the Survey Department of HMGN

Grid number	Sheet number (total 33 sheets)
2885	09, 10, 11, 13, 14, 15 and 16
2886	13,15 and 16
2785	04
2786	01,02,03,04,06,07,08 and 12
2787	01,02,03,04,05,06,07,08,10,11 and 12
2788	01*, 05* and 09*

* Not available due to restrictions on distribution by HMGN

4.2 Aerial Photographs

The aerial photographs (1:50,000 scale) used for the study were taken in 1992 for eastern Nepal and in 1996 for western Nepal. The list of aerial photographs is given in Table 4.3 for eastern Nepal and in Table 4.4 for western Nepal.

103.	51	55,56,57,58,59,	78A/1	5
104.	52	7,8,9,10,11		5
105.	102	17,		1
106.	50	11,12,13	78A/2	3
107.	67	6,7,8,55		4
108.	102	7,11		2
109.	45	54,55	78A/3	2
110.	46	46,47		2
111.	102	3,4,5,6		4

The total number of aerial photographs for eastern Nepal is 640.

S. No.	Flight No.	Photograph No.	Toposheet No.	Total
1.	62	6,7,8,9,10,11,12,13,14	71H/4	9
2.	L165	35,36,37,38	71H/2	4
3.	L164	44,45,46,47		4
4.	L218	22,23,24,25,26,27		6
5.	L163	3,4,5,6,	71H/3	4
6.	L164	37,38,39,40,41,42,43	71D/14	7
7.	L163	7,8,9,10,11,12,13		7
8.	L162	11,12,13,14,15,16	71D/15	6
9.	L161	3,4,5,6,7		5
10.	L218	18,19,20		3
11.	L166	39,40,41,42,43	71D/10	5
12.	L165	22,23,24,25,26		5
13.	L164	30,31,32,33,34,35,36		7
14.	L163	14,15,16,17,18,19,20,21		8
15.	L162	4,5,6,7,8,9,10	71D/11	7
16.	L161	8,9,10,11,12,13		6
17.	L110	9,10,11,12,13,14,15,16,17,18,19,20		11
18.	L109	59,60,61,62,63,64,65,66,67		9
19.	L135	8,9	71D/5	2
20.	L134	55,56,57,58,59,60,61		7
21.	L167	6,7,8,9,10,11		6
22.	L166	33,34,35,36,37,38	71D/6	6
23.	L165	16,17,18,19,20,21		6
24.	L164	25,26,27,28,29		5
25.	L163	22,23,24,25,26,27		6
26.	L162	1,2,3	71D/7	3
27.	L133	1,2,3,4		4
28.	L133	9,10,11,12,13,14,15,16,17	71D/3	9
29.	L133	18,19,20,21,22,23,24	62P/15	7
30.	L136	46,47,48,49,50,51,52	71D/1	7
31.	L135	10,11,12,13,14,15,16,17		8
32.	L134	47,48,49,50,51,52,53,54,55		9
33.	L167	12,13,14,15,16,17		6
34.	L141	50,51,52,53	71C/3	4
35.	L217	2,3,4,5,6,7,8,9,10,11,12	Diagonal 71C/4	11
36.	L140	49,50,5152,53	71C/4	5
37.	L139	36,37,38,39,40,41,42		7
38.	L138	7,8,9,10,11		5
39.	L137	5,6,7,8,9,10,11		7
40.	L142	4,5,6,7,8	62O/15	5
41.	L141	44,45,46,47,48,49		6
42.	L216	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15		15
43.	L140	43,44,45,46,47,48	62O/16	6
44.	L139	43,44,45,46,47,48		6
45.	L138	12,13,14,15,16,17,18		7
46.	L137	12,13,14,15,16,17,18		7
47.	L140	35,36,37,40,41,42	62O/12	6
48.	L139	49,50,51,52,53,54,55,56		8
49.	L138	19,20,21,22,23,24,25	62O/12	7
50.	L137	19,20,21,22,23,24,25,26		8
51.	L147	8,9	62O/2	2
52.	L146	30,31,32,33,34,35,36,37		8
53.	L145	5,6,7,8,9,10,11		7
54.	L144	26,27,28,29	62O/3	4
55.	L143	25, 26,27,28		4
56.	L142	26,27,28		3
57.	L141	25, 26,27,28		4
58.	L144	30,31,32	62O/7	3
59.	L143	28,29,30,31,32		5
60.	L142	20,21,22,23,24,25		6

Table 4.4 Cont….

S. No.	Flight No.	Photograph No.	Toposheet No.	Total
61.	L141	29,30,31,32,33,34,35		7
62.	L140	28,29,30,31,32,33,34	62O/8	7
63.	L139	57,58,59,60,61,62,63		7
64.	L138	26,27,28,29,30,31,32		7
65.	L137	27,28,29,30,31,32		6
66.	L140	22,23,24,25,26,27	62O/4	6
67.	L139	7,8,9,10,11,12,13		7
68.	L138	33,34,35,36,37,38,39		7
69.	L137	33,34,35,36,37,38,39		7
70.	L146	38	62O/6	1
71.	L145	2,3,4		3
72.	L136	19,20,21,22,23,24,25	62P/1	4
73.	L135	38,39,40,41,42,43		6
74.	L134	19,20,21,22,23,24,25		7
75.	L167	36,37,38,39,40,41		6
76.	L166	1,2,3,4,5,6,7	62P/2	7
77.	L115	54,55,56,57,58	62P/5	5
78.	L136	26,27,28,29,30,31,32		7
79.	L135	31,32,33,34,35,36,37		7
80.	L134	26,27,28,29,30,31,32		7
81.	L167	29,30,31,32,33,34,35		7
82.	L136	33,34,35,36,37,38,39	62P/9	7
83.	L135	25,26,27,28,29,30		6
84.	L134	33,34,35,36,37,38,39,40		8
85.	L167	23,24,25, 26,27,28,29		7
86.	L166	15,16,17,18,19,20	62P/10	6
87.	L165	41,42,43,44,45,46		6
88.	L136	40,41,42,43,44,45	62P/13	6
89.	L135	18,19,20,21,22,23,24		7
90.	L134	41,42,43,44,45,46,47		7
91.	L167	18,19,20,21,22		5
92.	L166	21,22,23,24,25,26	62P/14	6
93.	L165	5,6,7,8,9,10		6
94.	L164	60,61,62,63,64,65,66		7
95.	L163	36,37,38,39,40,41,42		7
96.	L166	8,9,10,11,12,13,14	62P/6	7
97.	L165	47,48,49,50,51,52,53		7
98.	L164	49,50,51,52,53,1,2,3		7
99.	L135	50,51,52,53,54,55	62L/9	6
100.	L134	5,6,7,8,9,10,11		7
101.	L173	1,2,3,4,5,6,7		7
102.	L116	25,26,27,28,29,30,31,32	62L/10	8
103.	L136	13,14,15,16,17,18	62L/13	6
104.	L135	44,45,46,47,48,49		6
105.	L134	12,13,14,15,16,17,18		7
106.	L173	8,9,10,11,12,13		6
107.	L113	8,9,10,11,12,13,14,15	62L/14	8
108.	L114	13,14,15,16,17,18,19,20		8
109.	L115	7,8,9,10,11,12,13,14	62L/14	8
110.	L152	9,10,11,12,13,14,15	62K/1	7
111.	L151	12,13, 14,15,16,17		6
112.	L150	18,19,20, 21,22,23		6
113.	L149	39,40,41,42,43,44	62K/1	6
114.	L148	23,24,25,26,27,28	62K/2	6
115.	L147	29,30,31,32,33,34		6
116.	L128	36,37,38,39,40	62K/3	5
117.	L144	1,2,3		3
118.	L127	5,6,7,8,9,10,11,12		8
119.	L141	32,33,34		3
120.	L144	4,5,6,7,8,9,10	62K/7	7

Table 4.4. Cont…..

S. No.	Flight No.	Photograph No.	Toposheet No.	Total
121.	L143	1,2,3,4,5,6,7		7
122.	L127	1,2,3,4		4
123.	L141	1,2,3,4,5,6,7		7
124.	L144	11,12,13,14,15,16,17	62K/11	7
125.	L143	8,9,10,11,12,13,14,15		8
126.	L141	8,9,10,11,12,13,14,15		8
127.	L144	18,19,20,21,22,23	62K/15	6
128.	L143	16,17,18,19,20,21,22,23		8
129.	L141	16,17,18,19,20,21,22		7
130.	L148	7,8,9	62K/14	3
131.	L147	7,8,9,10,11,12,13,14,15		9
132.	L148	10,11,12,13,14,15,16	62K/10	7
133.	L147	16,17,18,19,20,21,22		3
134.	L145	20,21,22		7
135.	L148	17,18,19,20,21,22,23	62K/6	7
136.	L147	23,24,25,26,27,28,29		7
137.	L145	23,24,25,26,27,28,29,30		8
138.	L124	5,6,7,8	62K/4	4
139.	L123	23,24,25,26,27		5
140.	L140	5,6,7	62K/8	3
141.	L124	1,2,3,4,		4
142.	L123	28,29,30,31		4
143.	L139	27,28,29,30		4
144.	L138	53,54,55,56,57,58		6
145.	L137	52,53,54,55,56,57		6
146.	L140	8,9,10,11,12,13,14	62K/12	7
147.	L139	21,22,23,24,25,26		6
148.	L138	47,48,49,50,51,52		6
149.	L137	46,47,48,49,50,51		6
150.	L140	15,16,17,18,19,20,21	62K/16	7
151.	L139	14,15,16,17,18,19,20		7
152.	L138	40, 41,42,43,44,45,46		7
153.	L137	40, 41,42,43,44,45		6
154.	L152	22,23	62K/9	2
155.	L150	5,6,7,8,9,10,11		7
156.	L149	52,53,54,55,56,57,58		7
157.	L152	15,16,17,18,19,20,21	62K/5	7
158.	L151	18,19,20,21,22,23		6
159.	L150	12,13,14,15,16,17		6
160.	L149	45,46,47,48,49,50,51		7
161.	L170	8,9,10,11,12	62G/1	5
162.	L169	14,15,16,17,18,19		6
163.	L168	13,14,15,16,17,18,19		7
164.	L149	14,15,16,17,18,19,20		7
165.	L170	13,14,15,16,17,18	62G/5	6
166.	L169	8,9,10,11,12,13		6
167.	L168	8,9,10,11,12		5
168.	L149	21,22,23,24,25,26		6
169.	L170	19,20,21	62G/9	3
170.	L152	1,2,3	62G/9	3
171.	L151	1,2,3,4,5		5
172.	L169	5,6,7		3
173.	L168	1,2,3,4,5,6,7		7
174.	L150	30,31,32		3
175.	L149	27,28,29,30,31,32,33		7
176.	L152	5,6,7,8	62G/13	4
177.	L151	6,7,8,9,10,11		6
178.	L148	41,42,43	62G/6	3
179.	L147	46,47,48		3
180.	L148	34,35,36,37,38,39,40	62G/10	7

S. No.	Flight No.	Photograph No.	Toposheet No.	Total
181.	L147	40,41,42,43,44,45		6
182.	L146	19,20,21,22,23,24,25		7
183.	L145	20,21,22,23,24,25,26		7
184.	L158	6,7,8,9	62J/3	4
185.	L157	6,7,8,9		4
186.	L214	4,5,6,7,8		5
187.	L156	25,26,27,28	62J/4	4
188.	L155	6,7,8,9,10,11,12		7
189.	L154	28,29,30,31,32		5
190.	L153	24,25,26,27,28,29,30		7
191.	L153	31,32,33,34,35	62J/8	5
192.	L159	1,2,3	62F/7	3
193.	L158	24,25,26		3
194.	L159	4,5,6,7,8,9	62F/11	6
195.	L158	17,18,19,20,21,22,23		7
196.	L157	17,18,19,20,21,22,23,24		8
197.	L159	10,11	62F/15	2
198.	L158	10,11,12,13,14,15,16		7
199.	L157	10,11,12,13,14,15,16		7
200.	L155	37,38,39	62F/4	3
201.	L154	2,3,4,5		4
202.	L171	7,8,9,10		4
203.	L215	5,6,7,8,9,10,11,12,13,14,15	Digonal 62F/4	11
204.	L156	9, 10,11	62F/8	3
205.	L155	27,28,29,30,31,32		6
206.	L154	10,11,12,13,14,15		6
207.	L153	5,6,7,8,9,10,11		7
208.	L156	12,13,14,15,16,17	62F/12	6
209.	L155	20,21,22,23,24,25,26		7
210.	L154	16,17,18,19,20,21		6
211.	L153	12,13,14,15,16,17,18		7
212.	L156	18,19,20,21,22,23,24	62F/16	7
213.	L155	13,14,15,16,17,18,19		7
214.	L154	22,23,24,25,26,27,28		7
215.	L153	19,20,21,22,23,24		6
216.	L205	1,2,3,4,5,6,7,8,9,10,11,12	62B/16	12
217.	L155	40,41,42		3
218.	L171	1,2,3,4,5,6		6
219.	L172	10,11,12,13,14		5
220.	L170	2,3,4,5,6,7	62C/13	6
221.	L169	20,21,22,23,24		5
222.	L168	19,20,21,22,23		5
223.	L149	7,8,9,10,11,12		6
The total number of aerial photographs for western Nepal is 1,344.				

4.3 Satellite Images

Various types of satellite image suitable for the present study are available from different organisations, institutes, and data providers. Prints of the satellite images in the form of planimetric maps on a scale of 1:250,000 published by the Remote Sensing Centre of Nepal in 1984 have been used for the inventory of glaciers and glacial lakes. LANDSAT MSS data in digital format from March–April 1994, resampled in 50m pixel size, are available at ICIMOD and have been used for the study. The list of planimetric maps is given in Table 4.5

Thirteen full or partial scenes of LANDSAT TM are required to cover the whole of Nepal as shown in Figure 4.1 and Table 4.6. For the present study, eight scenes have been used. They are given in Table 4.7.

Table 4.5: List of satellite image planimetric maps of Nepal

Planimetric maps on a scale of 1: 250,000					
NH44-6	NH44-7				
NH44-10	NH44-11	NH44-12	NH45-9		
NH44-14	NH44-15	NH44-16	NH45-13	NH45-14	
	NG44-3	NG444	NG45-1	NG45-2	NG45-3
			NG45-5	NG45-6	NG45-7

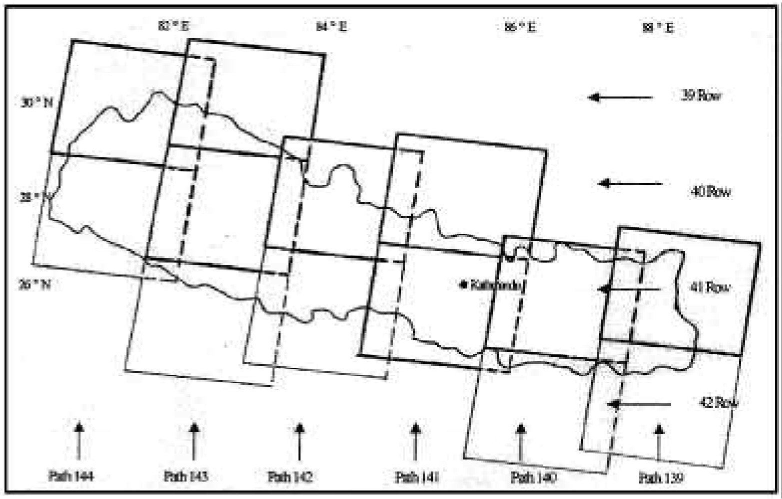


Figure 4.1: Index map of LANDSAT satellite images (arrows indicate the path and row of a scene)

1	139	041	Q1
2	140	041	Q1 and Q2
3	141	041	Q1 and Q2
4	141	040	Q3 and Q4
5	142	040	Q1, Q2 and Q3
6	143	140	Q2
7	143	039	Q3 and Q4
8	144	039	Q3 and Q4

1	144	39	Q3	8 November 1990
2	144	39	Q4	8 November 1990
3	144	40	Q1	8 November 1990
4	144	40	Q2	8 November 1990
5	144	40	Q3	8 November 1990
6	144	40	Q4	8 November 1990
7	143	39	Q3	17 November 1990
8	143	39	Q4	17 November 1990
9	143	40	Q1	17 November 1990
10	143	40	Q2	17 November 1990
11	143	40	Q3	17 November 1990
12	143	40	Q4	17 November 1990
13	143	41	Q1	17 November 1990
14	141	41	Q2	17 November 1990
15	142	40	Q1	15 December 1991
16	142	40	Q2	15 December 1991
17	142	40	Q3	15 December 1991
18	142	40	Q4	15 December 1991
19	142	41	Q1	26 November 1990
20	142	41	Q2	26 November 1990

Table 4.7 Cont.....

21	142	41	Q3	26 November 1990
22	142	41	Q4	26 November 1990
23	142	41	Q2	28 October 1991
24	141	40	Q3	28 October 1991
25	141	40	Q4	21 December 1990
26	141	41	Q1	21 December 1990
27	141	41	Q2	21 December 1990
28	141	41	Q3	21 December 1990
29	141	41	Q4	21 December 1990
30	140	41	Q1	17 December 1991
31	140	41	Q2	17 December 1991
32	140	41	Q3	17 December 1991
33	140	40	Q4	17 December 1991
34	140	42	Q1	17 December 1991
35	140	42	Q2	17 December 1991
36	139	41	Q1	24 November 1991
37	139	41	Q3	24 November 1991
38	139	42	Q1	24 November 1991
39	139	42	Q2	24 November 1991
40	140	42	(full scene)	? January 1998
41	142	41	(full scene)	? January 1998

Due to time constraints in acquiring cloud free data and relative costs, instead of LANDSAT TM, IRS1D LISS3 images from 1999–2000 with least cloud cover were acquired. Nine scenes, as given in Table 4.8, cover all northern parts and the glaciated area of Nepal.

Some selected SPOT scenes available from different organisations were acquired. The list of required SPOT images is given in Table 4.9.

1	099	050	18 January 2000	
2	100	050	05 January 1999	
3	101	052 and 051	02 January 1999	30%shift down to row 051
4	102	050 and 051	18 February 1999	30%shift up to row 051
5	103	051	15 February 1999	
6	104	051	03 January 2000	
7	105	051 and 052	15 January 1999	40%shift up to row 051
8	106	051 and 052	12 January 1999	40%shift up to row 051
9	107	052	19 January 2000	

1	J289	K215
2	J290	K214, K215, K216 and K217
3	J291	K218, K219, K220 and K221
4	J292	K219, K220 and K221
5	J293	K222, K223 and K224
6	J294	K225, K226, K227, K228, K229 and K230
7	J295	K227, K228, K229 and K230

4.4 Inventory Method

The methodology for the mapping and inventory of the glaciers is based on instructions for compilation and assemblage of data for the World Glacer Inventory (WGI), developed by the Temporary Technical Secretary (TTS) at the Swiss Federal Institute of Technology, Zurich (Muller et al. 1977) and the methodology for the inventory of glacial lakes is based on that developed by the Lanzhou Institute of Glaciology and Geocryology, the Water and Energy Commission Secretariat, and the Nepal Electricity Authority (LIGG/WECS/NEA 1988). The inventory of glaciers and glacial lakes has been systematically carried out for the drainage basins on the basis of topographic maps, aerial photographs, and satellite images. Topographic maps on a scale of 1:63,360 and 1:50,000 published respectively by the Survey of India during the period from the 1950s to the 1970s and the Survey Department of Nepal in 1996 respectively are used.

The following sections describe how the compilation of the inventories for both the glaciers and glacial lakes has been carried out.

Inventory of glaciers

The glacier margins on each map are delineated and compared with aerial photographs, and the exact boundaries between glaciers and seasonal snow cover are determined. The coding system is based on the subordinate relation and direction of river progression according to the World Glacier Inventory. The descriptions of attributes for the inventory of glaciers are given below.

The lettering and numbering start from the mouth of the major stream and proceed clockwise round the basin. The inventory of glaciers is carried out throughout the river basins of Nepal. For convenience, the major river systems are further divided into sub-basins.

All perennial snow and ice masses are registered in the inventory. Measurements of glacier dimensions are made with respect to the carefully delineated drainage area for each 'ice stream'. Tributaries are included in main streams when they are not differentiated from one another. If no flow takes place between separate parts of a continuous ice mass, they are treated as separate units.

Delineation of visible ice, firn, and snow from rock and debris surfaces for an individual glacier does affect various inventory measurements. Marginal and terminal moraines are also included if they contain ice. The 'inactive' ice apron, which is frequently found above the head of the valley glacier, is regarded as part of the valley glacier. Perennial snow patches of large enough size are also included in the inventory. Rock glaciers are included if there is evidence of large ice content.

Snow line

In the present study, the snow line specially refers to the **firn line** of a glacier, not the equilibrium line. The elevation of the firn line of most glaciers was not measured directly but estimated by indirect methods. For the regular valley and cirque glaciers from topographical maps, Hoss's method (i.e. studying changes in the shape of the contour lines from convex in the **ablation area** to concave in the **accumulation area**) was used to assess the snow line.

Accuracy rating table

Accuracy rating adopted from Muller et al. (1977)			
Index	Area/length (%)	Altitude (m)	Depth (%)
1	0–5	0–25	0–5
2	5–10	25–50	5–10
3	10–15	50–100	10–20
4	15–25	100–200	20–30
5	>25	>200	>30

The accuracy rating table proposed by Muller et al. (1977) on the basis of actual measurements (Table 4.10) is used in the present study. For the snow line an error range of 50–100m in altitude is entered as an **accuracy rating** of '3'. In the glacier inventory, different methods or a combination of methods are usually chosen for comparison with aerial photographs in order to assess the elevation of the firn line for different forms of glacier.

Mean glacier thickness and ice reserves

There are no measurements of glacial ice thickness for the Nepal Himalayas. Measurements of glacial ice thickness in the Tianshan Mountains, China, show that the glacial thickness increases with the increase of its area (LIGG/WECS/NEA 1988). The relationship between ice thickness (H) and glacial area (F) was obtained there as

$$H = -11.32 + 53.21\, F^{0.3}$$

This formula has been used to estimate the mean ice thickness in the glacier inventory of the Arun and Bhote-Sunkoshi Basins. The same method is also used here to find the ice thickness. The ice reserves are estimated by mean ice thickness multiplied by the glacial area.

Muller et al. (1977) roughly estimated the ice thickness values for Khumbu Valley using the relationship between glacier type, form, and area (see Table 4.11). The same method was used by WECS to calculate the thickness values for Rolwaling Valley.

According to Muller et al. (1977), mean depth can be estimated with the appropriate model developed for each area by local investigators.

Table 4.11: Relationship between glacier type, form, area, and depth given by Muller et al. (1977)

Glacier type	Form	Area (km²)	Depth (m)
Valley glacier	Compound basin	1–10	50
		10–20	70
		20–50	100
		50–100	120
	Compound basins	1–5	30
		5–10	60
		10–20	80
		20–50	120
		50–100	120
	Simple basins	1–5	40
		5–10	75
		10–20	100
Mountain glacier	Cirque	0–1	20
		1–2	30
		2–5	50
		5–10	90
		10–20	120

For example, the following model was used for the Swiss Alps

$$\bar{h} = a + b\sqrt{F}$$

where h is the mean depth, F is the total surface area, and a and b are arbitrary parameters that are empirically determined.

The measured depth is shown on the data sheet only if the depths of large parts of the glacier bed are known from literature and field measurements.

Area of the glacier

The area of the glacier is divided into accumulation area and ablation area (the area below the firn line). The area is given in square kilometres. The delineated glacier area is digitised in the 'integrated land and water information systems' (ILWIS) format and the database is used to calculate the total area.

Length of the glacier

The length of the glacier is divided into three columns: **total length**, **length of ablation** and the **mean length**. The total (maximum) length refers to the longest distance of the glacier along the centreline. The mean value of maximum lengths of glacier tributaries (or firn basins) is the mean length.

Mean width

The mean width is calculated by dividing the total area (km^2) by the mean length (km).

Orientation of the glaciers

The orientation of accumulation and ablation areas is represented in eight cardinal directions (N, NE, E, SE, S, SW, W, and NW). Some of the glaciers are capping just in the form of an apron on the peak, which is inert and sloping in all directions, is represented as 'open'. The orientations of both the areas (accumulation and ablation) are the same for most of the glaciers.

Elevation of the glacier

Glacier elevation is divided into **highest elevation** (the highest elevation of the crown of the glacier), **mean elevation** (the arithmetic mean value of the highest glacier elevation and the lowest glacier elevation), and **lowest elevation**.

Morphological classification

The morphological matrix-type classification and description is used in the study. It was proposed by Muller et al. (1977) for the TTS to the WGI. Each glacier is coded as a six-digit number, the six digits being the vertical columns of Table 4.12. The individual numbers for each digit (horizontal row numbers) must be read on the left-hand side. This scheme is a simple key for the classification of all types of glaciers all over the world.

Each glacier can be written as a six-digit number following Table 4.12. For example, '520110' represents '5' for a valley glacier in the primary classification, '2' for compound basins in Digit 2, '0' for normal or miscellaneous in frontal characteristics in Digit 3, '1' for even or regular in longitudinal profile in Digit 4, '1' for snow and/or drift snow in the major source of nourishment in Digit 5, and 0 for uncertain tongue activity in Digit 6.

Table 4.12: Classification and description of glaciers

	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6
	Primary classification	Form	Frontal characteristic	Longitudinal profile	Major source of nourishment	Activity of tongue
0	Uncertain or miscellaneous	Uncertain or miscellaneous	Normal or miscellaneous	Uncertain or miscellaneous	Uncertain or miscellaneous	Uncertain
1	Continental ice sheet	Compound basins	Piedmont	Even: regular	Snow and/or drift snow	Marked retreat
2	Ice field	Compound basin	Expanded foot	Hanging	Avalanche and/or snow	Slight retreat
3	Ice cap	Simple basins	Lobed	Cascading	Superimposed ice	Stationary
4	Outlet glacier	Cirque	Calving	Ice fall		Slight advance
5	Valley glacier	Niche	Confluent	Interrupted		Marked advance
6	Mountain glacier	Crater				Possible surge
7	Glacieret and snow field	Ice apron				Known surge
8	Ice shelf	Group				Oscillating
9	Rock glacier	Remnant				

The details for the glacier morphological code values according to TTS are explained below.

Digit 1 Primary classification

- ***0*** ***Miscellaneous***: Any not listed.
- ***1*** ***Continental ice sheet***: Inundates areas of continental size.
- ***2*** ***Ice field***: More or less horizontal ice mass of sheet or blanket type of a thickness not sufficient to obscure the sub-surface topography. It varies in size from features just larger than glacierets to those of continental size.
- ***3*** ***Ice cap***: Dome-shaped ice mass with radial flow.
- ***4*** ***Outlet glacier***: Drains an ice field or ice cap, usually of valley glacier form; the catchment area may not be clearly delineated (Figure 4.2a).
- ***5*** ***Valley glacier***: Flows down a valley; the catchment area is in most cases well defined.
- ***6*** ***Mountain glacier***: Any shape, sometimes similar to a valley glacier, but much smaller; frequently located in a cirque or niche.
- ***7*** ***Glacieret* and *snowfield***: A glacieret is a small ice mass of indefinite shape in hollows, river beds, and on protected slopes developed from snow drifting, avalanching and/or especially heavy accumulation in certain years; usually no marked flow pattern is visible, no clear distinction from the snowfield is possible, and it exists for at least two consecutive summers.
- ***8*** ***Ice shelf***: A floating ice sheet of considerable thickness attached to a coast, nourished by glacier(s), with snow accumulation on its surface or bottom freezing (Figure 4.2b).
- ***9*** ***Rock glacier***: A glacier-shaped mass of angular rock either with interstitial ice, firn, and snow or covering the remnants of a glacier, moving slowly downslope. If in doubt about the ice content, the frequently present surface firn fields should be classified as 'glacieret and snowfield'.

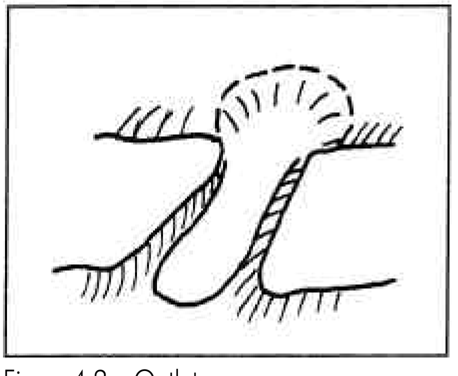


Figure 4.2a: Outlet

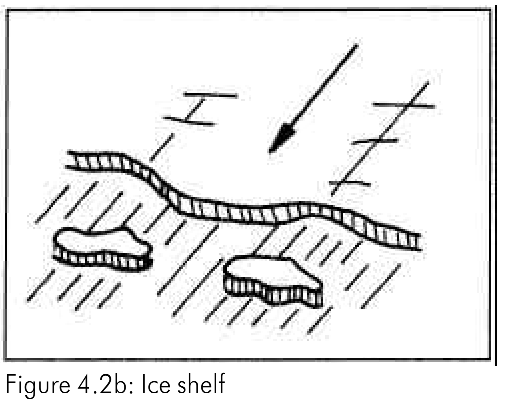


Figure 4.2b: Ice shelf

Digit 2 Form

- ***1*** ***Compound basins***: Two or more tributaries of a valley glacier, coalescing (Figure 4.3a).
- ***2*** ***Compound basin***: Two or more accumulation basins feeding one glacier (Figure 4.3b).
- ***3*** ***Simple basin***: Single accumulation area (Figure 4.3c).
- ***4*** ***Cirque***: Occupies a separate, rounded, steep-walled recess on a mountain (Figure 4.3d).
- ***5*** ***Niche***: Small glacier formed in initially a V-shaped gully or depression on a mountain slope (Figure 4.3e).
- ***6*** ***Crater***: Occurring in and /or on a volcanic crater
- ***7*** ***Ice apron***: An irregular, usually thin ice mass plastered along a mountain slope.
- ***8*** ***Group***: A number of similar ice masses occurring in close proximity and too small to be assessed individually.
- ***9*** ***Remnant***: An inactive, usually small ice mass left by a receding glacier.

Digit 3 Frontal characteristics

- ***1*** ***Piedmont***: Ice field formed on low land with the lateral expansion of one or the coalescence of several glaciers (Figures 4.4a and b).

2 ***Expanded foot***: Lobe or fan of ice formed where the lower portion of the glacier leaves the confining wall of a valley and extends on to a less restricted and more level surface. Lateral expansion markedly less than for Piedmont (Figure 4.4c).
3 ***Lobed***: Tongue-like form of an ice field or ice cap (see Figure 4.4d)
4 ***Calving***: Terminus of glacier sufficiently extending into sea or occasionally lake water to produce icebergs.
5 ***Confluent***: Glaciers whose tongues come together and flow in parallel without coalescing (Figure 4.4e).

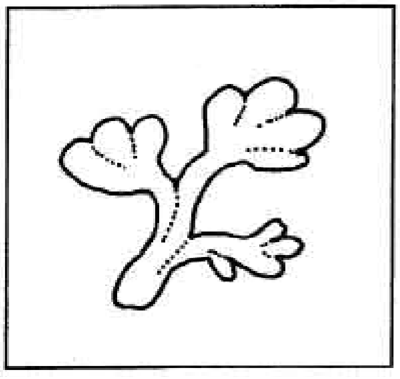


Figure 4.3a: Compound basins

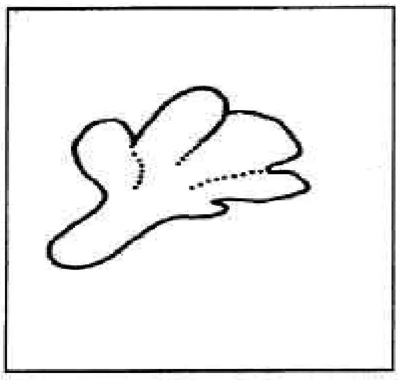


Figure 4.3b: Compound basin

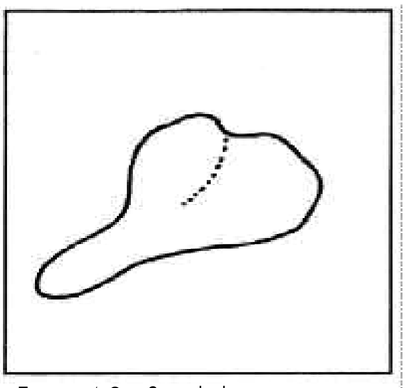


Figure 4.3c: Simple basin

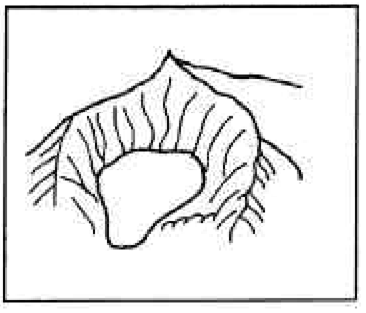


Figure 4.3d: Cirque

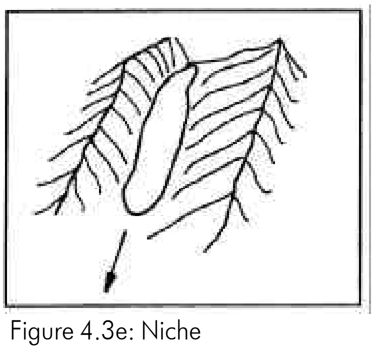


Figure 4.3e: Niche

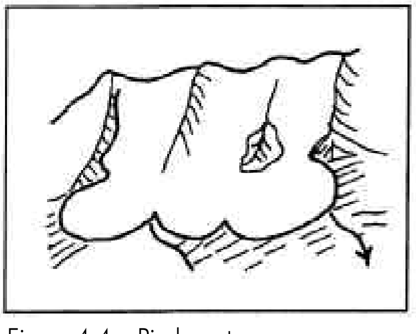


Figure 4.4a: Piedmont

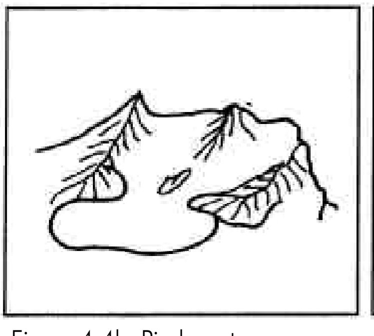


Figure 4.4b: Piedmont

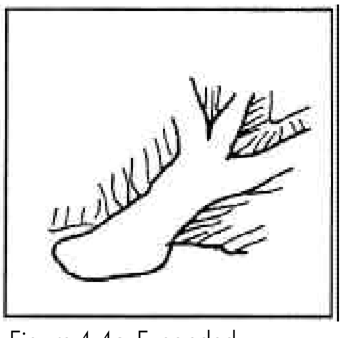


Figure 4.4c: Expanded

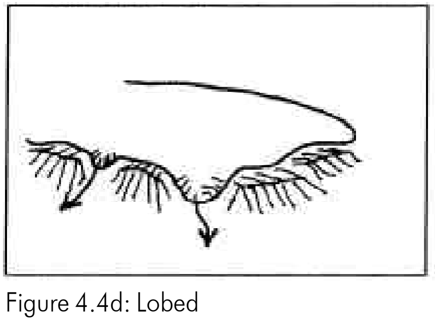


Figure 4.4d: Lobed

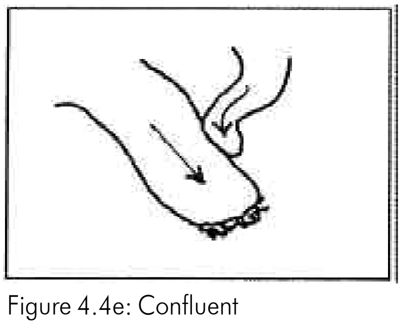


Figure 4.4e: Confluent

Digit 4 Longitudinal profile

1. ***Even /regular***: Includes the regular or slightly irregular and stepped longitudinal profile.
2. ***Hanging***: Perched on a steep mountain slope, or in some cases issuing from a steep hanging valley.
3. ***Cascading***: Descending in a series of marked steps with some crevasses and seracs.
4. ***Ice fall***: A glacier with a considerable drop in the longitudinal profile at one point causing a heavily broken surface.
5. ***Interrupted***: Glacier that breaks off over a cliff and reconstitutes below.

Digit 5 Major source of nourishment

The sources of nourishment could be uncertain or miscellaneous (0), snow and/or drift snow (1), avalanche and/or snow (2), or superimposed ice (3) as indicated in Table 4.12.

Digit 6 Activity of tongue

A simple-point qualitative statement regarding advance or retreat of the glacier tongue in recent years, if made for all glaciers on Earth, would provide the most useful information. The assessment of an individual glacier (strongly or slightly advancing or retreating etc) should be made in terms of the world picture and not just that of the local area; however, it seems very difficult to establish the quantitative basis for the assessment of the tongue activity. A change of frontal position of up to 20m per year might be classed as 'slight' advance or retreat. If the frontal change takes place at a greater rate it would be called 'marked'. Very strong advances or surges might shift the glacier front by more than 500m per year. Digit 6 expresses qualitatively the annual tongue activity. If observations are not available on an annual basis then an average annual activity is given.

Moraines: Two digits to be given.

Digit 1*:* moraines in contact with present-day glacier.
Digit 2*:* moraines further downstream.

0 no moraines
1 terminal moraine
2 lateral and/or medial moraine
3 push moraine
4 combination of 1 and 2
5 combination of 1 and 3
6 combination of 2 and 3
7 combination of 1, 2, and 3
8 debris, uncertain if morainic
9 moraines, type uncertain or not listed.

Remarks: The remarks can, for instance, consist of the following information.

- Critical comments on any of the parameters listed on the data sheet (e.g. how close is the snow line to the firn line, comparison of year concerned with other years).
- Special glacier types and glacier characteristics which, because of the nature of the classification scheme, are not described in sufficient detail (e.g. 'melt structures', glacier-dammed lakes).
- Additional parameters of special interest to the basins concerned (e.g. area of altitudinal zones, inclination etc).
- It is often useful to divide the snow line into several sections (because of different exposition or nourishment). In such cases, the snow line data of each section can be recorded separately.
- Literature on the glacier concerned.
- Any other remarks

The inventory database form (see Annex I) used for compilation of the inventory of glaciers includes map/satellite codes, aerial photographs, and basin numbers, as well as the glacier parameters described above.

Inventory of glacial lakes

The glacial lakes on each map are delineated and compared with aerial photographs and satellite images. The descriptions of attributes for the glacial lakes' inventory based on LIGG, WECS and NEA (1988) are given below.

Numbering of glacial lakes

For the study of the glacial lakes, the Nepal Himalayas are divided into four major river basins: The Mahakali River Basin, The Karnali River Basin, The Gandaki River Basin, and The Koshi River Basin. Further divisions into sub-basins within the major river basins are made.

The permanent snow line in the northern belt of the Himalayas is higher than 4,000 masl. All the glacial lake boundaries are demarcated in the topographic maps.

The global climatic change during the first half of the twentieth century had a tremendous impact on the high mountainous glacial environment. Many of the big glaciers melted rapidly and gave birth to a large number of glacial lakes. Due to the faster rate of ice and snow melting, possibly caused by global warming, the accumulation of water in these lakes has been increasing rapidly. The isolated lakes above 3,500m are assumed to be the remnants of the glacial lakes left due to the retreat of the glaciers.

The attributes used for the present inventory are similar to the lake inventories that were done in the Pumqu (Arun) and Poiqu (Bhote-SunKoshi) Basins in Tibet, China (LIGG/WECS/NEA 1988).

The numbering of the lakes starts from the outlet of the major stream and proceeds clockwise round the basin.

Longitude and latitude

Reference longitude and latitude are designated for the approximate centre of the glacial lake.

Area

The area of the glacial lake is determined from the digital database after digitisation of the lake from the topographic maps.

Length

The length is measured along the long axis of the lake, and estimated to one decimal place in km units (0.1 km).

Width

The width is normally calculated by dividing the area by the length of the lake, down to one decimal place in km units (0.1 km).

Depth

The depth is measured along the axis of the cross section of the lake. On the basis of the depth along the cross section the average depth and maximum depth are estimated. The data are collected from the literature.

Orientation

The drainage direction of the glacial lake is specified as one of eight cardinal directions (N, NE, E, SE, S, SW, W, and NW). For a closed glacial lake, the orientation is specified according to the direction of its longer axis.

Altitude

The altitude is registered by the water surface level of the lake in masl.

Classification of lakes

Genetically glacial lakes can be divided into the following.

- Glacial erosion lakes, including cirque lakes, trough valley lakes, and erosion lakes.
- Moraine-dammed lakes (also divided into neo end moraine and paleo end moraine lakes), including end moraine lakes and lateral moraine lakes.
- Blocking lakes formed through glaciers and other factors, including the main glacier blocking the branch valley, the glacier branch blocking the main valley, and the lakes formed through snow avalanche, collapse, and debris flow blockade.
- Ice surface and sub-glacial lakes.

In the glacial lake inventory, end moraine-dammed lakes, lateral moraine lakes, trough valley lakes, glacial erosion lakes, and cirque lakes are represented by the letters M, L, V, E, and C respectively; B represents blocking lakes.

Activity

According to their stability, the glacial lakes are divided into three types: stable, potential danger, and outburst (when there have been previous bursts). The letters S, D, and O represent these types respectively.

Types of water drainage

Glacial lakes are divided into drainage lakes and closed lakes according to the drainage pattern. The former refers to lakes from which water flows to the river and joins the river system. In the latter, water does not flow into the river. Ds and Cs represent those two kinds of glacial lakes respectively.

Chemical properties

This attribute is represented by the degree of mineralisation of the water, mg l^{-1}.

Other indices

One important index for evaluating the stability of a glacial lake is its contact relation with the glacier. So an item of distance from the upper edge of the lake to the terminus of the glacier has been added and the code of the corresponding glacier registered. Since an end moraine-dammed lake is related to its originating glacier, this index is only referred to end moraine dammed lakes. As not enough field data exist, the average depth of glacial lakes is difficult to establish in most cases. Based on field data, and as an indication only, the average depth of a glacial lake formed by different causes can be roughly estimated as follows: cirque lake, 10m; lateral moraine lake, 30m; trough valley lake, 25m; blocking lake and glacier erosion lake, 40m; lateral moraine lake, 20m. The water reserves of different types of glacial lakes can be obtained by multiplying their average depth by their area (LIGG/WECS/NEA 1988).

The inventory database form (see Annex II) used for compilation of the inventory of glacial lakes includes map/satellite image codes, aerial photographs, and basin numbers, as well as the lake parameters (attributes) described above.

Chapter 5
Spatial Data Input and Attribute Data Handling

One of the main objectives of the present study is to develop a digital database of glaciers and glacial lakes using geographic information systems (GIS). A digital database is necessary for the monitoring of glaciers and glacial lakes and to identify the potentially dangerous lakes. GIS is the most appropriate tool for spatial data input and attribute data handling. It is a computer-based system that provides the following four sets of capabilities to handle geo-referenced data:

- data input,
- data management (data storage and retrieval),
- data manipulation and analysis, and
- data output
  (Arnoff 1989).

Any spatial features of the Earth's surface are represented in GIS by the following:

- **area/polygons**: features which occupy a certain area, e.g. glacier units, lake units, land-use units, geological units etc;
- **lines/segments**: linear features, e.g. drainage lines, contour lines, boundaries of glaciers and lakes etc;
- **points**: points define the discrete locations of geographic features, the areas of which are too small to illustrate as lines or polygons, e.g. mountain peaks or discrete elevation points, sampling points for field observations, identification points for polygon features, centres of glaciers and lakes etc, and attribute data refer to the properties of spatial entities.

The spatial entities described above can be represented in digital form by two data models: vector or raster models. In a vector model the position of each spatial feature is defined by a series of *X* and *Y* coordinates. Besides the location, the meaning of the feature is given by a 'code'. In a raster model, spatial data are organised in grid cells or pixels, a term derived for a picture element. Pixels are the basic units for which information is explicitly recorded. Each pixel is assigned only one value.

For the present study, integrated land and water information system (ILWIS) 2.23 for Windows is used for the spatial and attribute database development and analysis. ILWIS for Windows is an object oriented image processing and geographic information system. Analysis and modelling in a GIS requires input of relevant data. The topographic maps of the 1960s on a scale of 1:63,360 (one inch to one mile) published by the Survey of India were used as the baseline for the spatial data of glaciers and glacial lakes. Topographic maps of the 1990s on a scale of 1:50,000 published by the Survey Department of His Majesty's Government of Nepal (HMGN) were used for the eastern half of Nepal. The list of topographic maps used for the study is given in Chapter 4. Delineation of all the glaciers and glacial lakes was done on the topographic maps. All the glaciers and glacial lakes were numbered and their attributes were noted. The details of the methodology for the delineation and attributes are also given in Chapter 4.

Table 5.1: Coordinate system for the maps published by the Survey of India

S No.	Coordinate system	For Grid Zone IIB	For Grid Zone IIA
1	Projection	Lambert conformal conic	
2	Ellipsoid	Everest (India 1956)	
3	Datum	India (India, Nepal)	
4	False easting	2743196.40	
5	False northing	914398.80	
6	Central meridian	90° 00' 00" E	
7	Central parallel	26° 00' 00" N	
8	Scale factor	0.998786	
9	Standard parallel 1	23° 9' 28.17" N	21° 30' 00" N
10	Standard parallel 2	28° 49' 8.18" N	30° 00' 00" N
11	Minimum *X* Value	1920240	1823188
12	Maximum *X* Value	2651760	2000644
13	Minimum *Y* Value	914398	1306643
14	Maximum *Y* Value	1188720	1433476

The most common method of entering spatial data is by manual digitising, using a digitiser board. Before starting digitisation one should know the map projection system. A map projection defines the relationship between the map coordinates and the geographic coordinates (latitude and longitude). Nepal is situated between 80° to 88°15´ East and 26° to 30°30´ North, which is defined by two grid zones (Zone IIA and Zone IIB) according to the Survey of India Map Series (originally prepared by the Ordnance Survey, Britain's National Mapping Agency). East of 82° falls in Grid Zone IIB and west of 82° in Grid Zone IIA. The coordinate systems for the maps published by the Survey of India for both of the grid zones are given in Table 5.1

It is always necessary to maintain the details, smoothness, and accuracy of the input spatial data of all the required information as in the maps of the given map scale. They are defined by the snap and tunnel tolerances in the system. The snap and tunnel tolerances in the system are defined by the extent of the minimum and maximum *X* and *Y* values. To increase the detail and accuracy, the coordinate system with the required *X* and *Y* extents for each one degree area was created to digitise all the topographic maps. These sub-coordinate systems were very useful and made the input and handling of the data easy.

The segment code values are necessary for data retrieval and analysis in GIS. Therefore, after the delineation of the glaciers, glacial lakes, and ridges on the maps, the segments were digitised using the following codes.

1 = lake boundary
2 = glacier boundary
3 = ridge line
5 = basin or international boundary
10 = dry lake
11 = drainage line
12 = lake attached to glacier common boundary
20 = rock glacier boundary only
23 = glacier attached to ridge line common boundary
25 = glacier attached to basin boundary common boundary
100 = tic points reference lines

All the polygons representing glaciers and glacial lakes are numbered as mentioned in Chapter 4. Points showing the location of glaciers and glacial lakes were digitised. They were used later for identification of the polygons of the glaciers and glacial lakes. After digitisation, the segments were checked and the glaciers and glacial lakes were numbered using point identifiers. Basin-wise polygon maps of glaciers and glacial lakes are presented in Chapters 7 and 8.

In an object oriented GIS, polygon maps with identifier domains of the objects have a related attribute table with the same domain. The domain defines the possible contents of a map, a table, or a column in a table (attribute). Some examples of 'domain' are class domain (a list of class names), value domain (measured, calculated, or interpolated values), image domain (reflectance values in a satellite image or scanned aerial photograph), identifier domain (a unique code for each item in the map), string domain (columns in a table that contain text), bit domain (value 0 and 1), bool domain (yes or no) etc. An attribute table is linked to a map through its domain. An attribute table can only be linked to maps with a class or identifier domain. An attribute table may contain several columns.

Required attributes of the glaciers and glacial lakes as explained in Chapter 4 were derived or entered in the attribute database in the GIS. Most of the attributes were derived from the topographic maps, aerial photographs, satellite images, reports, field data, etc. Attributes such as area, location (latitude, longitude) etc were derived from the spatial database. If other necessary digital spatial data layers, such as digital elevation models (DEM), are available, it is possible to generate terrain parameters such as elevation, slope, length etc as measuring units for glaciers and glacial lakes. Other attributes, such as aspect, mean length, elevation, map code, name, etc, were manually entered in the attribute database. Additional attributes, such as mean elevation, volume etc were derived using logical calculations. For each basin, attribute tables were developed for glaciers and glacial lakes. Some of the attributes were also derived from the results of an aggregation in the same table or from another table using the table joining operations, such as glaciers associated with the glacial lakes, etc. The attribute database for glaciers and glacial lakes is given in the annexes.

The criteria for the identification of potentially dangerous glacial lakes are explained in Chapter 11. Using the logical calculation in the GIS, the potentially dangerous glacial lakes were determined. To study the geomorphic characteristics of these potentially dangerous lakes, time-series' satellite images and aerial photographs were used and the potentially dangerous glacial lakes were finally identified (Table 11.15).

Chapter 6
Application of Remote Sensing

Glaciers and glacial lakes are generally located in remote areas, where access is through tough and difficult terrain. The study of glaciers and glacial lakes, as well as carrying out glacial lake outburst flood (GLOF) inventories and field investigations using conventional methods, requires extensive time and resources together with undergoing hardship in the field. Creating inventories and monitoring of the glaciers, glacial lakes, and extent of GLOF impact downstream can be done quickly and correctly using satellite images and aerial photographs. Use of these images and photographs for the evaluation of physical conditions of the area provides greater accuracy. The multi-stage approach using remotely sensed data and field investigation increases the ability and accuracy of the work. Visual and digital image analysis techniques integrated with techniques of geographic information systems (GIS) are very useful for the study of glaciers, glacial lakes, and GLOFs.

At first the inventory and evaluation of the glaciers, glacial lakes, and GLOFs were carried out based on topographic maps. The topographic maps of the higher terrain, which houses glaciers and glacial lakes, are not as reliable as those of hills and lowland areas. As a complementary data and tool, various remote-sensing techniques and satellite images were used.

Remote sensing is the science and art of acquiring information (spectral, spatial, temporal) about material objects, areas, or phenomena through the analysis of data acquired by a device from measurements made at a distance, without coming into physical contact with the objects, area, or phenomena under investigation.

Remote-sensing technology makes use of the wide range of the electro-magnetic spectrum (EMS). Most of the commercially available remote-sensing data are acquired in the visible, infrared, and microwave wavelength portion of the EMS. For the present study, the data acquired within the visible and infrared wavelength ranges were used.

There are different types of commercial satellite data available. Digital data sets of the Land Observation Satellite (LANDSAT)-5 Thematic Mapper (TM) and Indian Remote Sensing Satellite Series 1D (IRS1DL Linear Imaging and Self Scanning Sensor (LISS)3 were used mostly for the present study. Some data sets of Stéréo Système Probatoire d'Observation de la Terre (SPOT) Multi-Spectral (XS) and SPOT Panchromatic (PAN) were also used. The list of the images and aerial photographs relevant to the present study are given in Chapter 4.

A scene of a LANDSAT TM image gives the synoptic view of an area of 185 km by 170 km of the Earth's surface sensed by the American LANDSAT satellite from an altitude of 705 km. There are seven spectral bands of electromagnetic spectrum in LANDSAT TM data, ranging from the blue to far infrared wave length (Figure 6.1). The individual bands are 0.45–0.52, 0.53–0.60, 0.62 –0.69, 0.78–0.90, 1.57–1.78, and 2.10–2.35 μm with the spatial resolution of 30m in the visible, near infrared and middle infrared bands, and 10.45–11.66 μm in the far infrared band with 120m resolution. Some of the potential applications of different spectral bands of LANDSAT TM are given in Table 6.1. The TM sensors greatly facilitate the multi-temporal data availability (repeated coverage of 16 days) for studying the temporal changes of glaciers, lakes, and other features.

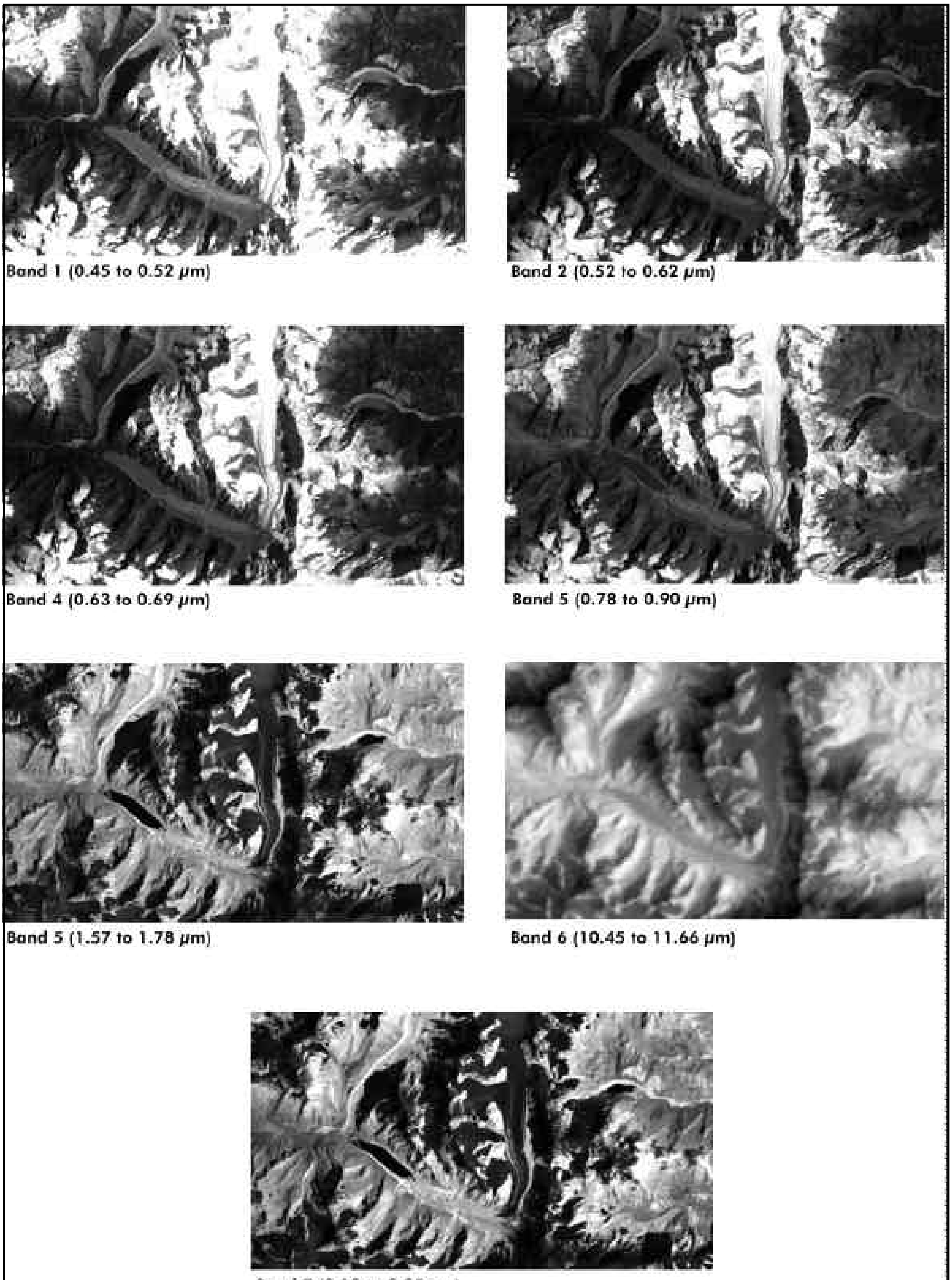


Figure 6.1: Individual bands of LANDSAT 4 TM images of 22 September 1992 showing part of Rolwaling Valley (left) and Dudh Koshi (right) Valley in Nepal

The SPOT series of French satellites and recent series of IRS satellites have more advantages for the study of glaciers, glacial lakes, and GLOFs due to their stereo data acquisition capacity (±26° off-nadir viewing capability of the system) and higher spatial resolutions of 6 (IRS1C/IRSID PAN data) to 10m (SPOT PAN data).

Table 6.1: Spectral band ranges (µm) used in TM on board LANDSAT's 4 and 5 sensor system and their potential applications

Band number	Band range (µm)	Potential applications
1	0.45–0.52	Coastal water mapping; soil/vegetation differentiation; deciduous/coniferous differentiation (sensitive to chlorophyll concentration) etc
2	0.52–0.62	Green reflectance by healthy vegetation etc
3	0.63–0.69	Chlorophyll absorption for plant species' differentiation
4	0.78–0.90	Biomass surveys; water body delineation
5	1.55–1.75	Vegetation moisture measurement; snow/cloud differentiation; snow/ice quality study
6	10.4–12.5	Plant heat stress management; other thermal mapping; soil moisture discrimination
7	2.08–2.35	Hydro-thermal mapping; discrimination of mineral and rock types; snow/cloud differentiation; snow/ice quality study

LISS3 sensors on board IRS1C/D satellites provide multi-spectral data collected in four bands of VNIR (visible and the near infrared) and SWIR (short wave infrared) regions (Tables 6.2 and 6.3). LISS3 images cover an area of 124 by 141 km for the VNIR bands (B2, B3, B4) and 133 by 148 km for the SWIR band (B5) sensed from an altitude of 817 km (IRS1C) to 780 km (IRS1D) with repetitive coverage of 25 days. The spatial resolution of VNIR bands is 24m and that of SWIR is 71m. The spatial resolution of LISS3 of the IRS satellite series and XS of the SPOT satellite series are greater than that of LANDSAT TM. With a greater number of spectral bands and spatial resolution of 30 by 30m

Table 6.2: Some optical sensor system characteristics of Earth resources satellites used in the study

Satellite system Optical sensor system (Launch dates)	LANDSAT 4/5 MSS (1982 LANDSAT-4) (1985 LANDSAT -5)	LANDSAT 4/5 TM (1982 LANDSAT-4) (1984 LANDSAt-5) (1999 LANDSAT -7)	SPOT XS (1986 SPOT-1) (1990 SPOT-2) (1993 SPOT-3) (1999 SPOT-4)	IRS-1C LISS-III (1995 IRS-1C) (1997 IRS-1D)
Sensor altitude	LANDSAT 1,2,3 = 900 km LANDSAT 4, 5 = 705 km	705 km	832 km	817 km
Spatial resolution	80m	30m	20m	24m
Temporal resolution (revisit cycle in days)	16	16	20 (nadir)	24 (nadir)
Radiometric resolution (bits per pixel)	6-bit (scaled to 7 or 8-bit during ground processing)	8-bit	8-bit	7-bit
Swath width	185 km scene area = 185*170	185 km scene area = 185*170	60 km	141 km 124*141 133*148
Off-nadir viewing (side-look) capability for PAN mode for stereo image data acquisition (±26° off-nadir viewing)			SPOT PAN (10m resolution) 0.51–0.73 µm 3 days revisit capability	IRS-1C PAN (6m resolution) (70 km swath width) 0.50–0.70 µm (6-bit) 3 days revisit capability
Spectral resolution (number of bands)	4	7	3	4

close to the former two data types, cloud free LANDSAT TM data are equally good for the inventory and evaluation of glaciers, glacial lakes, and GLOFs in the medium scale (1:100,000 to 1:25,000). One can compare the amount of detail in different images covering the same area of Rolwaling and Dig Tsho Lakes in Figures 6.4 and 6.5.

When electro-magnetic energy is incident on any given Earth surface feature, three fundamental energy interactions with the feature are possible. Various fractions of energy incident on the element are

Table 6.3: Wavelength ranges of the optical sensor system of Earth resources satellites used in the present study

Satellites systems Optical sensor system	LANDSAT 4/5 MSS	LANDSAT 4/5 TM	SPOT XS	IRS-1C/1D LISS-III
Blue		0.45–0.52 μm (B1)		
Green	0.50–0.60 μm (Ch1 or B4)	0.53–0.61 μm (B2)	0.50–0.59 m (XS1)	0.52–0.59 μm (B2)
Red	0.60–0.70 μm (Ch2 or B5)	0.62–0.69 μm (B3)	0.62–0.68 μm (XS3)	0.62–0.68 μm (B3)
NIR	0.70–0.80 μm (Ch3 or B6)	0.78–0.90 μm (B4)	0.78–0.88 μm (XS3)	0.77–0.86 μm (B4)
NIR	0.80–1.10 μm (Ch4 or B7)			
IIR		1.57–1.78 μm (B5)		1.55–1.75 μm (B5)
IIR		2.10–2.35 μm (B7)		
IIR (MIR)				
ThIR		10.45–11.66 μm (B6)		
FIR				

reflected, absorbed, and/or transmitted. All components of incident, reflected, absorbed, and/or transmitted energy are a function of the wavelength. The proportions of energy reflected, absorbed, and transmitted vary for different Earth features, depending on their material types and conditions. These differences permit us to distinguish different features on an image. Thus, two features may be distinguishable in one spectral range and may be very different on another wavelength band. Within the visible portion of the spectrum, these spectral variations result in the visual effect called **colour**. For example, blue objects reflect highly in the blue portion of the spectrum, likewise green reflects highly in the 'green' spectral region, and so on. Thus, the eye uses spectral variations in the magnitude of reflected energy to discriminate between various objects.

Satellite data are digital records of the spectral reflectance of the Earth's surface features. These digital values of spectral reflectance are used for image processing and image interpretations. A graph of the spectral reflectance of an object as a function of wavelength is called a spectral reflectance curve. The configuration of spectral reflectance curves provides insight into the characteristics of an object and has a strong influence on the choice of wavelength region(s) in which remote-sensing data are acquired for a particular application. Figure 6.2 shows the typical spectral reflectance curves for three basic types of Earth feature: green vegetation, soil, and water. The lines in this figure represent average reflectance curves compiled by measuring large sample features. It should be noted how distinctive the curves are for each feature. In general, the configuration of these curves is an indicator of the type and condition of the features to which they apply. Although the reflectance of individual features may vary considerably above and below the average, these curves demonstrate some fundamental points concerning spectral reflectance.

Spectral reflectance curves for vegetation almost always manifest the 'peak-and-valley' configuration (Figure 6.2). Valleys in the different parts of the spectral reflectance curve are the result of the absorption of energy due to plants, leaves, pigments, and chlorophyll content at 0.45 and 0.67 μm wavelength bands and water content at 1.4, 1.9, and 2.7 μm wavelength bands. In near infrared spectrum wavelength bands ranging from about 0.7–1.3 μm, plants reflect 40–50% of energy incident upon them. The reflectance is due to plant leaf structure and is highly variable among plant species, which permits discrimination between species. Different plant species reflect differently in different portions of wavelength.

The soil curve in Figure 6.2 shows considerably less peak-and-valley variation in reflectance. This is because the factors that influence soil reflectance act over less specific spectral bands. Some of the factors affecting soil reflectance are moisture content, soil texture (proportion of sand, silt, and clay), surface roughness, presence of iron oxide, and organic matter content. These factors are complex, variable, and inter-related. For example, the presence of moisture in soil will decrease its reflectance. As with vegetation, this effect is greatest in the water absorption bands at about 1.4, 1.9, and 2.7 μm (clay soils

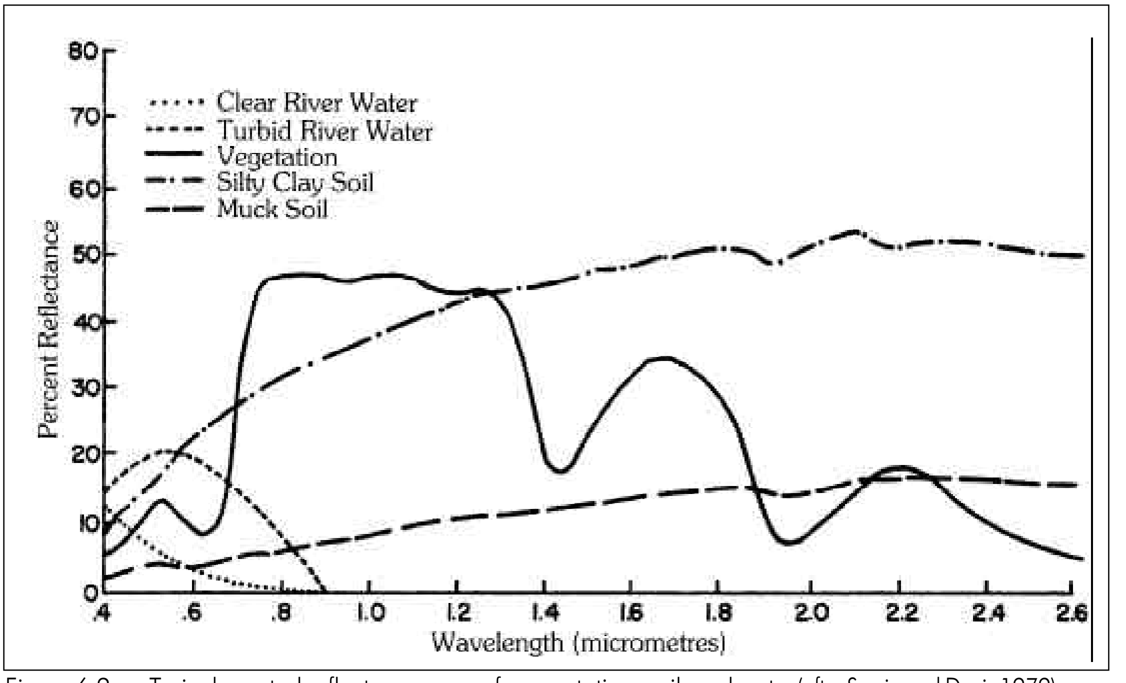


Figure 6.2: Typical spectral reflectance curves for vegetation, soil, and water (after Swain and Davis 1979)

also have hydroxyl absorption bands at about 1.4 and 2.2 μm). Soil moisture content is strongly related to soil texture; coarse and sandy soils are usually well drained, resulting in low moisture content and relatively high reflectance; poorly drained and fine-textured soils will generally have lower reflectance. In the absence of water, however, the soil may exhibit the reverse tendency, that is, coarse-textured soils may appear darker than fine-textured soils. Thus, the reflectance properties of soil are consistent only within a particular range of conditions. Two other factors that reduce soil reflectance are surface roughness and organic matter content. Soil reflectance normally decreases when surface roughness and organic matter content increases. The presence of iron oxide in soil also significantly decreases reflectance, at least in the visible wavelengths. In any case, it is essential that the analyst be familiar with the existing conditions.

When considering the spectral reflectance of water, probably the most distinctive characteristic is the energy absorption at near infrared wavelengths. Water absorbs energy in these wavelengths, whether considering water features per se (such as lakes and streams) or water contained in vegetation or soil. Locating and delineating water bodies with remote-sensing data are carried out easily in near infrared wavelengths because of this absorption property. However, various conditions of water bodies manifest themselves primarily in visible wavelengths. The energy/matter interactions at these wavelengths are very complex and depend on a number of inter-related factors. For example, the reflectance from a water body can stem from an interaction with the water surface (specula reflection), with material suspended in the water, or with the bottom of the water body. Even in deep water where bottom effects are negligible, the reflectance properties of a water body are not only a function of the water per se but also of the material in the water.

Clear water absorbs relatively little energy with wavelengths of less than about 0.6 μm. High transmittance typifies these wavelengths with a maximum in the blue-green portion of the spectrum. However, as the turbidity of water changes (because of the presence of organic or inorganic materials), transmittance, and therefore reflectance, changes dramatically. This is true in the case of water bodies in the same geographic area. Spectral reflectance increases as the turbidity of water increases. Likewise, the reflectance of water depends on the concentration of chlorophyll. Increases in chlorophyll concentration tend to decrease water reflectance in blue wavelengths and increase it in green wavelengths. Many important water characteristics, such as dissolved oxygen concentration, pH, and salt concentration, cannot be observed directly through changes in water reflectance. However, such parameters sometimes correlate with observed reflectance. In short, there are many complex inter-relationships between the spectral reflectance of water and its particular characteristics. One must use appropriate reference data to correctly interpret reflectance measurements made over water.

Snow and ice are the frozen state of water. Early work with satellite data indicated that snow and ice could not be reliably mapped because of the similarity in spectral response between snow and clouds due to limitations in the then available data set. Today satellite remote sensing systems' data are available in more spectral bands (e.g. LANDSAT TM in seven bands). It is now possible to differentiate snow and cloud easily in the middle infrared portion of the spectrum, particularly in the 1.55–1.75 and 2.10–2.35 μm wavelength bands (bands 5 and 7 of LANDSAT TM). As shown in Figure 6.3, in these wavelengths, the clouds have a very high reflectance and appear white on the image, while the snow has a very low reflectance and appears black on the image. In the visible, near infrared, and thermal infrared bands, spectral discrimination between snow and clouds is not possible, while in the middle infrared it is. The reflectance of snow is generally very high in the visible portions and decreases throughout the reflective infrared portions of the spectrum. The reflectance of old snow and ice is always lower than that of fresh snow and clean/fresh glacier in all the visible and reflective infrared portions of the spectrum. Compared to clean glacier and snow (fresh as well as old), debris covered glacier and very old/dirty snow have much lower reflectance in the visible portions of the spectrum and higher in the middle infrared portions of spectrum.

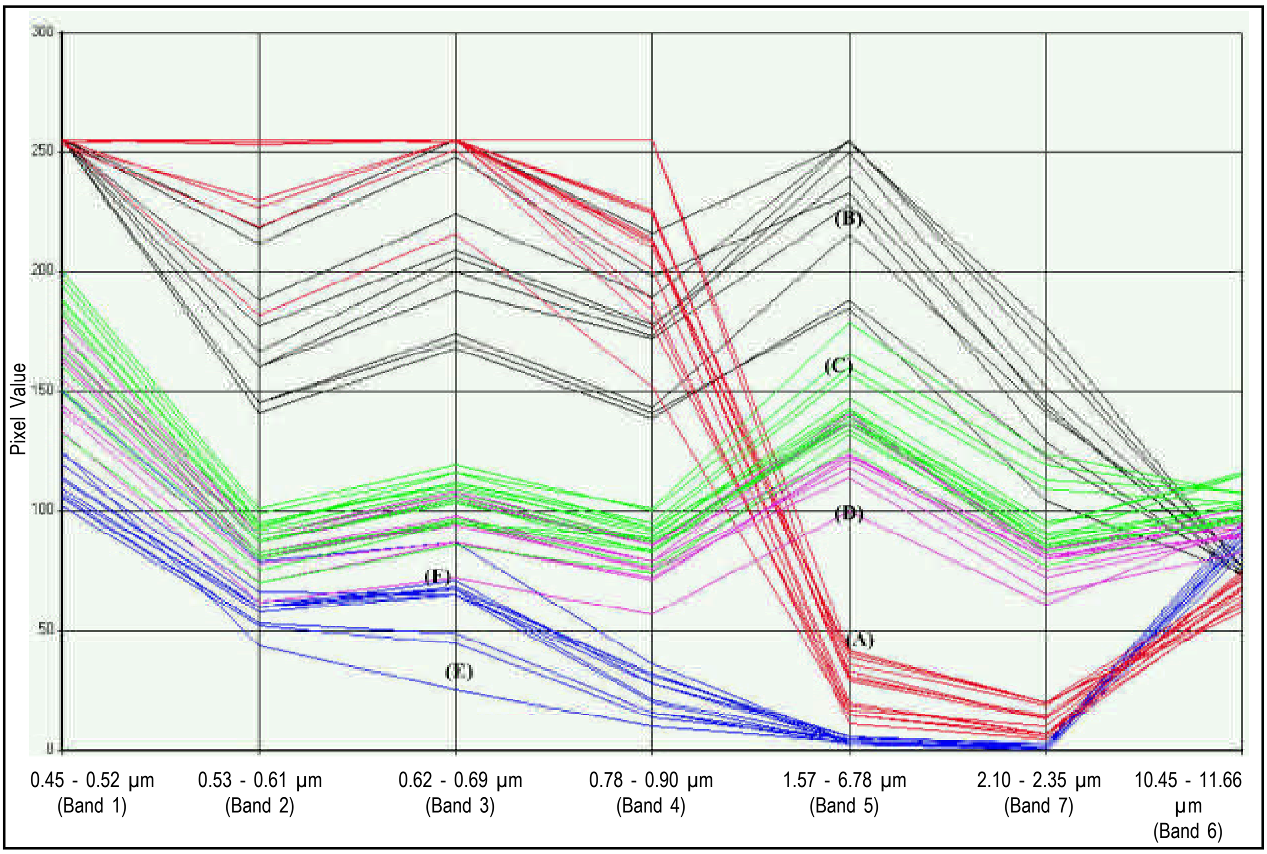


Figure 6.3: Spectral reflectance characteristics of snow/ice, clean glaciers, debris covered glaciers, clouds, and water bodies. Reflectance in terms of pixel value based on a September 22, 1992, LANDSAT TM seven-band data set of the Tama Koshi and Dudh Koshi areas of Nepal. Red lines—clean glaciers and fresh snow (A); black lines—clouds (B); green lines—recent debris from GLOFs (C); maroon lines—debris covered glacier (D); blue lines—clean/melted (E) and silty and/or partly frozen water (lake) (F)

To identify the individual glaciers and glacial lakes, different image enhancement techniques are useful. However, complemented by the visual interpretation method (visual pattern recognition), with the knowledge and experience of the terrain conditions, glacier and glacial lake inventories and monitoring can be done. With different spectral band combinations in false colour composite (FCC) and in individual spectral bands, glaciers and glacial lakes can be identified and studied using the knowledge of image interpretation keys: colour, tone, texture, pattern, association, shape, shadow etc. Combinations of different bands can be used to prepare FCC. Different colour composite images highlight different land-cover features.

Figures 6.4 and 6.5 show different colour composite images assigning red, green, and blue colours to different bands of a LANDSAT-4 TM image of 22 September 1992 covering an area of Tsho Rolpa Glacial Lake in Rolwaling Valley (left) and Dig Tsho Glacial Lake in Dudh Koshi Valley (right). In Figures 6.4 and 6.5 one can identify different types of land cover, glaciers, glacial lakes, and GLOF events such as: (A) Tsho Rolpa Glacial Lake; (B) Dig Tsho Glacial Lake, which breached on 4 August 1985; (C) Drolomba Glacier (clean and complex valley type glacier); (D) Trakarding Glacier (debris cover type glacier); (E) Langmoche Glacier (hanging type glacier); (F) Rolwaling Khola showing the effect of debris flow (11 July 1991) from Ripimoshar En-Glacial Lake; (G) Lamoche Khola showing the effect of debris flow (4 August 1985) from Dig Tsho Glacial Lake; and (H) Ripimoshar Glacier. Colours in the colour composite images and tones in the individual band images are the outcome of the reflectance values. Glaciers appear white (in individual bands and colour composite) to light blue (in colour composite) colour of variable sizes, with linear and regular shape having fine to medium texture, whereas, in the thermal band, they appear grey to black. The distinct linear and dendritic pattern associated with slopes and valley floors of the high mountains covered with seasonal snow can be distinguished in the glaciers in the mountains.

The lake water in colour composite images ranges in appearance from light blue to blue to black. In the case of frozen lakes, it appears white. Sizes are generally small, having circular, semi-circular, or elongated shapes with very fine texture and are generally associated with glaciers in the case of high lying areas, or rivers in the case of low lying areas. In general, erosion lakes and some cirque lakes are not necessarily associated with glaciers or rivers at present. The debris flow path along the drainage channel gives a white to light grey and bright tone.

For glacier and glacial lake identification from satellite images, the images should be with least snow cover and cloud free. Least snow cover in the Himalayas occurs generally in the summer season (May–September). But during this season, monsoon clouds will block the views. If snow precipitation is late in the year, winter images are also suitable except for the problem of long relief shadows in the high mountain regions. For the present study, most of the images are of the winter season under conditions of least seasonal snow cover and cloud free.

Knowledge of the physical characteristics of the glaciers, lakes, and their associated features is always necessary for the interpretation of the images. For example, the end moraine damming the lake may range from a regular curved shape to a semi-circular crescent shape. The frozen lake and glacier ice field may have the same reflectance, but the frozen lake always has a level surface and is generally situated in the ablation areas of glaciers or at the toe of the glacier tongue, and there is greater possibility of association with drainage features downstream.

The technique of digital image analysis facilitates image enhancement and spectral classification of the ground features and, hence, greatly helps in the study of glaciers and lakes. Monitoring of the lakes and glaciers can be done visually as well as digitally. In both the visual interpretation and digital feature extraction techniques, the analyst's experience and adequate field knowledge are necessary. The satellite images have to be geometrically rectified based on the appropriate geo-reference system and cell sizes. The same geo-reference system is required for the integration and analysis of the remote sensing satellite data in the GIS database. The image resolutions and geo-reference system should be the same for better results. Figure 6.6 shows an example of the Tsho Rolpa and Dig Tsho lake areas of Nepal on three different dates. The images are projected in the same geo-reference system and resampled into the same size. The three-date images show the change in physical condition and the process related to the glacial lake; they indicate the fast growth of Tsho Rolpa glacial lake at the tongue of Trakarding glacier and the GLOF event from Dig Tsho of 4 August 1985.

The lakes that have already burst in the past can be identified from the disturbed damming materials and the drainage characteristics associated with the debris along the valley. Figures 6.4 and 6.6–6.11 show rapid growth of Tsho Rolpa Glacial Lake and the situation before and after the breaching on 4 August 1985 of the Dig Tsho Glacial Lake located near the tongue of Langmoche glacier and dammed by a moraine. Tsho Rolpa Glacial Lake is dammed by ice cored moraine. The length of Tsho Rolpa Glacial Lake was about 2,500m in April 1984, 3,000m in November 1992, and 3,300m in January 1999. If the moraine damming the lake remains stable, Tsho Rolpa Glacial Lake could reach up to 5,000m in length within the next 15 years.

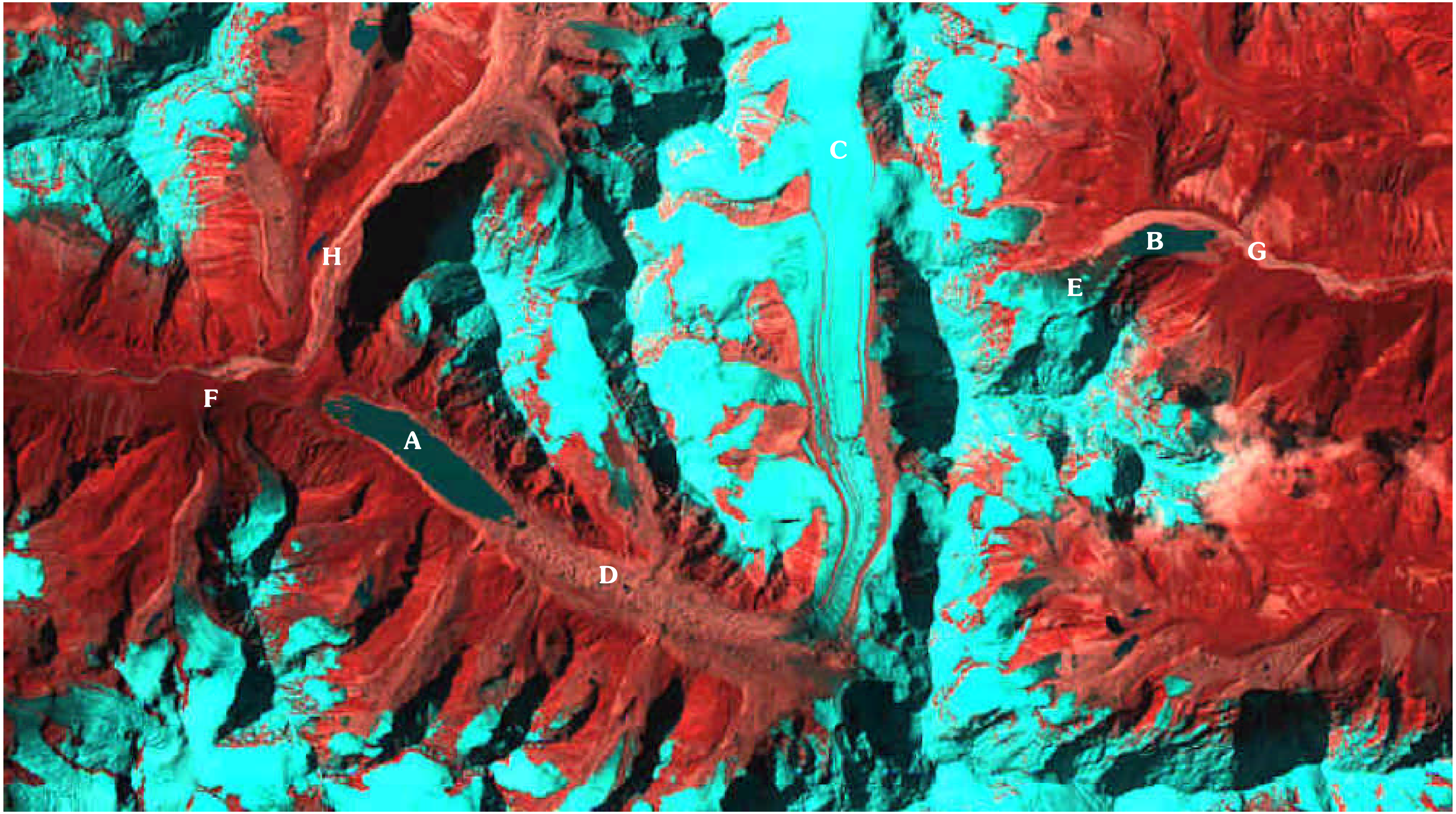


Figure 6.4: LANDSAT-4 TM image FCC R5G4B2 of 22 September 1992 (A) Tsho Rolpa Glacial Lake; (B) Dig Tsho Glacial Lake (breached on 4 August 1985); (C) Drolomba (clean and complex valley) Glacier; (D) Trakarding Glacier (debris cover type glacier); (E) Langmoche (hanging) Glacier; (F) Rolwaling Khola showing the effect of debris flow (11 July 1991) from Ripimoshar En-Glacial Lake; (G) Lamoche Khola showing the effect of debris flow (4 August 1985) from Dig Tsho Glacial Lake; (H) Ripimoshar Glacier

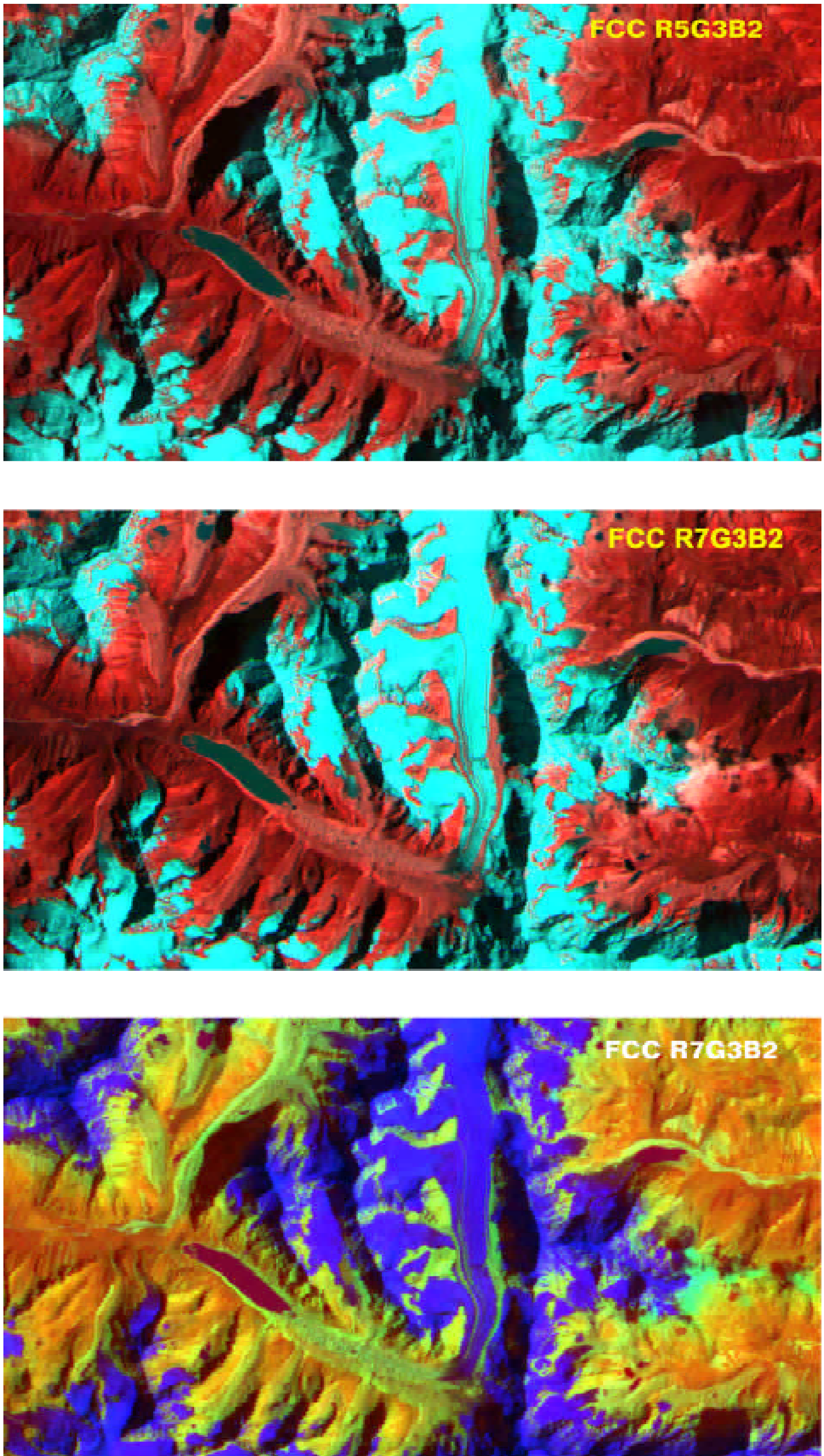


Figure 6.5: Examples of different combinations of bands to generate FCC

An ice-cored moraine dam usually has a hummock dissected end moraine with smaller ponds in some cases, which show a coarse texture in satellite images. The lateral moraine ridges are generally of a smooth, narrow, linear appearance and are easily identifiable on the images. The channel path along which glacial lake outburst flooding has occurred shows distinct light tone widths along the drainage channel and banks due to bank erosion and deposition in different places along the river. The loose materials transported and deposited along the streams have higher spectral reflectance compared to their surroundings and old stable river channels, which appear relatively lighter and brighter in the satellite image. Figure 6.12 shows the change in shape and size of Imja Glacial Lake during the period between 1991 and 1999.

Coarse spatial resolution images have limitations when distinguishing smaller lakes and small stream paths. However, such smaller objects will show up in the coarse spatial resolution images averaged with reflectance values of their surrounding objects. One can identify in the satellite image (Figure 6.13) the ancient glacial lake around the Machapuchre–Annapurna region that was the source of debris flow deposited in Pokhara Valley in Nepal. Figure 6.14 shows evidence of the GLOF from the Lirlung Kyenging area in Langtang Valley. Past GLOF events can easily be identified in areas such as Barun Valley (Figure 6.15), Kali Gandaki Valley in Mustang (Figures 6.16, 6.17, and 6.18), and Mugu Karnali Valley (Figure 6.19). About a kilometre long and half a kilometre wide, Lower Barun Glacial Lake has developed (Figure 6.15) at the tongue of Glacier number 20 of the Arun Basin. One can observe the breaching and debris effects of the Dig Tsho Glacial Lake (Figure 6.4), Nagma Glacial Lake (Figure 6.20), and Chubung Repimosar En-glacial Lake (Figure 6.4). The Nagma Glacial Lake that burst in 1980, carrying lots of debris, blocked the tributary river and created a debris dammed lake in the Tamor River that is visible on the images (Figure 6.20). The largest number and area of lakes is shown in the Panch Pokhari area in Hungu Valley of the Dudh Koshi Basin (Figure 6.21).

The technique of integrating remote-sensing data with GIS does help a lot with identification and monitoring of lakes and glaciers. The DEM of an area generated, either using stereo satellite images, aerial photographs, or digitisation of topographic map data, can play a big role in deciding the rules for discrimination of features and land-cover types in GIS techniques and for better perspective viewing and presentations (Figure 6.22). DEM itself can be used to create various data sets of the area (e.g. slope, aspect). For example, even though glacial lakes are covered by snow, the lake surfaces are flat, and glaciers, snow, and ice give some slope angle. In this case, decision rules for integrated analysis in GIS can be assigned, that is, if the slope is not so pronounced, then those areas are recognised as the frozen glacial lakes. DEM should be compatible with and of reliable quality when compared with other data sets. The satellite images or orthophotos can be draped over the DEM for interpretation or presentation. Figures 6.8–6.11 show some examples of the use of DEM and are draped by satellite images and inventory data.

Based on different criteria, actively retreating glaciers and potentially dangerous lakes can be determined using the developed spatial and attribute database complemented by multi-temporal remote-sensing data sets. Once the activity of glaciers and the potentially dangerous status of lakes are determined, the use of medium- to large-scale aerial photographs provides the best tool for detailed geomorphic studies and other evaluation. The photograph image characteristics, shape, shadow, tone, colour, texture, pattern, and relation to surrounding objects were used for aerial photo interpretation. Geomorphic features and processes of the area are very distinctive in their appearance on the aerial photographs. Physical parameters of the glaciers, glacial lakes, and associated moraines can easily be estimated by stereoscopic viewing. Aerial photographs of 1992 and 1996, on the approximate scale of 1:50,000, are available for the eastern and western halves of Nepal respectively. All the potentially dangerous lakes and associated glaciers were identified and physical parameters and on-going geomorphic processes in the area were studied. Some examples of aerial photographs showing past outbursts and potentially dangerous lakes are shown in Figures 6.23–6.26.

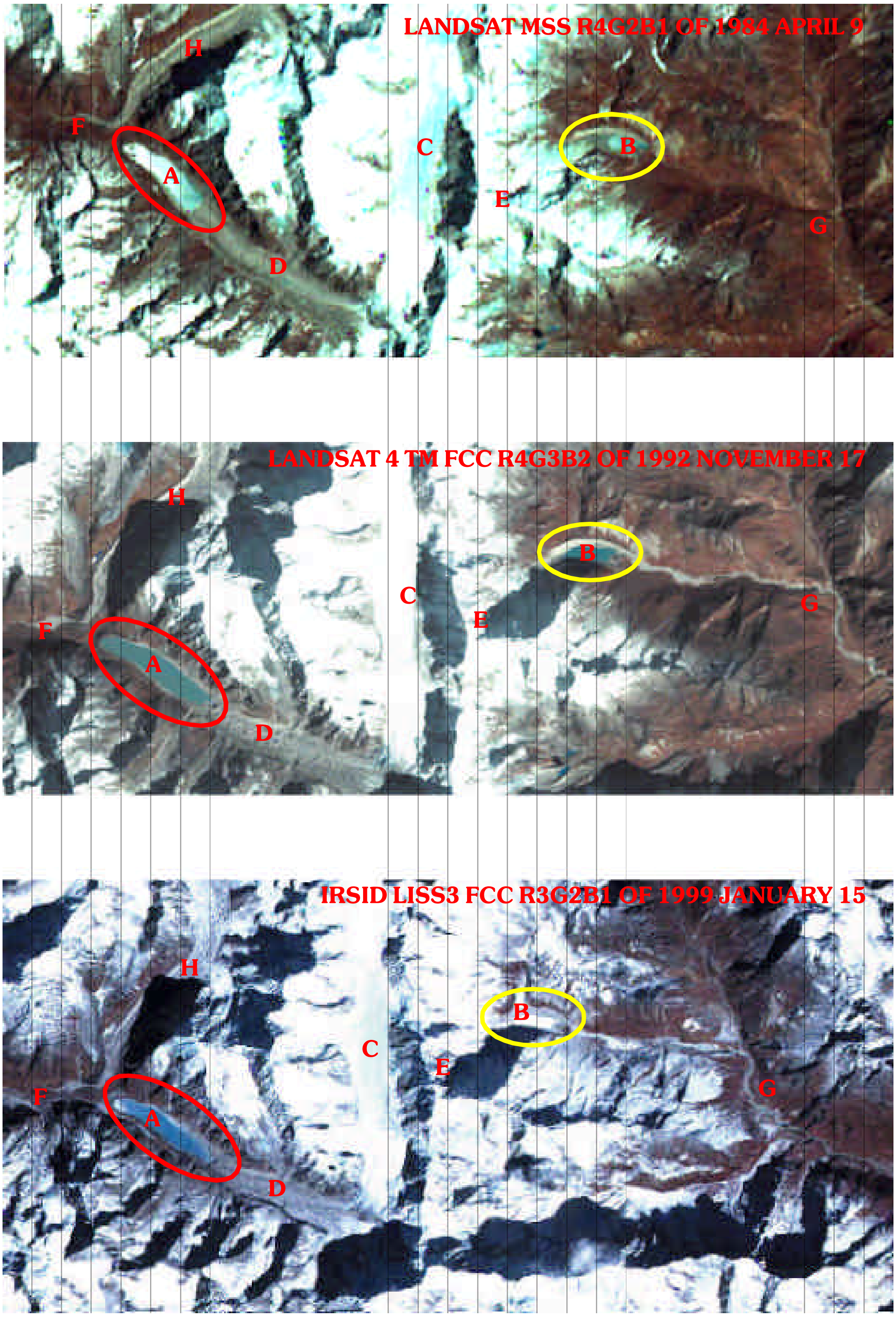


Figure 6.6: Satellite images of 1984, 1992, and 1999 of the Tsho Rolpa and Dig Tsho

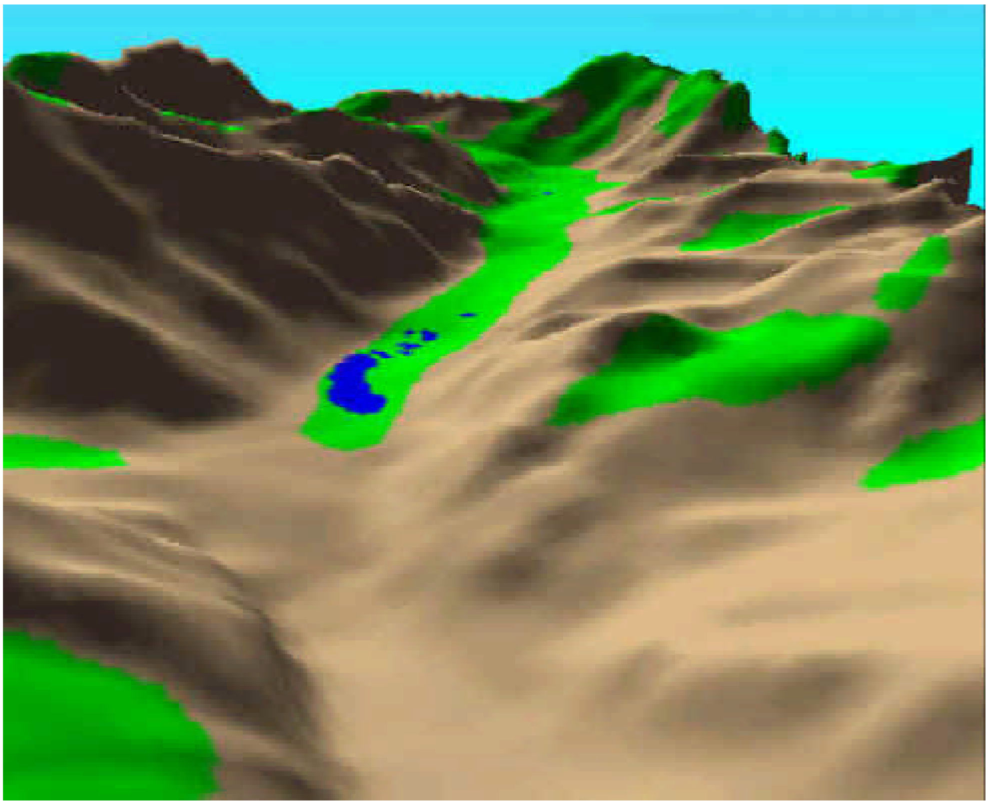


Figure 6.7: Glaciers (green) and lakes (blue) based on topographic maps published by the Survey of India (1960s–1970s) on a scale of 1:63,360 and draped over the digital elevation model (DEM) generated from the topographic map of Tsho Rolpa Glacial Lake area in Rolwaling Valley

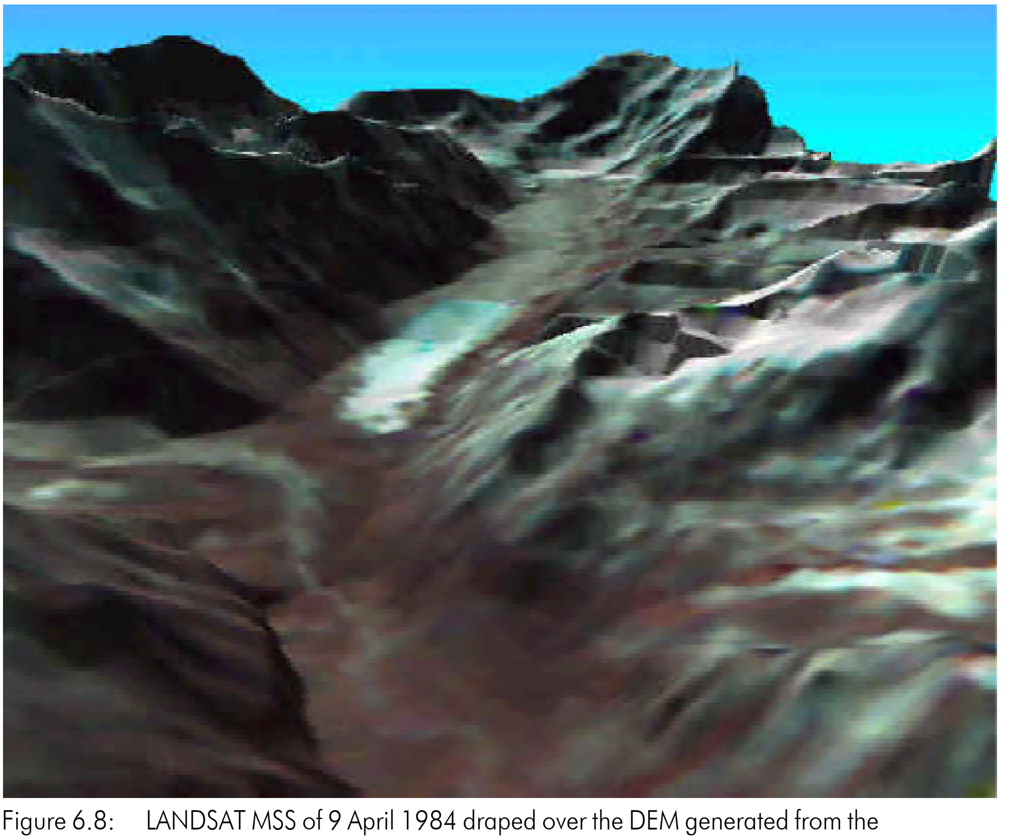


Figure 6.8: LANDSAT MSS of 9 April 1984 draped over the DEM generated from the topographic map of 1:63,360 of Tsho Rolpa Glacial Lake area in Rolwaling Valley

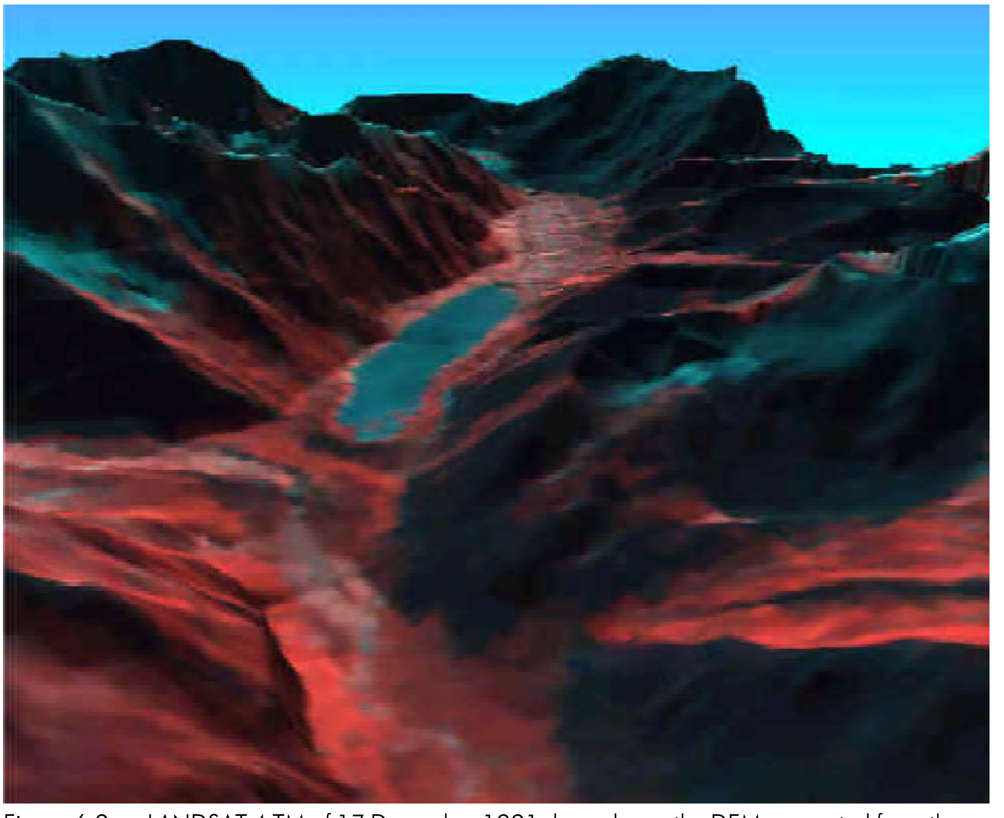


Figure 6.9: LANDSAT 4 TM of 17 December 1991 draped over the DEM generated from the topographic map of 1:63,360 of Tsho Rolpa Glacial Lake area in Rolwaling Valley

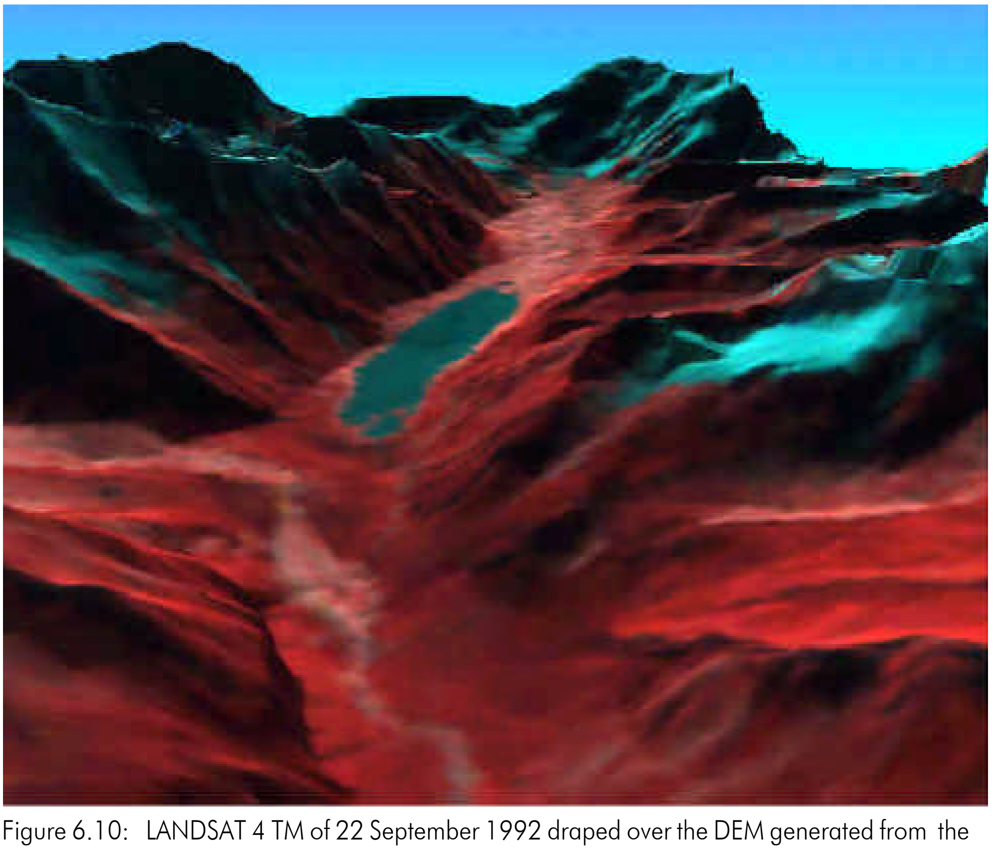


Figure 6.10: LANDSAT 4 TM of 22 September 1992 draped over the DEM generated from the topographic map of 1:63,360 of Tsho Rolpa Glacial Lake area in Rolwaling Valley

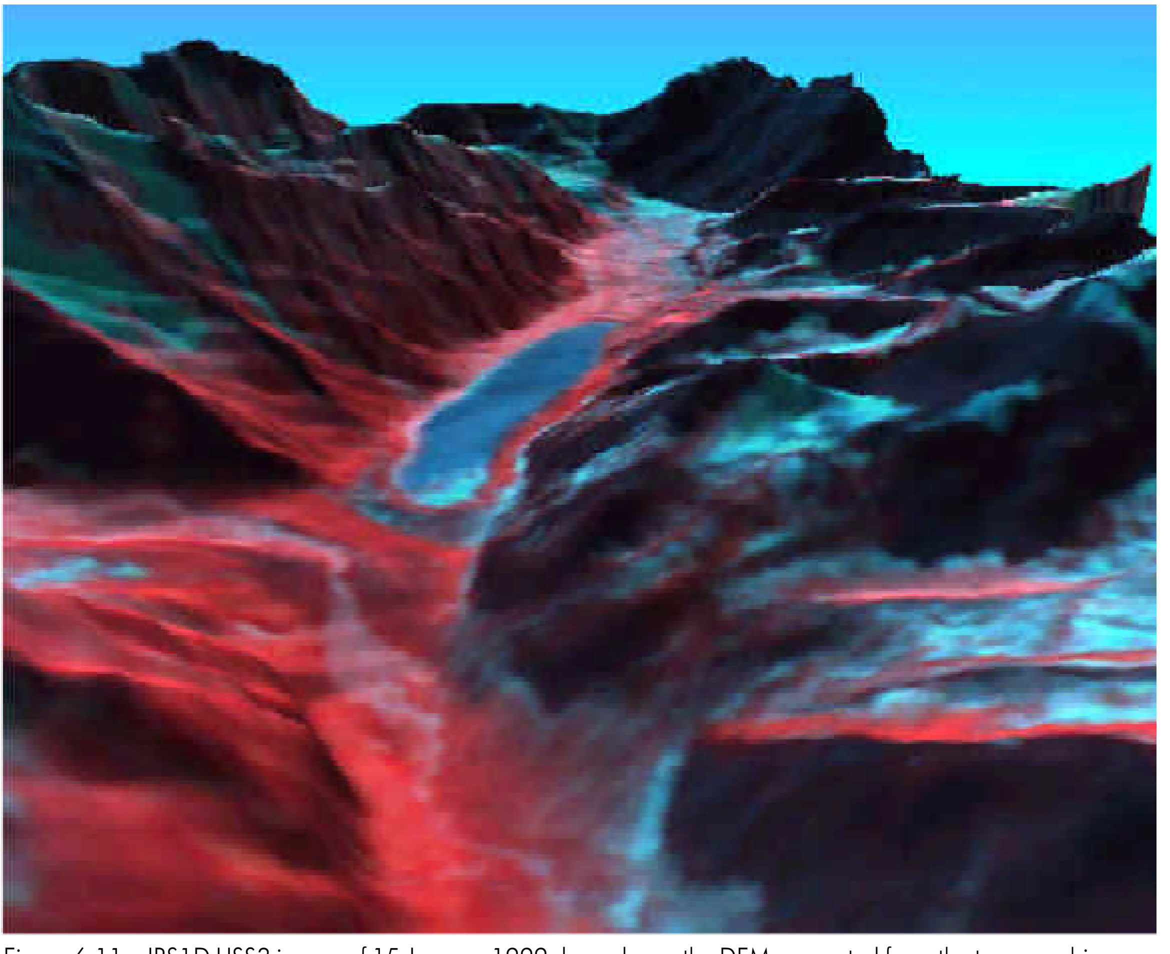
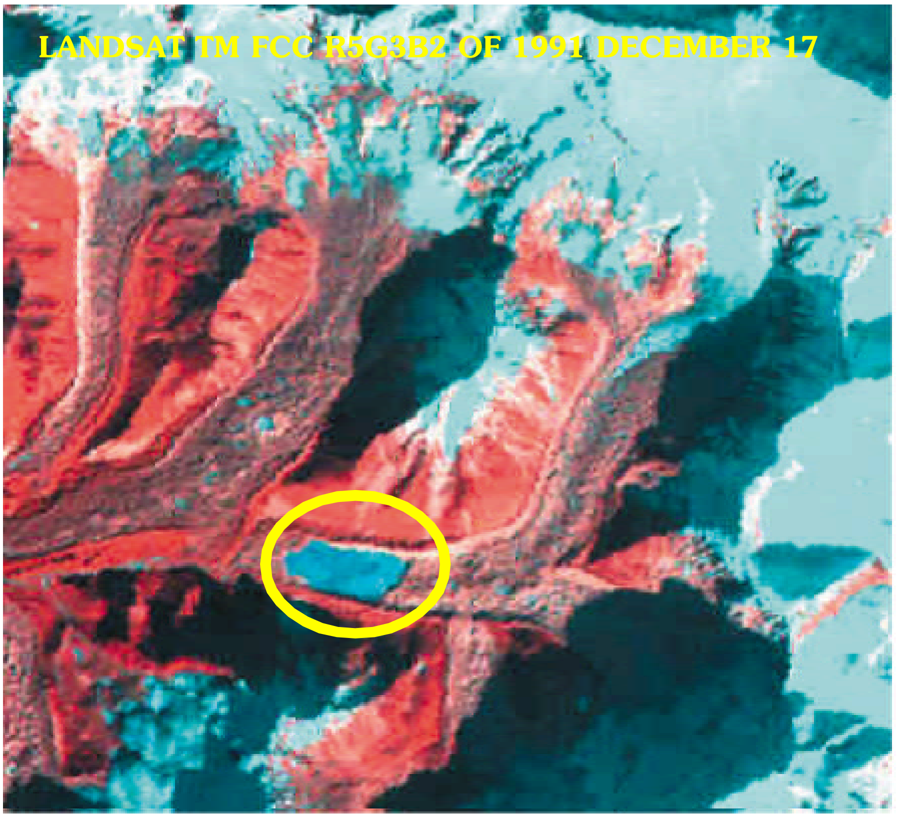


Figure 6.11: IRS1D LISS3 image of 15 January 1999 draped over the DEM generated from the topographic map of 1:63,360 of Tsho Rolpa Glacial Lake area in Rolwaling Valley



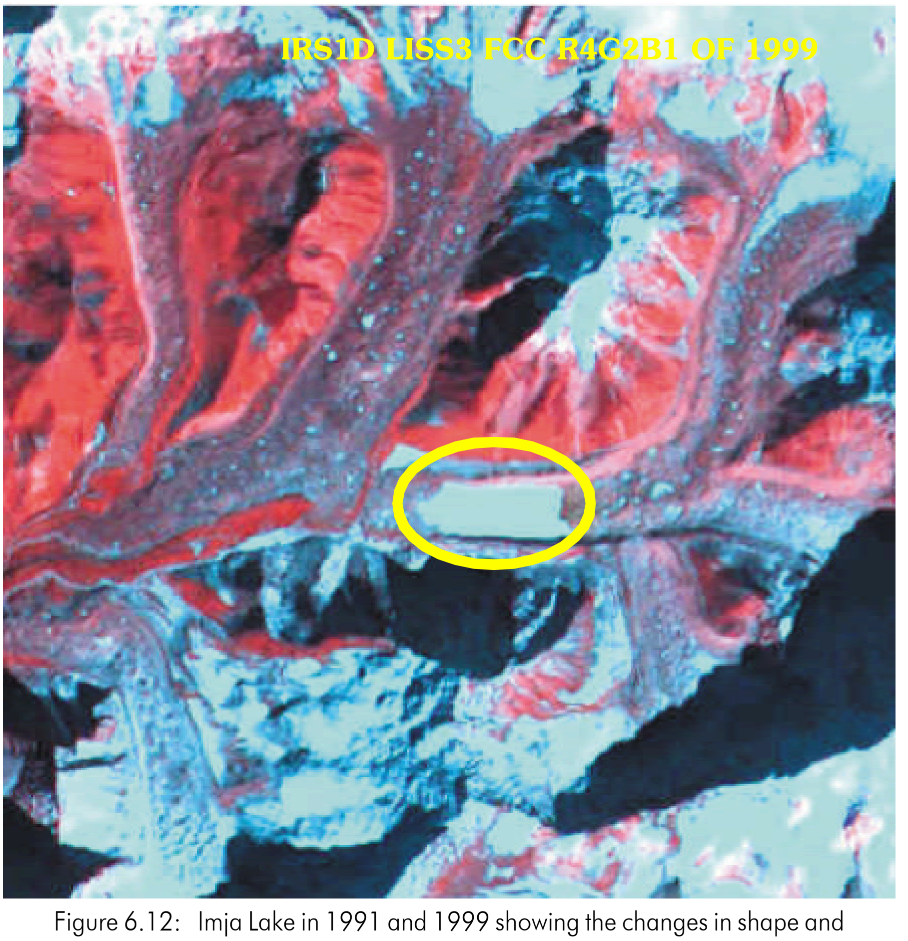


Figure 6.12: Imja Lake in 1991 and 1999 showing the changes in shape and size

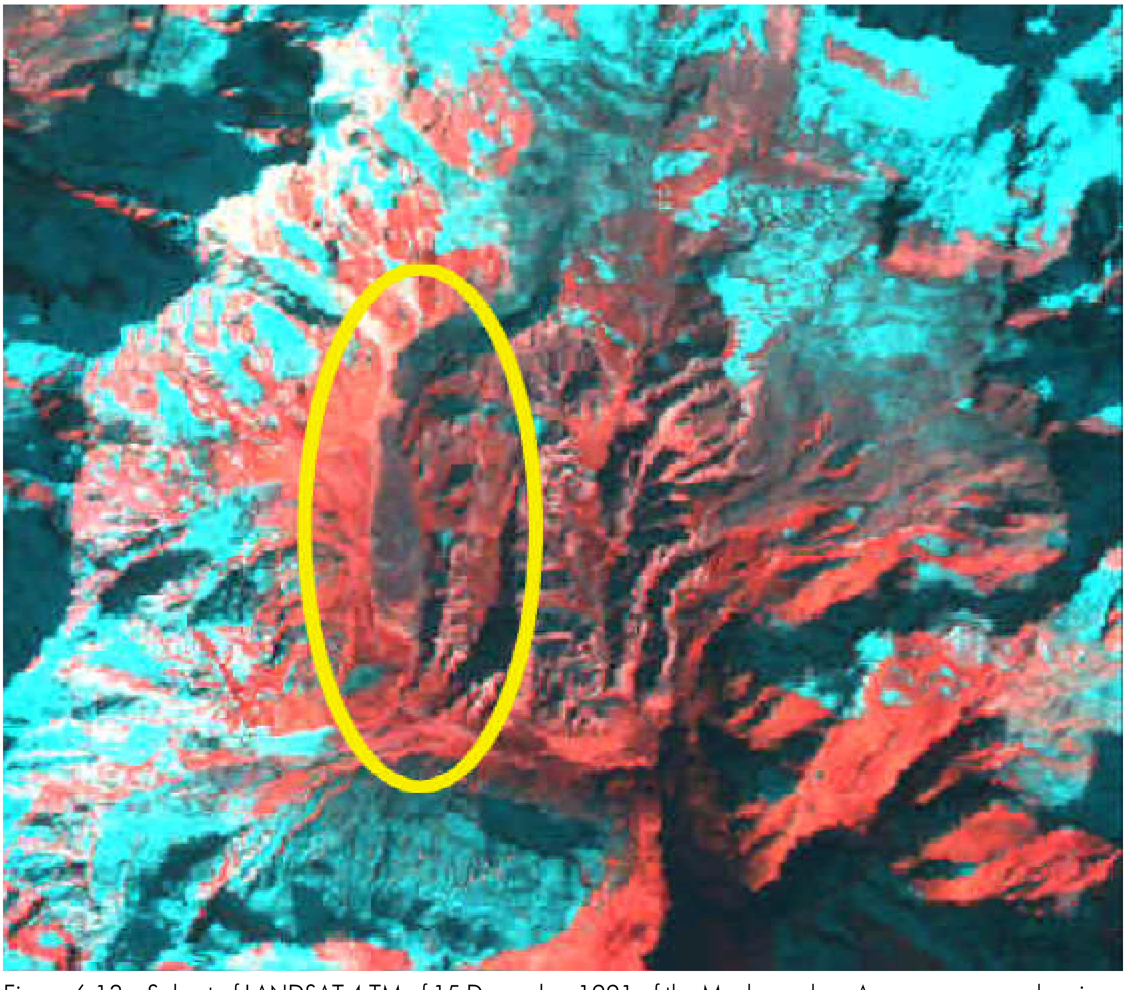
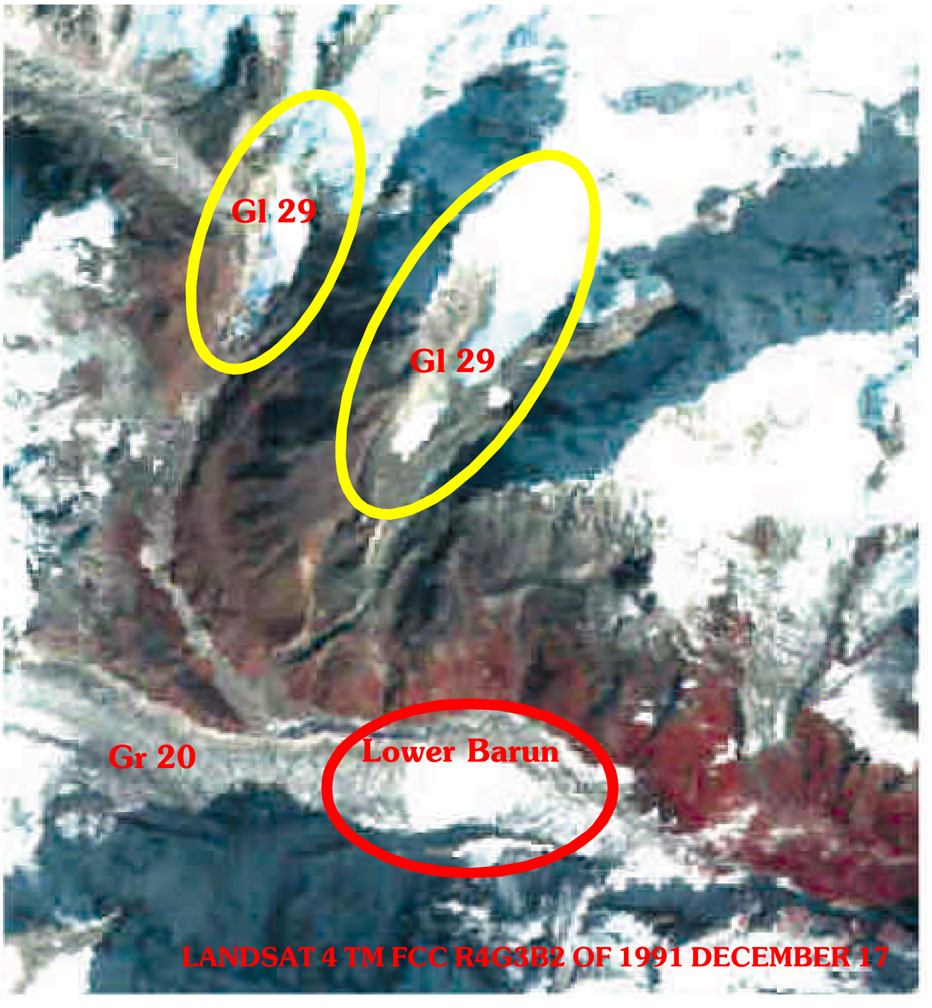


Figure 6.13: Subset of LANDSAT 4 TM of 15 December 1991 of the Machapuchre–Annapurna area showing the debris flow source area of Pokhara Valley

Figure 6.14: IRS1D LISS3 FCC R3G3B2, 3 January 2000, showing evidence of the past GLOF from the end moraine dammed glacial lake associated with the hanging glacier of Lirung–Kyenging Glacier in Langtang Basin in Nepal



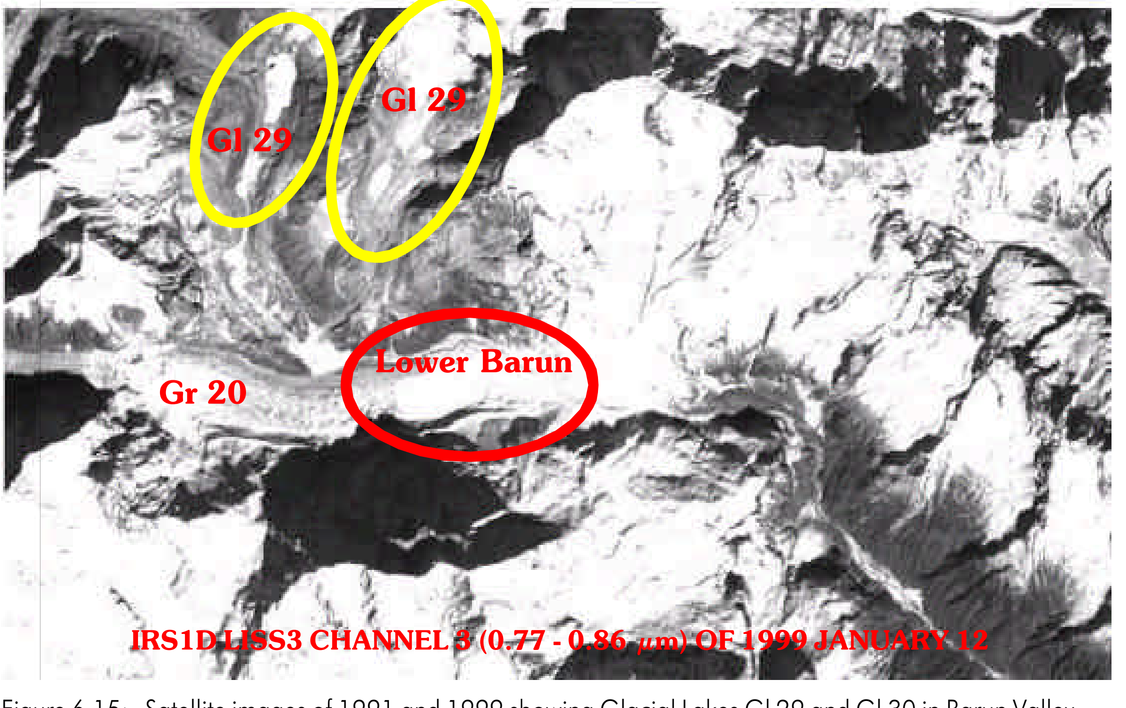


Figure 6.15: Satellite images of 1991 and 1999 showing Glacial Lakes Gl 29 and Gl 30 in Barun Valley which have burst out in the past, and formation of a glacial lake at the tongue of Lower Barun Glacier Gr 20 of the Arun Basin which is not shown on the topographic map

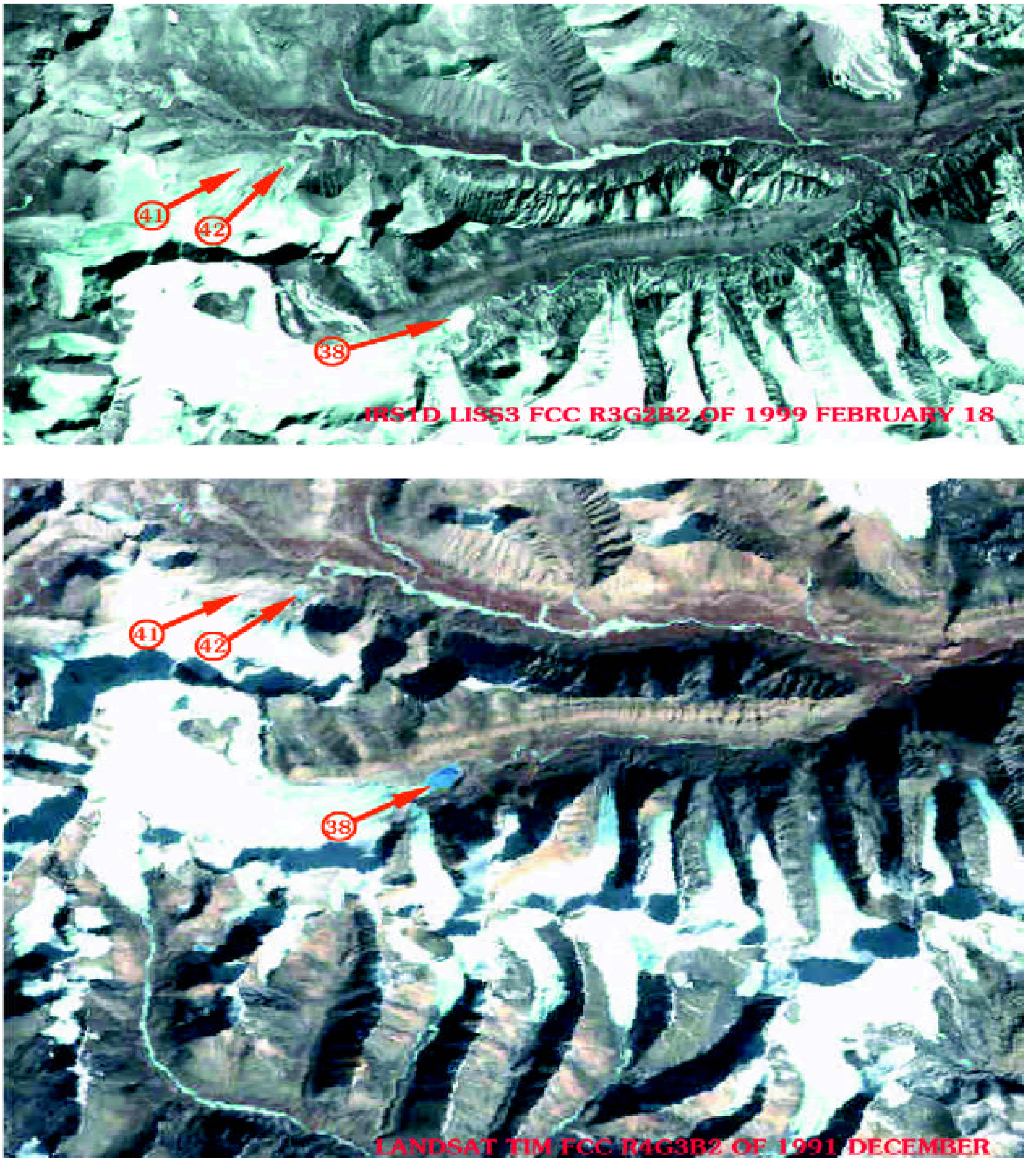


Figure 6.16: Satellite images of 1999 and 1991 showing Glacial Lakes 38, 41, and 42 of Kali Gandaki basin; Lakes 41 and 42 burst out even before 1991

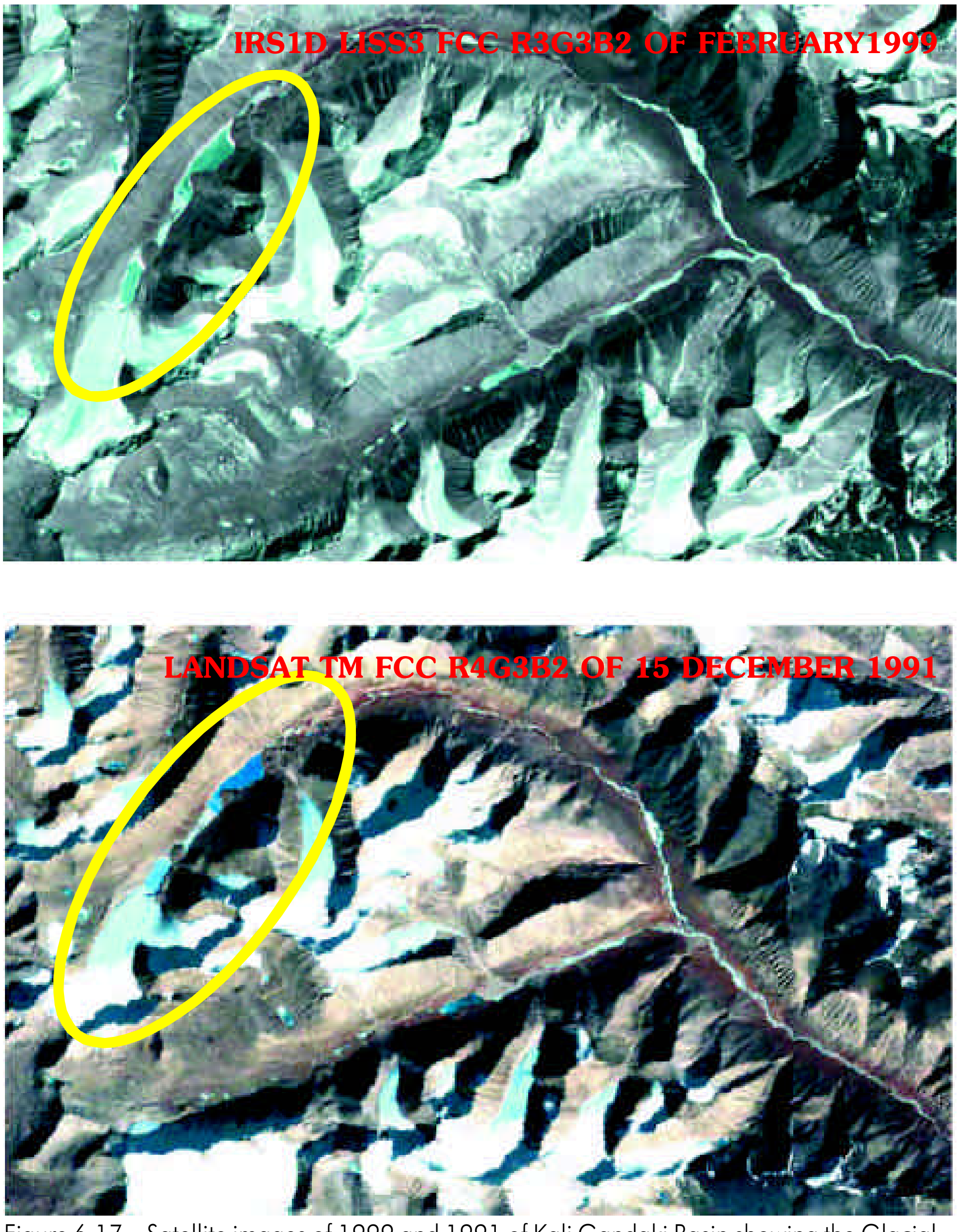


Figure 6.17: Satellite images of 1999 and 1991 of Kali Gandaki Basin showing the Glacial Lake Gl_67

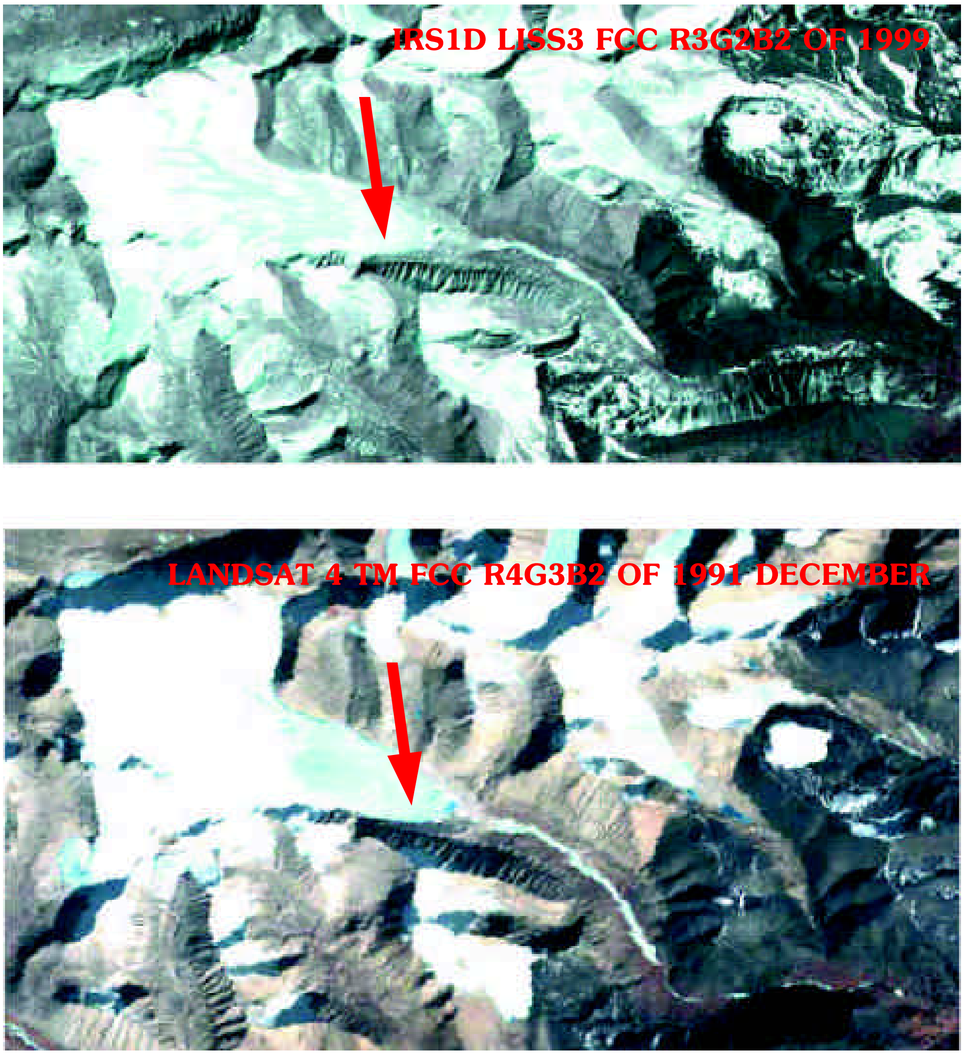


Figure 6.18: Satellite images of 1999 and 1991 showing evidence of a past GLOF event before 1991 from the lake at the tongue of Glacier Gr_207 in Kali Gandaki basin. The breached lake is not refilled.

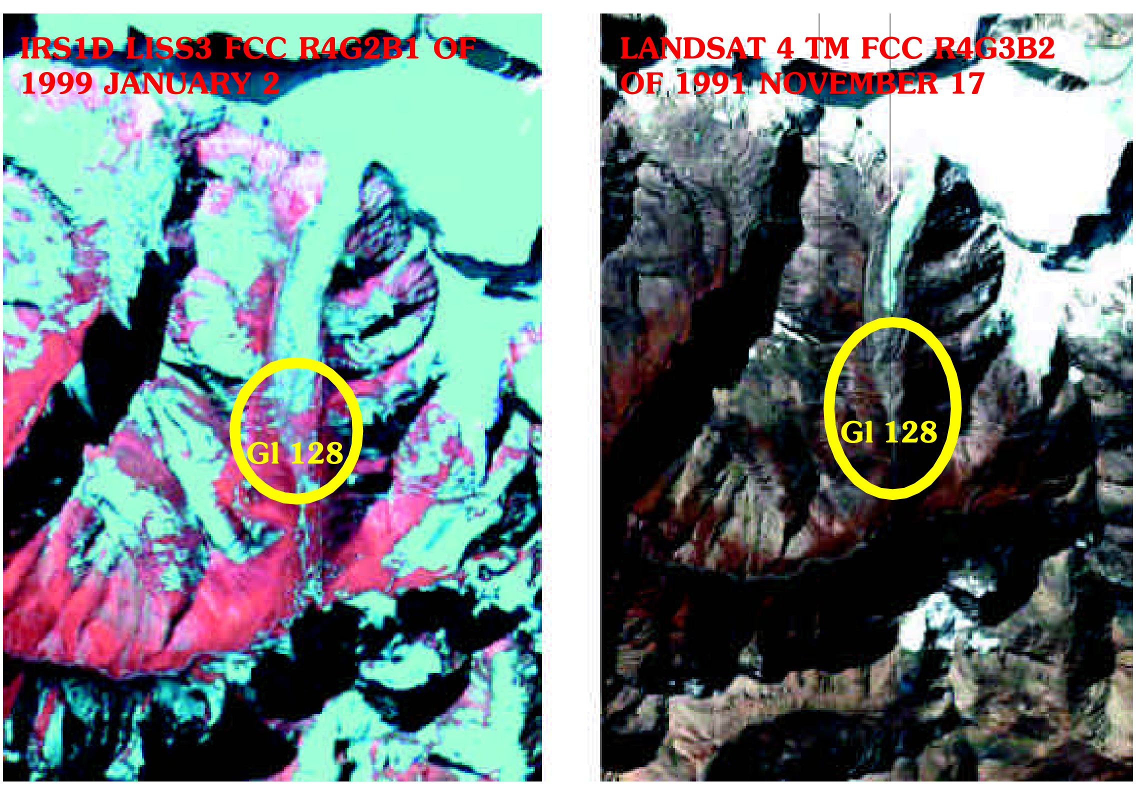


Figure 6.19: Satellite images showing past GLOF evidence from Glacial Lake Gl 128 of the Mugu Karanali Basin in Nepal

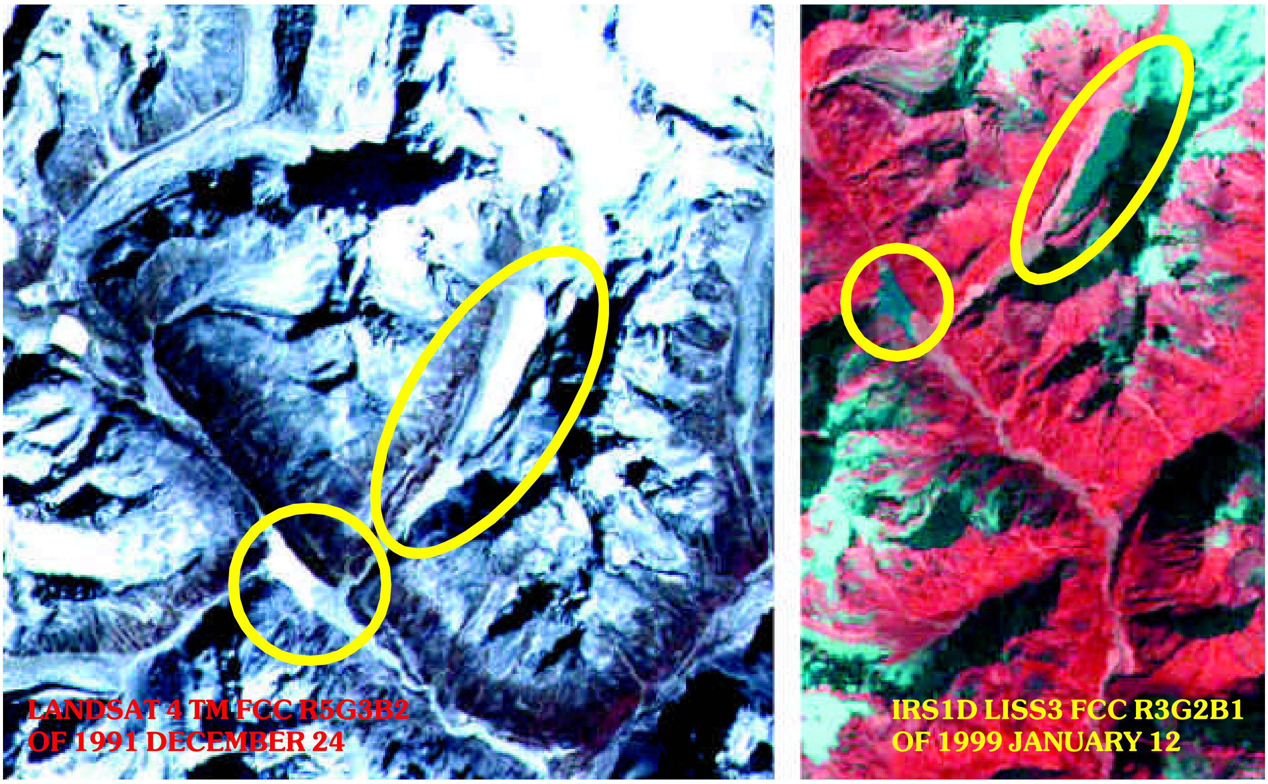


Figure 6.20: Satellite images showing the Nagma Pokhari in Tamor Basin in Nepal which burst in 1980 and formed the debris dammed lake, Chheche Pokhari

Figure 6.21: Satellite image showing the large number of glacial lakes in Panch Pokhari area (Hungu Valley) of the Dudh Koshi Basin

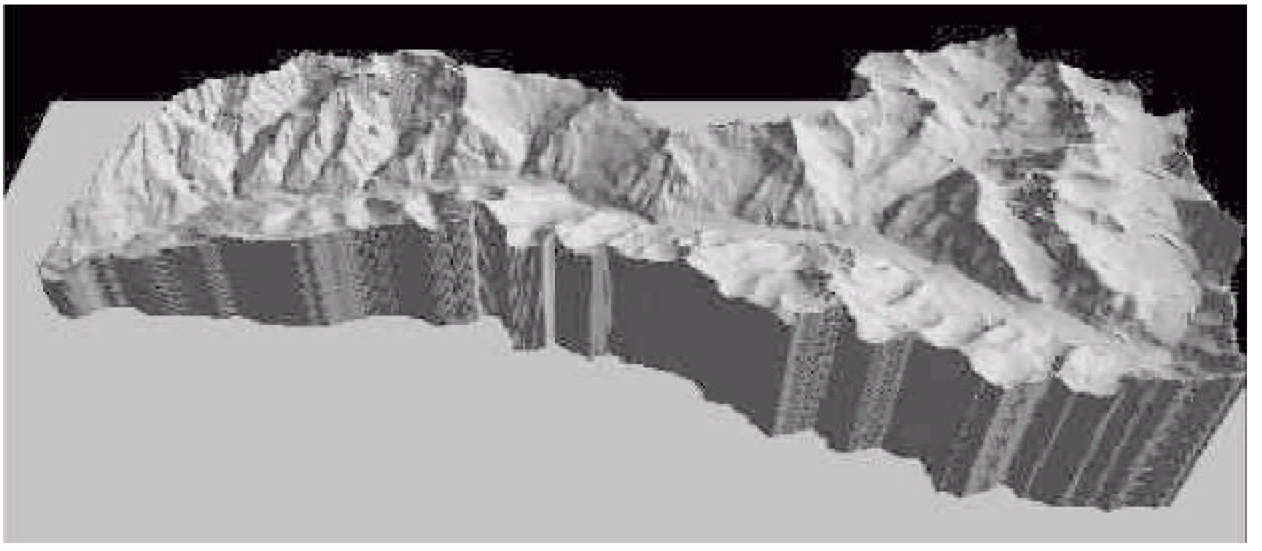


Figure 6.22: Hill shading relief of Rolwaling Valley based on DEM generated by interpolation of contour and spot height data of 1:63,360 scale topographic maps

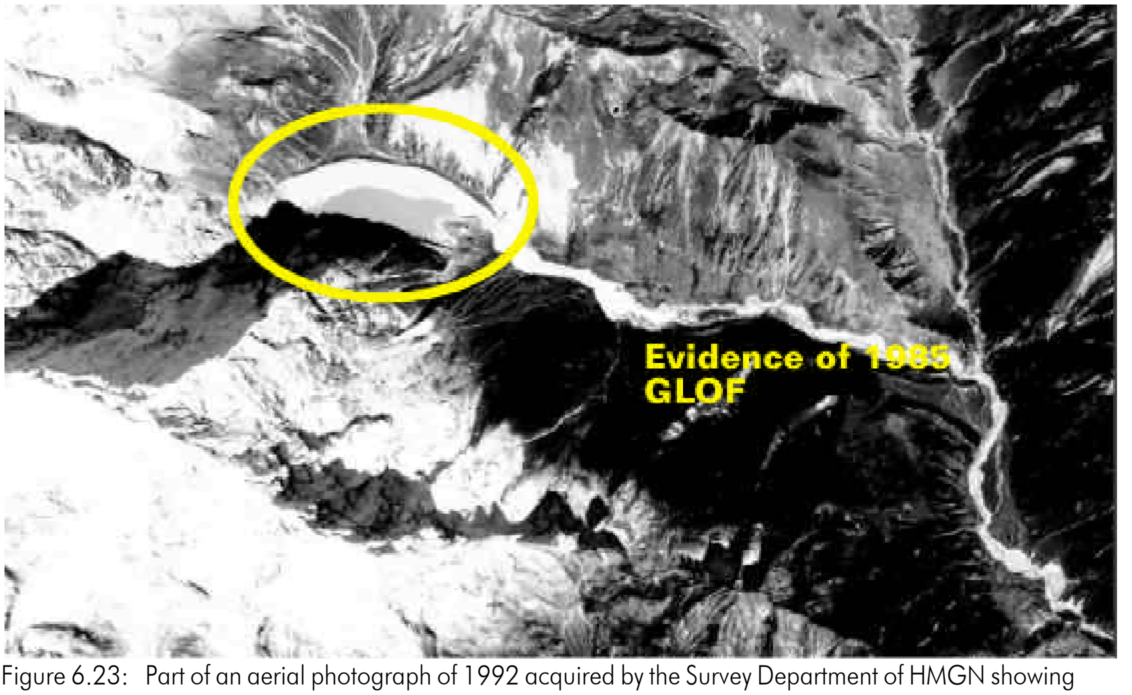


Figure 6.23: Part of an aerial photograph of 1992 acquired by the Survey Department of HMGN showing Dig Tsho Glacial Lake and the effect of the 1985 GLOF (Aerial Photo 52-49)

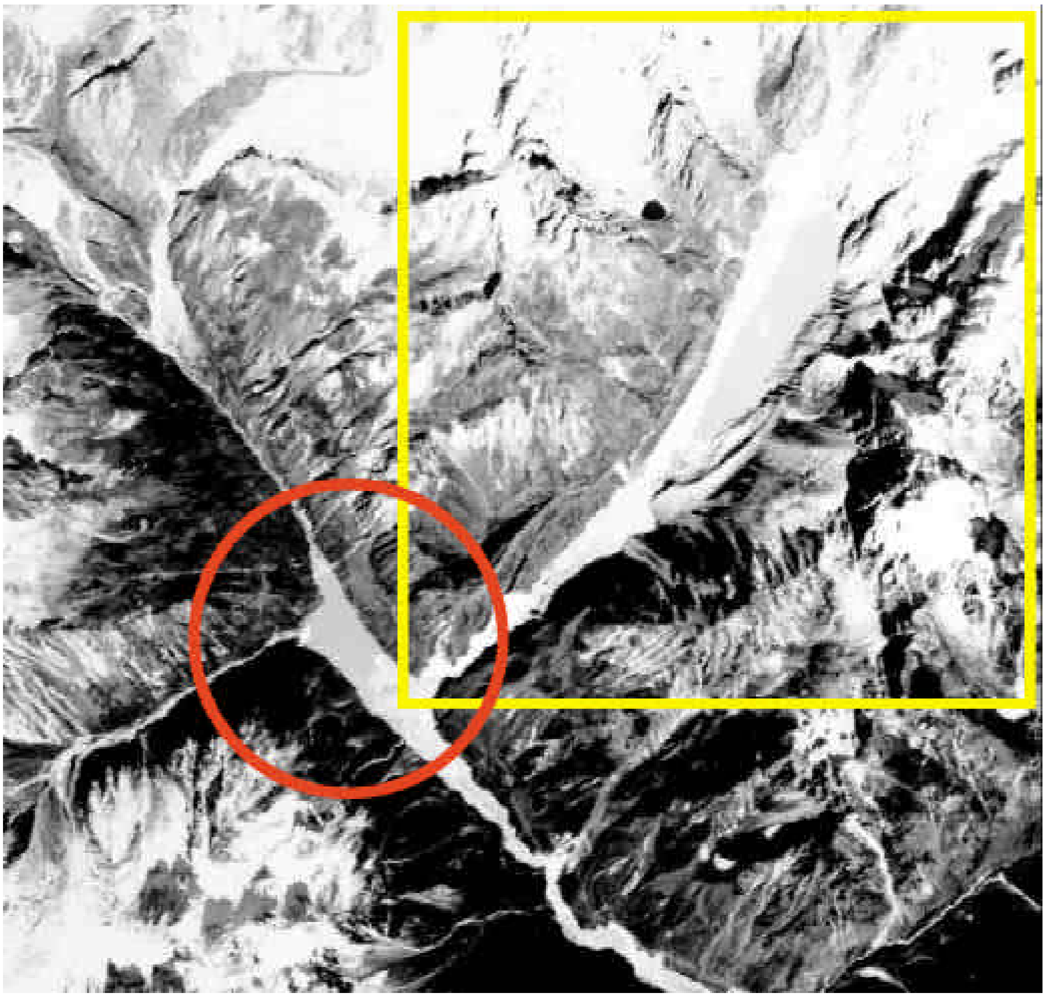


Figure 6.24: Part of an aerial photograph of 1992 acquired by the Survey Department of HMGN showing the debris deposited along the gully which blocked the Chhechen Khola to form the Chhechen Pokhari after the Nagma (Phuchan) GLOF of 1980 (Aerial Photo 52-15)

Figure 6.25: Part of an aerial photograph of 1992 showing Lower Barun Glacier and Glacial Lake area (Aerial Photo 51-33)

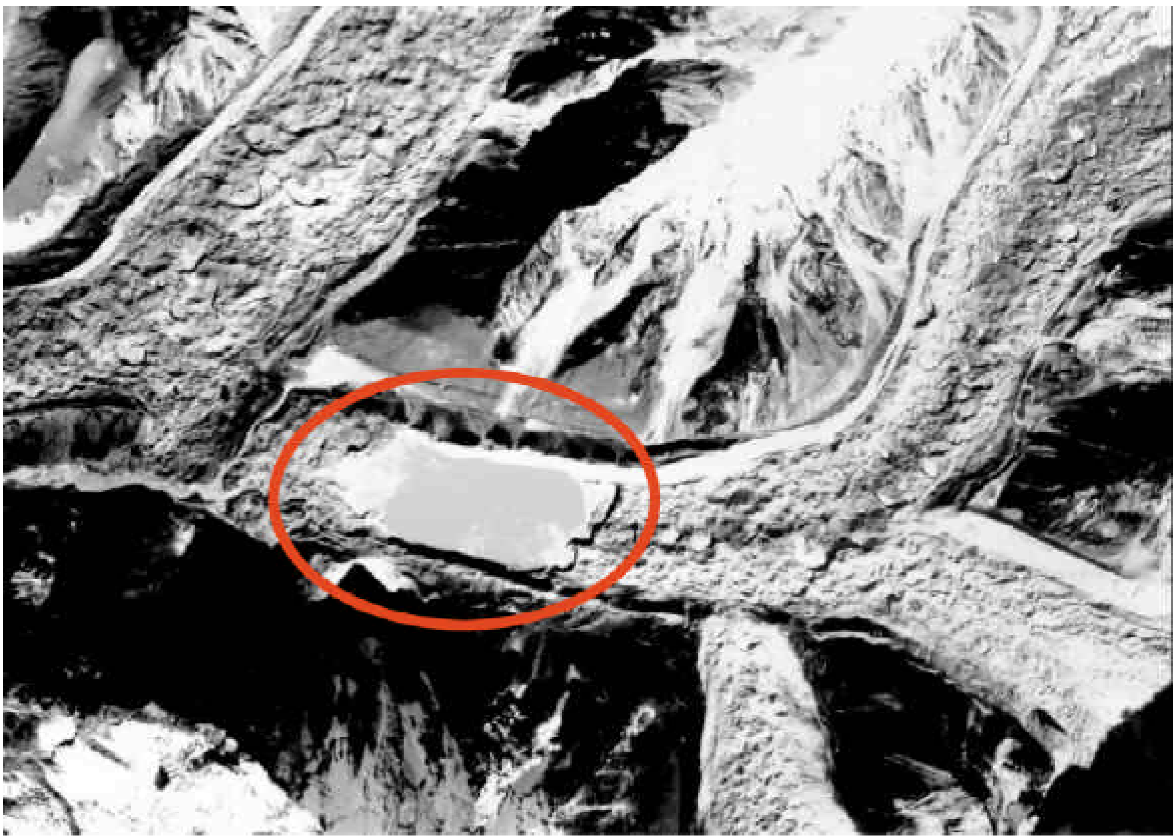


Figure 6.26: Part of an aerial photograph of 1992 acquired by the Survey Department of HMGN showing Imja Glacier and Glacial Lake area (Aerial Photo 53-30)

Chapter 7

The Inventory of Glaciers

7.1 Brief Description of Glacier Inventory

The inventory of glaciers has been based on topographic maps on a scale of 1:63,360 and on the 1992 aerial photographs of eastern Nepal and the 1996 aerial photographs of western Nepal on more or less equivalent scales to the topographic maps.

Satellite images and aerial photographs are intensively used for the identification, classification, and determination of stages of glaciers. The spatial inventory is entirely based on the Survey of India topographic maps (1:63,360 scale) published in the period from the 1950s–1970s. The topographic maps of 1995 published by the Topographic Survey Branch of Nepal covering only eastern Nepal are available for the inventory of glaciers. All the glacier boundaries are demarcated in the topographical maps on a scale of 1: 63,360 and verified with aerial photographs. The satellite images are used to correlate and analyse the activity of glaciers in the 30-year range.

For the inventory of glaciers, the area is divided into the basins of the Koshi River, the Gandaki River, the Karnali River, and the Mahakali River. The major river basins are further divided into sub-basins: the Koshi River Basin into the Tamor River, the Arun River, the Dudh Koshi River, the Tama Koshi River, the Likhu River, the Sun Koshi River, and the Indrawati River; the Gandaki River Basin into the Trishuli River, the Budhi Gandaki River, the Seti River, the Marsyangdi River, and the Kali Gandaki River; and the Karnali River Basin into the Bheri River, the Humla Karnali River, the Mugu Karnali River, the Kawari River, the West Seti River, and the Tila River (Figure 7.1). There are more sub-basins, but only the above-mentioned sub-basins contain glaciers and glacial lakes.

The glacial area is measured with the help of GIS. Since the ice thickness data are not available, it is estimated from the equation developed for the Tianshan Mountains (Chaohai Liu and Liangfu Ding 1986)

$$H = -11.32 + 53.21F^{0.3}$$

where H = mean ice thickness (m) and F = glacier area (km^2)

The ice reserves were estimated by multiplying the mean thickness by the glacial area.

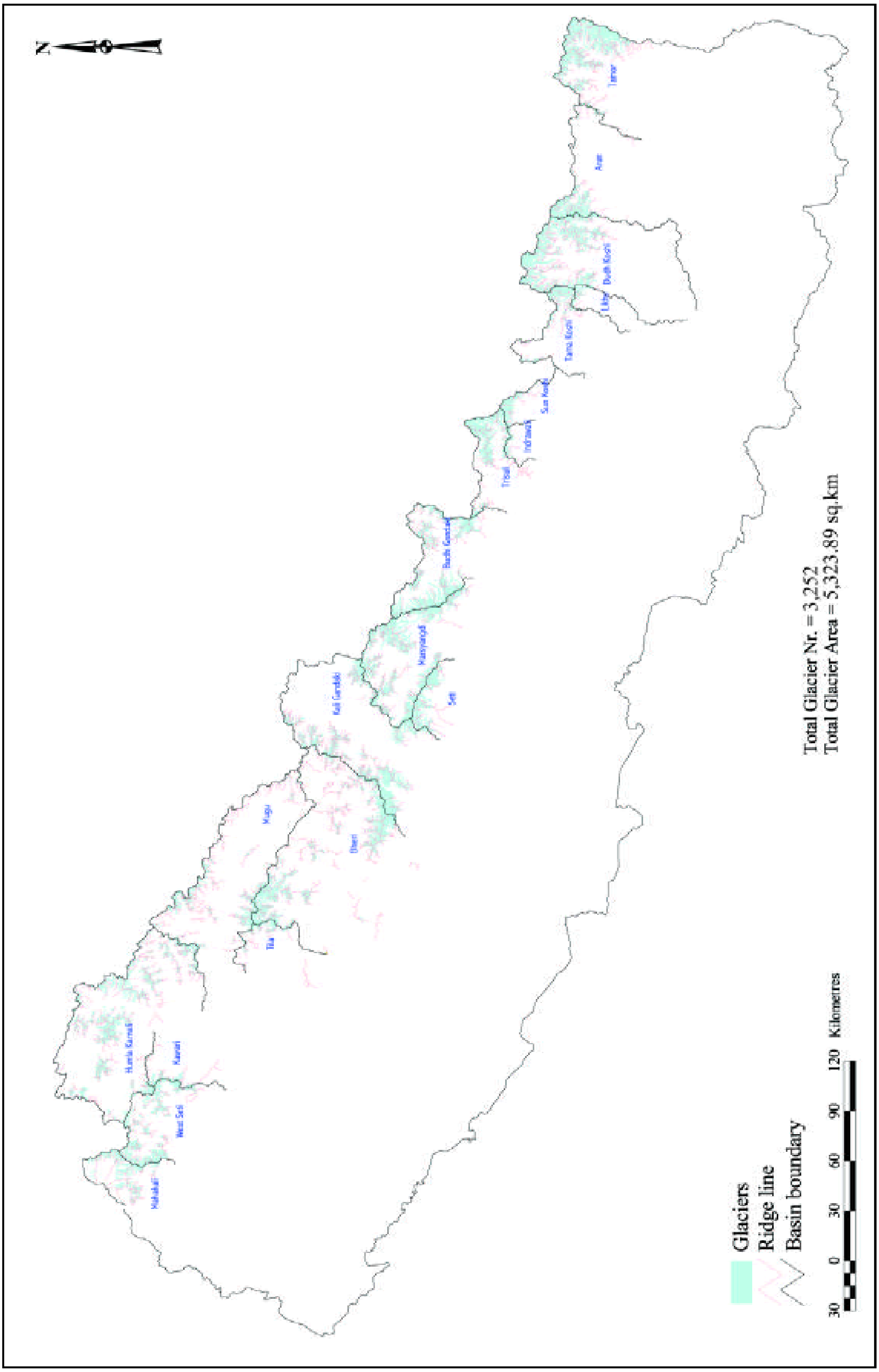


Figure 7.1: Glaciers of Nepal

7.2 Types of Glaciers

The classification of glaciers is adopted from the morphological classification of glaciers by the World Glacier Monitoring Service (WGMS) (1989). Details of the classification are mentioned in Chapter 4. The classified glaciers are divided into different types, combining Digit 1 of 'primary classification' and Digit 2 of 'form'. Generally, six types of glacier are observed in the Nepal Himalayas—mountain glaciers, valley glaciers, cirque glaciers, niche glaciers, ice caps, and ice aprons. Mountain glaciers are dominant in quantity and the profile shows a hanging nature. Other glaciers, except for valley glaciers, generally fall into the category of mountain glaciers but the thickness of ice is comparatively low. The number of valley glaciers is comparatively low but the corresponding areas and ice reserves are higher than those of mountain glaciers. If a valley glacier continues up to a mountain glacier and is represented as a single unit, then this part of the mountain glacier is also considered a valley glacier. The area and ice reserves of the valley glaciers are generally large owing to the fact that the ice thickness increases with increase in the glacial area.

Mountain glaciers are uncertain or miscellaneous, compound basins, compound basin, or simple basin in the form of a hanging glacier. The major source of nourishment is snow and/or drift snow.

Ice caps, cirque glaciers, niche glaciers, and ice aprons are other types of hanging mountain glaciers, but they are considered to be a different type due to their significance in size, shape, form, and ice thickness. The most significant valley type glaciers are fewer in number and characterised by compound basins, compound basin, and simple basin. They are mainly nourished by snow and drift snow at the headwaters and by snow and ice avalanches in the lower valley. The adjoining part of the valley glacier at the headwater is characteristically a mountain glacier, but due to its continuation into a valley glacier, the whole ice mass will be considered to be a valley glacier. Hence, the area of the valley glacier is higher than the mountain glaciers. The longitudinal profile of the valley glacier from crown to toe shows an even or regular shape. As the headwater is steeper and has a gentle slope in the lower reaches, the profile makes the curve concave upwards. Due to the gentle slope at the lower reaches and the accumulation of debris derived from the headwater, glacial lakes develop in a supra-glacial and moraine-dammed form. Generally, the stability of glacial lakes is poor and there is always the chance of avalanches from mountain glaciers, which may break the damming material and cause glacial lake outburst floods (GLOF).

7.3 General Characteristics of Glaciation

The occurrence of glaciers has always been linked to climatic conditions. Climate is of fundamental importance to the inception and growth of glaciers. The form of the landscape dictates the threshold conditions for glacier occurrence and determines glacier morphology. In certain climatic conditions for glaciation, glaciers of different shapes and sizes are formed depending on the landscape. Mountain glacier regions are associated with climatic fronts, zones of maximum precipitation. The central and eastern Himalayas receive moisture from the summer monsoons and the western Himalayas receive moisture from the winter and summer monsoons.

Muller (1959), Iwata (1976), and Fushimi (1977, 1978) have studied glaciation in the Khumbu, Hinku, and Hongu regions of the eastern Nepal Himalayas. Five different stages of glaciation have been identified in the Khumbu region: the present stage, the Thukla stage of the sixteenth century, the Periche stage of the eighth century, and the Ghat and Lukla stages of a much earlier period, of which much of the glacier area has disappeared (Fushimi 1977, 1978). Naulekh Glacier in Hongu region has lost 56% of its area since the Thukla stage of the sixteenth century. The glacial area coverage of each stage in the Khumbu, Hinku, and Hongu regions is shown in Table 7.1.

Table 7.1: Glacial area of each stage in Khumbu, Hinku, and Hongu regions (modified from Fushimi 1978)

Period	Stage	Khumbu area (km²)	Hinku and Hongu area (km²)
Holocene	Thukla (Present)	170	72
	Thukla (sixteenth century)	274	208
Late Pleistocene	Periche (eighth century)	481	288
Pre last inter-glaciation	Ghat	564	352
	Lukla	649	408

During the late Pleistocene glaciation maximum, glaciers in the Sapta Koshi drainage basin covered slightly more than 5.8% of the basin area (3,440 sq.km) compared to 2.6% (1,520 sq.km) at present (Williams 1983). The Sapta Koshi catchment extends to Tibet, where five small ice caps existed in the past but do not exist at present. Valley glaciers in this part of the Himalayan range have retreated a relatively short distance of about 60% of maximum length since the late Pleistocene glacial maximum. Glacial deposits in the Dudh Kunda Valley apparently record a maximum late Pleistocene glaciation, an older Holocene or late Pleistocene glaciation, and three younger Holocene glacial advances. The length of the Dudh Kunda Glacier was 12 km (about some 8 km longer than at present). Similarly, enormous glacial expansion in the the Marsyangdi Sub-basin of the Gandaki Basin in western Nepal is estimated to have occurred in the sixteenth century (Fushimi et al. 1980).

In the Langtang Valley, central Nepal, Shiraiwa (1993) reconstructed the glacial chronology derived from the fourteenth century. He recognised five different stages and moraine identifications: the Lama stage, the Ghora Tabela stage, the Langtang stage, the Lirung stage, and Yala I and Yala II stages.

To understand the physical characteristics of glaciers and their stability, it is necessary to know the glacier ablation, ice temperature, and flow velocity of glaciers.

Glacier ablation and mass balance

Mass balance studies of glaciers in eastern Nepal have been carried out since 1970. At present Rikha Samba Glacier in Hidden Valley, Yala Glacier in Langtang Valley and Glacier AX010 in Shorong Himal are studied for mass balance in cooperation with the Department of Hydrology and Meteorology (DHM). Several reports have been published on mass balance studies (Ageta and Kadota 1992). Glaciers in the Nepal Himalayas have a unique character showing simultaneous occurrences of accumulation and ablation during the summer monsoon only. As a result, during mass balance studies of glaciers, direct measurement of ablation is obtained as the residual of the balance and accumulation. During the summer monsoon season in 1978, the mass balance of Glacier AX010 was negative and the relation derived for Glacier AX010 by Ageta et al. (1980) can be used to estimate the mass balance during the summer of any year.

$A = 0.1(T + 3.0)^{3.2}$, when $T > -3.0$
$A = 0$, when $T < -3.0$

where
A = ablation, mm water
T = mean air temperature, °C

The mass balance study of Glacier AX010 concludes that the fluctuation of the summer temperature on glaciers in the Nepal Himalayas under the influence of the summer monsoon is important for the variation of mass balance. The above relationship between temperature and ablation is widely and successfully used in estimating the ablation in other regions of Nepal (Fukushima et al. 1991; Rana et al. 1997).

Ice temperature

Glaciers are not uniformly cold, their temperatures vary in space and time. Many glaciers have temperatures at or close to 0^0C, whereas parts of the Antarctic ice sheet are as cold as -40^0 C. The actual temperature of a portion of glacier ice depends on the balance of heat from:

1) heat exchange with the atmosphere,
2) geothermal heat flux, and
3) frictional heat generated by flow.

The temperature of surface firn in glacier accumulation areas is strongly influenced by mean annual air temperature fluctuations and near surface processes such as water percolation and refreezing, whereas, at slightly greater depths, ice temperature tends to be similar to mean annual air temperature. At greater depths, internal processes such as ice deformation, basal sliding, and geothermal heat flux raise ice temperature. Melting temperatures are more likely at the base of rapidly flowing ice streams than below thinner and more slowly moving ice. Melting temperatures below ice streams promote rapid ice motion.

Efficient glacier motion can only occur where the ice is at or close to the melting point. The temperature of ice controls a wide variety of glacial processes, including glacier motion, mass balance, melting of water, and sub-glacial erosion and deposition.

In the Nepal Himalayas, very few studies on ice temperature have been conducted. Annual mean temperature in the layer of Glacier AX010 was estimated in the range of –2.3°C to –3.1°C in the region of 5,007 to 5,195 masl (Mae 1976; Tanaka et al. 1980). An ice temperature study of the Khumbu Glacier at an elevation of 5,360m showed –5.3°C in November at a depth of 2.7m (Mae 1976).

Flow of glaciers

The very first flow velocity measurements carried out in the Khumbu Glacier showed seasonal fluctuations of the flow velocity (Muller 1980). Later the flow velocity measurements made at four stake lines showed remarkable seasonal variations, 50–60m $year^{-1}$ in the upper parts and not consistent at the lower lines (10–25m $year^{-1}$). The maximum flow velocity was measured in the months of May–August and the minimum in the months of December–March. Seasonal variation of flow velocity has also been reported for the upper lines of Nuptse Glacier (Table 7.2) (Kodama and Mae 1976).

Table 7.2: Flow velocity of Khumbu Glacier (after Kodama and Mae 1976)

Location	Elevation (masl)	Summer (m $year^{-1}$)	Winter (m $year^{-1}$)
Everest Base camp	5,340	75	50
Pumo Ri line	5,280	50	30
Gorak shep line	5,140	25	15
Lobuche line	4,960	2	1

7.4 Basin-wise Description of Glaciers

The present inventory work is based on the base map of 1960–1970 on a scale of one inch to a mile, published by the Survey of India. As mentioned in previous sections, for inventory work Nepal is divided into four main basins: the Koshi River Basin, the Gandaki River Basin, the Karnali River Basin, and the Mahakali River Basin from east to west. The Koshi River Basin has been widely studied by different organisations at different times for various purposes (Muller 1980; Watanabe 1976; Higuchi et al. 1978; Water and Energy Commission Secretariat [WECS] 1987b).

Within the territory of Nepal there are 3252 glaciers altogether covering an area of 5,323 sq.km with an ice reserve of approximately 481 km^3

The Koshi River basin

The Koshi River Basin covers the eastern part of Nepal between the longitudes of 85° 30' and 88° 12'. It consists of seven major sub-basins as described in Chapter 3. The Arun River, the Tama Koshi River, and the Bhote Koshi–Sun Koshi River originate in Tibet, China, and flow down through the Himalayas towards the south. All other tributaries originate within the territory of Nepal and flow in a northeast to southwest direction and join with the Sun Koshi River. The general trend of the Sun Koshi River is northwest to southeast. Finally, the Sun Koshi River after confluence with the Arun River and the Tamor River is called the Sapta Koshi River and flows towards the southwest.

There are 779 glaciers in the Koshi River Basin covering an area of about 1,410 sq.km (Figure 7.2). Higuchi et al. (1978) had reported only 664 glaciers in this basin. Table 7.3 shows the number of glaciers and the area covered by those glaciers with estimated ice reserves for each sub-basin. The distribution of glaciers in each sub-basin is shown in Figures 7.3–7.9. The Indrawati Sub-basin has the smallest number of glaciers (18) and glacial area. The number of glaciers in each of two sub-basins, Dudh Koshi and Tamor, is more than 261 and, subsequently, accounts for a large glacial area. The Arun and Sun Koshi Sub-basins have only 91 and 23 glaciers respectively, which is quite low compared to the number of glaciers in the Tamor and Dudh Koshi Sub-basins. However, the average area covered by the glaciers in these sub-basins is much larger.

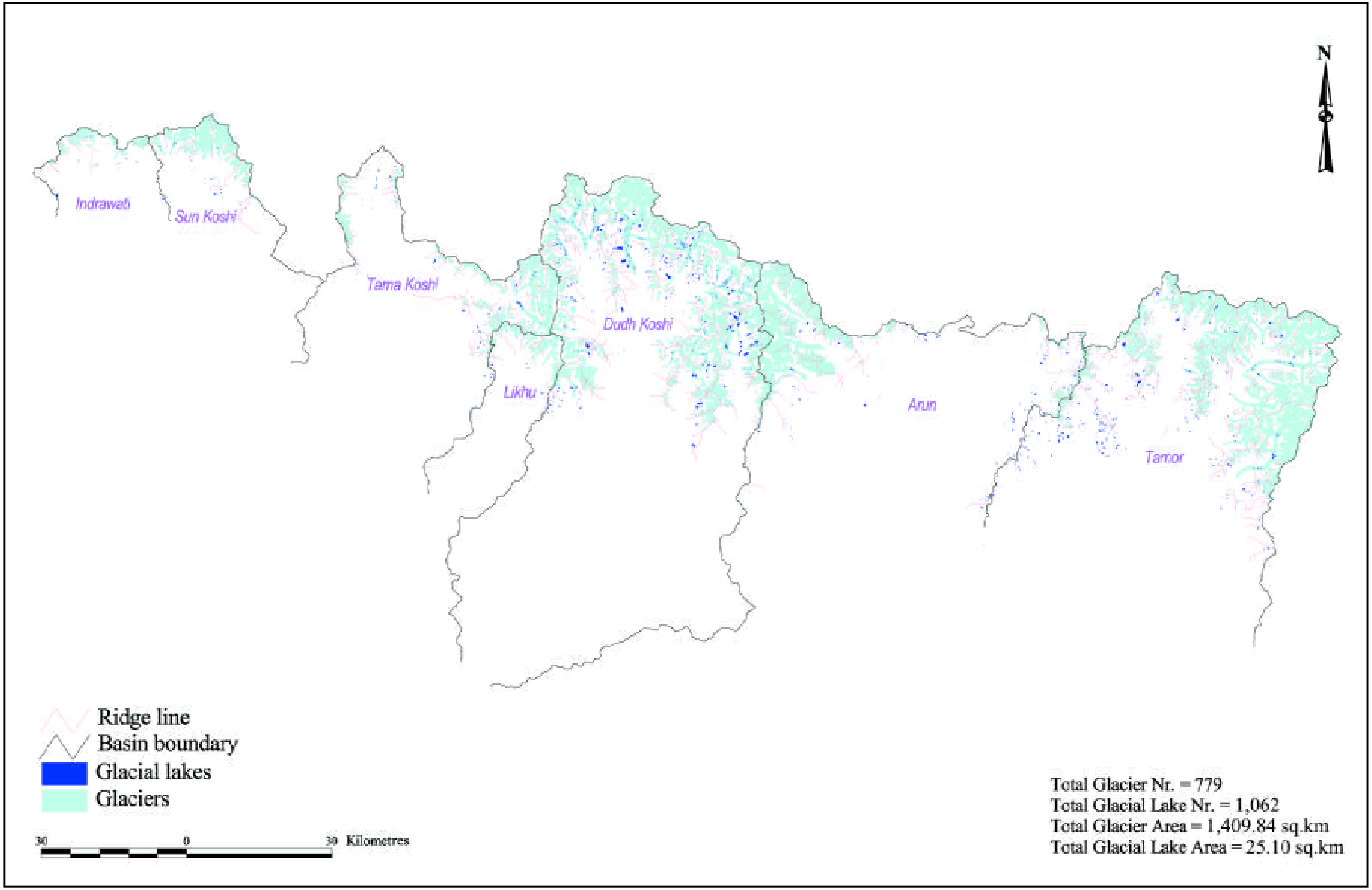


Figure 7.2: Glaciers and glacial lakes of the Koshi Basin

The aspects of glaciers in the sub-basins of the Koshi Basin are distributed randomly in all cardinal directions. The majority of glaciers face towards the south. Although quite a few glaciers also face towards the north, the area occupied by the south aspect glaciers is generally high. Only 9% of the area is occupied by north facing glaciers.

Table 7.3: Distribution of glaciers in the sub-basins of the Koshi River Basin

Sub-basin	Number of glaciers	Area (km^2)	Mean area per glacier (km^2)	Ice reserve (km^3)
Tamor	261	474.15	1.82	56.64
Arun	91	216.07	2.37	23.47
Dudh	278	482.20	1.73	51.01
Likhu	28	30.19	1.08	1.94
Tama	80	109.69	1.37	10.37
Sun Koshi	23	74.56	3.24	7.19
Indrawati	18	22.98	1.28	1.44
Total	779	1409.84	1.53	152.06

Glaciers with a north, northwest, or northeast aspect are generally small in number and aerial extension. The distribution of glaciers with a south, southwest, or southeast aspect covers more than 50% of the total number of glaciers. Most of the valley glaciers and compound basins of mountain glaciers lie within these aspects. As a general rule, the west aspect is much warmer than the east aspect and it might be expected that this be reflected in the number and area of glaciers. But in this basin it is just the reverse, i.e. the number and area of glaciers in the west aspect is higher than in the east aspect (Tables 7.4B–7.10B).

The inventoried glaciers are classified mostly into mountain glaciers and valley glaciers. The headwater region of the valley glacier is classified as a mountain glacier, while the adjoining mountain glacier with a valley glacier is considered to be a valley glacier. There are also other types of mountain glaciers, such as ice caps, ice aprons, cirque glaciers, and niche glaciers, which have a thin ice sheet or ice thickness and small aerial extension. The glaciers on the mountain slopes with the forms of miscellaneous, simple basin, compound basin, and compound basins are also included in mountain glaciers. Hence the area occupied by the other types of glaciers is generally low (less than 10%) in comparison to mountain glaciers and valley glaciers. Again the area occupied by valley glaciers is quite high due to the addition of the adjoining parts of the mountain glaciers. In the Tamor Sub-basin (Figure 7.3), valley glaciers cover about 74% of the area with 90.4% of the ice reserve. Mountain glaciers cover about 20% of the area and have 8% of the ice reserve. Other types of glaciers cumulatively occupy 6% of the area and have less than 2% of the ice reserve (Table 7.4A).

Table 7.4A: Glacier types in the Tamor Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice caps	36	14	5.42	1	0.458	0.018	0.1213	0.21
Valley	31	12	352.97	74	94.511	0.36	51.2139	90.41
Mountain	112	43	95.65	20	5.485	0.025	4.5928	8.11
Ice apron	23	9	7.49	2	1.679	0.040	0.2507	0.44
Cirque	8	3	2.73	1	0.580	0.189	0.0767	0.14
Niche	51	20	9.87	2	3.930	0.014	0.3917	0.69
Total	261	100	474.15	100			56.6471	100

Table 7.4B: Distribution of glaciers on the basis of aspect in the Tamor Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
NE	36	18.41	4	1.80	0.02	4520	150	6447	4694	0.72
NW	36	21.30	4	5.72	0.03	3515	190	7385	4267	1.09
SE	44	56.55	12	16.70	0.03	11 400	150	8473	4267	4.06
S	38	52.81	11	14.08	0.02	10 130	150	6812	4115	3.81
E	17	6.99	1	1.98	0.01	2410	150	6157	4938	0.27
SW	48	154.93	33	81.91	0.02	23 435	190	8184	4700	20.87
W	29	158.82	33	94.51	0.03	20 900	190	8586	4115	25.68
N	13	4.37	1	1.06	0.05	1584	250	7529	4907	0.15

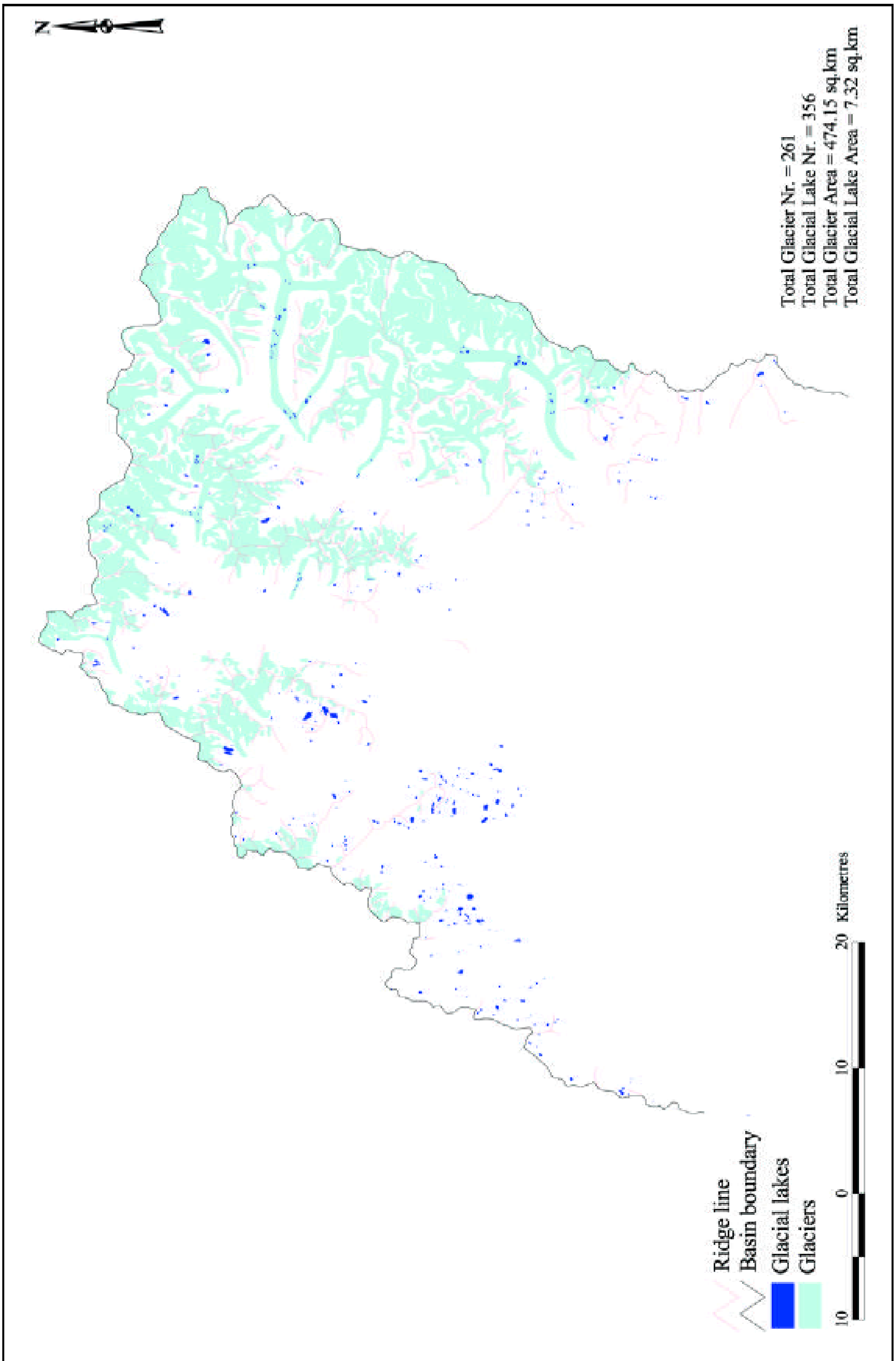


Figure 7.3: Glaciers and glacial lakes of the Tamor Basin

The Arun River Sub-basin (Figure 7.4) consists of three valley glaciers, which cover 54% of the area with 75% of the ice reserve. The mountain glaciers occupy 32% of the area and have 18% of the ice reserve. Around 6% of the area is occupied by ice caps and ice aprons, each with 4% and 2.5% of the ice reserve respectively. The areas and ice reserves of cirque and niche glaciers are less than 1% of the sub-basin (Table 7.5A).

The area and ice reserves of valley glaciers in the Dudh Koshi Sub-basin are 73 and 88% respectively. The mountain glaciers cover only 19% of the area and have 9% of the ice reserve. The area and ice reserves of other glaciers are nominal in comparison to the mountain and valley glaciers (Table 7.6A). The distribution of glaciers in the Dudh Koshi Sub-basin are given in Figure 7.5.

The Likhu River Sub-basin (Figure 7.6) consists of only 28 glaciers. The mountain glaciers are the highest in number with 17 in total. The valley glaciers are only four in number; however, they cover 55% of the area and have 71% of the ice reserve compared to the mountain glaciers which have only 42% of the area with 28% of the ice reserve. The area and ice reserves of other glaciers are 3 and 1% respectively (Table 7.7A).

In the Tama Koshi Sub-basin the area and ice reserve of the valley glaciers are around 62 and 82.7% respectively. The mountain glaciers cover an area of 35% and have an ice reserve of about 16.6%. The other glaciers cover around 4% of the area and have less than 1% of the ice reserve (Table 7.8A). The distribution of glaciers in the Tama Koshi Sub-basin is given in Figure 7.7.

Table 7.5A: Glacier types in the Arun River Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	8	9	14.15	6.55	7.310	0.529	0.918	3.91
Valley	3	3	116.95	54.13	52.414	27.549	17.602	74.97
Mountain	43	47	70.04	32.42	7.608	0.192	4.353	18.54
Ice apron	24	26	13.01	6.02	2.460	0.021	0.564	2.40
Cirque	2	2	0.71	0.33	0.458	0.258	0.02	0.09
Niche	11	12	1.18	0.55	0.299	0.041	0.022	0.09
Total	91	100	216.07	100			23.479	100

Table 7.5B: Distribution of glaciers on the basis of aspect in the Arun River Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SE	9	70.98	33	36.99	0.04	15 840	315	7235	3962	9.35
NE	14	19.24	9	7.61	0.11	2850	315	6757	4770	1.22
S	15	66.88	31	52.41	0.06	16 470	315	6949	4602	9.40
N	9	4.90	2	1.99	0.04	2215	190	6553	4900	0.21
NW	9	3.77	2	1.40	0.02	1580	250	6096	4785	0.14
SW	23	39.92	18	7.31	0.04	3800	190	8077	4300	2.68
E	2	2.88	1	2.46	0.42	1390	950	6858	5395	0.16
W	10	7.50	3	2.65	0.05	2530	315	6584	4846	0.34

Table 7.6A: Glacier types in the Dudh Koshi Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	25	9	3.33	0.7	0.362	0.018	0.04	0.08
Valley	40	14	352.86	73.2	82.607	0.324	45.05	88.32
Mountain	116	42	93.07	19.3	5.628	0.089	4.37	8.57
Ice apron	34	12	25.92	5.4	6.959	0.021	1.53	3.00
Cirque	7	3	1.28	0.3	0.413	0.113	0.01	0.02
Niche	56	20	5.71	1.2	0.292	0.025	0.01	0.02
Total	278	100	482.20	100			51.01	100

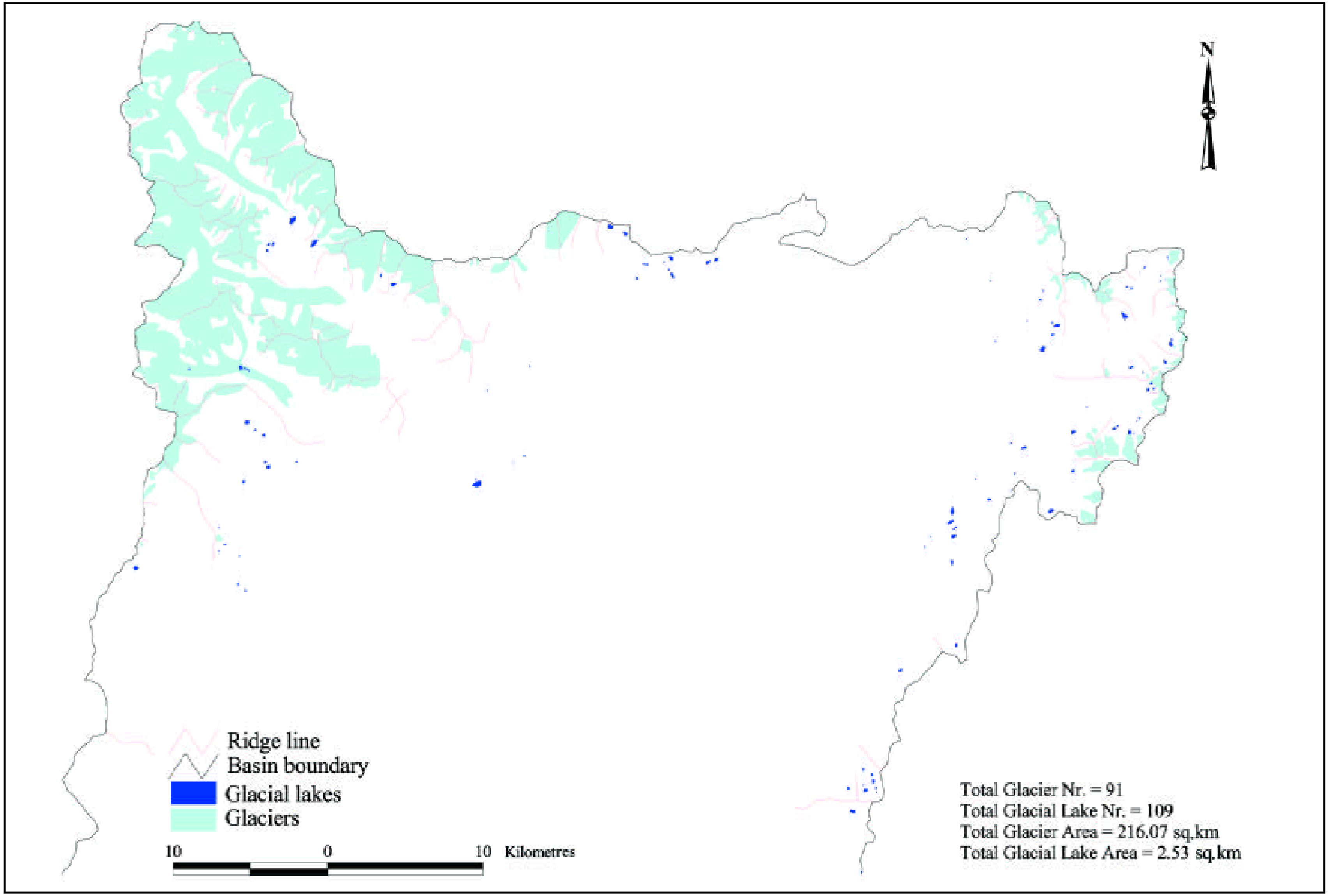


Figure 7.4: Glaciers and glacial lakes of the Arun Basin

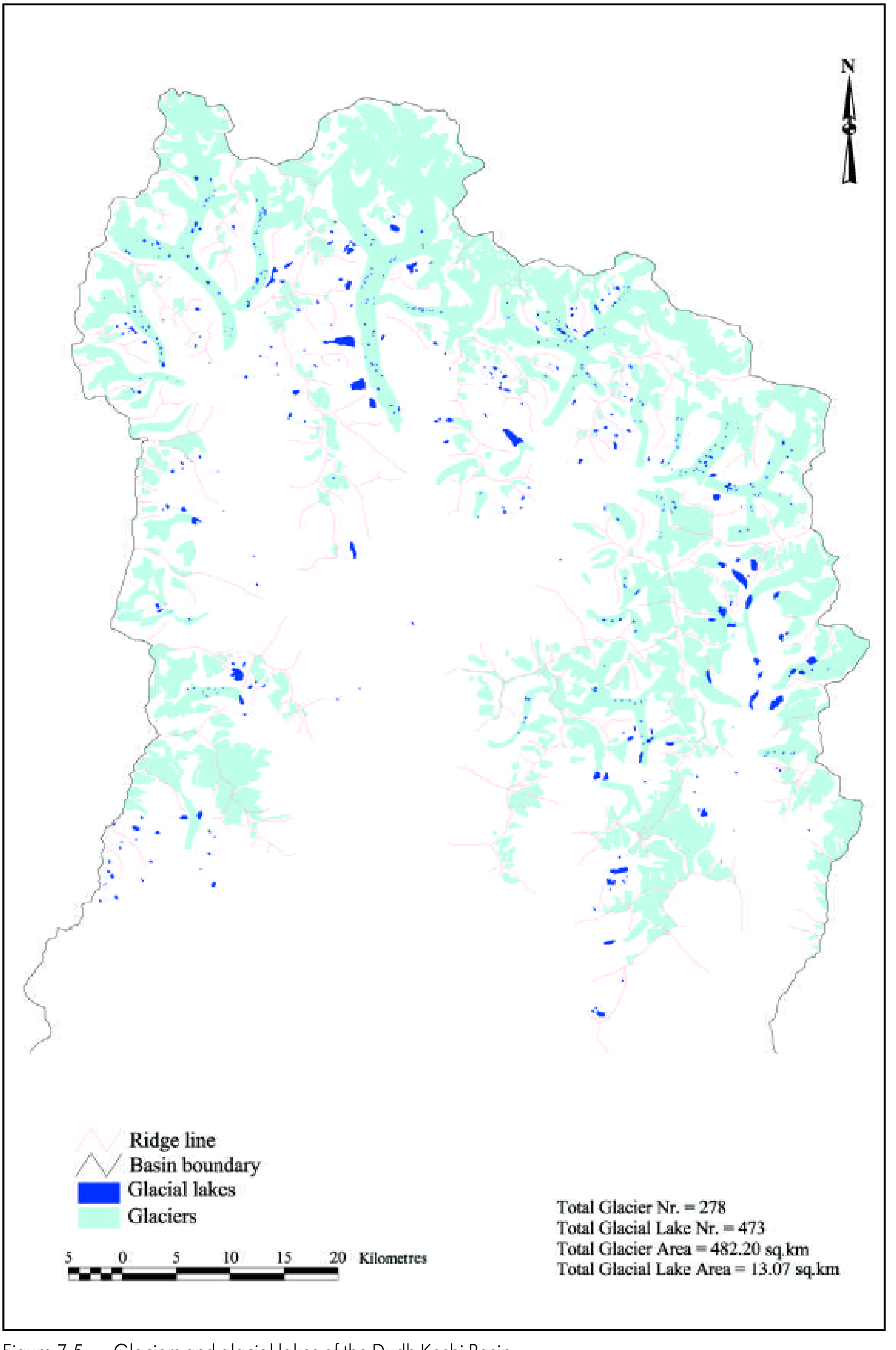


Figure 7.5: Glaciers and glacial lakes of the Dudh Koshi Basin

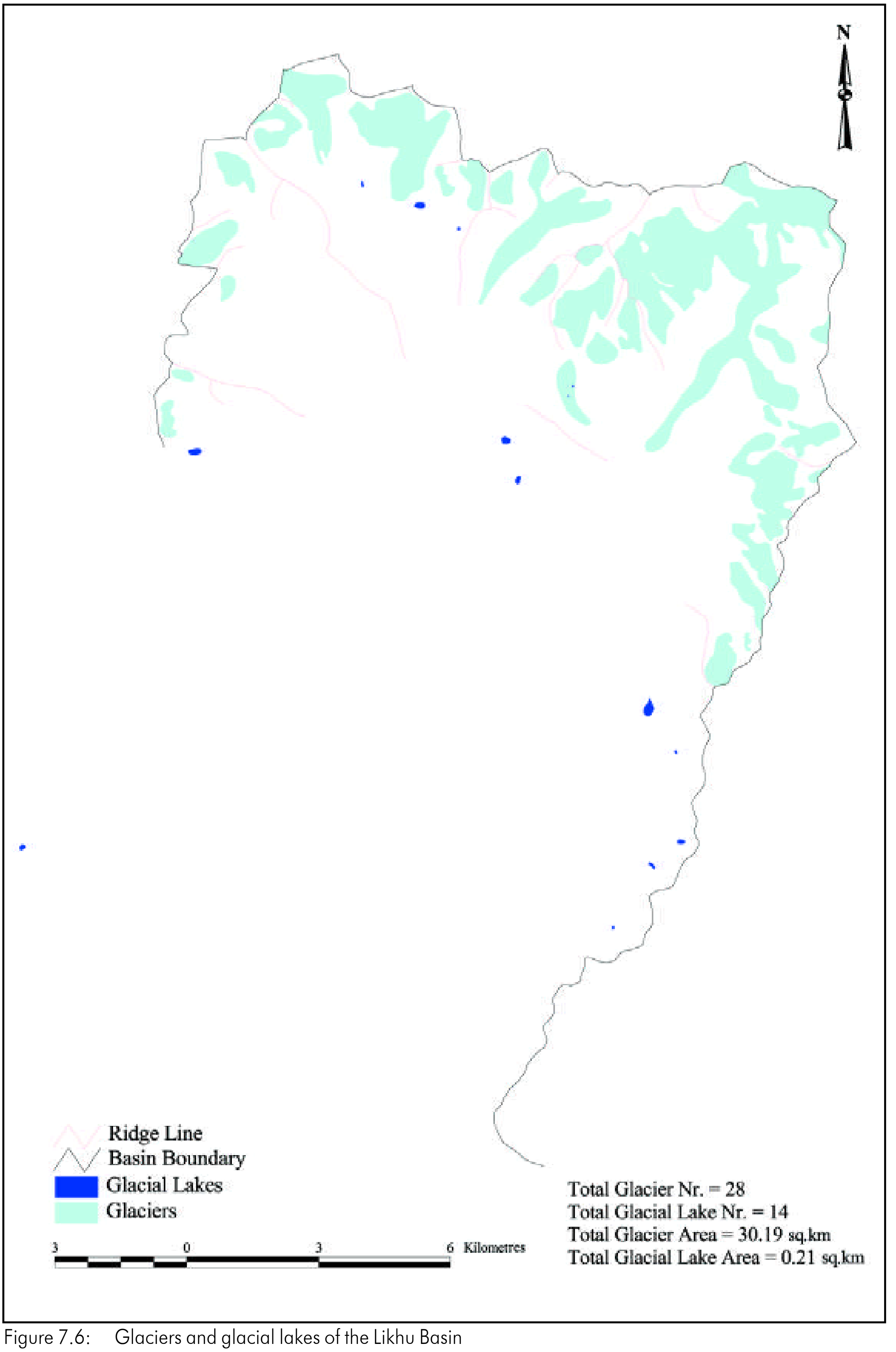


Figure 7.6: Glaciers and glacial lakes of the Likhu Basin

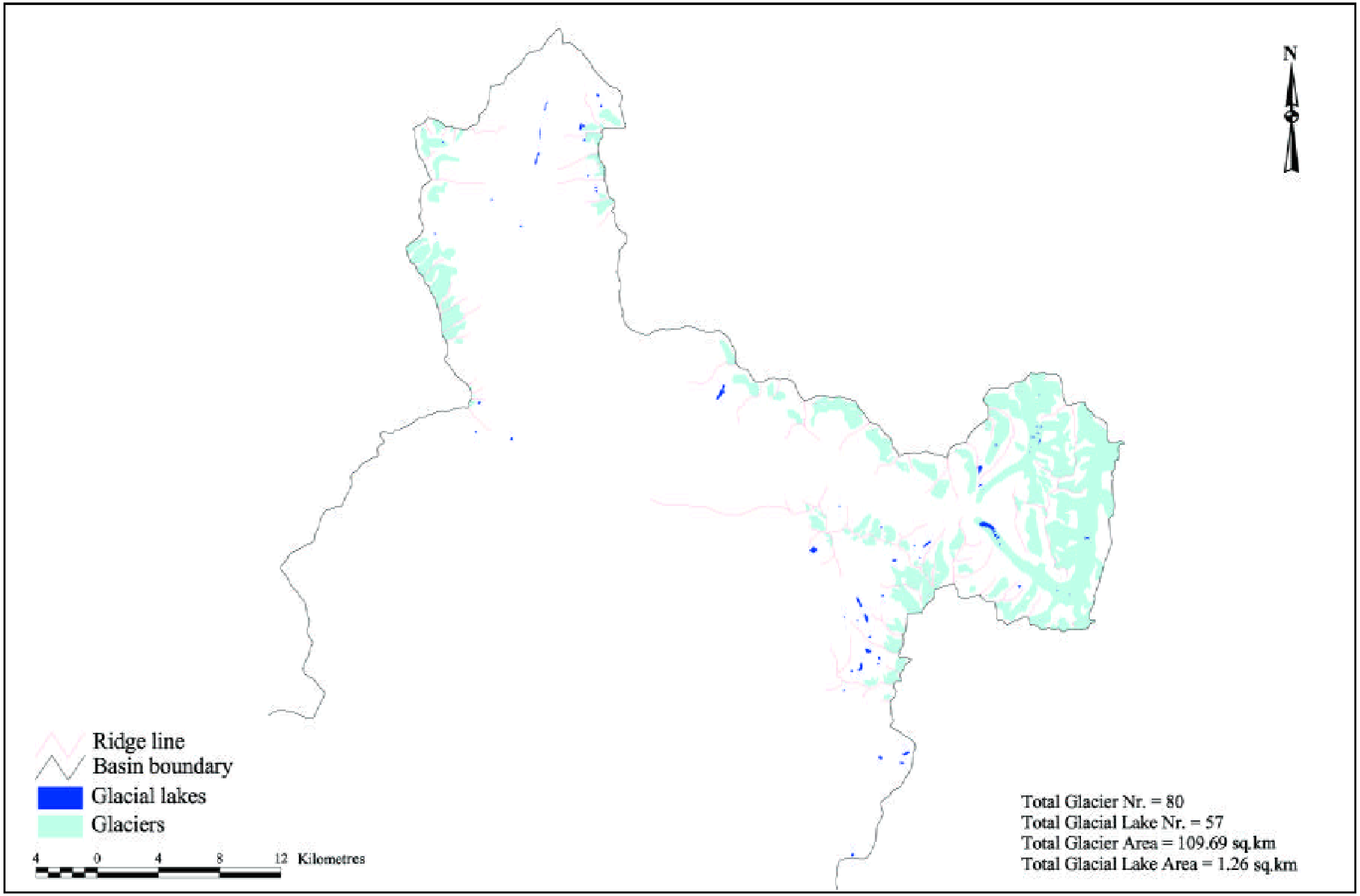


Figure 7.7: Glaciers and glacial lakes of the Tama Koshi Basin

Table 7.6B: Distribution of glaciers on the basis of aspect in the Dudh Koshi Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SE	56	52.91	11	10.19	0.03	8870	190	7346	4755	3.19
S	39	251.14	52	82.61	0.06	22 500	250	8230	4511	36.03
W	25	23.83	5	5.63	0.03	6330	250	6675	4694	1.56
SW	42	65.35	14	19.43	0.02	10 770	190	8382	4298	5.34
E	31	20.90	4	6.40	0.02	7600	170	6812	4206	1.08
NE	33	35.49	7	6.96	0.05	6015	250	6511	4359	2.16
N	21	12.49	3	6.02	0.07	5060	250	6782	4481	0.66
NW	28	19.44	4	4.46	0.04	4110	190	7757	4450	0.97
Open	3	0.75	0	0.36	0.09	315	70	6654	5182	0.02

Table 7.7A: Glacier types in the Likhu River Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	2	7	0.36	1	0.206	0.156	0.0077	0.40
Valley	4	14	16.50	55	10.664	0.495	1.373	70.73
Mountain	17	61	12.65	42	2.792	0.107	0.5481	28.24
Niche	4	14	0.44	1	0.153	0.042	0.0075	0.39
Ice apron	1	4	0.21	1	0.218	0.218	0.0049	0.25
Total	28	100	30.19	100			1.9412	100

Table 7.7B: Distribution of glaciers on the basis of the aspect of Likhu River sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
E	3	1.14	3.77	0.61	0.22	1070	315	5925	5029	0.034
SE	4	4.22	13.97	3.13	0.11	2215	550	5730	4359	0.232
S	7	5.62	18.60	2.79	0.14	3160	570	5885	4999	0.272
NE	1	0.77	2.55	0.77	0.77	1580	1580	5273	4968	0.029
SW	4	13.84	45.81	10.66	0.41	7915	1070	6718	4130	1.188
Open	1	0.21	0.70	0.21	0.21	380	380	6231	5913	0.004
W	1	0.16	0.53	0.16	0.16	500	500	6553	6096	0.003
NW	5	3.63	12.02	7.94	0.11	1900	570	6005	4846	0.158
N	2	0.62	2.05	0.58	0.04	1325	315	5425	4968	0.020

Table 7.8A: Glacier types in the Tama Koshi Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	4	5	0.72	1	0.32	0.11	0.0157	0.15
Valley	7	9	67.73	62	38.16	0.50	8.5757	82.68
Mountain	45	56	38.52	35	3.36	0.10	1.7249	16.63
Ice apron	4	5	0.79	1	0.6	0.02	0.0232	0.22
Cirque	5	6	0.78	1	0.28	0.11	0.0156	0.15
Niche	15	19	1.15	1	0.19	0.02	0.0170	0.16
Total	80	100	109.69	100			10.37	100

Out of 23 glaciers in the Sun Koshi Sub-basin (Figure 7.8), five are valley glaciers with 78% of the area and 87% of the ice reserve. The mountain glaciers cover 20% of the area and have 13% of the ice reserve. The area of other glaciers is about 1.3% and the ice reserve is only about 0.3% (Table 7.9A).

The Indrawati is the smallest sub-basin among the seven sub-basins of the Sapta Koshi Basin. This sub-basin consists of 18 glaciers (Figure 7.9). There are 12 mountain glaciers and two valley glaciers (Table 7.10A). The areas of mountain and valley glaciers are 56 and 41% respectively. The ice reserve in this sub-basin is almost equally distributed between valley and mountain type glaciers.

Table 7.8B: Distribution of glaciers on the basis of aspect in the Tama Koshi Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
E	5	1.65	2	1.35	0.02	2250	190	19 900	16 000	0.07
NE	14	12.67	10	2.85	0.15	3200	570	19 700	13 900	0.57
SE	4	1.83	3	1.46	0.11	950	630	18 800	15 600	0.06
S	12	46.50	37	38.16	0.02	22 170	190	22 042	14 900	6.07
SW	12	28.78	32	20.41	0.08	7600	380	21 000	15 000	2.84
NW	18	11.19	9	2.95	0.02	4100	190	22 250	14 500	0.51
W	7	2.76	2	0.71	0.12	1580	505	21 400	16 000	0.08
N	8	4.31	4	1.67	0.04	3160	380	21 851	15 700	0.17

Table 7.9A: Glacier types in the Sun Koshi Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	2	9	0.32	0.43	0.277	0.043	0.0074	0.10
Valley	5	22	58.31	78.21	19.63	3.703	6.2696	87.15
Mountain	10	43	15.25	20.45	5.163	0.359	0.9055	12.59
Ice apron	2	9	0.09	0.12	0.053	0.037	0.0009	0.01
Cirque	1	4	0.18	0.24	0.181	0.181	0.0037	0.05
Niche	3	13	0.40	0.54	0.173	0.100	0.0072	0.10
Total	23	100	74.56	100			7.1943	100

Table 7.9B: Distribution of glaciers on the basis of aspect in the Sun Koshi Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
NE	1	0.18	0	0.18	0.18	630	630	5090	4816	0.00
SE	7	5.17	7	3.70	0.05	5060	190	5547	4298	0.29
SW	7	25.67	34	12.93	0.41	8230	1260	6973	4115	2.17
S	2	37.57	50	19.63	17.94	10 130	8870	6980	3840	4.40
NW	2	2.17	3	2.13	0.04	1900	190	5669	4907	0.12
W	3	3.74	5	3.25	0.13	2400	630	5944	4481	0.22
E	1	0.04	0	0.04	0.04	190	190	5669	5425	0.00

Table 7.10A: Glacier types in the Indrawati Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Valley	2	11	9.51	41.38	5.948	3.562	0.710	49.31
Mountain	12	67	12.89	56.10	5.110	0.295	0.72	50.00
Ice apron	1	6	0.11	0.48	0.110	0.110	0	0.00
Cirque	1	6	0.10	0.47	0.108	0.108	0	0.00
Niche	2	11	0.36	1.57	0.231	0.129	0.01	0.69
Total	18	100	22.98	100			1.440	100

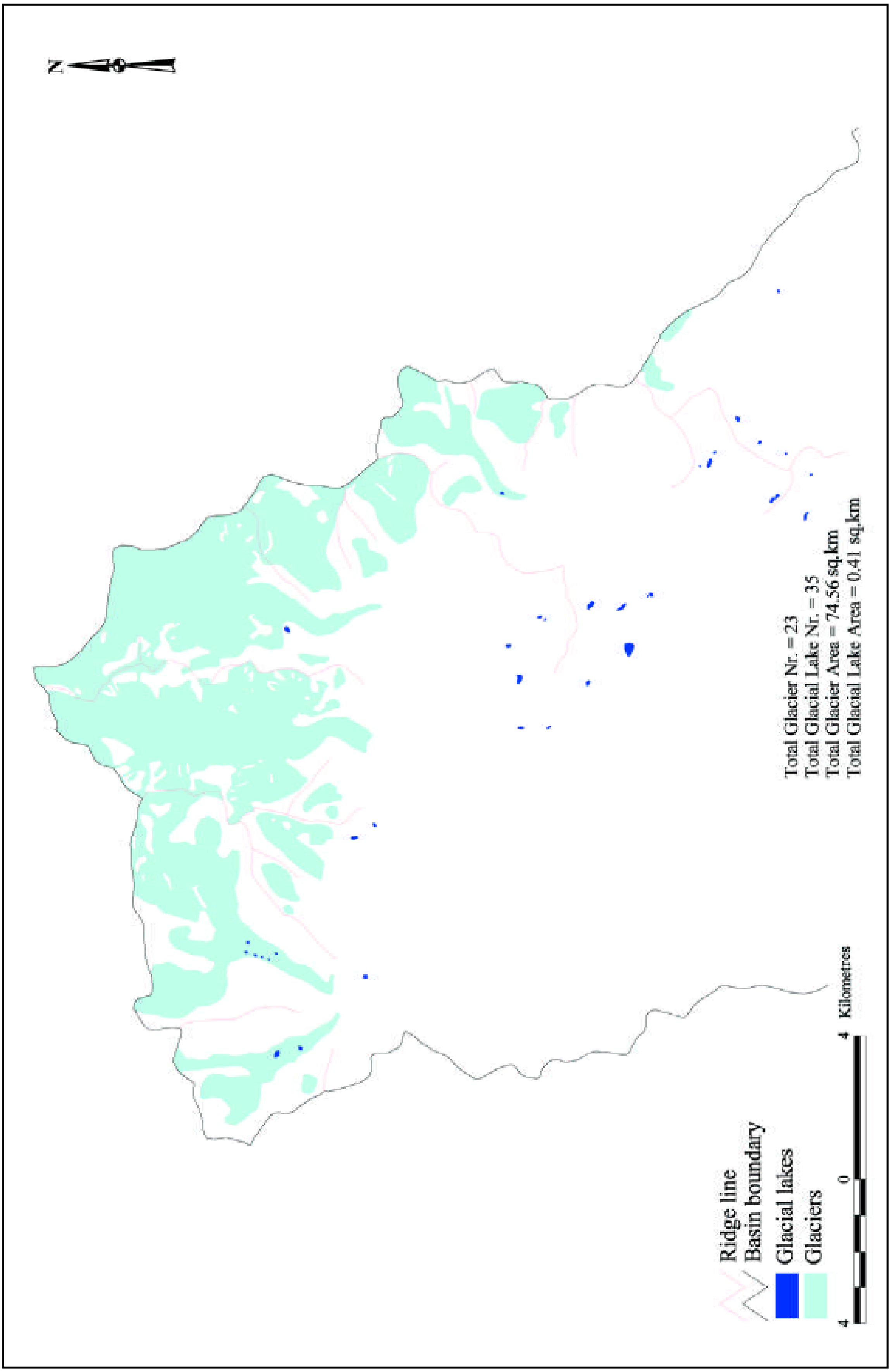


Figure 7.8: Glaciers and glacial lakes of the Sun Koshi Basin

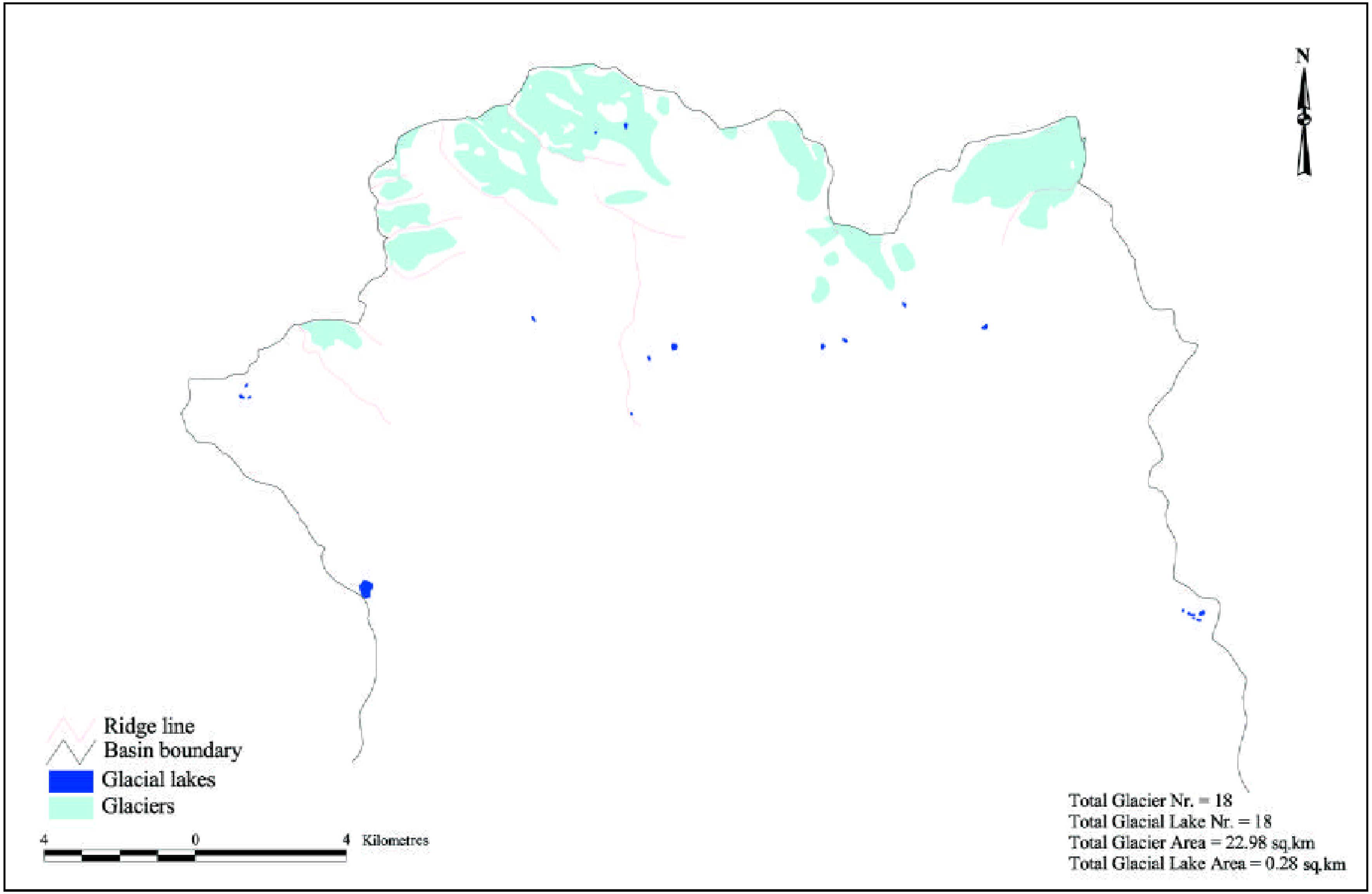


Figure 7.9: Glaciers and glacial lakes of the Indrawati Basin

Table 7.10B: Distribution of glaciers on the basis of aspect in the Indrawati Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SE	5	11.67	51	5.95	0.31	4745	630	5846	4389	0.80
NE	5	2.91	13	1.23	0.30	2025	880	5486	4572	0.12
S	4	2.65	12	1.59	0.11	2340	315	5639	4846	0.11
SW	3	5.52	24	5.11	0.11	3925	315	5761	4724	0.40
W	1	0.23	1	0.23	0.23	440	440	4999	4907	0.01

The Gandaki River basin

The Gandaki River Basin occupies central Nepal. The river basin extends from longitude 82° 55'E to 85° 50'E. The Gandaki River Basin consists of five major sub-basins as described in Chapter 3. This is the biggest of Nepal's four river basins in terms of total glacier area coverage. There are 1025 glaciers listed in this basin with an area of 2,030.15 sq.km and an ice reserve of 191.39 km^3 (Figure 7.10). The distribution of glaciers in each sub-basin of the Gandaki Basin is shown in Table 7.11. The Kali Gandaki River Sub-basin has the highest number of glaciers (399), while the Marsyangdi River Sub-basin has the highest glacier area coverage (614.21 sq.km) as given in Table 7.11.

Table 7.11: Distribution of glaciers in the sub-basins of the Gandaki River Basin				
Sub-basin name	Number of glaciers	Area (km^2)	Mean area per glacier (km^2)	Ice reserve (km^3)
Trisuli River	74	246.65	3.33	27.47
Budhi Gandaki River	180	442.14	2.45	40.40
Marsyangdi River	311	614.31	1.97	54.99
Seti River	61	164.48	4.34	16.88
Kali Gandaki River	399	562.67	1.41	51.65
Total	1025	2030.25	2.25	191.39

The glaciers in the sub-basins of the Gandaki River are also classified mainly into mountain glaciers and valley glaciers. The other forms of glaciers like ice cap, ice apron, cirque, and niche glaciers are also studied in the basin. The number of valley glaciers is low, but the area occupied by them is generally high due to adjoining parts of mountain glaciers.

The Trishuli River Sub-basin is generally elongated in an east–west direction. The major part of the catchment area of the river (around 50%) lies in China. The river enters Nepalese territory by the name of Bhotekoshi. There are only 74 glaciers in the Trishuli River Sub-basin within Nepal (Figure 7.11). There is only one ice cap and nineteen ice apron glaciers in the sub-basin (Table 7.12A). The mountain glaciers are greater in number (36), but the valley glaciers number only nine. However, valley glaciers cover 66% of the area with 81% of the ice reserve.

The highest number of glaciers is found in the southwest and northeast aspect (Table 7.12B). Although the glaciers in the south aspect are only six in number, the area occupied by these glaciers stands highest when compared with the areas occupied by other glaciers.

Table 7.12A: Glacier types in the Trishuli River Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	1	1	0.65	0.03	0.065	0.065	0	0.00
Valley	9	12	163.22	66.18	67.932	4.685	22.26	81.03
Mountain	36	49	74.19	30.08	11.031	0.359	4.94	17.98
Ice apron	19	26	7.58	3.07	1.305	0.087	0.24	0.87
Cirque	1	1	0.40	0.17	0.409	0.409	0.01	0.04
Niche	8	11	1.17	0.48	0.428	0.011	0.02	0.07
Total	74	100	246.65	100			27.47	100

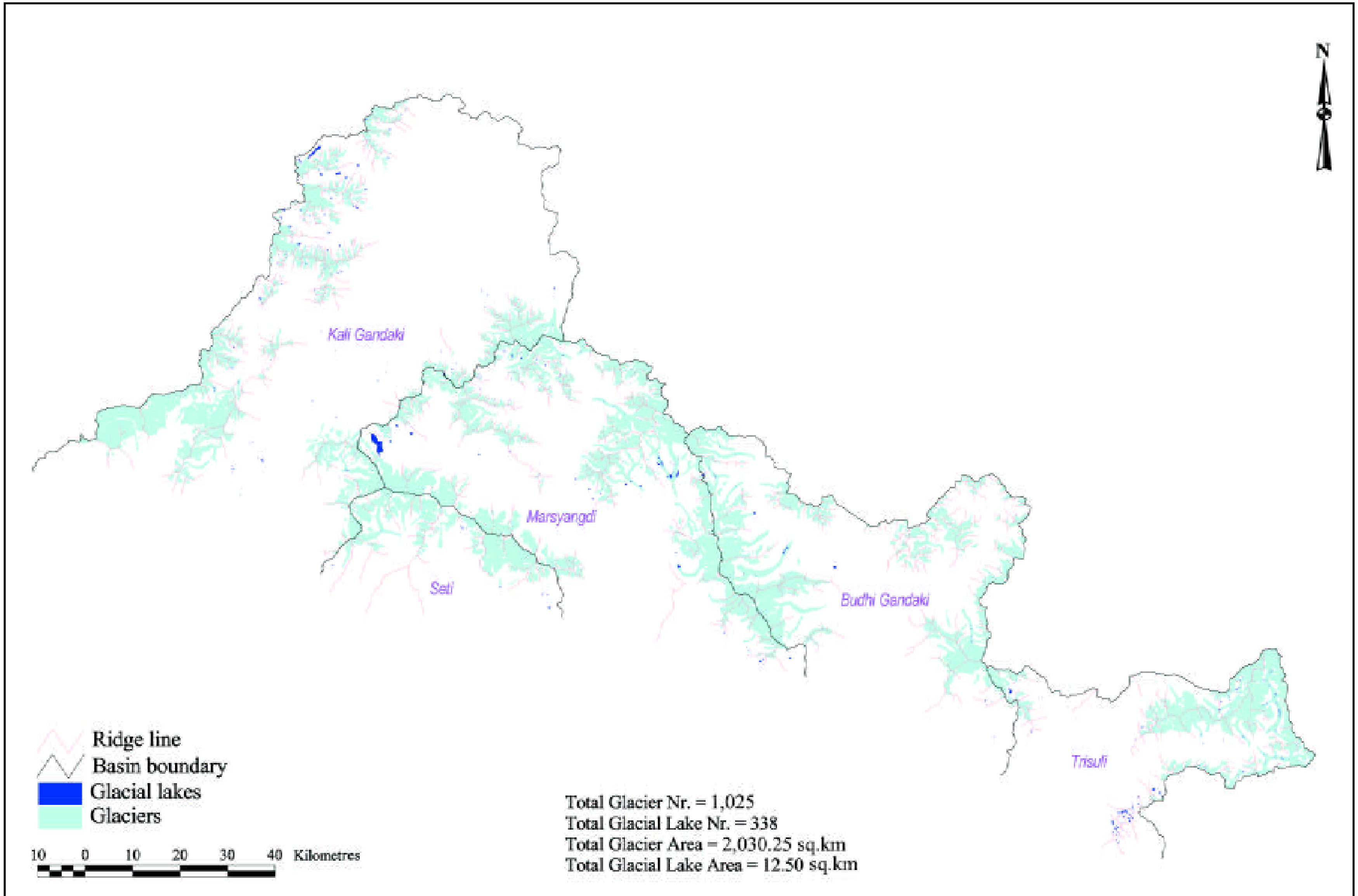


Figure 7.10: Glaciers and glacial lakes of the Gandaki Basin

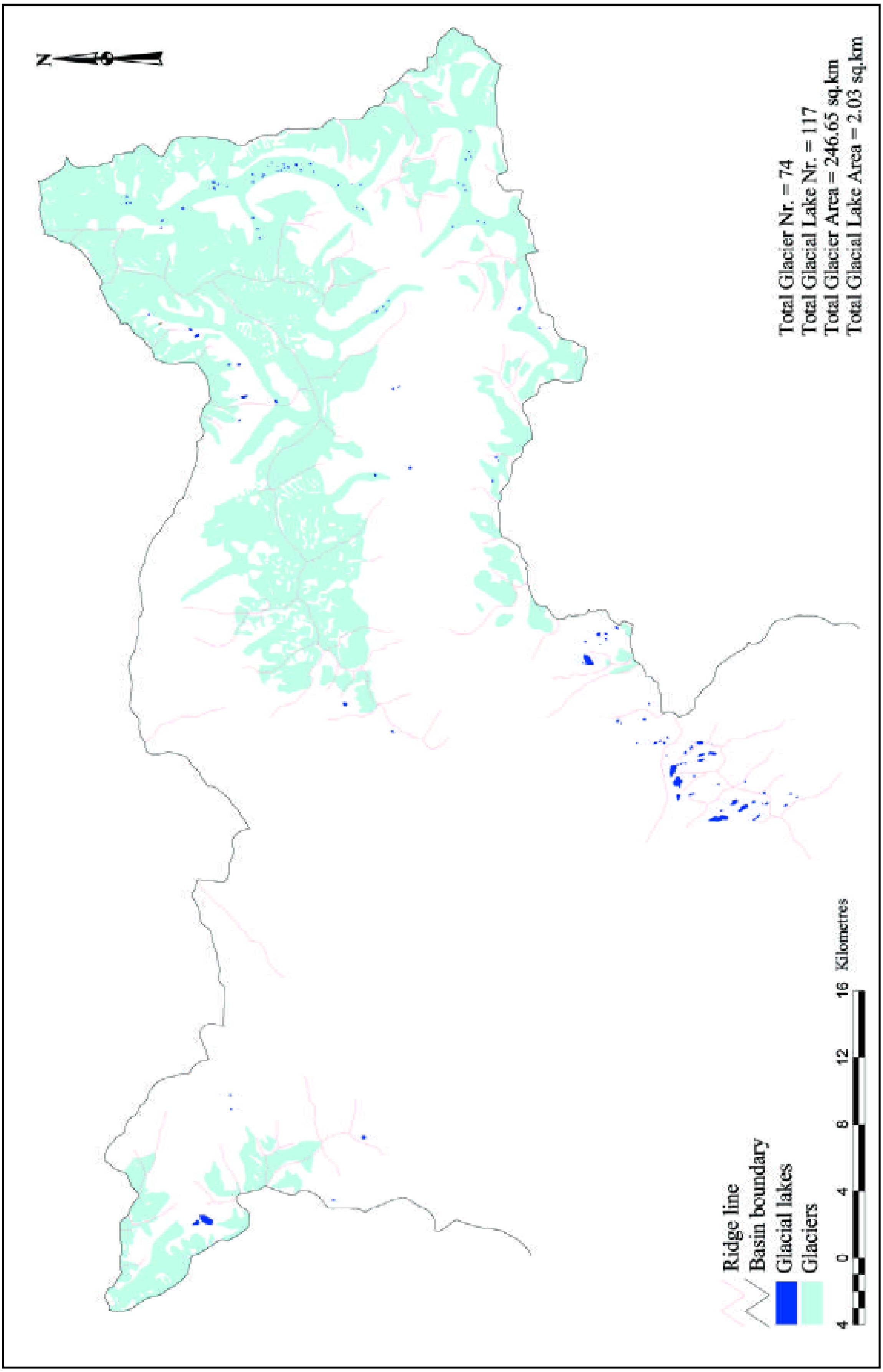


Figure 7.11: Glaciers and glacial lakes of the Trishuli Basin

Table 7.12B: Distribution of glaciers on the basis of aspect of in the Trishuli River Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation Highest (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SE	11	50.57	20.5	16.46	0.15	11 590	500	7051	3993	4.64
SW	19	49.43	20.0	25.65	0.07	5830	315	6892	4206	4.83
S	6	82.50	33.4	67.93	0.17	17 740	760	7218	4450	13.30
NE	18	16.23	6.6	2.49	0.02	3350	315	6279	4602	0.76
N	7	18.25	7.4	6.55	0.07	5700	315	6195	4130	1.36
E	1	0.13	0.1	0.13	0.13	630	630	5456	4923	0.00
NW	8	27.63	11.2	16.52	0.18	6330	410	7051	3414	2.54
W	4	1.94	0.8	1.17	0.01	2850	150	5791	4785	0.07

The Budhi Gandaki River Sub-basin consists of 180 glaciers (Figure 7.12). Out of them, 17 glaciers are valley glaciers, which is only 9% of the total number of glaciers, but the area occupied by them is more or less equal to the area of the rest of the glaciers in the sub-basin (Table 7.13A). The valley glaciers have around 60% of the ice reserves of this sub-basin.

Table 7.13A: Glacier types in the Budhi Gandaki Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	23	13	13.27	3.00	2.089	0.031	0.53	1
Valley	17	9	210.84	47.69	35.972	0.837	24.02	59
Mountain	80	44	190.83	43.16	20.880	0.128	14.77	37
Ice apron	26	14	19.91	4.51	5.192	0.049	0.94	2
Cirque	5	3	1.08	0.25	0.370	0.141	0.02	0
Niche	29	16	6.18	1.40	0.972	0.028	0.12	0
Total	180	100	442.14	100			40.40	100

The aspect of the glaciers in the Budhi Gandaki sub-basin is distributed in all directions. The lowest number of glaciers is distributed in the west aspect and the highest number in the southwest and northwest aspects. The northeast and southeast aspect glaciers are also significantly higher in number (Table 7.13B). Although quite a few of the glaciers are also facing towards the north, the area occupied by the south aspect glaciers is generally high.

Table 7.13B: Distribution of glaciers on the basis of aspect in the Budhi Gandaki Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
S	21	37.91	8.6	11.44	0.08	6300	250	7101	3658	2.93
SE	25	48.26	10.9	17.62	0.09	9500	250	6693	3978	3.89
NE	29	86.69	19.6	35.97	0.05	14 570	315	7893	2865	8.75
N	18	49.92	11.3	20.88	0.05	9185	185	7893	3139	4.58
NW	32	84.77	19.2	21.51	0.03	11 400	190	7424	3597	7.58
E	13	103.28	23.4	26.67	0.09	15 200	315	8163	3139	11.25
SW	34	25.02	5.7	3.54	0.03	2340	190	7138	4267	1.13
W	8	6.28	1.4	3.13	0.08	2530	315	6032	3962	0.29

There are 311 glaciers in the Marsyangdi River Sub-basin. The distribution of glaciers in the sub-basin is shown in Figure 7.13. Among them, the 21 valley glaciers, which amount to only about 7% of the number, cover around 41% of the area with an ice reserve of above 50% of the sub-basin (Table 7.14A).

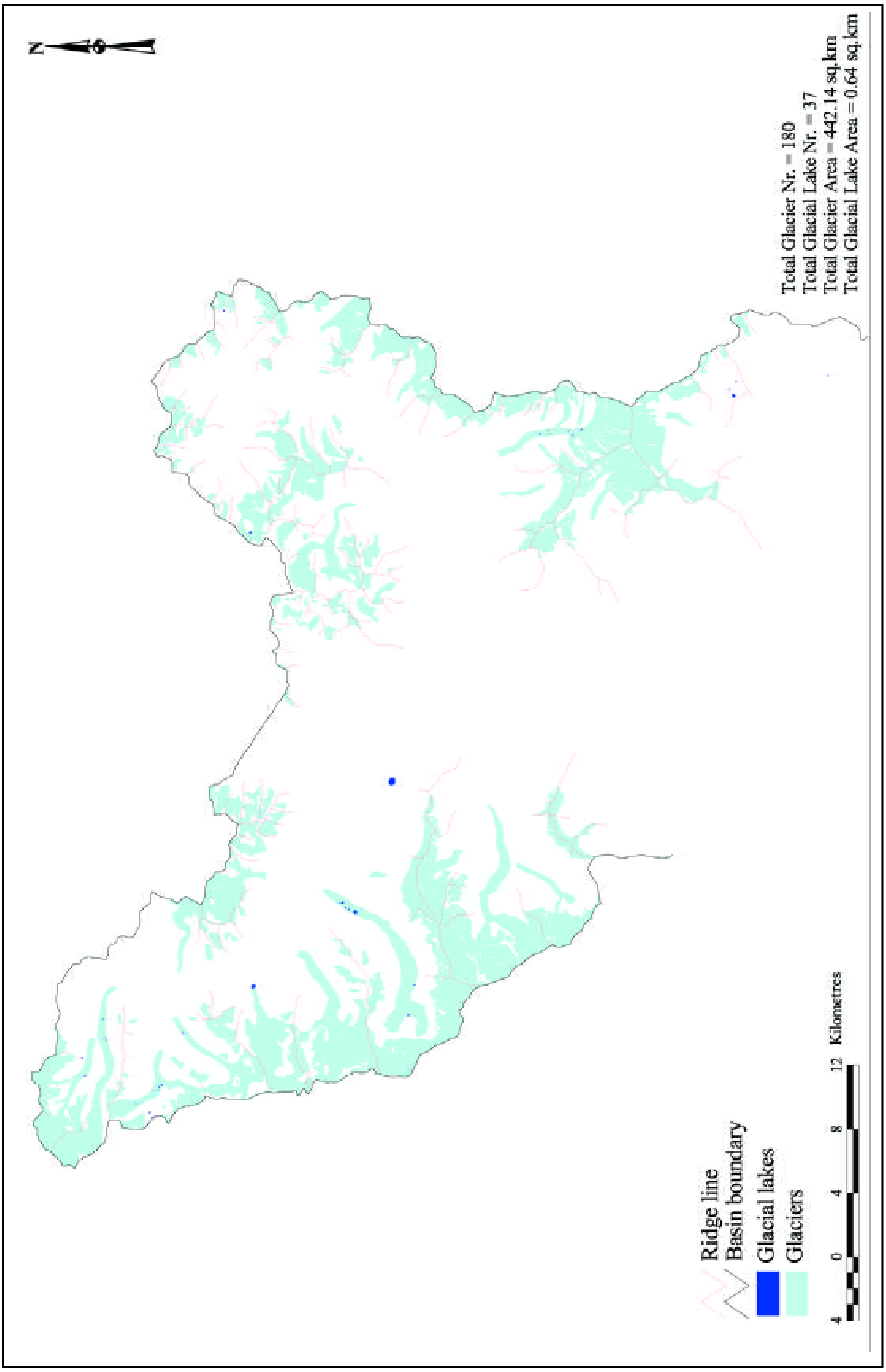


Figure 7.12: Glaciers and glacial lakes of the Budhi Gandaki Basin

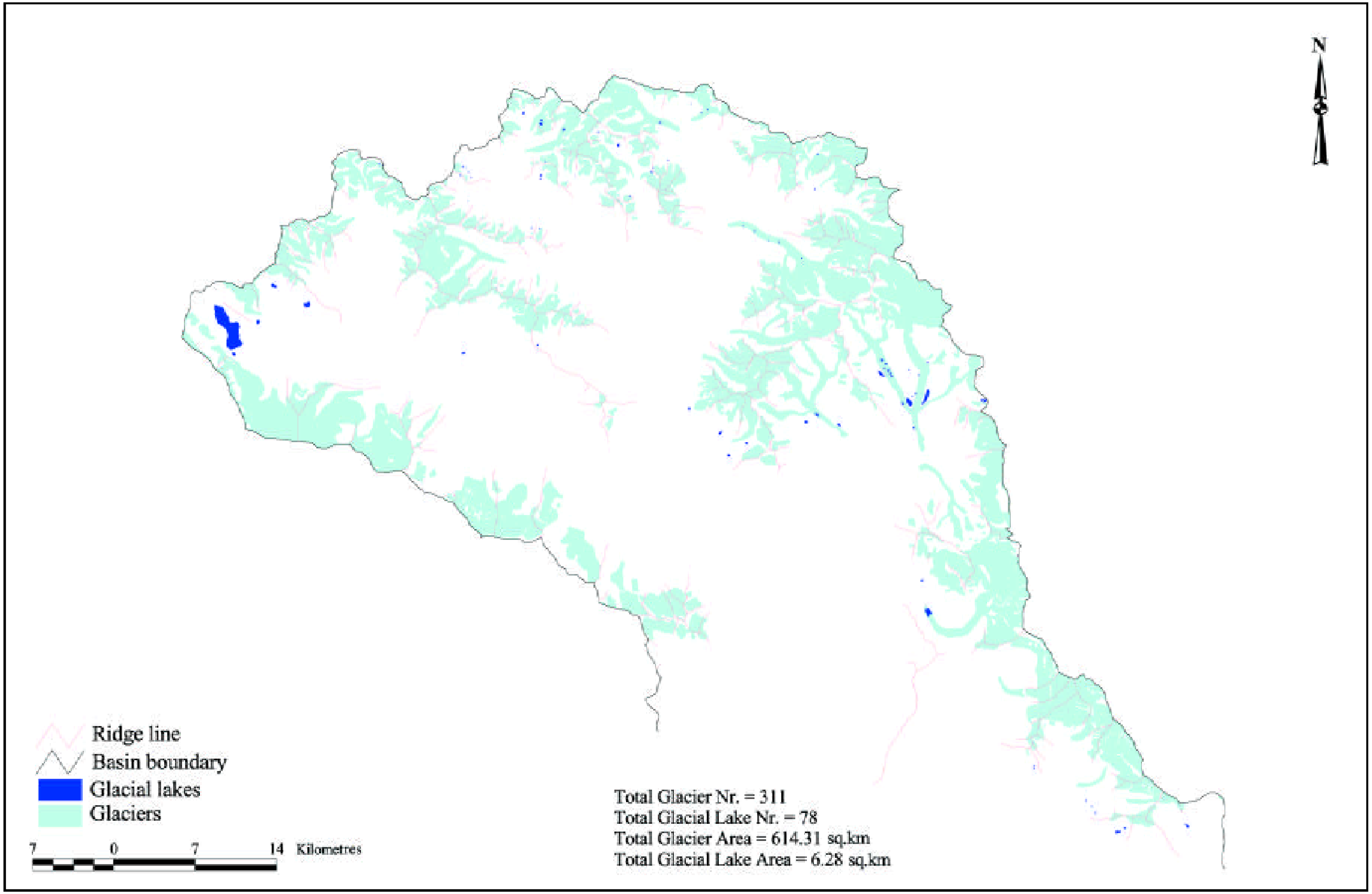


Figure 7.13: Glaciers and glacial lakes of the Marsyangdi Basin

Table 7.14A: Glacier types in the Marsyangdi River Sub-basin								
Glacier type	Number		Area (km²)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km³	%
Ice cap	56	18	14.16	2.31	1.102	0.074	0.31	0.56
Valley	21	7	249.33	40.59	46.254	0.310	29.99	54.54
Mountain	160	51	326.07	53.08	22.058	0.064	23.84	43.35
Ice apron	67	22	22.96	3.74	2.615	0.050	0.80	1.45
Cirque	4	1	1.57	0.26	0.907	0.144	0.05	0.09
Niche	3	1	0.20	0.03	1.935	0.006	0.00	0.00
Total	311	100	614.31	100			54.99	100

The Marsyangdi River Sub-basin is elongated in the northwest–southeast direction. The glaciers are distributed mostly in the aspects of south, southwest, and northwest, and these glaciers cover more than 60% of the glacial area in the sub-basin. The lowest number of glaciers is distributed in the east and west aspects (Table 7.14B).

Table 7.14B: Distribution of glaciers on the basis of aspect in the Marsyangdi Sub-basin										
Aspect	Number	Area		Largest area (km²)	Smallest area (km²)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Tongue elevation (m)	Ice reserve (km³)
		km²	%							
S	55	129.10	21.1	46.25	0.11	19 000	190	7540	3688	13.20
SW	57	141.54	22.9	34.93	0.03	10 770	190	7893	3048	13.08
NE	47	80.85	13.2	22.06	0.03	6960	190	7468	3719	7.25
N	38	45.27	7.4	11.29	0.01	5060	150	7468	4328	3.13
NW	51	120.50	19.7	31.92	0.01	22 150	150	7681	3444	11.27
SE	29	47.26	7.7	14.31	0.03	10 130	150	6858	3475	3.41
E	17	20.60	3.4	13.60	0.03	7600	315	6581	4511	1.64
W	17	29.09	4.8	8.59	0.03	6330	190	7035	3688	2.01

The Seti River Sub-basin is the smallest of the seven sub-basins of the Gandaki River Basin and comprises the lowest number of glaciers among the sub-basins. The sub-basin comprises 61 glaciers (Figure 7.14) and covers an area of about 164 sq.km (Table 7.15A). The ice reserve in the sub-basin is about 16 km³. There are only six valley glaciers and the rest are mountain glaciers and other small forms of mountain glaciers.

Table 7.15A: Glacier types in the Seti River Sub-basin								
Glacier type	Number		Area (km²)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km³	%
Ice cap	11	18	2.98	2	0.558	0.058	0.08	0.47
Valley	6	10	45.89	28	14.728	0.378	4.40	26.07
Mountain	24	39	95.71	58	52.770	0.261	11.09	65.70
Ice apron	14	23	18.13	11	7.899	0.084	1.26	7.46
Niche	6	10	1.75	1	0.561	0.0459	0.05	0.30
Total	61	100	164.48	100			16.88	100

The glaciers are mostly distributed in the northern part of the basin. The glaciers in the south, southwest, and southeast aspects are more or less equal in number, but the area occupied by the south aspect glaciers is larger. The glaciers with north, northeast, west, northwest, and open aspects occupy an almost negligible area (Table 7.15B).

The valley glaciers in the Kali Gandaki River Sub-basin comprise only 12% in terms of number, but the area occupied by them is 41% of the area covered by all the glaciers in the sub-basin. The ice reserve of

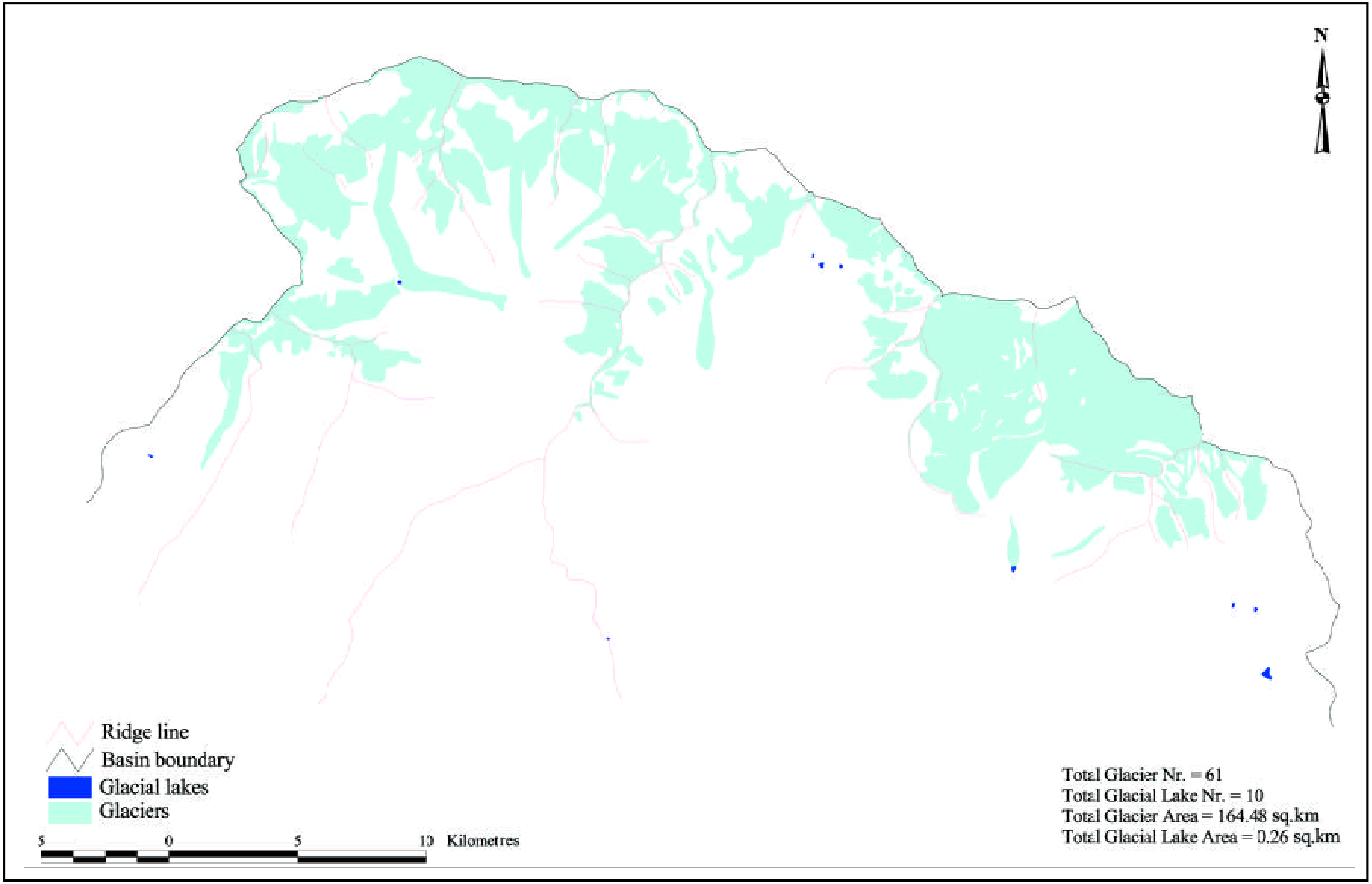


Figure 7.14: Glaciers and glacial lakes of the Seti Basin

Table 7.15B: Distribution of glaciers on the basis of aspect in the Seti River Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
S	13	89.75	54.6	52.77	0.26	12 670	570	8092	2408	11.67
SW	17	32.94	20.0	14.73	0.05	19 000	190	7555	2865	2.68
E	7	4.65	2.8	2.17	0.06	2720	190	7647	4115	0.21
N	1	0.35	0.2	0.35	0.35	315	315	6441	6066	0.01
NE	1	5.24	3.2	5.24	5.24	2530	2530	7193	4176	0.40
SE	14	20.61	12.5	7.90	0.09	5060	315	6983	3688	1.32
W	3	4.91	3.0	2.91	0.76	3215	1200	6309	4633	0.27
NW	3	5.62	3.4	3.06	1.03	3160	1710	6248	4542	0.31
Open	2	0.40	0.2	0.25	0.15	250	190	6993	5517	0.01

the valley glaciers in the sub-basin is about 47% (Table 7.16A). There is a significant number of ice caps, ice aprons, and niche glaciers, but the cirque glaciers number only six. The distribution of glaciers in the sub-basin is shown in the Figure 7.15.

The general trend of the Kali Gandaki River Sub-basin is north–south. In this sub-basin, most of the glaciers have northeast and northwest aspects (Table 7.16B). The lengths and areas of the northwest aspect glaciers are comparatively higher than glaciers of other aspects. The south aspect glaciers are shorter in length and smaller in area.

Table 7.16A: Glacier types in the Kali Gandaki Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice caps	48	12	15.39	2.74	1.220	0.030	0.45	0.87
Valley	48	12	232.03	41.24	46.047	0.331	24.34	47.12
Mountain	172	43	288.60	51.29	57.148	0.068	26.17	50.67
Ice apron	80	20	20.62	3.67	2.891	0.026	0.59	1.14
Cirque	6	2	1.34	0.24	0.575	0.051	0.03	0.06
Niche	45	11	4.66	0.83	0.645	0.006	0.07	0.14
Total	399	100	562.67	100.00			51.65	100.00

Table 7.16B: Distribution of glaciers on the basis of aspect in the Kali Gandaki Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SE	53	120.58	21.4	39.31	0.02	7033	95	8230	4267	12.42
SW	53	41.04	7.3	6.90	0.03	4689	127	7986	4267	2.23
S	59	106.25	18.9	57.15	0.01	12 038	90	8138	3322	12.02
NE	67	89.69	15.9	32.15	0.02	10 328	140	8230	4420	7.49
E	32	23.19	4.1	9.05	0.03	5449	170	7620	4770	1.36
NW	61	126.87	22.6	46.05	0.05	8680	190	8091	4237	13.31
N	52	35.21	6.3	3.76	0.03	4562	127	7620	3993	1.60
W	15	18.10	3.2	8.60	0.17	3421	253	7315	4328	1.17
Open	7	1.71	0.3	0.71	0.04	2851	325	7711	4115	0.05

The Karnali River basin

The western and parts of the far-western regions of Nepal are occupied by the Karnali River Basin (Figure 7.16). The river network of the Karnali River Basin comprises the Bheri, Mugu Karnali, Humla Karnali, Kawari, Tila, and West Seti rivers. The major part of the Mugu Karnali flows from east to west, whereas the Humla Karnali flows from west to east. Generally, rivers flow from north to south in Nepal.

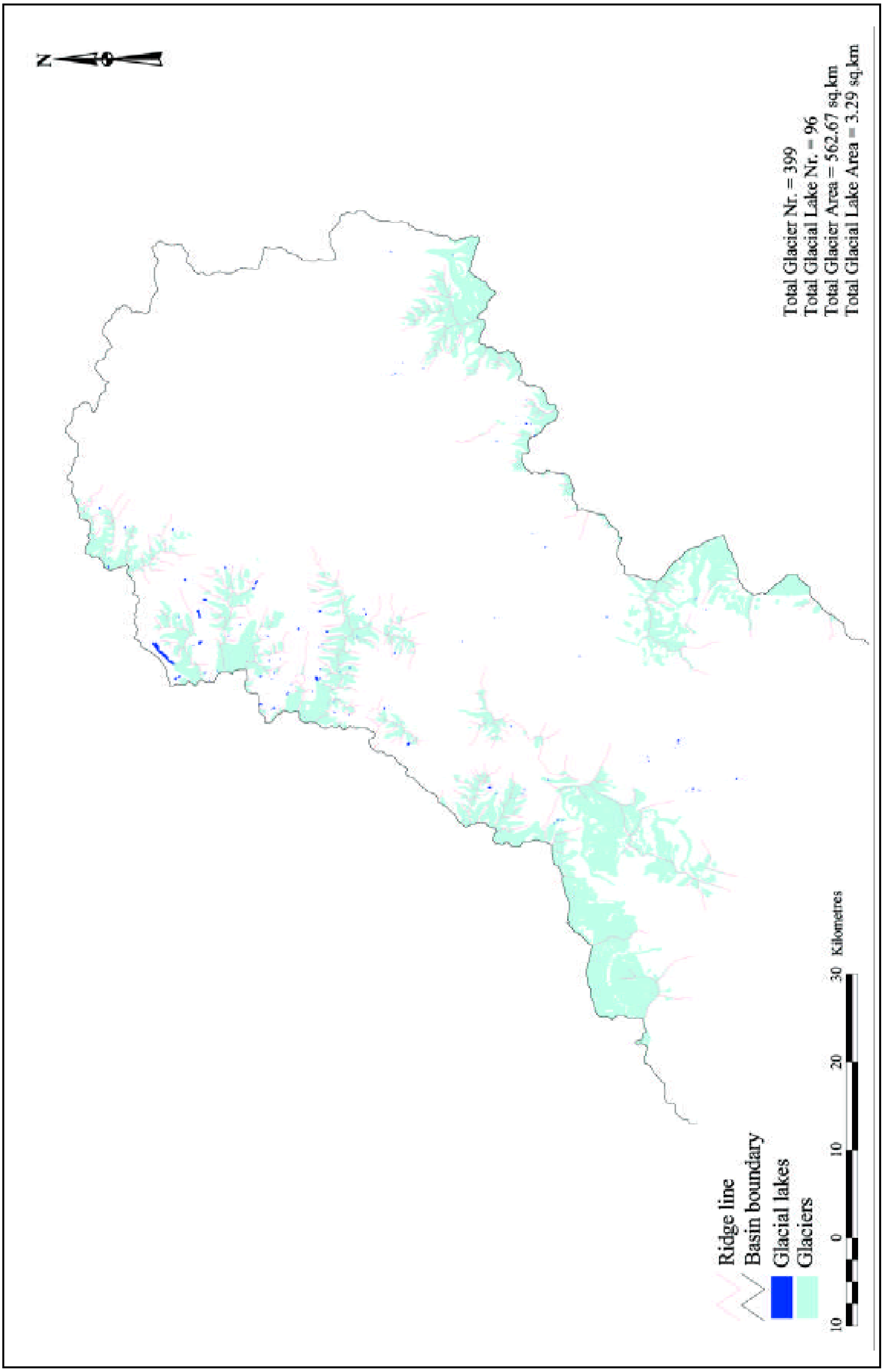


Figure 7.15: Glaciers and glacial lakes of the Kali Gandaki Basin

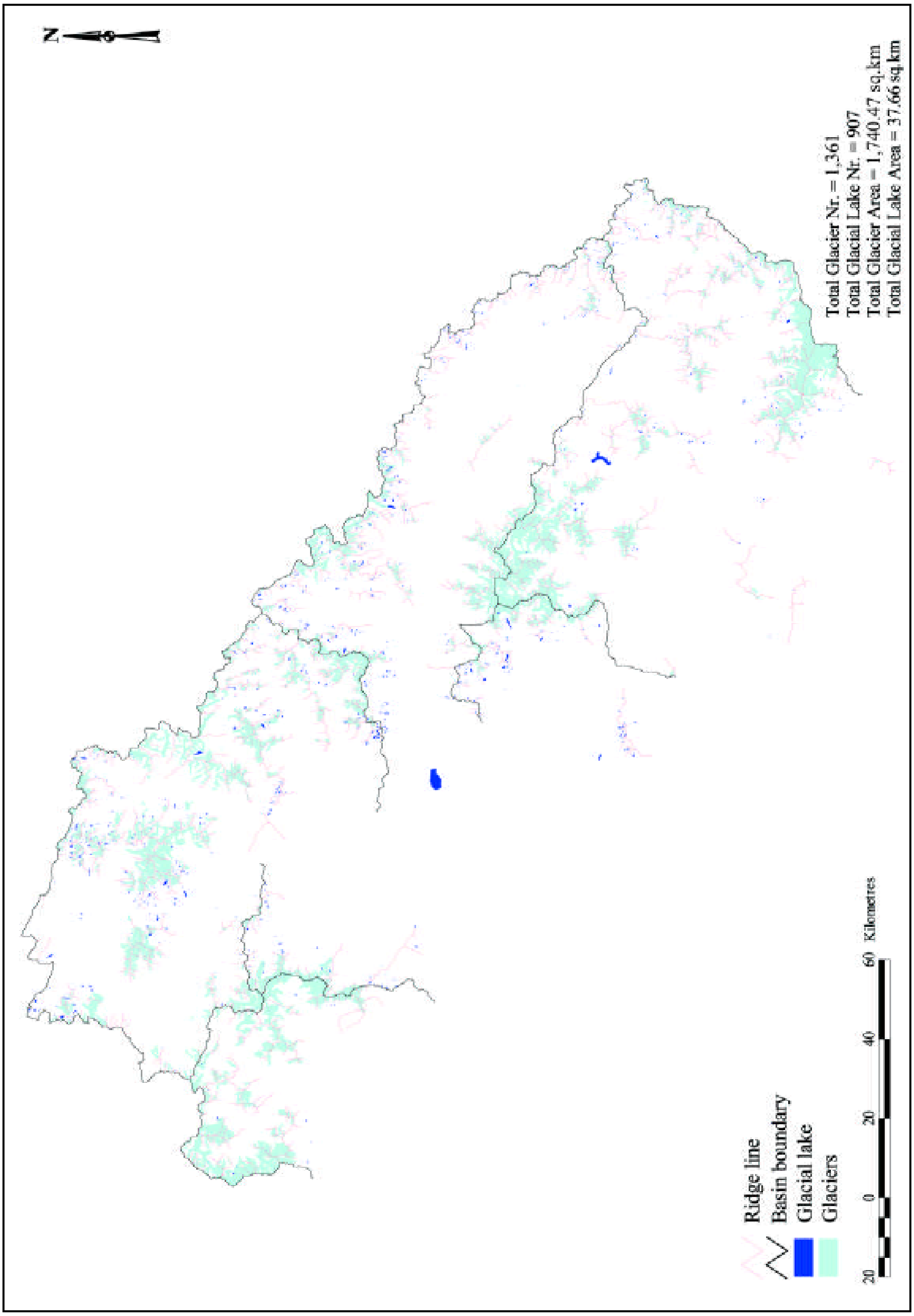


Figure 7.16: Glaciers and glacial lakes of the Karnali Basin

As in the other basins, one of the tributaries belonging to this river basin (the Humla Karnali) originates in Chinese territory. In Indian territory the Karnali River is called the Ghaghara River, and is one of the major tributaries of the Ganges. The distribution of glaciers in the sub-basins of the Karnali River Basin is shown in Table 7.17.

There are 1,361 glaciers inventoried altogether with an area of 1,741.32 sq.km and an estimated ice reserve of 127.87 km^3. The highest number of glaciers lies in the Bheri River Sub-basin and the lowest number of glaciers in the Kawari River Sub-basin (Table 7.17).

Table 7.17: Distribution of glaciers in the sub-basins of the Karnali River Basin

Sub-basin	Number of glaciers	Area (km^2)	Mean area per glacier (km^2)	Ice reserve (km^3)
Bheri River	452	583.40	1.29	47.77
Mugu River	254	220.39	0.87	12.52
Tila River	58	54.69	0.94	3.75
Kawari River	39	53.33	1.37	3.29
Humla River	424	534.53	1.27	36.006
West Seti River	134	294.13	2.25	24.48
Total	1361	1740.47	1.14	127.81

Although the number of glaciers in the Karnali River Basin is comparatively high, the ice reserve is less than in other basins. Usually, a higher number of valley glaciers indicates a larger ice reserve and a higher number of mountain glaciers, ice caps, and ice aprons indicates a smaller ice reserve. The smaller ice reserve in the Karnali River Basin indicates that there are fewer valley glaciers in comparison to the other basins of Nepal. Most of the glaciers in this region are scattered in the form of remnants, which means higher glacier retreat in western Nepal than in eastern Nepal.

The glaciers in the Bheri River Sub-basin are scattered in the form of remnants (Figure 7.17). The Bheri River Sub-basin has a higher number of glaciers (452) than other sub-basins. There are only 13 valley glaciers in the sub-basin but their area coverage amounts to around 30% of the total glacier area in the sub-basin and 42% of the ice reserve (Table 7.18A) of the sub-basin is confined to these glaciers.

Table 7.18A: Glacier types in the Bheri River Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	37	8	8.74	1.49	0.957	0.046	0.24	0.50
Valley	14	3	174.53	29.92	13.101	1.558	20.06	41.99
Mountain	203	45	347.27	59.53	39.819	0.048	25.77	53.95
Ice apron	89	20	34.45	5.91	2.998	0.032	1.26	2.65
Cirque	9	2	3.81	0.65	0.862	0.076	0.12	0.26
Niche	100	22	14.58	2.50	0.627	0.012	0.31	0.66
Total	452	100	583.40	100			47.77	100

The highest number of glaciers is distributed in the northeast and southwest aspects, whereas the lowest number of glaciers is distributed in the south and east aspects. There are three glaciers with open aspect which are represented by small and isolated ice cap glaciers. The glaciers extend down to an elevation of 3,962 masl (Table 7.18B). The lowest elevation of the glaciers is probably at the toe of the valley glaciers.

Table 7.18B: Distribution of glaciers on the basis of aspect in the Bheri River Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
NE	84	107.54	18.4	20.32	0.01	10 130	190	7371	4389	7.81
SW	85	115.30	19.8	25.65	0.03	8870	190	6883	4298	9.23
SE	44	75.25	12.9	14.56	0.03	6330	190	7246	4420	5.54
W	41	60.36	10.4	23.03	0.05	8870	190	7661	4084	4.99
E	36	20.78	3.6	1.86	0.05	2215	190	6919	4404	0.82
S	34	101.86	17.5	39.82	0.01	13 930	190	7268	4206	12.66
NW	65	49.33	8.5	6.34	0.03	6020	250	6483	4023	2.56
N	60	52.17	8.9	22.58	0.05	6330	250	7715	3962	4.14
Open	3	0.79	0.1	0.41	0.12	990	250	5944	5334	0.02

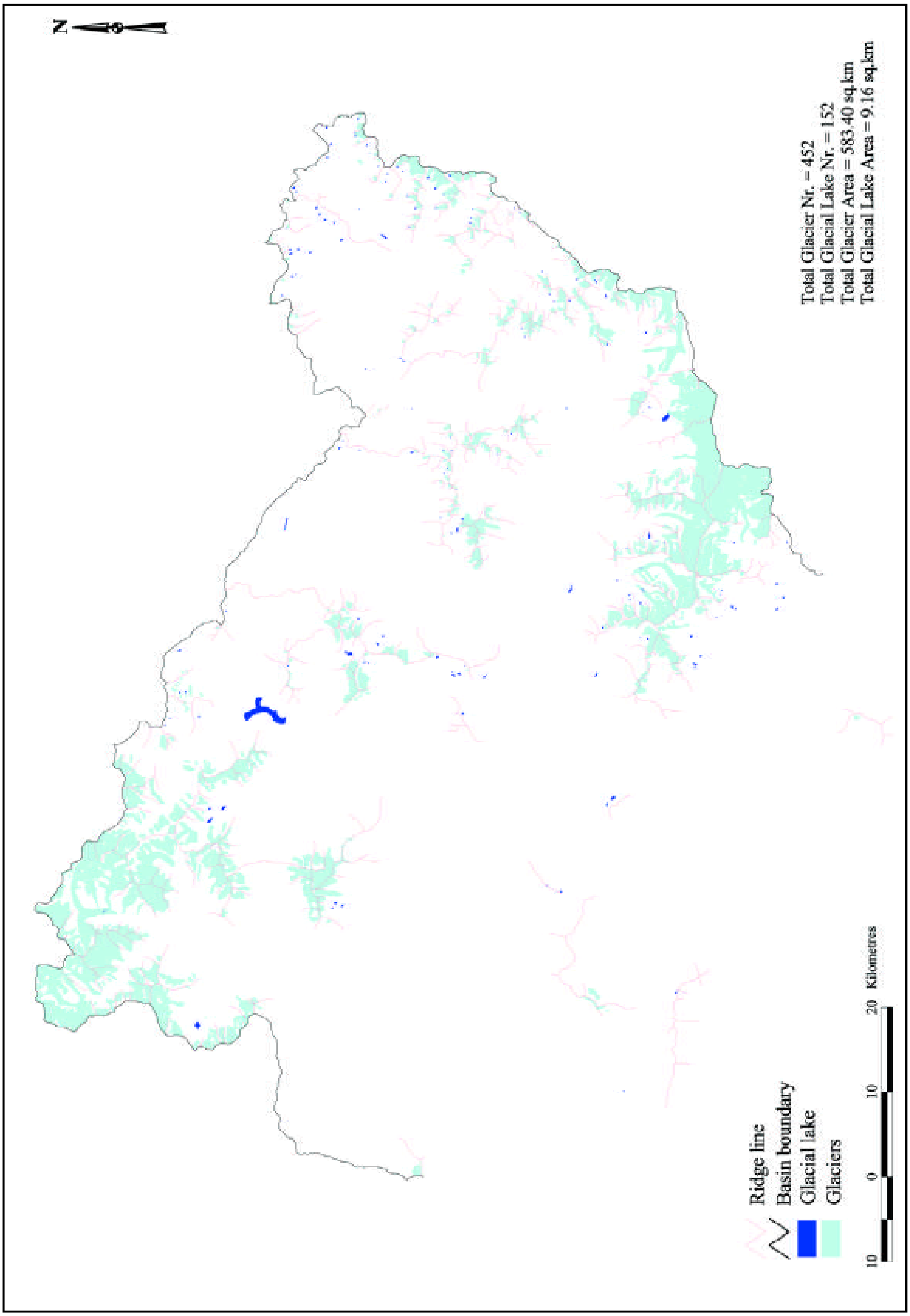


Figure 7.17: Glaciers and glacial lakes of the Bheri River Basin

Among the 254 glaciers of the Mugu River Sub-basin, 23 are valley glaciers (Figure 7.18), and this is about 9% of the total number of glaciers (Table 7.19A). The area covered by these valley glaciers is smaller (45%) than other valley glaciers, but their ice reserve is quite substantive (60%).

The aspects of glaciers in the Mugu River Sub-basin are in all directions, including one of open aspect. The area occupied by the southeast aspect glaciers is highest, whereas the area occupied by the north aspect glaciers is lowest. The glaciers extend down to a lowest level of 4,298 masl (Table 7.19B).

Table 7.19A: Glacier types in the the Mugu River Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	10	4	1.47	0.67	0.374	0.023	0.0302	0.24
Valley	23	9	98.46	44.68	11.151	0.449	7.5184	59.93
Mountain	126	50	101.52	46.06	4.478	0.102	4.5141	35.98
Ice apron	28	11	7.39	3.35	0.720	0.056	0.2041	1.63
Cirque	13	5	3.17	1.44	0.605	0.077	0.0811	0.65
Niche	54	21	8.35	3.79	1.074	0.031	0.1964	1.57
Total	254	100	220.39	100.00			12.5443	100.00

Table 7.19B: Distribution of glaciers on the basis of aspect in the Mugu River Sub-basin

Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
E	19	12.18	5.5	2.14	0.08	3475	190	6309	4877	0.51
NE	47	27.08	12.2	4.48	0.07	4750	315	6126	4359	1.24
S	21	27.17	12.4	7.14	0.07	6330	250	6255	4572	1.81
SE	41	56.63	25.7	6.39	0.08	5375	190	6440	4542	3.42
SW	33	21.63	9.8	6.03	0.02	6960	190	6255	4694	1.09
W	16	20.93	9.5	11.15	0.09	5375	190	6450	4298	1.51
NW	53	38.41	17.5	7.72	0.04	6330	315	6279	4450	2.09
N	23	16.23	7.4	5.49	0.06	5700	315	6248	4511	0.85
Open	1	0.10	0.1	0.10	0.10	440	440	5928	5486	0.00

The glaciers in the Tila River Sub-basin are mostly concentrated in the northeastern part (Figure 7.19). Following the mountain glaciers, which cover 63% of the area and have 56% of the ice reserve, the highest number is of niche glaciers. The niche glaciers cover around 4% of the area and contain 1% of the ice reserve. There is only one valley glacier, and this covers 26% of the area and has 40% of the ice reserve (Table 7.20A).

In the Tila River Sub-basin, the glaciers are distributed only at the watershed boundaries. As the downstream of the basin is towards the southwest, the glaciers of southwest aspect are found to be highest in number. They also occupy the largest area in the sub-basin. The second highest number of glaciers is those of northwest aspect, which also occupy a higher area than those of other aspects. The glaciers are extended to a minimum level (4,023 masl) in the northwest aspect (Table 7.20B).

Table 7.20A: Glacier types in the Tila River Sub-basin

Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Ice cap	6	10	1.51	2.77	0.457	0.057	0.0394	1.05
Valley	1	2	14.20	25.98	14.208	14.208	1.5155	40.41
Mountain	25	43	34.39	62.89	8.361	0.060	2.0835	55.56
Ice apron	7	12	2.23	4.08	0.715	0.062	0.0662	1.77
Cirque	2	3	0.34	0.63	0.205	0.138	0.0071	0.19
Niche	17	29	1.99	3.65	0.250	0.029	0.0384	1.02
Total	58	100	54.69	100.00			3.7501	100.00

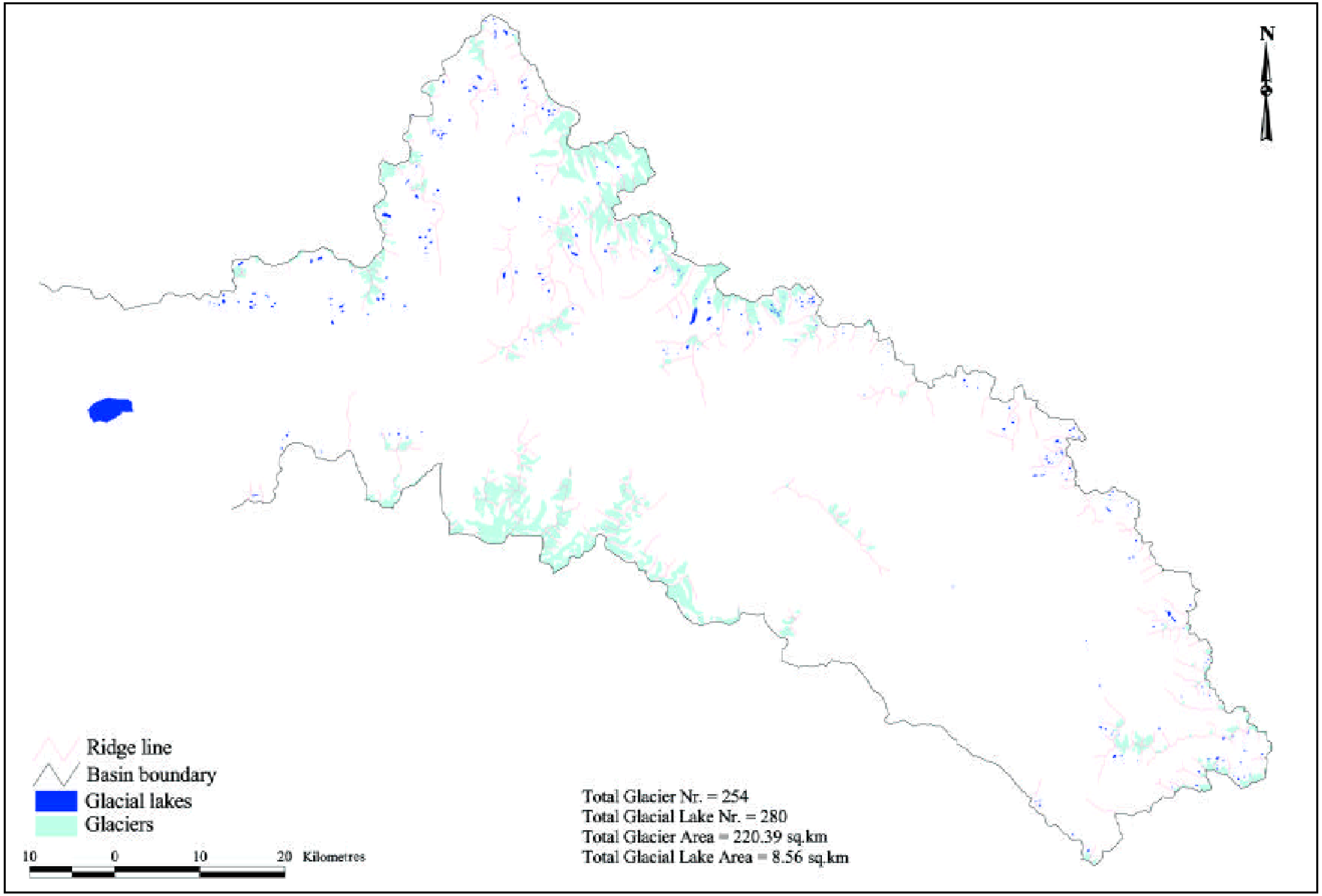


Figure 7.18: Glaciers and glacial lakes of the Mugu Karnali Basin

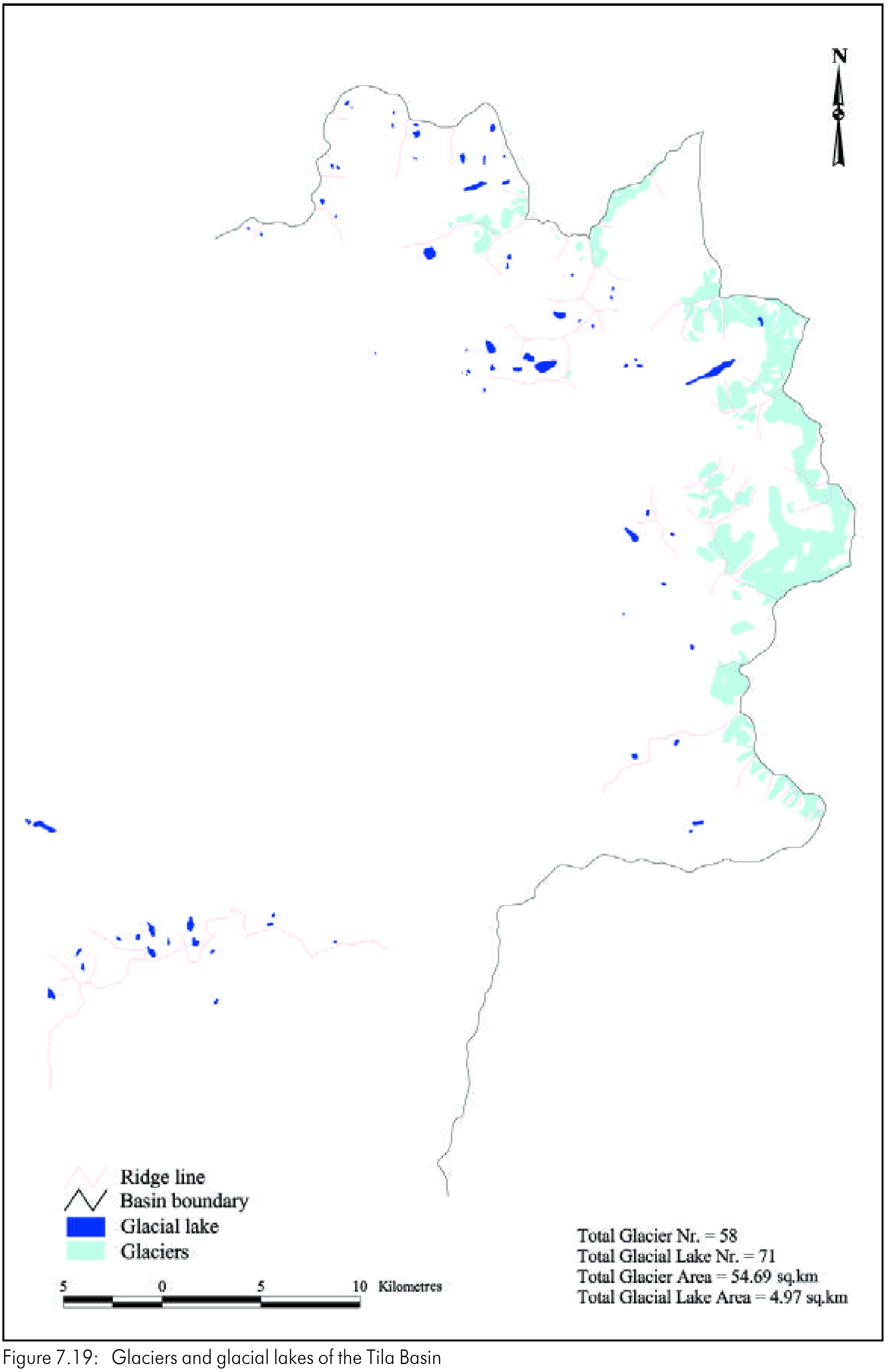


Figure 7.19: Glaciers and glacial lakes of the Tila Basin

Table 7.20B: Distribution of glaciers on the basis of aspect in the Tila River Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	(%)							
NW	13	19.77	36.1	14.21	0.06	8870	250	6386	4023	1.73
W	3	0.36	0.7	0.18	0.06	820	250	5425	4511	0.01
N	1	0.46	0.8	0.46	0.46	630	630	5464	4877	0.01
SW	29	25.03	45.7	8.36	0.03	2025	250	6627	4420	1.58
S	3	0.73	1.3	0.54	0.03	990	150	5304	4633	0.02
E	1	1.11	2.0	1.11	1.11	760	760	5545	4968	0.05
SE	3	1.85	3.4	1.56	0.13	630	250	5557	4542	0.08
NE	5	5.43	9.9	2.79	0.40	2530	1140	6111	4420	0.27

As the Kawari River Sub-basin is smaller in size, the number of glaciers is also lower in this sub-basin compared to other sub-basins. Most of the glaciers are distributed on the northwestern part of the sub-basin (Figure 7.20). There is only one valley glacier, five niche glaciers, and 33 mountain glaciers. This one valley glacier covers around 20% of the area and contains more than 30% of the ice reserve (Table 7.21A).

Table 7.21A: Glacier types in the Kawari River Sub-basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km^3	%
Valley	1	3	10.53	19.76	10.538	10.538	1.0175	30.92
Mountain	33	85	42.08	78.91	3.973	0.097	2.257	68.60
Niche	5	13	0.71	1.34	0.355	0.027	0.0158	0.48
Total	39	100	53.33	100.00			3.2903	100.00

With respect to aspect, glaciers in the Kawari River Sub-basin seem to be randomly distributed. The highest number is eight in the northeast, whereas the lowest number is one in the northwest. The glaciers of western Nepal are assumed to have retreated more in the past than those in eastern Nepal, but the glaciers in the Kawari Sub-basin are found even at the lowest level of 3,505 masl (Table 7.21B).

Table 7.21B: Distribution of glaciers on the basis of aspect of the Kawari River Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		(km^2)	(%)							
E	4	15.53	29.1	10.54	0.36	8364	824	6922	3505	1.33
SE	7	8.61	16.1	3.45	0.03	2978	190	6248	4267	0.49
N	7	10.46	19.6	3.27	0.30	3992	1077	5878	4679	0.58
SW	5	2.25	4.2	1.11	0.11	1521	444	5608	5029	0.08
NE	8	13.02	24.4	2.52	0.60	3992	1077	5788	4343	0.68
S	3	0.69	1.3	0.31	0.17	824	760	5212	4359	0.02
NW	1	1.31	2.5	1.31	1.31	2028	2028	5630	4724	0.06
W	4	1.50	2.8	0.98	0.06	1647	444	5630	4862	0.05

As in the Bheri Sub-basin, the number of glaciers in the Humla Karnali River Sub-basin is high (Figure 7.21). The mountain glaciers constitute the highest number and cover the largest proportion of the area. The valley glaciers are around 7% in number, but cover around 37% of the area and contain more than 50% of the ice reserve of this sub-basin. This sub-basin also has a significant number of ice apron and niche glaciers and the area covered by these glaciers is about 3 and 2% respectively (Table 7.22A).

The glaciers are distributed in all aspects in the Humla River Sub-basin. The smallest number of glaciers is 26 in the west aspect and the highest numbers are in the northwest and northeast aspects, 83 and 82 respectively (Table 7.22B). The glaciers with north and west aspects occupy the largest area. The minimum level of the glacier tongue is at an elevation of 4,880 masl.

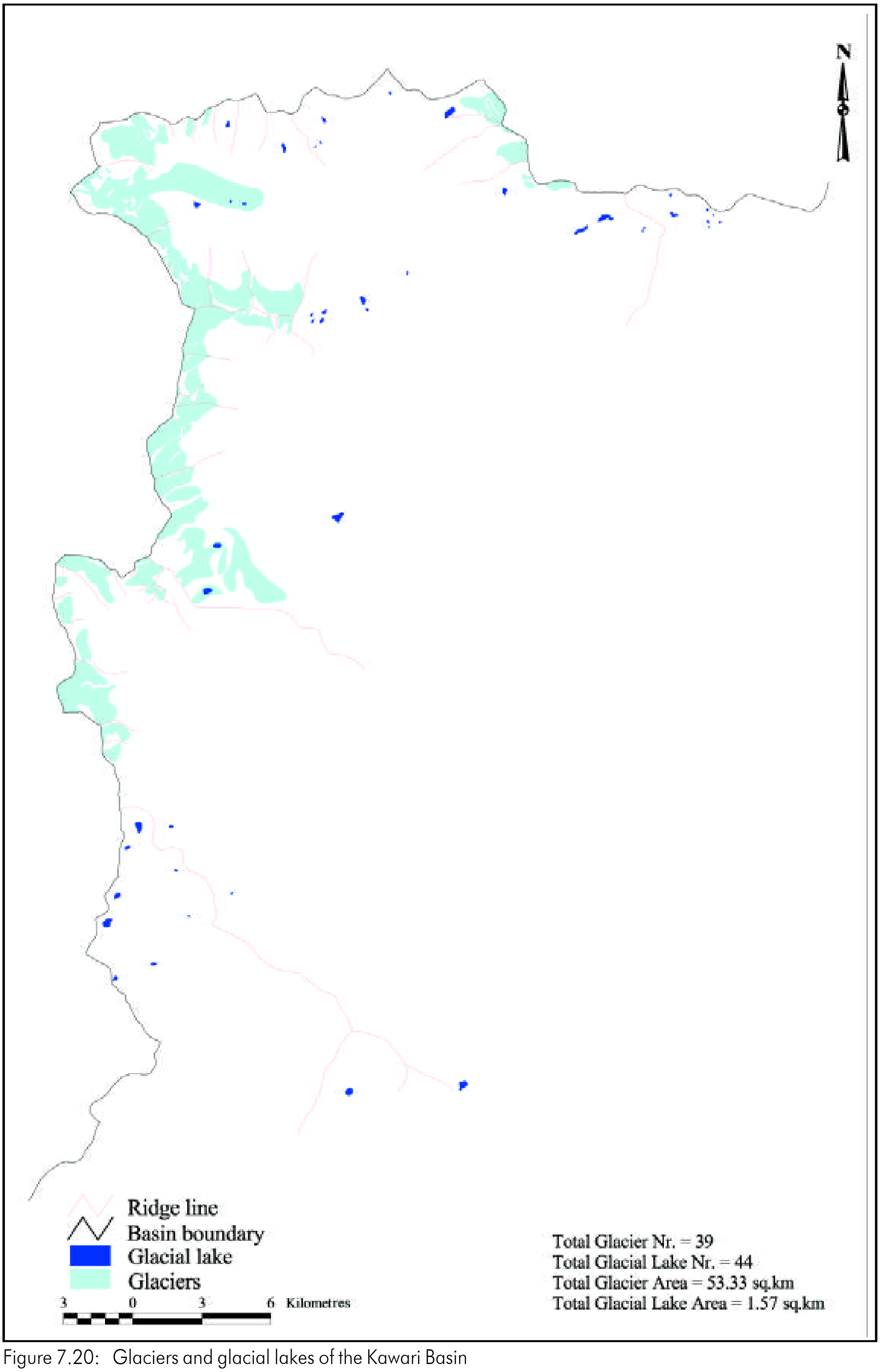


Figure 7.20: Glaciers and glacial lakes of the Kawari Basin

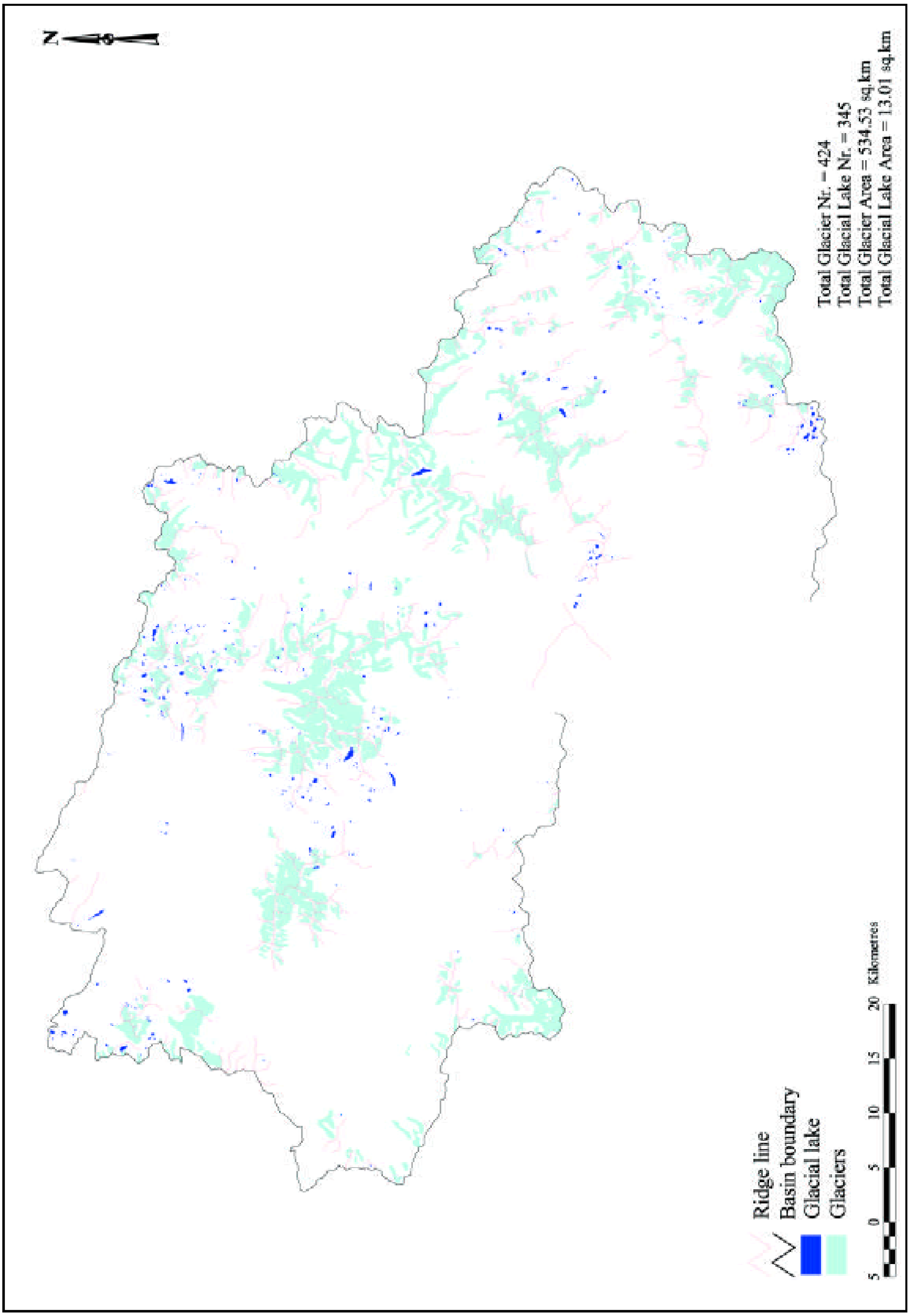


Figure 7.21: Glaciers and glacial lakes of the Humla Karnali Basin

Table 7.22A: Glacier types in the Humla River Sub-basin								
Glacier Type	Number		Area (km²)				Ice Reserve	
	num	%	Total	%	of largest glacier	of smallest glacier	km³	%
Ice Caps	3	1	1.02	0.19	0.474	0.222	0.0284	0.08
Valley	30	7	196.11	36.69	20.524	0.355	18.1512	50.65
Mountain	265	63	307.64	57.56	12.384	0.092	16.7775	46.82
Ice Apron	58	14	18.04	3.38	3.142	0.021	0.6151	1.71
Cirque	7	2	1.67	0.31	0.433	0.136	0.0407	0.11
Niche	61	14	10.00	1.87	0.630	0.031	0.2249	0.63
Total	424	100	534.51	100			35.8378	100.00

Table 7.22B: Distribution of glaciers on the basis of aspect in the Humla River Sub-basin										
Aspect	Num.	Area		Largest Area (km²)	Smallest Area (km²)	Longest Length (m)	Shortest Length (m)	Elevation Highest (m)	Elevation Tongue (m)	Reserve of Ice (km³)
		(km²)	(%)							
NW	83	122.60	22.94	15.25	0.10	9060	317	6115	4983	8.15
NE	82	85.56	16.01	9.08	0.05	6083	222	6247	4995	5.14
N	38	67.22	12.58	20.52	0.07	8850	127	7031	4880	5.26
W	26	59.03	11.04	19.63	0.07	8934	253	6234	4997	5.23
SW	69	66.01	12.35	10.00	0.03	4625	127	6172	5115	3.90
E	39	32.25	6.03	3.95	0.04	44352	317	6279	5064	1.54
S	32	20.96	3.92	3.70	0.04	4942	127	6126	5273	0.45
SE	55	80.89	15.13	12.38	0.02	7096	190	6218	5118	5.66

Out of the 134 glaciers of the West Seti River Sub-basin (Figure 7.22), only three glaciers are valley glaciers and they cover around 16% of the area and have 21% of the ice reserve. The sub-basin consists of a greater number of mountain glaciers covering an area of around 80% with 77% of the ice reserve (Table 7.23A).

In the West Seti River Sub-basin, the glaciers are randomly distributed in all aspects. The highest number of glaciers is in the southeast aspect and the lowest in the east and north aspects. The glaciers are not distributed below the level of 4,001 masl (Table 7.23B).

Table 7.23A: Glacier types in the West Seti River Sub-basin								
Glacier type	Number		Area (km²)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smallest glacier	km³	%
Ice cap	4	3	0.60	0.21	0.278	0.068	0.01	0.04
Valley	3	2	46.05	15.66	23.676	9.974	5.2	21.24
Mountain	97	72	235.58	80.09	25.385	0.167	18.88	77.12
Ice apron	14	10	8.61	2.93	2.322	0.130	0.34	1.39
Cirque	4	3	1.09	0.37	0.431	0.145	0.02	0.08
Niche	12	9	2.17	0.74	0.461	0.055	0.03	0.12
Total	134	100	294.13	100.00			24.48	100.00

The Mahakali River basin

The Mahakali River flows along the western border of Nepal and India. The basin has two major sub-basins in Nepalese territory. Both of these basins contain drainage channels that join the Mahakali River at the Nepal–India border. The Mahakali River along the Nepalese and Indian border flows towards the southwest. When it enters Nepal it takes the southward direction, after approaching Indian territory in the south it flows towards the southeast, and finally it confluences with the Ghaghara in India. Though only 35% of the catchment area of the Mahakali River is in Nepal, the number of glaciers within Nepal is eighty-seven, which represents 10 km³ of the ice reserve (Figure 7.23 and Table 7.24).

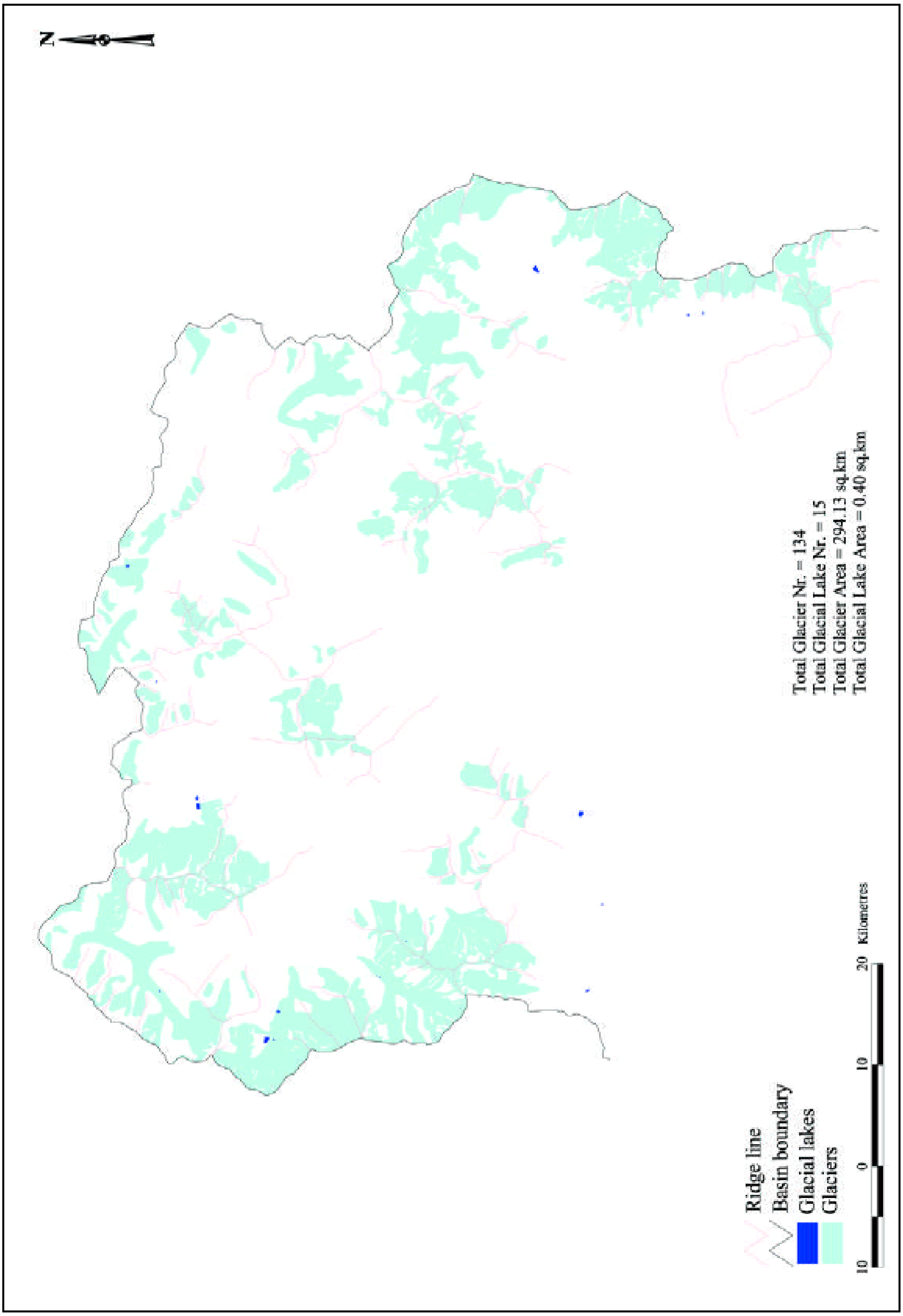


Figure 7.22: Glaciers and glacial lakes of the West Seti Basin

Table 7.23B: Distribution of glaciers on the basis of aspect of in the West Seti Sub-basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
SW	18	27.88	9.4	12.41	0.06	7650	275	7025	4298	2.12
S	10	16.23	5.6	6.25	0.21	2915	650	6712	4481	1.04
SE	31	84.33	28.3	23.68	0.06	8997	317	6922	4001	7.58
NE	20	61.15	21.0	25.39	0.07	6780	400	6849	4282	6.28
NW	28	68.92	23.6	14.18	0.12	5512	450	6632	4115	5.43
E	6	5.21	1.8	4.05	0.13	2661	400	6632	4663	0.3
N	6	10.77	3.7	4.43	0.18	2770	550	6526	4237	0.64
W	15	19.67	6.7	5.42	0.27	3050	850	6632	4420	1.09

Table 7.24: Glaciers in the Mahakali River Basin			
Number of glaciers	Area (km^2)	Mean area per glacier (km^2)	Ice reserve (km^3)
87	143.34	1.65	10.06

The valley glaciers in the Mahakali River Basin are the highest in number. They cover more than 63% of the area and contain 76% of the ice reserve (Table 7.25A). As the number of the valley glaciers is higher, it follows that the area covered should also be exceptionally high, but in this basin this is not the case. This is due to the type and form of the valley glaciers, which are smaller in size and have simple basins.

Most of the glaciers are of northwest and southwest aspect. Glaciers of eastern aspect are not found in this basin (Table 7.25B).

Table 7.25A: Glacier types in the Mahakali River Basin								
Glacier type	Number		Area (km^2)				Ice reserve	
	Number	%	Total	%	of largest glacier	of smalleat glacier	km^3	%
Ice cap	1	1	0.14	0.10	0.147	0.147	0.003	0.03
Valley	16	18	91.03	63.51	12.066	1.424	7.684	76.31
Mountain	38	44	41.20	28.75	4.014	0.191	2.023	20.09
Ice apron	16	18	7.59	5.30	1.445	0.045	0.276	2.74
Cirque	3	3	0.69	0.48	0.487	0.086	0.019	0.19
Niche	13	15	2.65	1.85	0.381	0.027	0.064	0.64
Total	87	100	143.34	100.00			10.069	100.00

Table 7.25B: Distribution of glaciers on the basis of aspect in the Mahakali River Basin										
Aspect	Number	Area		Largest area (km^2)	Smallest area (km^2)	Longest length (m)	Shortest length (m)	Highest elevation (m)	Elevation tongue (m)	Ice reserve (km^3)
		km^2	%							
NW	25	77.49	54.1	12.07	0.03	9821	190	6620	3886	6.26
NE	12	14.18	9.9	4.07	0.19	4752	824	6370	3909	0.80
N	6	12.02	8.4	9.63	0.17	3295	760	5523	4008	0.98
W	7	7.43	5.2	4.60	0.05	4562	190	6828	4414	0.44
SW	29	22.50	15.7	2.94	0.05	5196	380	6467	4066	1.07
S	2	0.54	0.4	0.33	0.19	824	634	5456	4816	0.01
SE	6	9.15	6.4	2.69	0.15	4245	317	6005	3999	0.51

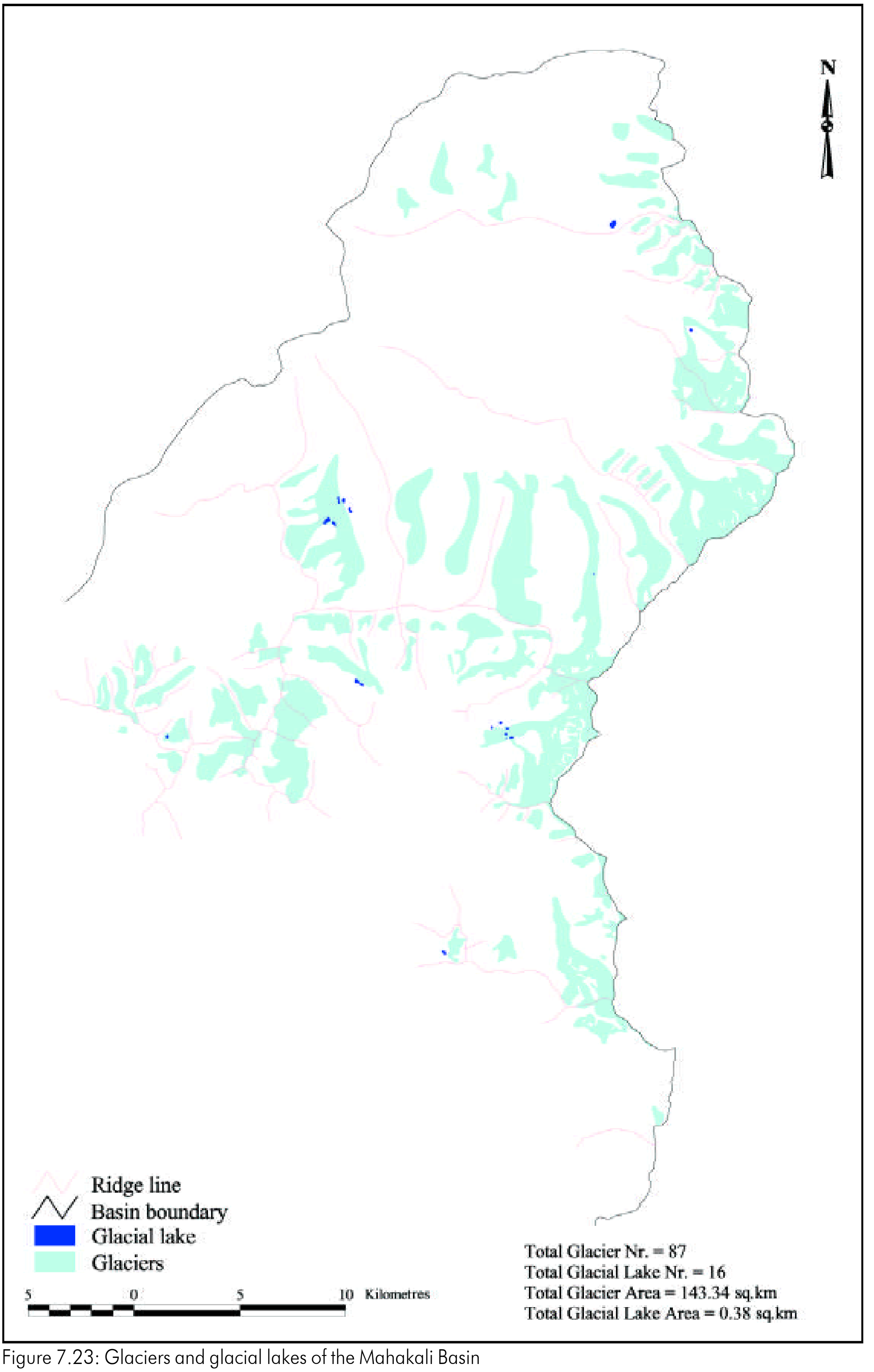


Figure 7.23: Glaciers and glacial lakes of the Mahakali Basin

Chapter 8
The Inventory of Glacial Lakes

8.1 Brief Description of Glacial Lake Inventory

The inventory of glacial lakes is based on topographic maps, aerial photographs, and satellite images. The topographic maps published by the Survey Department of Nepal on a scale of 1:50,000 still do not cover all the glaciated regions of Nepal. The 1:63,360 scale topographic maps published by the Survey of India in the period from the 1950s to the 1970s are used for the inventory of glacial lakes. As some of the topographic maps are unavailable due to restrictions, the data of that area are assembled from satellite images and aerial photographs. The aerial photographs, on a scale of 1:50,000, used for the inventory of lake areas, were acquired in 1992 for eastern Nepal and 1996 for western Nepal. Images of the Land Observation Satellite (LANDSAT) Thematic Mapper (TM), Indian Remote Sensing (IRS), and Stéréo Système Probatoire d'Observation de la Terre (SPOT) of different years are used.

8.2 Glacial Lakes—Their Numbering, Type and Characteristics

A glacial lake is defined as a water mass existing in a sufficient amount and extending with a free surface in, under, beside and/or in front of a glacier and originated by glacier activities and/or retreating processes of a glacier.

The numbering of the lakes started from the mouth of the major stream and proceeded clockwise round the basin.

For the inventory of glacial lakes, it is obvious to note that the lakes associated with perennial snow and ice originate from glaciers. But the isolated lakes found in the mountains and valleys far from the glaciers may not have a glacial origin. Due to the faster rate of ice and snow melting, possibly caused by global warming noticed during the last half of the twentieth century, accumulation of water in these lakes has been increasing rapidly. The isolated lakes above 3,500 masl are considered to be the remnants of the glacial lakes left due to the retreat of the glaciers.

The lakes are classified into erosion lakes, valley trough lakes, cirque lakes, blocked lakes, lateral and end moraine-dammed lakes, and supraglacial lakes.

Erosion lakes

Glacial erosion lakes are the water bodies formed in a depression after the glacier has retreated. They may be cirque type and trough valley type lakes and are stable lakes.

Supraglacial lakes

The supraglacial lakes are small and change their position in the glacier. The Lanzhou Institute of Glaciology and Geocryology (LIGG)/the Water and Energy Commission Secretariat (WECS)/the Nepal Electricity Authority (NEA) study did not consider such lakes in their classifications. However, the history of past glacial lake outburst flood (GLOF) events of moraine-dammed lakes indicates that they are initially derived from supraglacial lakes. As the target of the project is to identify and monitor the potentially dangerous glacial lakes with the help of time series' satellite images, aerial photographs, and topographic maps, it will be helpful to know the activity of supraglacial lakes. If supraglacial lakes are situated at the toe of a valley glacier, larger in size, or grouping rapidly to expand their size, then they are potentially dangerous and may burst out in the near future.

The supraglacial lakes develop within the ice mass away from the moraine with dimensions of from 50 to 100m. These lakes may develop in any position of the glacier but the extension of the lake is less than half the diameter of the valley glacier. Shifting, merging, and draining of the lakes characterise the supraglacial lakes. The merging of lakes results in expansion of the lake area and storage of a huge volume of water with a high potential energy. The tendency of a glacial lake towards merging and expanding indicates the danger level of the GLOF.

Most of the potentially dangerous lakes, including Tsho Rolpa, Imja, Lower Barun, Thulagi, etc, are advanced forms of supraglacial lake.

Moraine-dammed lakes

A typical example of a moraine-dammed lake is one formed on the tongue of the Imja Glacier in the Khumbu region, eastern Nepal. In the retreating process of a glacier, glacier ice tends to melt in the lowest part of the glacier surrounded by lateral and end moraines. As a result, many supraglacial ponds are formed on the glacier tongue. These ponds sometimes enlarge to become a large lake by interconnecting with each other and have a tendency to deepen further. A moraine-dammed lake is thus born. The lake is filled with melt water and rainwater from the drainage area behind the lake and starts flowing from the outlet of the lake even in the winter season when the flow is minimum.

There are two kinds of moraine: an ice-cored moraine and an ice-free moraine. Before the ice body of the glacier completely melts away, glacier ice exists in the moraine and beneath the lake bottom. The ice bodies cored in the moraine and beneath the lake are sometimes called **dead ice** or **fossil ice**. As glacier ice continues to melt, the lake becomes deeper and wider. Finally when ice contained in the moraines and beneath the lake completely melts away, the container of lake water consists of only the bedrock and the moraines.

Ice-dammed lakes

An ice-dammed lake is produced on the side(s) of a glacier, when an advancing glacier happens to intercept a tributary/tributaries pouring into a main glacier valley. The typical ice core-dammed lakes are shown in Figure 8.1. Three lakes are seen on the right bank of the debris covered glacier tongue of the Ngozumpa Glacier in the Dudh Koshi Basin, which is one of the largest glaciers in the Nepal Himalayas and flows from top to bottom in the figure. The lakes were still frozen and covered by snow when the image was captured. Since the glaciers in the Nepal Himalayas produce relatively rich debris, thick lateral moraines are deposited on both sides of the glacier tongue. As such an ice core-dammed lake is usually small in size and does not come into contact with glacier ice. This type of lake is less susceptible to GLOF than a moraine-dammed lake.

A glacial lake is formed and maintained only up to a certain stage of glacier fluctuation. If one follows the lifespan of an individual glacier, it is found that the moraine-dammed glacial lakes build up and disappear with a lapse of time. The moraine-dammed lakes disappear once they are fully destroyed or when debris

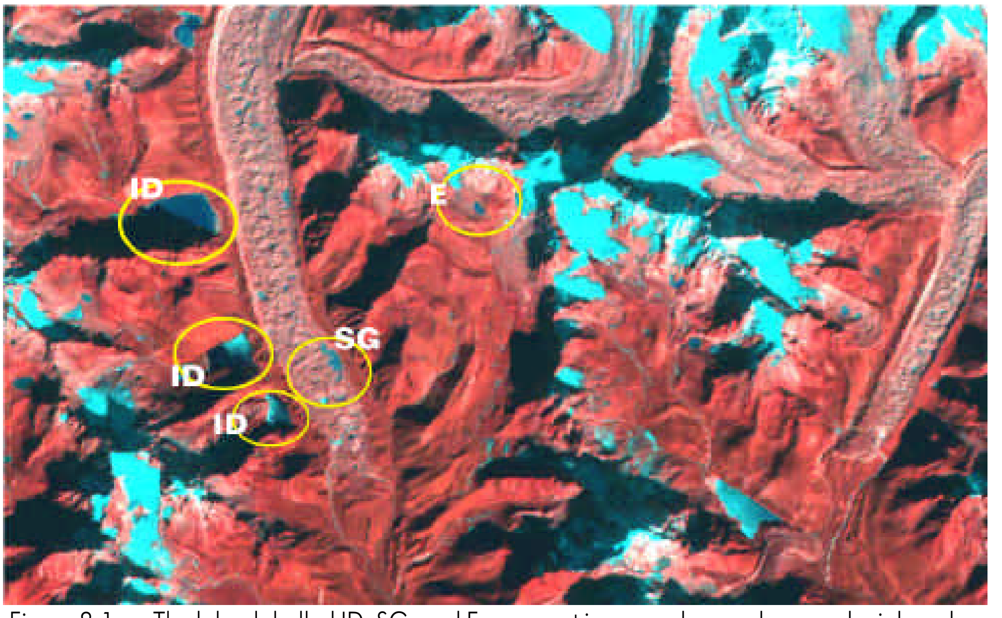


Figure 8.1: The lakes labelled ID, SG, and E represent ice core-dammed, supraglacial, and erosion lakes respectively around the Ngozumpa Glacier, one of the largest glaciers in the Nepal Himalayas (LANDSAT TM satellite image of 17 December 1991)

fills the lakes completely or the mother glacier advances again to lower altitudes beyond the moraine-dam position. Such glacial lakes are essentially ephemeral and are not stable from the point of view of the life of glaciers.

Only moraine-dammed lakes pose a threat in the Nepal Himalayas. The description hereafter is, thus, mainly concentrated on moraine-dammed lakes and associated outburst floods.

8.3 Glacial Lakes of Nepal

As in the inventory of glaciers, major river systems like Koshi, Gandaki, Karnali, and Mahakali are further divided into sub-basins. Altogether 2,323 lakes have been identified above 3,500 masl. They cover an area of 75.70 sq.km (Figure 8.2).

The Koshi River basin

There are 1,062 lakes in the Koshi River Basin covering an area of around 25 sq.km, of which the largest number is of erosion lakes and supraglacial lakes. Generally, the erosion lakes are isolated and far away from the glaciers, and the supraglacial lakes are situated in groups, within the ice mass.

The number as well as the mean area per lake of the Dudh Koshi Sub-basin are higher than those in the other sub-basins of the Koshi Basin. The lakes of the Sun Koshi Sub-basin have a minimum mean area per lake. The Likhu and Indrawati Sub-basins are smaller in area and consist of only 14 and 18 lakes respectively (Table 8.1).

The Tamor River is the easternmost branch of the Koshi River. It consists of the highest number of lakes (356) after the Dudh Koshi Sub-basin (Figure 7.3). Besides the erosion, valley, and cirque lakes, it consists of 21 moraine-dammed lakes, 6 blocked lakes, and 72 supraglacial lakes (Table 8.2). The erosion lakes, cirque lakes, and valley lakes are not potentially dangerous as they are isolated and not associated with the hanging glaciers. In general, erosion and valley lakes are higher in number. The most potentially dangerous lakes

Table 8.1: Distribution of lakes in the sub-basins of the Koshi River Basin

Sub-basin Name	Number of Lakes	Area (km^2)	Mean area per lake (km^2)
Tamor	356	7.320	0.020
Arun	109	2.530	0.023
Dudh	473	13.075	0.027
Tama	57	1.258	0.022
Sun Koshi	35	0.412	0.011
Likhu	14	0.217	0.025
Indrawati	18	0.278	0.015
Total	1062	25.090	

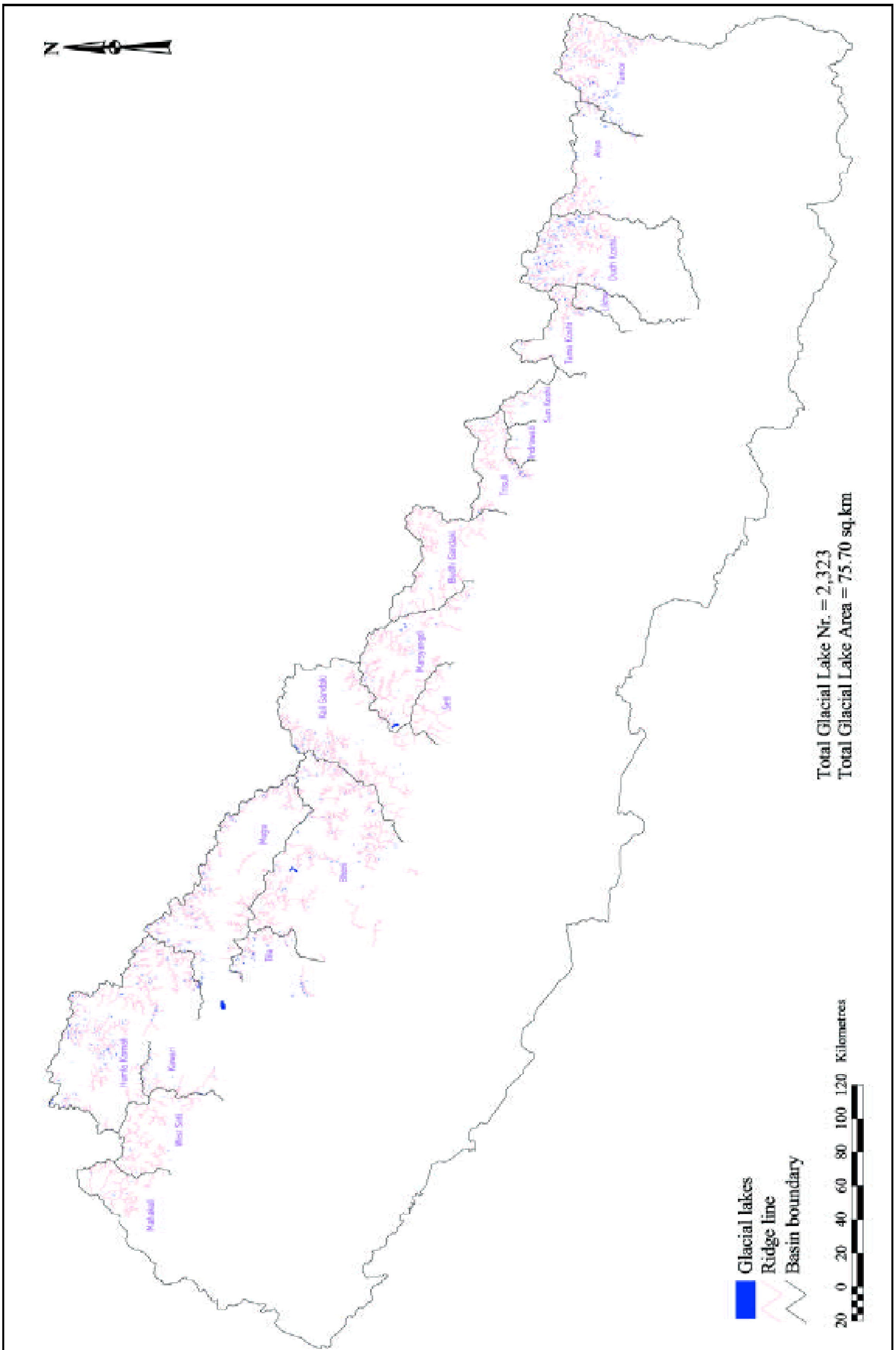


Figure 8.2: Glacial lakes of Nepal

are identified in the categories of moraine-dammed lakes and blocked lakes. They are described in Chapter 11.

The Arun Sub-basin is the largest sub-basin of the Koshi River Basin. Since the major part of the Arun River catchment lies in Tibet (China), a large number of lakes is also situated in China. The number of lakes in Nepal is 109 (Figure 7.4), of which the majority are erosion and cirque lakes. There are seven valley lakes (Table 8.3). The valley lakes situated at the toes of the glaciers are potentially dangerous. Beside the six supraglacial lakes, there is also one moraine-dammed lake with an area of around 100,000 sq.m.
Among the sub-basins of the Koshi River Basin, the Dudh Koshi River Sub-basin has the highest number of lakes. There are 473 glacial lakes (Figure 7.5). It has the highest number of supraglacial lakes in the sub-basins of the Koshi River Basin (Table 8.4). There are large numbers of moraine-dammed lakes and blocked lakes too, and this signals potential danger. More than 25% of the lake area is occupied by moraine-dammed and blocked lakes. The well-known lakes in the sub-basin are Lumding Tsho, Dig Tsho, Chokarma Cho, Imja Tsho, Tam Pokhari, Dudh Pokhari, Hungu, and Chamjang Lakes. Some of them have already burst in the past.

The Likhu River Sub-basin is smaller in aerial extension and has a less lakes than other sub-basins (Figure 7.6). Most of the lakes are the erosion type. Some are also cirque and supraglacial types (Table 8.5). None of these lakes is categorised as potentially dangerous.

There are only 57 lakes in the Tama Koshi Sub-basin, of which 20 are supraglacial lakes (Table 8.6 and Figure 7.7). The well-known Tsho Rolpa Glacial Lake of this sub-basin created great panic some years ago and has undergone mitigation measures recently. In the beginning the Tsho Rolpa Glacial Lake developed in the form of a supraglacial lake, this has now transformed into an end moraine-dammed lake of extreme vulnerability.

Table 8.2: Types of lakes in the Tamor River Sub-basin

Type		Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion		110	31.61	1239403.71	16.93	98767.42
Valley		127	36.49	3472215.36	47.42	252344.62
Cirque		20	5.75	826671.91	11.29	140286.65
Moraine dammed	End	16	4.60	633442.78	8.65	181146.84
	Lateral	5	1.44	84861.79	1.16	28668.04
Blocked		6	1.72	104259.38	1.42	58676.11
Supraglacial		72	20.69	961400.70	13.13	57731.49

Table 8.3: Types of lakes in Arun River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Cirque	15	13.76	510323.37	20.19	148940.53
Erosion	80	73.39	1596781.06	63.19	84476.61
Supraglacial	6	5.50	67157.84	2.66	34637.33
Valley	7	6.42	235533.86	9.32	119113.94
Moraine dammed	1	0.92	117189.64	4.64	117189.64

Table 8.4: Types of lakes in the Dudh Koshi River Sub-basin

Type		Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion		141	29.81	3607401.97	27.59	406643.81
Cirque		9	1.90	335125.01	2.56	120568.60
Blocked		10	2.11	1764386.87	13.50	529069.35
Valley		13	2.75	1706397.20	13.05	650699.06
Supraglacial		267	56.45	3369527.74	25.77	207314.33
Moraine-dammed	End	19	4.02	1392918.84	10.65	209834.47
	Lateral	14	2.96	898282.51	6.87	274296.89

Table 8.5: Types of lakes in the Likhu River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	10	71.43	154020.08	70.98	35 149.26
Cirque	2	14.29	61597.42	28.39	55 973.54
Supraglacial	2	14.29	1379.44	0.64	689.72

Table 8.6: Types of lakes in the Tama Koshi River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	29	50.88	469010.52	37.28	69078.25
Supraglacial	20	35.09	369637.62	29.38	231693.33
Blocked	3	5.26	155797.44	12.38	91653.36
Moraine dammed	2	3.51	26209.41	2.08	13529.15
Valley	2	3.51	123725.40	9.84	74224.63
Cirque	1	1.75	113618.33	9.03	113618.33

Table 8.7: Types of lakes in the Sun Koshi River Sub-basin					
Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	20	57.14	254793.22	61.87	67479.81
Supraglacial	9	25.71	62047.23	15.07	21381.08
Moraine-dammed	1	2.86	18919.21	4.59	18919.21
Valley	4	11.43	53718.13	13.04	23246.04
Cirque	1	2.86	22343.82	5.43	22343.82

The Sun Koshi River Sub-basin comprises 35 glacial lakes, out of which 20 are erosion type, 9 supraglacial, 1 moraine-dammed, 4 trough valley, and 1 cirque (Table 8.7). The distribution of the lakes is shown in Figure 7.8. The areas of lakes located within Nepalese territory are very small and, therefore, none of these lakes is dangerous from the perspective of the GLOF event. However, the GLOF that occurred at the headwaters of this sub-basin located in Tibet has affected infrastructures in Nepalese Territory (see Chapter 9).

Table 8.8: Types of lakes in the Indrawati River Sub-basin					
Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	17	94.44	266296.58	95.57	118854.35
Supraglacial	1	5.56	12336.82	4.43	12336.82

The Indrawati River Sub-basin is small in aerial extension and has less lakes than other sub-basins (Figure 7.9). Most of the lakes are erosion types. There is only one supraglacial lake in the sub-basin (Table 8.8). None of these lakes is categorised as potentially dangerous.

The Gandaki River basin

The area covered by the glaciers in this basin is the largest, but the area covered by the lakes is the smallest among the three major basins, namely, the Koshi, Gandaki, and Karnali basins. There are 338 lakes in total listed in this basin with an area of 12.28 sq.km (Figure 7.10). The average lake area ranges from 0.01 to 0.08 sq.km (Table 8.9). Among the sub-basins, the Trishuli River sub-basin has the highest number of lakes (117), whereas the largest area (6.28 sq.km) is covered by the Marsyangdi River Sub-basin.

Table 8.9: Distribution of lakes in the sub-basins of the Gandaki Basin			
Sub-basin Name	Number of Lakes	Area (m^2)	Mean area per lake (km^2)
Trisuli	117	2.03	0.02
Budi Gandaki	37	0.64	0.01
Marsyangdi	78	6.28	0.08
Seti	10	0.26	0.03
Kali Gandaki	96	3.29	0.03
Total	338	12.50	0.17

The Trishuli River Sub-basin elongates in the east–west direction in general. The major part (50%) of the river is in China and goes by the name of Chi_lung Ho, and it enters Nepal by the name of Bhotekoshi, one of the major tributaries of the Trishuli River. It consists of 117 lakes and accounts for the highest number of lakes amongst the sub-basins of the Gandaki Basin (Figure 7.11). The number of supraglacial lakes is highest, then erosion lakes, and then valley lakes (Table 8.10). There is one each of the blocked, cirque, and lateral moraine-dammed lakes. No potentially dangerous lake in this sub-basin within the territory of Nepal is recorded.

Table 8.10: Types of lakes in the Trisuli River Sub-basin					
Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	29	25	831945.59	41.0	167467.28
Erosion	34	29	860809.58	42.4	214713.77
Blocked	1	1	52452.09	2.6	52452.09
Supraglacial	51	44	273297.61	13.5	19430.01
Cirque	1	1	7907.41	0.4	7907.41
Lateral moraine-dammed	1	1	4075.06	0.2	4075.06

The Budhi Gandaki River Sub-basin generally trends from north to south. The river originates in Chinese territory. About 25% of the catchment area lies in China. It comprises only 37 lakes in Nepal (Figure 7.12), of which most are supraglacial and erosion lakes (Table 8.11). There are three valley lakes and one moraine-dammed lake. As the area occupied by the supraglacial lakes is

Table 8.11 Types of lakes in the Budi Gandaki River Sub-basin					
Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	6	16.22	259549.82	40.47	11268.31
Supraglacial	27	72.97	242422.06	37.80	51740.41
Moraine Dammed	1	2.70	81544.98	12.72	81520.93
Valley	3	8.11	57800.67	9.01	46511.86

small, they do not pose any danger. But the moraine-dammed lake (Gbu_gl 9) is identified as potentially dangerous.

In the Marsyangdi River Sub-basin, there are almost equal numbers of supraglacial lakes, erosion lakes, and valley lakes, seven blocked lakes, and two of both cirque lakes and moraine-dammed lakes (Table 8.12). The distribution of glacial lakes is shown in Figure 7.13. The area occupied by the supraglacial and blocked lakes is not sufficiently large to pose danger. Out of the two moraine-dammed lakes, the Gmar_gl 70 (Thulagi) is identified as a potentially dangerous lake.

Table 8.12: Types of lakes in the Marsyangdi River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	22	28.21	4298517.64	68.37	3945017.46
Cirque	2	2.56	72127.42	1.15	66752.43
Valley	21	26.92	744357.63	11.84	175545.74
Supraglacial	24	30.77	393065.41	6.25	54129.02
Moraine dammed	2	2.56	227176.83	3.61	223385.35
Blocked	7	8.97	551861.73	8.78	269240.01

Table 8.13: Types of lakes in the Seti River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	7	70.00	209 675.40	78.26	104 519.29
Blocked	1	10.00	13 332.66	4.98	13 332.66
Valley	2	20.00	44 926.30	16.77	28 165.46

The catchment area of the Seti River Sub-basin is small and it consists of only ten lakes (Figure 7.14). Out of these, seven lakes are erosion lakes, two are valley lakes, and one is a blocked lake (Table 8.13). The maximum area occupied by the lake is less than 0.11 sq.km, so this sub-basin is relatively safe.

Table 8.14: Types of lakes in the Kali Gandaki River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Supraglacial	15	15.63	159068.98	4.82	36016.13
Erosion	25	26.04	476364.32	14.44	62110.84
Moraine dammed	20	20.83	1569623.88	47.58	1013344.49
Cirque	4	4.17	137024.40	4.15	80975.14
Lateral M. dammed	1	1.04	6115.95	0.19	6115.95
Valley	30	31.25	941285.01	28.53	213460.15
Blocked	1	1.04	9676.79	0.29	9676.79

Some parts of the Kali Gandaki River catchment area lie in Chinese territory. This sub-basin consists of a substantial number of glaciers as well as lakes. The average area per lake is greater than in the Trishuli River Sub-basin. Besides the valley lakes and erosion lakes, there is a significant number of moraine-dammed lakes and supraglacial lakes (Table 8.14 and Figure 7.15). The average area of the moraine-dammed lakes is about 0.78 sq.km, which is very large in comparison with the average area of lakes in other sub-basins. The lakes Gka_gl 38, Gka_gl 41, Gka_gl 42, and Gka_gl 67 are found to be potentially dangerous. All the identified potentially dangerous lakes belong to the category of moraine-dammed lakes.

The Karnali River basin

The Karnali River Basin comprises six major sub-basins: the Bheri, Mugu Karnali, Humla Karnali, Kawari, Tila, and West Seti sub-basins. The headwater area of the Humla Karnali River lies in Chinese territory, all the other sub-basins are located completely within Nepalese territory. The Humla Karnali and Mugu Karnali rivers comprise a great number of lakes. The mean area of the lakes in the basin ranges from 0.03 to 0.07 sq.km (Table 8.15). Altogether the basin consists of 907 glacial lakes (Figure 7.16).

Table 8.15: Distribution of glacial lakes in the sub-basins of the Karnali River Basin

Sub-basin	Number of lakes	Total area (km^2)	Mean area per lake (km^2)
West Seti	15	0.40	0.03
Tila	71	4.97	0.07
Mugu	280	8.56	0.03
Kawari	44	1.57	0.04
Humla	345	13.01	0.04
Bheri	152	9.16	0.06
Total	907	37.67	0.04

Compared with other sub-basins, the Bheri River Sub-basin consists of a large

Table 8.16: Types of lakes in the Bheri River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	52	34	6990069.79	76.3	4528440.96
Supraglacial	9	6	94548.50	1.0	24879.75
Erosion	72	47	1766679.72	19.3	162017.17
Cirque	1	1	61927.77	0.7	61927.77
Blocked	1	1	12467.04	0.1	12467.04
Moraine-dammed	12	8	161772.72	1.8	29714.46
Lateral moraine-dammed	5	3	76404.75	0.8	26264.98

Table 8.17: Types of lakes in the Mugu River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	115	40.71	4 253595.34	49.71	165 593.90
Erosion	124	44.29	3 064 581.15	35.82	350 348.34
Blocked	3	1.07	44 464.82	0.52	26 696.57
Lateral moraine-dammed	3	1.07	35 558.60	0.42	15 867.67
Moraine-dammed	4	1.43	829 649.10	9.70	681 094.15
Supraglacial	30	10.71	270 656.40	3.16	27 668.97
Cirque	1	0.36	58 188.81	0.68	58 188.81

Table 8.18: Types of lakes in the Tila River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	34	47.89	785220.57	15.80	101072.72
Cirque	16	22.54	1767515.46	35.57	444312.07
Valley	20	28.17	2354834.31	47.38	604064.51
Supraglacial	1	1.41	62189.80	1.25	62071.29

Table 8.19: Types of lakes in the Kawari River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	24	55	804 247.79	51	116 558.66
Erosion	14	32	424 950.91	27	103 303.37
Cirque	1	2	114 363.86	7	114 363.86
Supraglacial	3	7	131 758.28	8	112 440.43
Blocked	1	2	42 273.82	3	42 273.82
Moraine-dammed	1	2	61 549.92	4	61 549.92

number of glaciers scattered in the form of remnants. The number of lakes is only 152, which is the third highest in the sub-basins (Figure 7.17) of the Karnali Basin. Among the total number of lakes, there are 12 moraine-dammed lakes, nine supraglacial lakes, and five lateral dammed lakes (Table 8.16). Valley lakes occupy about 76% of total lake area in the sub-basin.

The Mugu Karnali River Sub-basin comprises the second highest number of lakes in the Karnali Basin. The distribution of glacial lakes in accordance with the glaciers is shown in Figure 7.18. The highest number of lakes is of the erosion type, followed by valley lakes (Table 8.17). There are seven moraine-dammed lakes. Most of the lake areas are less than 40,000 sq.m, except Kmu_gl 129, which has an area of 70,000 sq.m. The Kmu_gl 129 is a moraine-dammed lake that is potentially dangerous and may trigger a GLOF event in coming years.

As the number of glaciers is less than in other sub-basins and they are scattered in the form of remnants in the Tila River Sub-basin, the lakes that have developed in the sub-basin are also scattered and their areas small. The lakes are mostly of erosion, valley, and cirque types. There is only one supraglacial lake (Table 8.18). The distribution of glacial lakes in accordance with the glaciers is shown in Figure 7.19. No potentially dangerous lakes are identified in this sub-basin.

There are 44 lakes in total in the Kawari River Sub-basin. Among them, the valley lakes and erosion lakes are highest in number (Table 8.19). There are three supraglacial lakes and one cirque lake, blocked lake, and moraine-dammed lake. The distribution of glacial lakes in accordance with the glaciers is shown in Figure 7.20. No potentially dangerous lakes are identified in this sub-basin.

The Humla River Sub-basin consists of the highest number of glacial lakes (345). Their distribution is shown in Figure 7.21. Most of the lakes are valley lakes due to the dissected topography. The cirque lakes and erosion lakes are of more or less equal proportions (Table 8.20). The sub-basin consists of a high number of moraine-dammed lakes compared to other sub-basins of Nepal. There are 35 moraine-dammed lakes and seven blocked lakes.

Only 15 lakes are found in the West Seti River Sub-basin (Table 8.21). As there are few glaciers, there are only a few lakes. The average size of the erosion lakes is 0.04 sq.km, while it is 0.02 sq.km for other lakes. There is one blocked lake of around 0.07 sq.km in size. The distribution of glacial lakes in accordance with the glaciers is shown in Figure 7.22. None of the lakes is potentially dangerous in this sub-basin.

Table 8.20: Types of lakes in the Humla River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	204	59	8577157.50	65.90	681700.23
Cirque	40	12	812645.73	6.24	94911.87
Supraglacial	15	4	198499.80	1.53	35683.79
Erosion	44	13	616489.85	4.74	137592.48
Moraine dammed	32	9	2155825.39	16.56	689886.51
Lateral M. dammed	3	1	22669.70	0.17	12629.26
Blocked	7	2	631707.95	4.85	319369.88

The Mahakali River basin

The Mahakali River has two major sub-basins on the Nepalese side. Both of these drainage basins join the Mahakali River at the Nepal–India border. The Mahakali River Basin, in its Nepalese portions of the catchment, has only 16 lakes with a total area of 0.38 sq.km (Figure 7.23). The mean area per lake in the Mahakali River Basin is 0.02 sq.km.

Table 8.21: Types of lakes in the West Seti River Sub-basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Erosion	6	40.00	247514.48	60.51	66 019.25
Valley	3	20.00	32057.42	7.84	16 937.63
Supraglacial	5	33.33	54563.99	13.34	21 496.65
Blocked	1	6.67	74877.61	18.31	74 877.61

Since most of the lakes have developed within the glaciers, there are quite a number of supraglacial lakes. There are nine supraglacial lakes, four blocked lakes, and three valley lakes (Table 8.22). The average area of the lakes ranges from 0.01 to 0.03 sq.km. No potentially dangerous lakes are identified in the Nepalese portion of this basin.

Table 8.22: Types of lakes in the Mahakali River Basin

Type	Number	Number (%)	Area (m^2)	Area (%)	Area of largest lake (m^2)
Valley	3	18.75	109329.95	28.08	77128.26
Blocked	4	25.00	120236.98	30.88	55602.75
Supraglacial	9	56.25	159767.74	41.04	52803.86

Chapter 9
Glacial Lake Outburst Floods and Damage in the Country

9.1 Introduction

Periodic or occasional release of large amounts of stored water in a catastrophic outburst flood is widely referred to as a **jokulhlaup** (Iceland), a **debacle** (French), an **aluvión** (South America), or a **Glacial Lake Outburst Flood** (GLOF) (Himalaya). A **jokulhlaup** is an outburst which may be associated with volcanic activity, a **debacle** is an outburst but from a proglacial lake, an **aluvión** is a catastrophic flood of liquid mud, irrespective of its cause, generally transporting large boulders, and a GLOF is a catastrophic discharge of water under pressure from a glacier. GLOF events are severe geomorphological hazards and their floodwaters can wreak havoc on all human structures located on their path. Much of the damage created during GLOF events is associated with the large amounts of debris that accompany the floodwaters. Damage to settlements and farmland can take place at very great distances from the outburst source, for example in Pakistan, damage occurred 1,300 km from the outburst source (WECS 1987b).

9.2 Causes of Lake Creation

Global warming

There is growing concern that human activities may change the climate of the globe. Past and continuing emissions of carbon dioxide (CO_2) and other gases will cause the temperature of the Earth's surface to increase—this is popularly termed 'global warming' or the 'greenhouse effect'. The 'greenhouse effect' gives an extra temperature rise.

Glacier retreat

An important factor in the formation of glacial lakes is the rising global temperature ('greenhouse effect') which causes glacial retreat in many mountain regions.

During the so-called 'Little Ice Age' (AD 1550–1850), many glaciers were longer than today. Moraines formed in front of the glaciers at that time nowadays block the lakes. Glaciation and interglaciation are natural processes that have occurred several times during the last 10,000 years.

As a general rule, it can be said that glaciers in the Himalayas have retreated about 1 km since the Little Ice Age, a situation that provides a large space for retaining melt water, leading to the formation of moraine-dammed lakes (LIGG/WECS/NEA 1988).

Röthlisberger and Geyh (1985) conclude in their study on 'glacier variations in Himalaya and Karakorum' that a rapid retreat of nearly all glaciers with small oscillation was found in the period from 1860/1900–1980.

Causes of glacial lake water level rise

The causes of rise in water level in the glacial lake dammed by moraines that endanger the lake to reach breaching point are given below.

- Rapid change in climatic conditions that increase solar radiation causing rapid melting of glacier ice and snow with or without the retreat of the glacier.
- Intensive precipitation events
- Decrease in sufficient seepage across the moraine to balance the inflow because of sedimentation of silt from the glacier runoff, enhanced by the dust flow into the lake.
- Blocking of ice conduits by sedimentation or by enhanced plastic ice flow in the case of a glacial advance.
- Thick layer of glacial ice (dead ice) weighed down by sediment below the lake bottom which stops subsurface infiltration or seepage from the lake bottom.
- Shrinking of the glacier tongue higher up, causing melt water that previously left the glacier somewhere outside the moraine, where it may have continued underground through talus, not to follow the path of the glacier.
- Blocking of an outlet by an advancing tributary glacier.
- Landslide at the inner part of the moraine wall, or from slopes above the lake level
- Melting of ice from an ice-core moraine wall.
- Melting of ice due to subterranean thermal activities (volcanogenic, tectonic).
- Inter-basin sub-surface flow of water from one lake to another due to height difference and availability of flow path.

9.3 Bursting Mechanisms

Different triggering mechanisms of GLOF events depend on the nature of the damming materials, the position of the lake, the volume of the water, the nature and position of the associated mother glacier, physical and topographical conditions, and other physical conditions of the surroundings.

Mechanism of ice core-dammed lake failure

Ice-core dammed (glacier-dammed) lakes drain mainly in two ways.

- through or underneath the ice
- over the ice

Initiation of opening within or under the ice dam (glacier) occurs in six ways.

- Flotation of the ice dam (a lake can only be drained sub-glacially if it can lift the damming ice barrier sufficiently for the water to find its way underneath).
- Pressure deformation (plastic yielding of the ice dam due to a hydrostatic pressure difference between the lake water and the adjacent less dense ice of the dam; outward progression of cracks or crevasses under shear stress due to a combination of glacier flow and high hydrostatic pressure).
- Melting of a tunnel through or under the ice
- Drainage associated with tectonic activity
- Water overflowing the ice dam generally along the lower margin
- Sub-glacial melting by volcanic heat

The bursting mechanism for ice core-dammed lakes can be highly complex and involve most or some of the above-stated hypothesis. Marcus (1960) considered ice core-dammed bursting as a set of interdependent processes rather than one hypothesis.

A landslide adjacent to the lake and/or subsequent partial abrasion on ice may lead to overtopping as the water flows over, the glacier retreats, and the lake fills rapidly, which may subsequently result in the draining of ice core moraine-dammed lakes.

Mechanisms of moraine-dammed lake failure

Moraine-dammed lakes are generally drained by rapid incision of the sediment barrier by outpouring waters. Once incision begins, the hustling water flowing through the outlet can accelerate erosion and enlargement of the outlet, setting off a catastrophic positive feedback process resulting in the rapid release of huge amounts of sediment-laden water (Figure 9.1). The onset of rapid incision of the barrier can be triggered by waves generated by glacier calving or ice avalanching, or by an increase in water level associated with glacial advance (examples include an ice avalanche from Langmoche Glacier on 4 August 1985 and another on 3 September 1998 from Sabai Glacier).

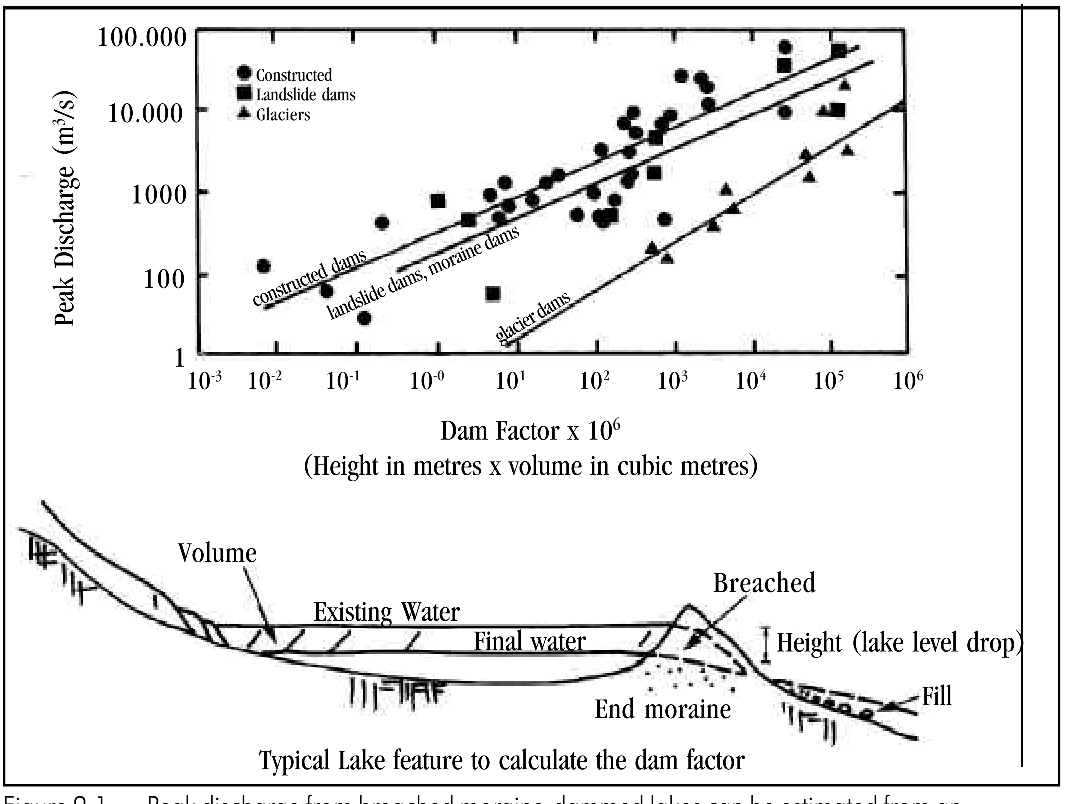


Figure 9.1: Peak discharge from breached moraine-dammed lakes can be estimated from an empirical relationship developed by Costa (1985)

Dam failure can occur for the following reasons:

- melting ice core within the moraine dam,
- rock and/or ice avalanche into a dammed lake,
- settlement and/or piping within the moraine dam,
- sub-glacial drainage, and
- engineering works.

Melting ice-core

The melting of impervious ice core within a moraine dam may result in the lowering of the effective height of the dam, thus allowing lake water to drain over the residual ice core. As the discharge increases with the melting of the ice core, greater amounts of water filter through the moraine, carrying fine materials. Eventually, the resulting regressive erosion of the moraine dam leads to its ultimate failure.

Overtopping by displacement waves

Lake water is displaced by the sudden influx of rock and/or ice avalanche debris. The resultant waves overtop the freeboard of the dam causing regressive and eventual failure.

Settlement and/or piping

Earthquake shocks can cause settlement of the moraine. This reduces the dam freeboard to a point that the lake water drains over the moraine and causes regressive erosion and eventual failure.

Sub-glacial drainage

A receding glacier with a terminus grounded within a proglacial lake can have its volume reduced without its ice front receding up-valley. When the volume of melt water within the lake increases to a point that the formerly grounded glacier floats, an instantaneous sub-glacial drainage occurs. Such drainage can destroy any moraine dam, allowing the lake to discharge until the glacier loses its buoyancy and grounds again.

Engineering works

One of the main difficulties in changing water levels or dam structures artificially is that this can unintentionally trigger a catastrophic discharge event. For example, in Peru in 1953, during the artificial lowering of the water level, an earth slide caused 12m high displacement waves, which poured into a trench, excavated as part of the engineering works and almost led to the total failure of the moraine dam.

9.4 Surge Propagation

As GLOFs pose severe threats to humans and man-made structures, it is important to make accurate estimates of the likely magnitude of future floods. Several methods have been devised to predict peak discharges, which are the most erosive and destructive phases of floods. The surge propagation hydrograph depends upon the type of GLOF event, i.e. from moraine-dammed lake or from ice-dammed lake (Figure 9.2). The duration of a surge wave from an ice-dammed lake may last for days to even weeks, while from a moraine-dammed lake the duration is shorter, minutes to hours. The peak discharge from the moraine-dammed lake is usually higher than from ice-dammed lakes.

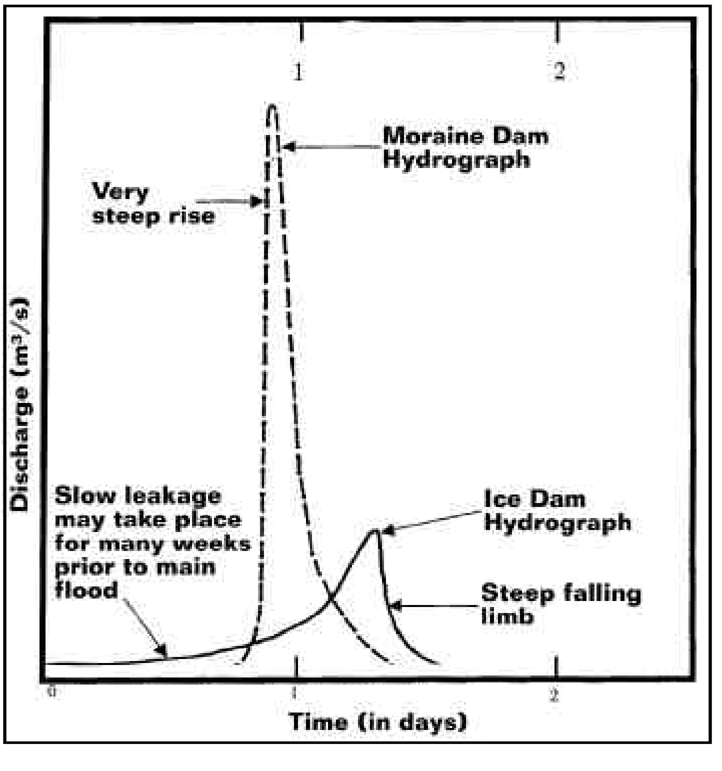


Figure 9.2: Difference in release hydrograph between moraine- and ice-dammed lakes (WECS 1987A)

The following methods have been proposed for estimation of peak discharges.

1) Clague and Mathews formula

Clague and Mathews (1973) were the first to show the relationship between the volume of water released from ice-dammed lakes and peak flood discharges.

$Q_{max} = 75(V_0 * 10^{-6})^{0.67}$

where
Q_{max} = peak flood discharge ($m^3 s^{-1}$)
V_0 = total volume of water drained out from lake (m^3)

The above relationship was later modified by Costa (1988) as the peak discharge yielded from the equation was higher than that measured for Flood Lake in British Columbia that occurred in August 1979:

$Q_{max} = 113(V_0 * 10^{-6})^{0.64}$

Later Desloges et al. (1989) proposed:

$Q_{max} = 17 V_0 * 19(0^{-6})^{0.64}$

This method of discharge prediction is not based on any physical mechanism, but seems to give reasonable results.

2) Mean versus maximum discharge method

If the volume of water released by a flood and the flood duration are known, the mean and peak discharges can be calculated. Generally the flood duration will not be known in advance. Hence, this method cannot be used to determine the magnitude of future floods. Observations of several outburst floods in North America, Iceland, and Scandinavia have shown that peak discharges are between two to six times higher than the mean discharge for the whole event.

3) Slope area method

This method is based on measured physical parameters such as dimensions and slope of channel during peak flood conditions from direct observations or geomorphological evidence.

$$Q_{max} = vA$$

The peak velocity is calculated by the Gauckler–Manning formula (Williams 1988)

$$v = r^{0.67} S^{0.50}/n$$

where
v = peak velocity
S = bed slope for a 100m channel reach
n = Manning's roughness coefficient
r = hydraulic radius of the channel

$$r = A/p$$

where
A = cross-sectional area of the channel
p = perimeter of the channel under water

For sediment floored channels, bed roughness is mainly a function of bed material, particle size, and bed form or shape and can be estimated from:

$n = 0.038D^{0.167}$

where
D = average intermediate axis of the largest particles on the channel floor.

Desloges et al. (1989) compared the results from all the three methods for a jokulhlaup from the ice-dammed Ape Lake, British Columbia. All the methods gave comparable results.

- The Clague and Mathews method gave a calculated peak discharge of 1,680 ± 380 $m^3 s^{-1}$.
- The mean versus maximum discharge method gave 1,080–3,240 $m^3 s^{-1}$.
- The slope area method gave 1,534 and 1,155 $m^3 s^{-1}$ at a distance of 1 and 12 km from the outlet respectively.

These general relationships are useful for determining the order of magnitude of initial release that may propagate down the system. However, to predict the magnitude of future floods, the first method should be applied, because volume of lake water can be estimated in advance.

Attenuation of a peak discharge of 15,000–20,000$m^3 s^{-1}$ has been reported for the Sun Koshi River in Tibet within a distance of 50 km (XuDaoming 1985) (Figure 9.11). The propagation of surge waves can be numerically modelled using the dam-break flood-forecasting model.

9.5 Sediment Processes During a Glacial Lake Outburst Flood

During a GLOF, the flow velocity and discharge are exceptionally high and it becomes practically impossible to carry out any measurement. Field observations after a GLOF event have shown a much higher sediment concentration of rivers than before the GLOF event (Electrowatt Engineering Service Ltd 1982; WECS 1995a). WECS (1995a) calculated the volume of scoured sediment as 22.5*10^4 m^3 after the Chubung GLOF in 1991. A high concentration of 350,000 mg^{-1} during a GLOF in the Indus River at Darband in 1962 is reported by Hewitt (1985). Hypothetical illustrations showing discharge and variation in sediment concentration (WECS 1987a) are shown in Figure 9.3.

The total sediment load is generally accepted as the wash load, which moves through a river system and finally deposits in deltas. In Nepal, no measurements have been taken of total sediment during GLOF events, however, rough estimates of total load during torrents can be made assuming a high sediment concentration (WECS 1987b). During a GLOF event, stones the size of small houses can be easily moved (WECS 1987b). The relationship between flow velocity and particle diameter can also be used to calculate the size of boulders that can be moved during such events.

9.6 Socioeconomic Effects of Glacial Lake Outburst Floods

The impact of a GLOF event downstream is quite extensive in terms of damage to roads, bridges, trekking trials, villages, and agricultural lands as well as the loss of human lives and other infrastructures. The sociological impacts can be direct when human lives are lost, or indirect when the agricultural lands are converted to debris filled lands and the village has to be shifted. The records of past GLOF events show that once every three to ten years, a GLOF has occurred in Nepal with varying degrees of socioeconomic impact. Therefore, proper hazard assessment studies must be carried out in potentially problematic basins to evaluate the likely economic loss and the most appropriate method of mitigation activities.

The 1981 GLOF from Zhangzangbo in Tibet (China) brought a lot of destruction in Tibet (China) and Nepal. It even caused severe damage to sections of the Nepal–China Highway including the Phulping and Friendship bridges in Nepal. The road was rebuilt at a cost of US $3 million. The present road level is now above the historic 1981 GLOF.

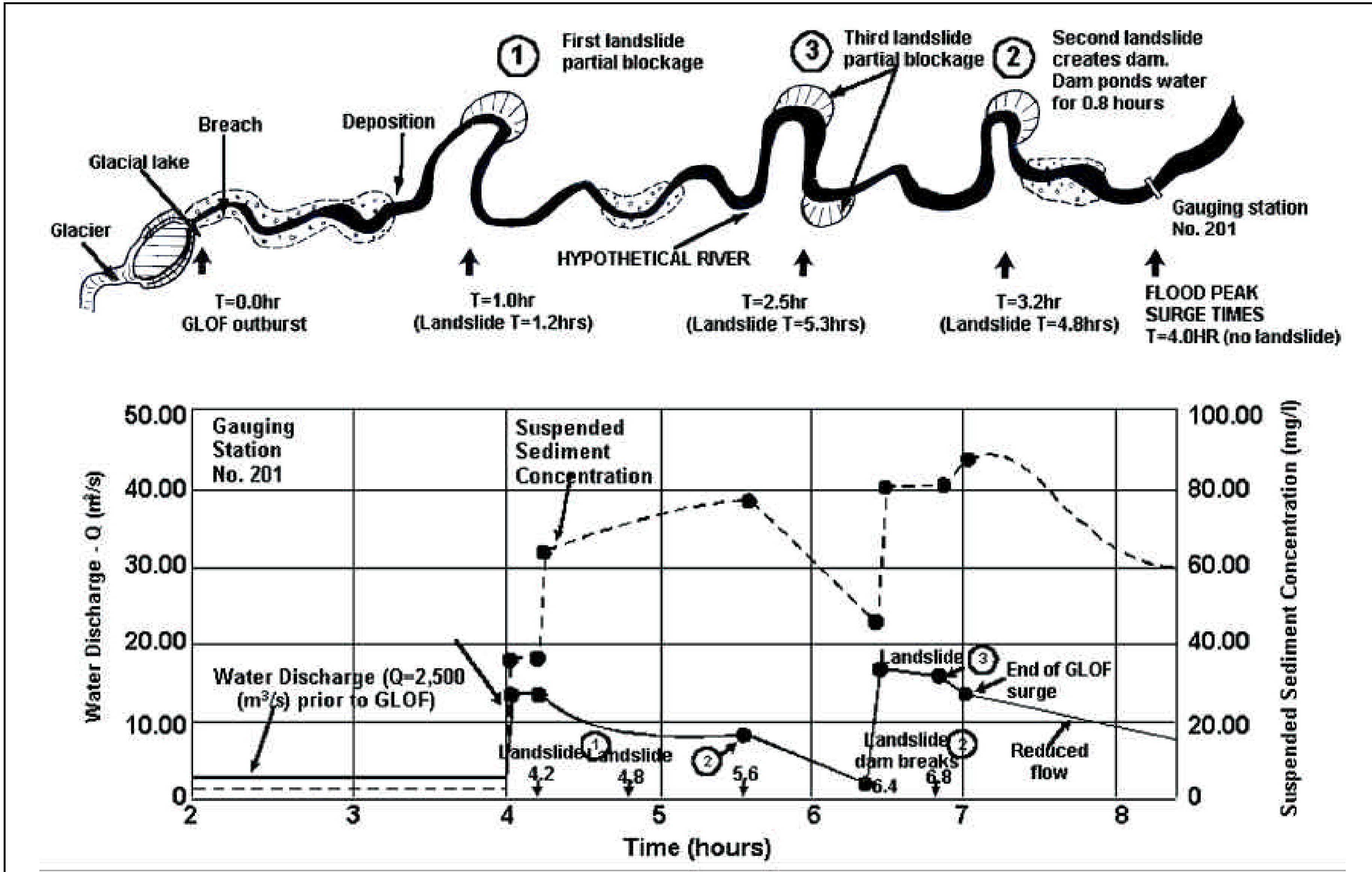


Figure 9.3: Hypothetical illustration of GLOF showing discharge and variation in sediment concentration (WECS 1987a)

The 1985 GLOF from Dig Tsho in the Dudh Koshi Basin damaged Namche hydropower station (US $1.5 million), 14 bridges, cultivated lands etc. (Vuichard and Zimmerman 1987). The hydropower plant has been rebuilt at another site. The sociological cost of lost lives and dwellings to communities was enormous. The study shows that this glacial lake is refilling again and possibly engineering a greater risk of a GLOF occurrence in the same basin. This and many more GLOF events indicate that before any major project is undertaken in the basin, in-depth cost and benefit analyses have to be carried out for deciding on the most appropriate alternative that will enable project financiers to assess their risks from a GLOF. The assessment of tangible benefits in respect to mitigation of GLOFs is, however, difficult. Reduced damage is considered a benefit and can be quantified, but the frequency of the reduced damage is difficult to ascertain due to lack of data. One cannot simply predict the timing and occurrences of GLOFs. It is extremely difficult to simulate numerically the flood level and velocities at a particular place.

At this stage, from brief studies of GLOFs throughout the world, it appears that there are no simple direct means of estimating the recurrence of GLOFs.

9.7 Brief Review of Glacial Lake Outburst Flood Events and Damage Caused

GLOF events have been reported most frequently within the last three decades. The reported GLOF events are given in Table 9.1 and shown in Figure 9.4. Some of the events have been disastrous for Tibet (China) as well as for Nepal. The GLOF event of the Barun Khola is not known, but the accumulation of the debris along the river valley is the indication of the GLOF event along the Barun Khola. The damage caused by the GLOF event of Jinco and Tara-Cho is not well known. The first GLOF event was experienced on 25 August 1964, when the Longda GLOF took place in the headwaters of the Trishuli River in Chinese territory. Most of the damage occurred in Chinese territory and a large debris flow was experienced in Nepal. In the same year, another Gelhaipuco GLOF was experienced along the Arun Valley. Severe damage and heavy economic losses occurred in Chinese Territory. The Zhangzangbo-Cho GLOF event at the headwaters of the Sun Koshi River on 11 July 1981 destroyed the Friendship Bridge of the China–Nepal Highway and the diversion weir at the Sun Koshi hydropower plant in Nepal, causing serious economic losses for Nepal. Dig Tsho GLOF, on 4 August 1985, destroyed the nearly completed Namche hydropower plant, cultivated land, and other infrastructures and caused the loss of many lives. Similar events have been reported from time to time. The most recent GLOF event is that of Tam Pokhari (Sabai-Tsho) on 3 September 1998 at the headwaters of the Inkhu Khola, one of the tributaries of the Dudh Koshi River.

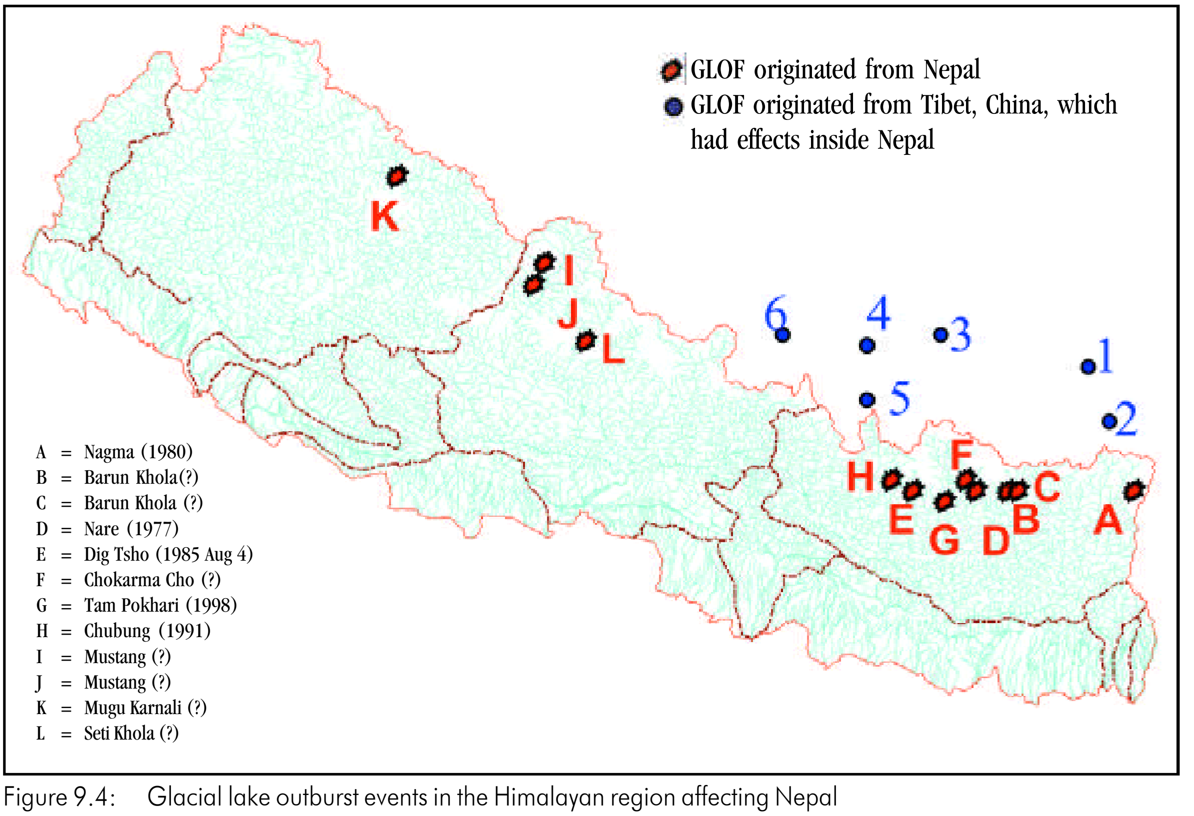
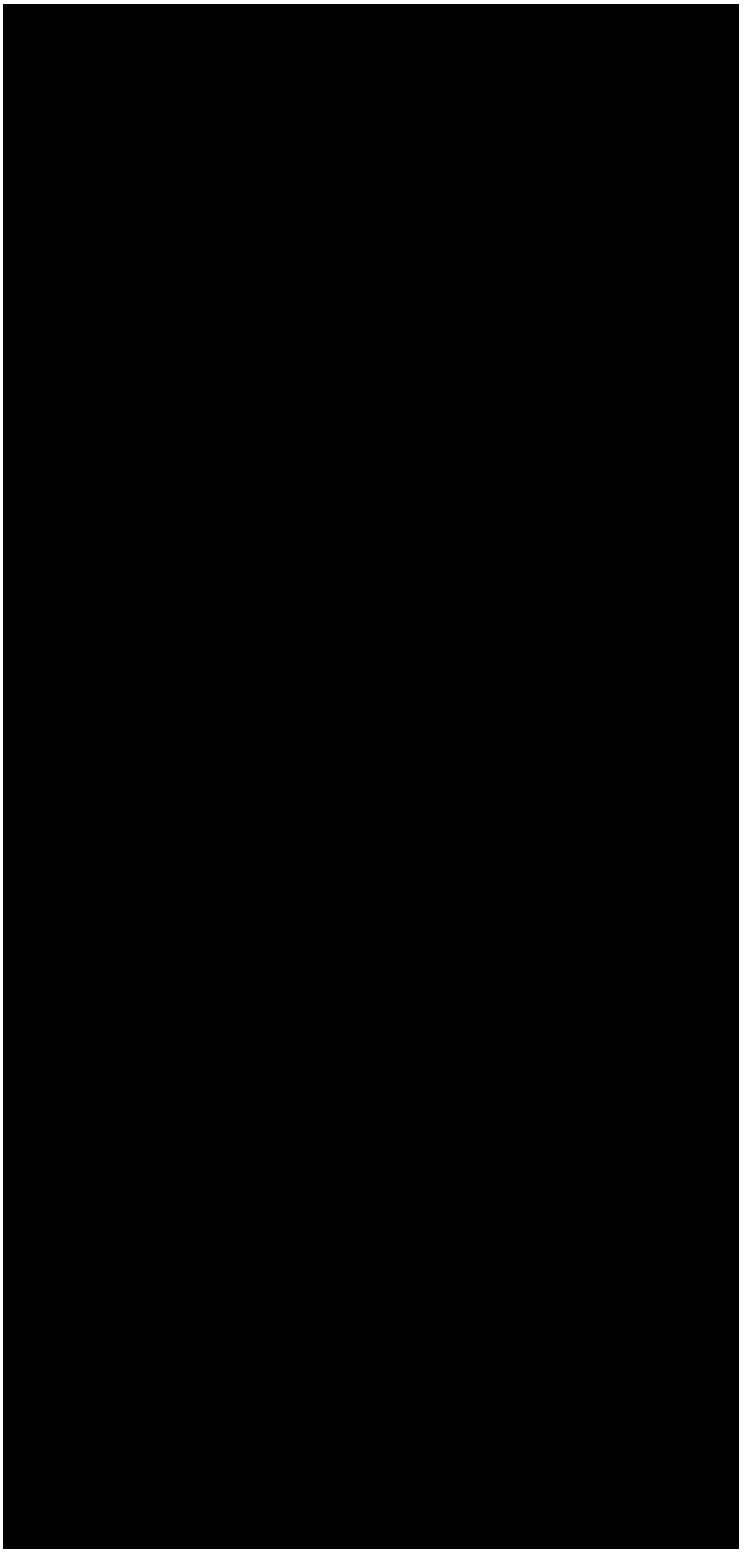


Figure 9.4: Glacial lake outburst events in the Himalayan region affecting Nepal



Pokhara valley

The 50–60m thick sediments at the floor of the Pokhara Valley are an indication of the debris flow in the past. It is estimated that the valley has suffered from a GLOF event that occurred 500 years ago. The source of the debris deposited in the Pokhara Valley floor is the Machhapuchhre area.

Barun khola

There is evidence of a GLOF in the Barun Khola Valley as shown in Figure 9.5, and this is indicated by the debris along the Barun Khola. The source of the GLOF is the Barun Pokhari. The dates and other details are not available.

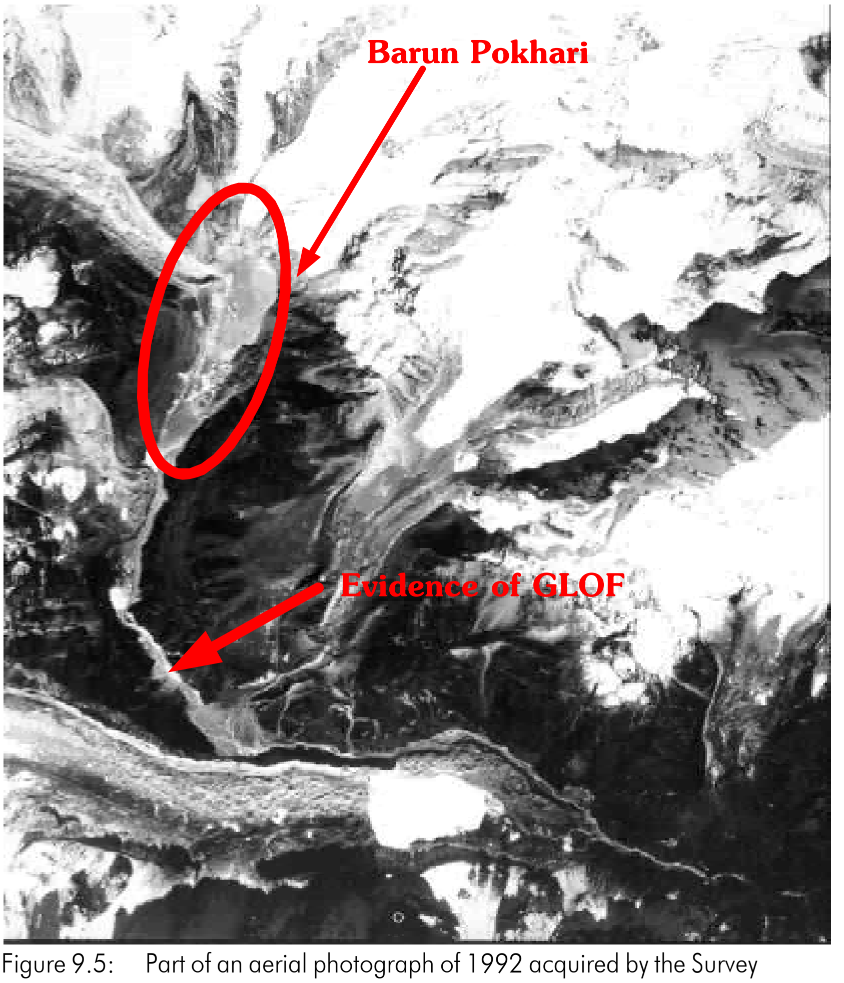


Figure 9.5: Part of an aerial photograph of 1992 acquired by the Survey Department of His Majesty's Government of Nepal (HMGN) showing the Barun Pokhari and evidence of a GLOF from the Barun Pokhari (Aerial Photo 53-35)

Tara-Cho

The Tara-Cho Lake is located in the Targyailing Gully of the Boqu Basin (Tibet [China]) and the Bhote Koshi Basin (in Nepal) situated at latitude 28° 17' N and longitude 86° 08' E at an elevation of 5,240 masl. It is a moraine-dammed lake. The lake is 1.0 km long, occupies an area of 0.224 sq.km, and is dammed by a moraine 50m thick.

The lake burst due to dam piping and released a 6.3 million m^3 volume of water breaching at a depth of 10m. According to local, old residents' descriptions, the lake burst abruptly one night in August 1935. It happened during the wheat harvest season. Nearly 66,700m^2 of wheat field at the outlet of the gully were destroyed and several livestock including yaks were lost. A huge amount of debris was deposited on the terraces of the Targyailing Gully. Now there is no cultivation in the affected area due to the thick accumulation of stony debris. According to the description of local old men, there was water oozing from beneath the dam before the burst. It is understood that the burst was probably caused by the collapse of part of the dam due to seepage. There is a cirque hanging glacier behind the lake, with an area of 2.46 sq.km and length of 1.5 km. Now the terminus of the glacier is 0.3 km away from the lake. If the glacier moves forward again, there is still the possibility of another burst, but the scale and damage degree would not be as big as in 1935.

Longda

The Longda Glacial Lake burst on 25 August 1964. The outburst flood washed out a huge amount of sediment which created a debris blockage 800m long, 200m wide, and 5m deep, on average, along the Gyirongzangbo River, the source of the Trishuli River.

Gelhaipuco

Gelhaipuco is an end moraine-dammed lake located in the headwaters of the Gelhaipu Gully (Natangqu River Basin), east of Riwo, Dinggye County, Tibet (China). Its geographic position is latitude 27° 58' N and longitude 87° 49' E. The lake burst abruptly due to an ice avalanche at 2 pm, on 21 September 1964. According to an investigation by Chengdu Institute of Geography of the Chinese Academy of Sciences, from the middle of March to the end of September 1964, there was a large precipitation in the Natangqu River Basin, which caused the glacier of the Natangqu River to slide (LIGG/WECS/NEA 1988). Huge amounts of ice slid into the lake resulting in the generation of a shock wave and water level increase. Finally, the lake water overflowed through the moraine dam and breached the 30m steep valley through the dam.

The flood, with a huge amount of debris, damaged Chentang-Riwo Highway and 12 trucks transporting timber were washed away. The debris flow rushed down to the lower reaches of the Arun (Pumqu) River of Nepal and caused heavy economic losses. Based on flood trace marks and sediment deposits on the river bed, it was concluded that it was a turbulent debris flow with a bulk density of about 1.45 t m^{-3}.

Before the burst, Gelhaipuco Lake was 1.4 km in length and 0.548 sq.km in area with water reserves of about 25.45 million m^3. The water level of the lake dropped by 40m after the lake burst in 1964 and released about 23.36 million m^3 of water. The slope of the exposed lake bed is 0.6% and it is 0.2 km away from the glacier margin. The present condition of the lake indicates stability. But if the glacier advances forward again, the possibility of another burst cannot be ruled out.

The LANDSAT TM and field photographs of Gelhaipuco Lake are given in Figures 9.6, 9.7, and 9.8 respectively.

Figure 9.6: LANDSAT TM of 22 September 1988 (the Gelhaipuco Glacial Lake area is shown in the circle)

Zhangzangbo-Cho

The GLOF event of the Zhangzangbo-Cho Lake at Poiqu (Bhote-Sun Koshi) River in Tibet took place on 11 July 1981. This Little Ice Age moraine-dammed lake is located at the headwaters of the Zhangzangbu Gully (Figure 9.9). The lake burst due to a sudden ice avalanche at midnight. A breach 50m deep and 40–60m bottom width was formed at the moraine. The flood formed a large alluvial fan. According to XuDaoming (1985), the largest burst discharge was about 1,6000 m^3 s^{-1}, which happened 23 min after the burst. The main flood lasted about 60 min and the amount of burst water was estimated to be about 19 million m^3. Erosion and sedimentation can be seen along the valley and about 4 million m^3 of debris mixed materials joined the flow process. Before the burst, the end moraine-dammed lake was 1.7 km long and 0.643 sq.km in area. After the burst the length and area were reduced to 1.1 km and 0.265 sq.km respectively. The water reserves of the lake were also greatly reduced. According to an investigation in 1984, there had been a burst in 1964 from the same lake, but the breach was different

Figure 9.7: The field photograph (1987) of Gelhaipuco Glacial Lake shows the lake in contact with the hanging glacier

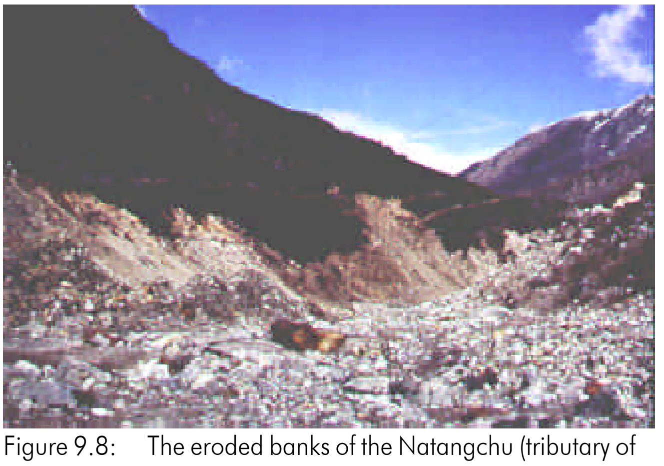


Figure 9.8: The eroded banks of the Natangchu (tributary of the Arun River in Tibet [China]) after the Gelhaipuco GLOF in 1964 (photograph 1987)

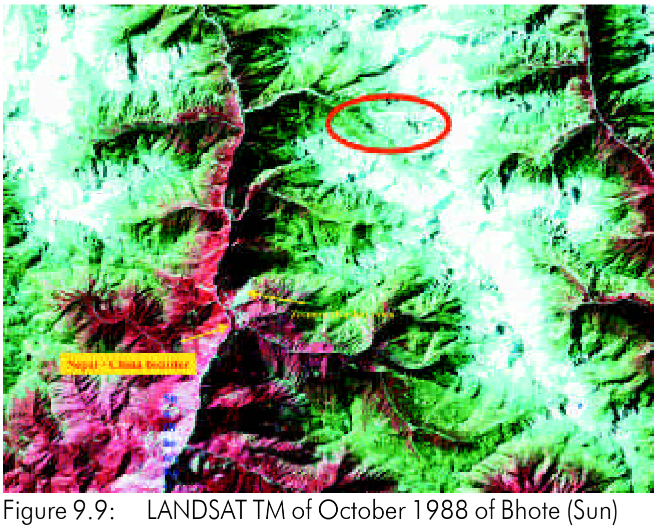


Figure 9.9: LANDSAT TM of October 1988 of Bhote (Sun) Koshi (Poiqu in Tibet [China]) showing Zhangzangbo-Cho

from that in 1981. The burst discharge and the damage caused were smaller. There is a cirque hanging glacier in the Zhangzangbo Gully (Figure 9.9), whose area is 2.47 sq.km, length is 2.2 km, and it ends at the bank of the lake. From 5 to 10 July 1981, there was continuous hot weather. The increased glacier ablation produced a large amount of water seeping into the crevasse of the glacier tongue, which brought the glacier into a critical state and caused part of the glacier to slide. Huge amounts of ice collapsed into the lake, which generated the shock wave that caused the dam burst.

The geomorphological map around Zhangzangbo Glacial Lake (XuDaoming 1985) is shown in Figure 9.10.

This debris flow damaged the highway sections between the outlet of Zhangzangbo Gully and the Sun Koshi Power Station in Nepal. It destroyed the Friendship Bridge of the China–Nepal Highway and the diversion weir at the Sun Koshi hydropower plant in Nepal, causing serious economic losses to Nepal. It also destroyed two bridges and tore out extensive road sections of the Arniko Highway of Nepal amounting to losses of US $3 million. The peak discharge attenuation downstream due to the GLOF is shown in Figure 9.11, the remnant pier of the old bridge damaged by the 1981 GLOF and new bridge at Phulping is shown in Figure 9.12, and the washed out portion of the Kodari Highway is shown in Figure 9.13.

Ayaco

Ayaco is located at the headwaters of the Zongboxan River in the Pumqu Basin (Tibet) on the northwestern slope of Mount Everest. The geographic position of the lake is latitude 28° 21'N and longitude 86° 29'E. According to an investigation by Chengdu Institute of Geography of the Chinese Academy of Sciences, there were three burst events recorded in mid August 1968, 1969, and 1970 (LIGG/WECS/NEA 1988). A huge fan-shaped mass of debris was deposited at the confluence of the lake drainage channel and the main river course. The estimated sediment deposit is about 4.59 million m^3. At present the lake is only 1.2 km long and 0.35 sq.km in area, which is much smaller than its size before the burst. The distance from the glacier to the lake is 0.5 km. If the glacier advances again, there is the possibility of another burst, but the intensity may not be as strong as during the period from 1968–1970. The flood damaged the highway and concrete bridges of Desha No.1 in Tibet (China). The damage on the Nepal side is unknown.

Nare

Nare is situated in the Dudh Koshi watershed boundary at the southern slope of Mount Ama Dablam in Nepal. The lake was formed due to damming of the ice cored moraine. The GLOF event of 3 September 1977 damaged a mini hydro plant, a road, bridges, and farmland in Nepal. The lake is not present in the map studied.

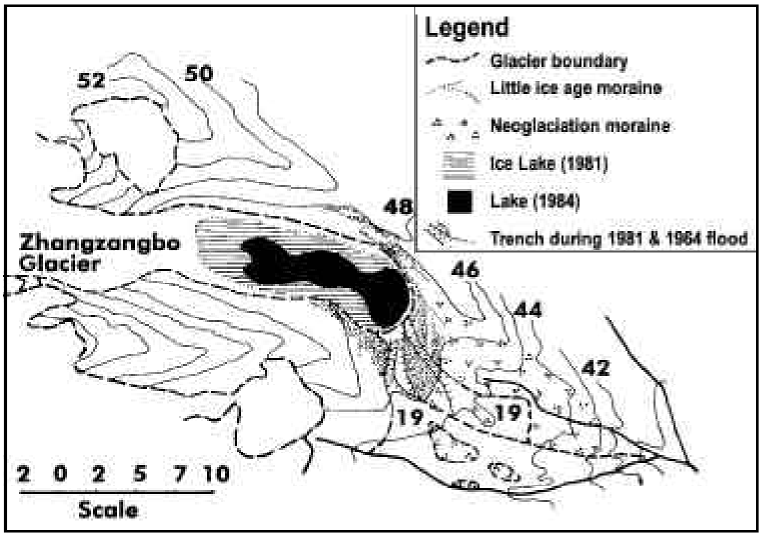


Figure 9.10: Geomorphological map of Zhangzangbo Glacial Lake area, Tibet (China) (XuDaoming 1985)

Nagma

Nagma (Punchan) is situated at the Tamor watershed. Due to the GLOF event of 23 June 1980, one village was completely destroyed and the villagers had to migrate to other places. The eroded banks of the Tamor River after the Nagma GLOF of 1980 is shown in Figure 9.14, while the 1992 aerial photographs of Nagma Glacial Lake and Chhechen Pokhari formed after the Nagma GLOF are shown in Figure 9.15 and 9.16 respectively.

Jinco

Jinco Lake is located at the headwaters of the Yairuzangbo River of the Pumqu Basin (Tibet) and the Arun Basin in Nepal. It is an end moraine-dammed lake. The Jinco GLOF happened at 5 pm on August 27 1982 and formed a huge amount of debris flow. At 7 pm the flood peak arrived at Sar. The summer of 1982 was dry and hot. The outburst might have been the result of a strong glacier ablation that seeped melting water into the glacier bed and made it slide. The ice blocks collapsed into the lake and the generated shock wave damaged the dam, thus causing the burst.

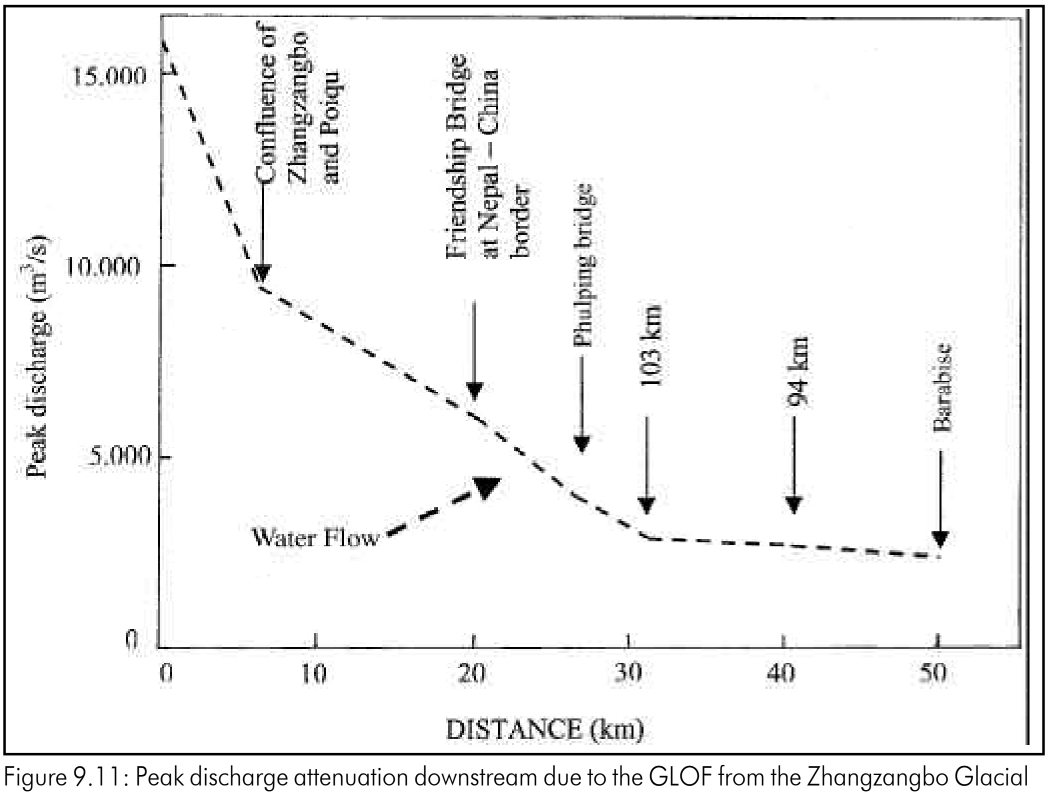


Figure 9.11: Peak discharge attenuation downstream due to the GLOF from the Zhangzangbo Glacial Lake, Poiqu River, Tibet (China) or the Bhote (Sun) Koshi (Nepal) (Xu Daoming 1985)

Figure 9.12: Remnant pier of the old bridge damaged by the 1981 GLOF and the new bridge at Phulping along the Nepal–China Highway

Figure 9.13: The washed out portion of the Kodari Highway (Nepal–China Highway) by the 1981 GLOF

Over 1,600 livestock were lost, about 19 hectares of cultivated field were destroyed, and the houses of eight villages were washed away. Gujing village suffered a different degree of destruction.

Figure 9.14: The eroded banks of the Tamor River after the Nagma GLOF of 1980 (Carson 1985)

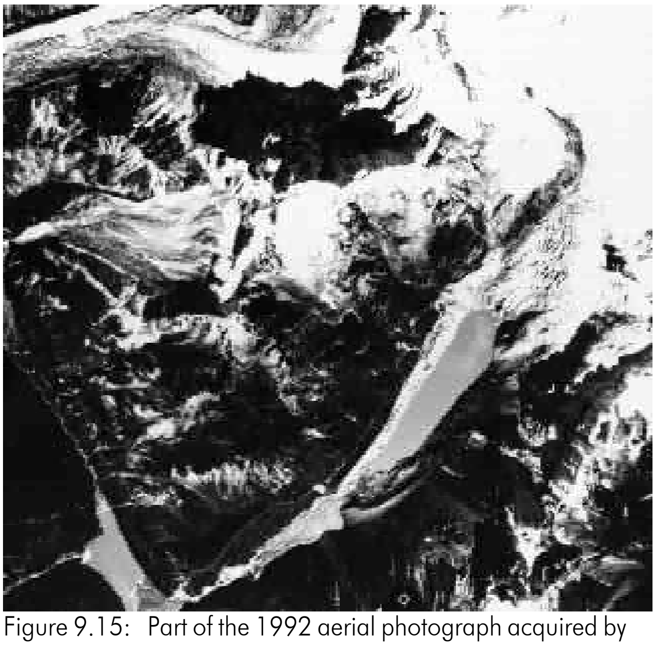


Figure 9.15: Part of the 1992 aerial photograph acquired by the Survey Department of HMGN showing the Nagma (Phuchan) Glacial Lake after the GLOF of 1980 (Aerial Photo 53-56).

Dig Tsho

Dig Tsho (Langmoche) Glacial Lake is in contact with the Langmoche hanging glacier in the Dudh Koshi Basin. It burst on 4 August 1985. The GLOF destroyed the nearly completed Namche Hydropower Plant (estimated loss of US $1.5 million), 14 bridges, trails, cultivated land, etc and caused the loss of many lives. The details of the Dig Tsho Glacial Lake are given in Chapter 10. A photograph taken after the GLOF of 1985, showing the remnants of Dig Tsho Glacial Lake and Langmoche Glacier, constitutes Figure 9.17.

Chubung

Chubung is situated in the Tama Koshi Basin at the end of the Ripimo Shar Glacier in the Rolwaling Valley. It is a moraine dam type of glacier, which burst on 12 July 1991 and damaged many houses and much farmland in the upper part of the Rolwaling Valley. Figure 9.18 shows the photograph of the breaching of the moraine dam and fan deposited after the Chubung GLOF of July 1991.

Kali Gandaki

In this basin two lakes identified from the topo-maps are found not to exist at present. Satellite images show evidence of GLOF events. Field interviews indicate that one of these lakes bears the name Tsarang Chu. According to local people the outburst of this lake occurred in May 1995, this has yet to be confirmed.

Tam Pokhari

Tam Pokhari (Sabai Tsho) is situated at the tongue of the Sha (Sabai) Glacier in the headwater of the Inkhu Khola of the Dudh Koshi Sub-basin. It burst on 3 September 1998. Two persons were killed, four suspension bridges and two wooden bridges were damaged, and farmland was buried. The total loss of property is estimated to be worth NRs 150.66 million.

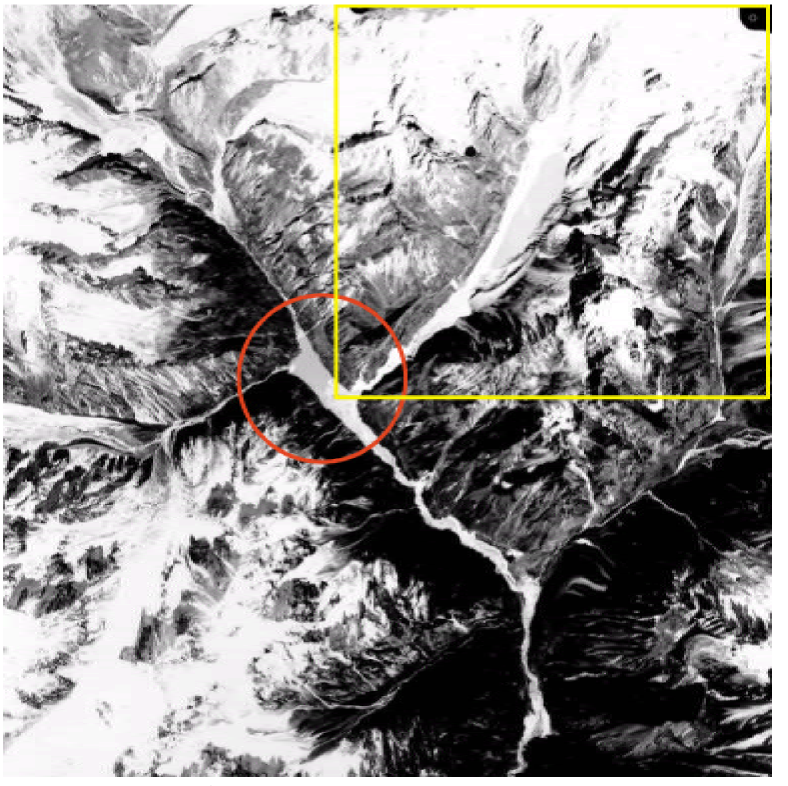


Figure 9.16: Part of the 1992 aerial photograph acquired by the Survey Department of HMGN showing the debris deposited along the gully which blocked the Chhechen Khola to form the Chhechen Pokhari after the Nagma (Phuchan) GLOF of 1980 (Aerial Photo 52-15)

Figure 9.17: Birds-eye view showing the remnants of Dig Tsho Glacial Lake, Langmoche Glacier at the slope and the debris along the gully after the GLOF of 1985 (WECS 1991)

Figure 9.18: The breaching of the moraine dam and fan deposited after the Chubung GLOF of 12 July 1991 in the Rolwaling Valley, Nepal (photograph 1993)

Chapter 10
The Glacial Lakes Studied in Nepal

The unexpected flood from Dig Tsho Lake in eastern Nepal on 4 August 1985 aroused different personnel as well as organisations in His Majesty's Government of Nepal (HMGN). The people concerned stated that it must be understood that glacial lake outburst floods (GLOFs) can be the source of serious disasters. The study of glacial lakes in Nepal began in 1985 at the Water and Energy Commission Secretariat (WECS), HMGN (WECS 1987a and b) and other government and non-governmental organisations. As a result of these studies, a lake (Tsho Rolpa) with the potential for outburst was found. The Tsho Rolpa Glacial Lake developed from 0.23 sq.km in 1959 to 1.37 sq.km in 1993 (WECS 1993a). It made the people of Naa and Beding villages panic, and the government as well as researchers worldwide gave great attention to this lake. Consequently various studies of it were undertaken.

The other glacial lakes in the Nepal Himalayas which drew the attention of researchers, different personnel, and organisations for study are Lower Barun, Imja, Thulagi, Dig Tsho, and Tam Pokhari glacial lakes. Their general features, including those of Tsho Rolpa Glacial Lake, are presented in Table 10.1.

Table 10.1: Outline of the studied glacial lakes in the Nepal Himalayas

	Lower Barun	Imja	Tsho Rolpa	Thulagi	Dig Tsho	Tam Pokhari
Latitude	27° 48' N	27° 59' N	27° 50' N	28° 30' N	27° 52' N	27° 44' N
Longitude	87° 07' E	86° 56' E	86° 28' E	84°30' E	86°35' E	86°15' E
Altitude (m above sea level (masl))	4570	5000	4580	4146	4365	4432
Depth (m)						45 left after GLOF
Average	50	47.0	55.1	41.8	20	
Maximum	118	99	131	81		
Length (km)	1.250	1.3	3.2	2.0	1.21	1.15
Width (km)	0.625	0.5	0.5	0.45	0.44	0.5
Area (km^2)	0.78	0.60	1.39	0.76	0.5	0.47
Stored water (10^6*m^3)	28	28.0	76.6	31.8	10	21.25
Drainage area (km^2)	50	—	77.6	55.4	?	?
Approximate age (years)	35	45	45	45+	50	45+
GLOF release (10^6*m^3)					8	17

10.1 Lower Barun Glacial Lake

The Lower Barun Glacial Lake is situated at an elevation of 4,570 masl at latitude 27° 48'N and longitude 87° 07'E in the Barun Khola Valley. The lake lies at the foot of Mount Makalu. The Barun Khola starts in the Makalu region and is one of the major tributaries of the Arun River within Nepal. The glacial lake at the toe of the Lower Barun Glacier is one of the potentially dangerous lakes identified in Nepal.

The lake was not visible in the topographic map on a scale of 1:63,360 published by Survey of India in 1967 (Figure 10.1) based on the 1963 survey. The map published by Nepal-Kartenwerk der Arbeitsgenmeinschaft für vergleichende Hochgebirgsforschung (Schneider) Nr. 2 on a scale of 1:50,000 in 1965 showed the lake in the form of a supraglacial lake (Figure 10.2). The map was revised in 1988 and 1993, but it shows a smaller lake area than the satellite images of 1983 and the photograph of 1991.

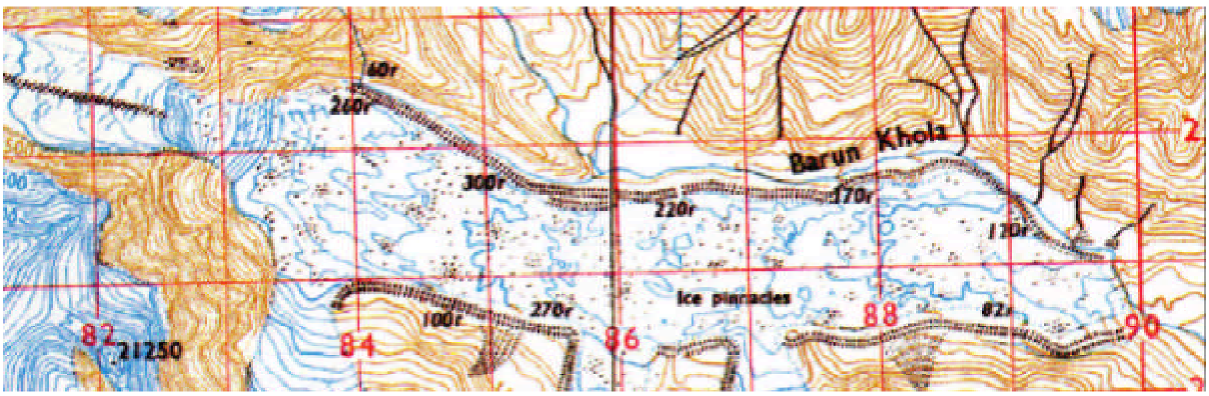


Figure 10.1: Part of Lower Barun Glacier showing no evidence of a glacial lake at the tongue of the glacier in the topographic map published in 1967 by the Survey of India on a scale of 1:63,360, based on aerial photographs taken in 1957–59 and the survey of 1963

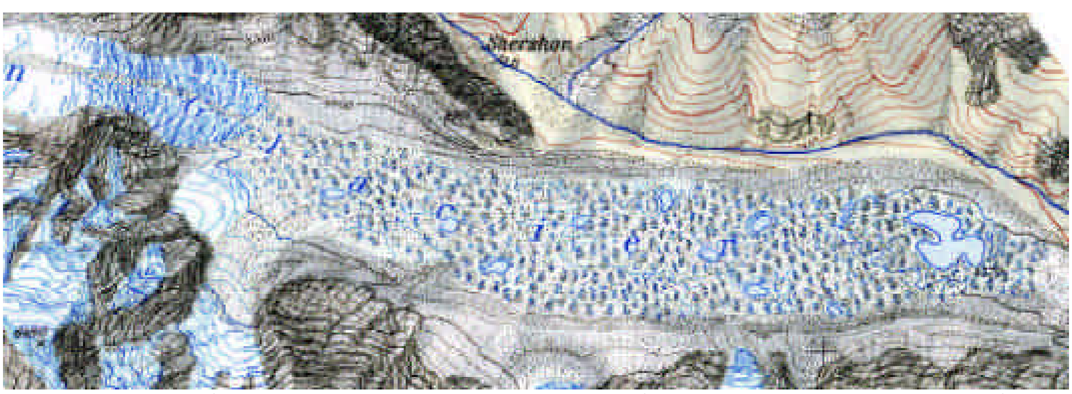


Figure 10.2: Part of Lower Barun Glacier showing evidence of supraglacial lakes at the tongue of the glacier in the topographic map (1993 edition) published by Schneider on a scale of 1:50,000 (first published in 1965 with selective revisions in 1988 and 1993 editions)

The LANDSAT MSS imagery of 1976 of the Barun Khola Valley (Figure 10.3) shows the lake bigger in size than the lake area mapped in 1965. The lake is clearly visible on the glacier tongue in the 1983 colour infrared metric camera photographs of Space lab (Figure 10.4).

The supraglacial lake in 1965 has developed to become bigger in size and in the form of an end moraine dammed lake. The lake was still smaller than Barun Pokhari Glacial Lake and another nearby lake.

Flight observations were carried out by WECS/Japanese International Cooperation Agency (JICA) in the Arun, Honku Drangka, Hinku Drangka, Dudh Koshi, Lantang Khola, Chilime, and Marsyangdi Basins in 1990 and 1991. The flight observation report recommended detailed examination of the dangerous glacial lakes by site visit, development of protection measures, and establishment of a monitoring system

(WECS 1991). An oblique aerial photograph of the Lower Barun Glacier (Figure 10.5) was also taken successfully during flight observation by WECS on 25 April 1991 (WECS 1991). A supraglacial lake developed on the glacier tongue is clearly seen in Figure 10.5 and in the vertical aerial photograph (Figure 10.6).

The Lower Barun Glacial Lake appeared around the mid-1960s and has developed in dimension very rapidly, the increasing dimensions are clearly visible from the aerial photographs of 1992 (Figure 10.6), LANDSAT TM of 1992 (Figure 10.7), and SPOT3 HRV1 PAN image of 1993 (Figure 10.8) at the toe of the Barun Glacier. Considering that this lake might be a potentially dangerous lake, and also keeping in mind the planned Arun-III hydropower project downstream, WECS carried out a field investigation to conduct a topographic survey in order to obtain the shape/area of the lake. Depths were measured through drilled bore holes on the frozen lake surface in 1993 and a bathymetric survey was also done in 1997 (WECS 1993, 1997). It was found that the size of Lower Barun Glacial Lake is increasing and it is associated with the larger mother glacier (Figures 10.7 and 10.9). It was recommended that any project downstream of Lower Barun Glacial Lake requires detailed investigation of the lake and the downstream valley.

However, the field investigation carried out by the Nepal Electricity Authority (NEA) (the authority for the proposed Arun III Hydropower Project) in 1995 confirmed that Barun Khola should be safe from GLOF events and that the impact would be little or negligible from the Lower Barun Glacial Lake (NEA 1995). Part of Lower Barun Glacier showing the glacial lake at the tongue of the glacier in the topographic map published in 1995 by the Survey Department of HMGN on a scale of 1:50,000 based on aerial photographs of 1992 is shown in Figure 10.10.

The lake as mapped by WECS (1997) is 1,250m long and has a width of 625m. It has an average depth of 50m and maximum depth of 118m measured close to the glacier tongue. The bathymetric map and the longitudinal profile of the lake are shown in Figures 10.11 and 10.12 respectively.

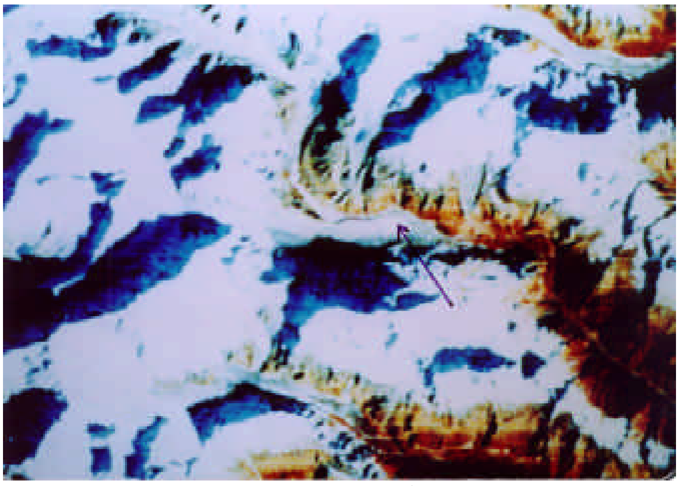


Figure 10.3: LANDSAT MSS imagery of 29 December 1976 – an arrowhead indicates the position of Lower Barun

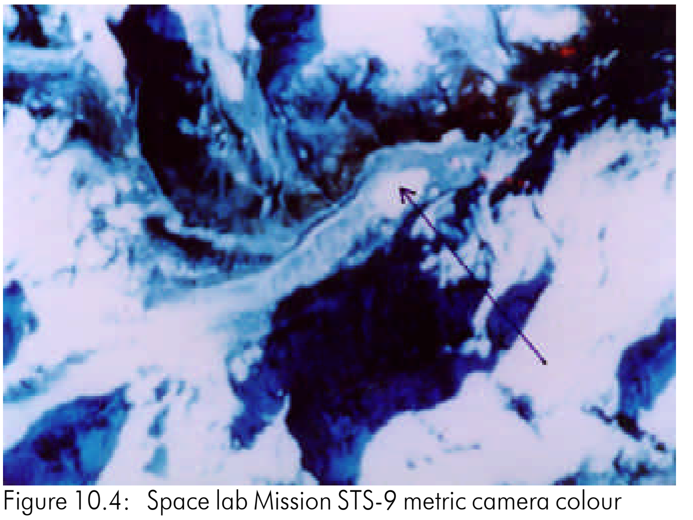


Figure 10.4: Space lab Mission STS-9 metric camera colour infrared photograph of 2 December 1983 – an arrow indicates the Lower Barun Glacial Lake

Figure 10.5: Birds-eye view, oblique photograph of the Lower Barun Glacial Lake photographed on 25 April 1991 (WECS 1993)

Glacial Lake

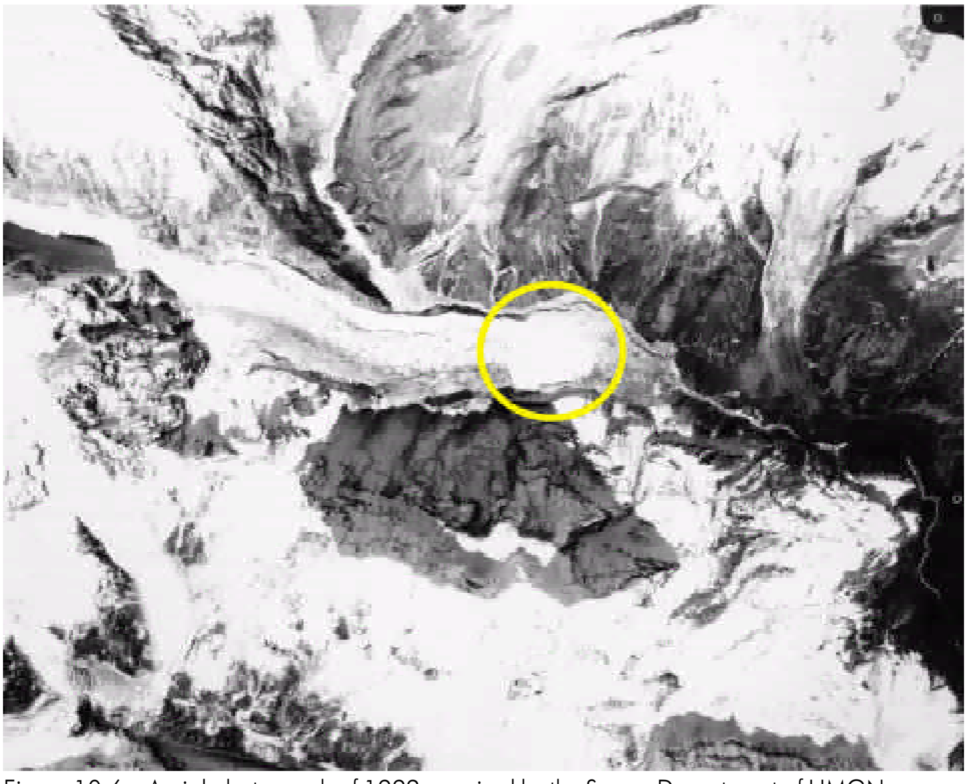


Figure 10.6: Aerial photograph of 1992 acquired by the Survey Department of HMGN showing Lower Barun Glacier and the glacial lake area (part of Aerial Photo 51-33)

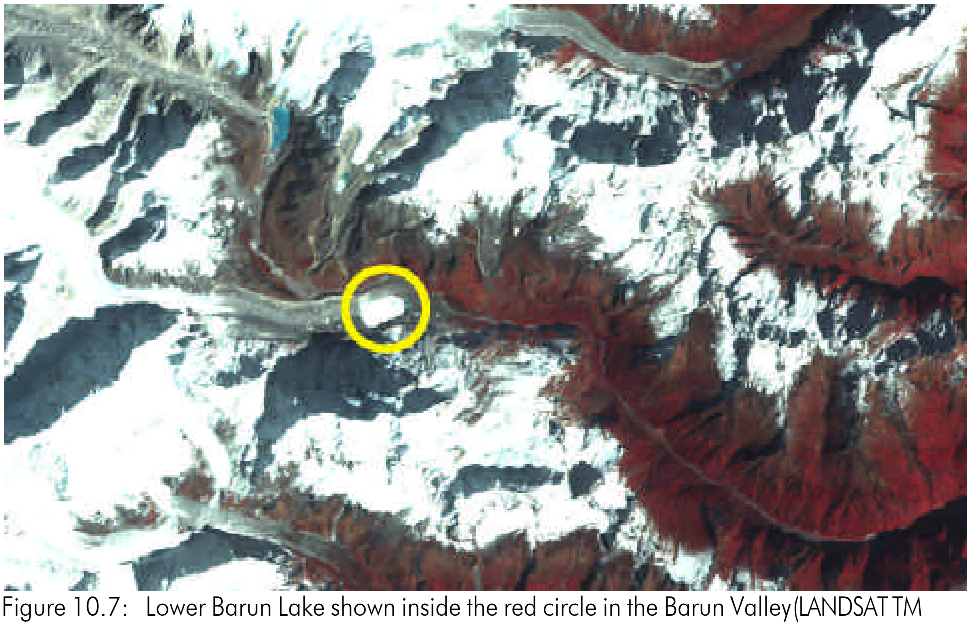


Figure 10.7: Lower Barun Lake shown inside the red circle in the Barun Valley (LANDSAT TM image 17 November 1992)

Figure 10.8: Lower Barun Lake (SPOT3 HRV1 PAN 228-294 image of 25 December 1993)

Figure 10.9: Lower Barun Glacial Lake in contact with the tongue of the glacier — The photograph was taken in March 1993 (WECS 1993)

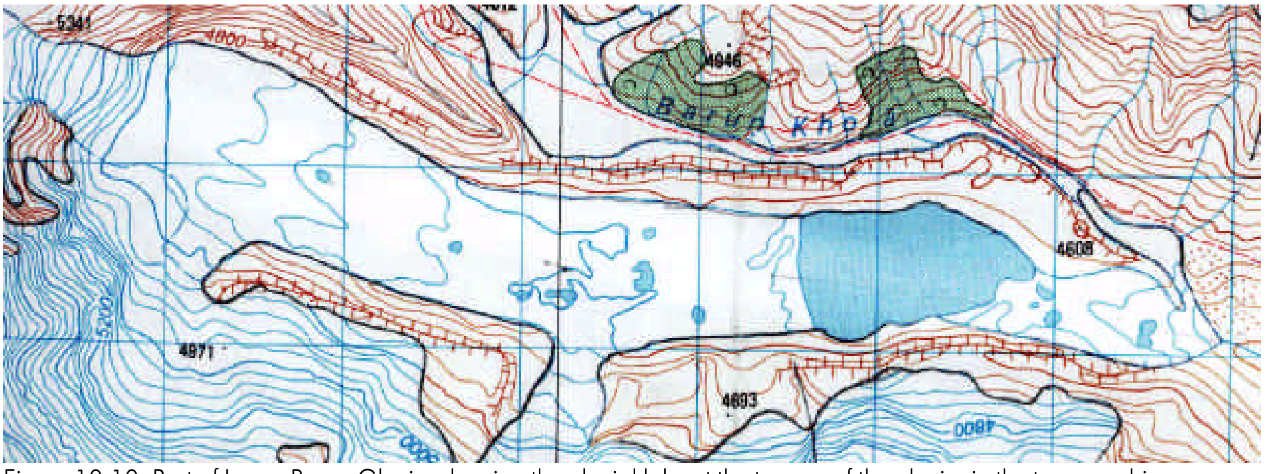


Figure 10.10: Part of Lower Barun Glacier showing the glacial lake at the tongue of the glacier in the topographic map published in 1995 by the Survey Department of HMGN on a scale of 1:50,000 based on aerial photographs of 1992

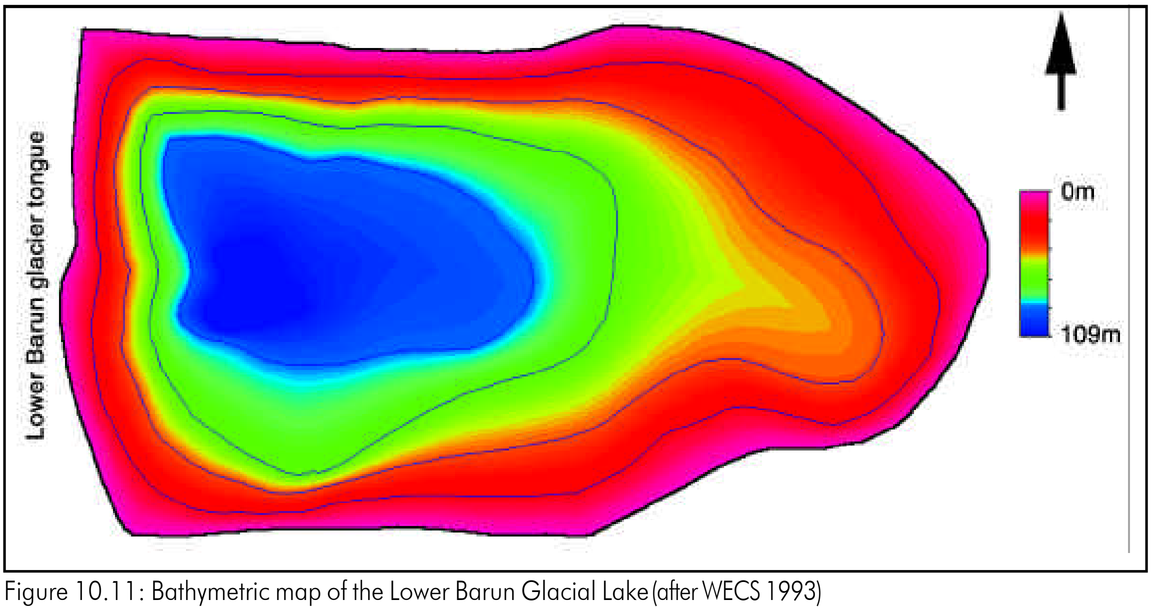


Figure 10.11: Bathymetric map of the Lower Barun Glacial Lake (after WECS 1993)

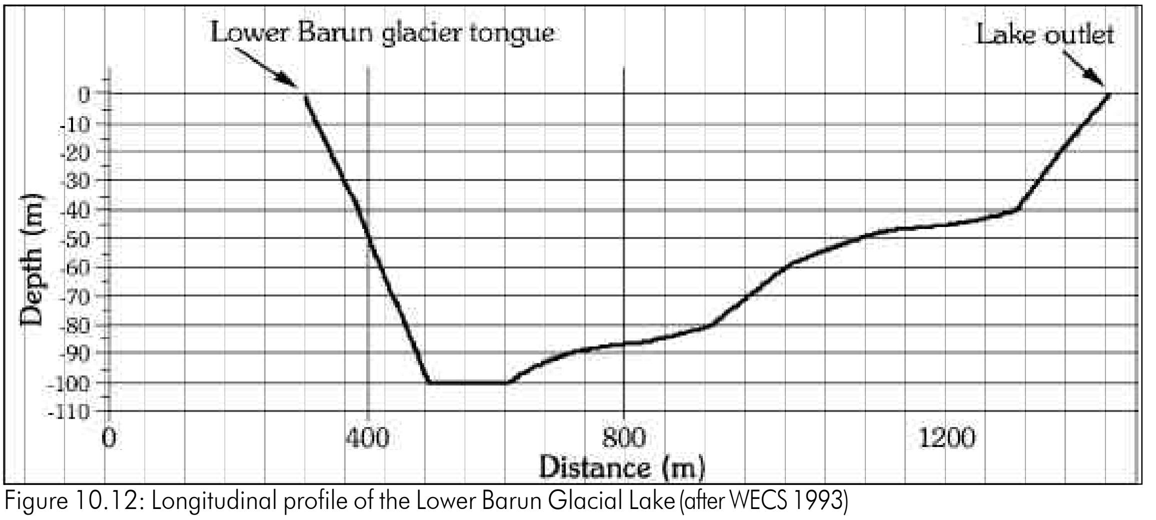


Figure 10.12: Longitudinal profile of the Lower Barun Glacial Lake (after WECS 1993)

10.2 Imja Glacial Lake

The Imja Khola starts flowing from the base of the Mount Everest Region in the form of Imja Glacier and is one of the major tributaries of the Dudh Koshi River. The tongue of the Imja Glacier extends from east to west at an elevation of 5,000 masl just south of Lhotse and Island Peak (Imjatse). The glacial lake at the toe of the Imja glacier is located at latitude 27° 59' N and longitude 86° 56' E in the Nepal Himalayas. According to the data from a survey done in April 1992, the length and width of the lake are 1.3 km and 0.5 km respectively. The average depth of the lake is 47m and the maximum depth is 99m. The lake occupies an area of 0.60 sq.km. The accumulation of water is estimated at about 28 million m^3.

Many climbers, researchers, and workers have visited this area for mapping. There are good descriptions by Hammond (1988), Yamada (1993), Watanabe et al. (1994), Watanabe et al. (1995), and Kettelmann and Watanabe (1998). On the basis of research by previous workers and aerial photographs, the development processes of Imja Glacial Lake were reconstructed (Figure 10.13).

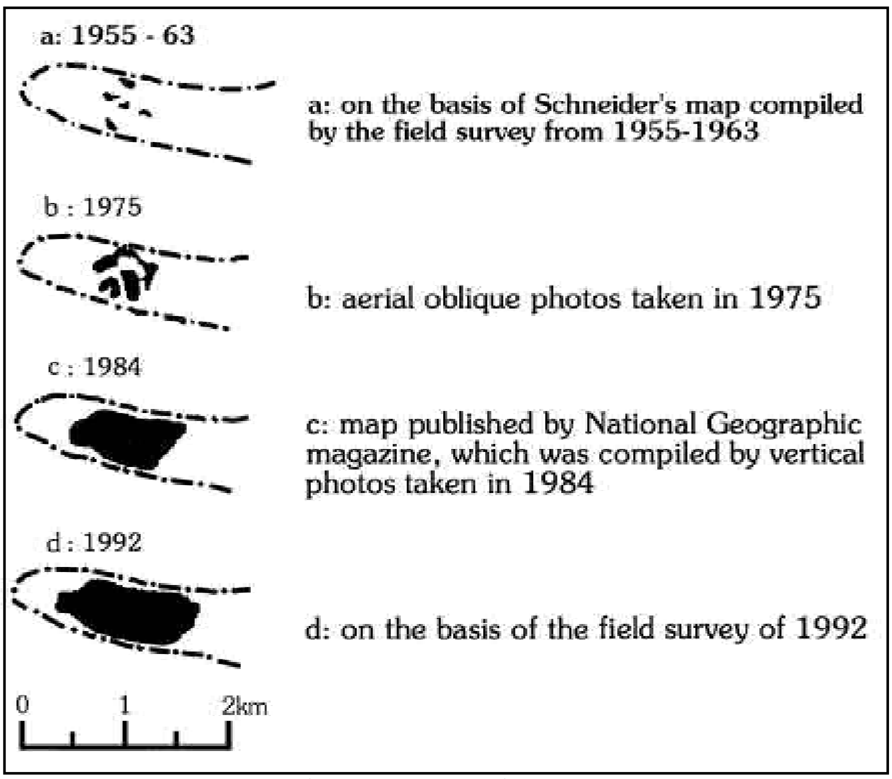


Figure 10.13: Development of Imja Glacial Lake from 1955 to 1992 (Yamada 1993)

No lake can be seen on the photographs taken in 1956 by Muller (Swiss Everest/Lhotse Expedition of 1956), in 1963 by Bishop and probably in 1971 by Yamada (1998). No lake but a couple of ponds can be found on the topographical map known as the 'Schneider Map', Khumbu Himal (1:50,000), which was based on terrestrial photogrammetry and field work done from 1956 to 1963. The map shows only a couple of small ponds on the glacier tongue with a total area of 0.03 sq.km (Figure 10.13a). The lake was first recognised in the terrestrial oblique photographs taken in 1975 (Figure 10.13b) by a Japanese glaciological research team (Japenese Glaciological Expedition of Nepal) [GEN]). The aerial oblique photographs taken in 1975 and in 1978 by GEN show a large lake with islands and peninsulas. The size of the lake was estimated to be around 0.3 sq.km in 1975 and 0.36 sq.km in 1978. The islands and peninsulas disappeared, probably by melting. It is evident from the aerial photographs (scale 1:50,000) taken in December 1984 (Figure 10.13c). One can see the large lake with an area of 0.47 sq.km on the map published in 1988. According to the result of the field survey made in early April 1992 (Figure 10.13d), the area of the lake expanded to 0.60 sq.km (Yamada 1992). The age of the lake as of 2,000 may be estimated to be about 45 years.

The Imja Lake started to form by melting about 45 years ago. In a 1991 survey the maximum depth found was 99m. The average annual melting rate at the bottom of the lake estimated at that time was at least 3.3m $year^{-1}$. The survey in 1997 showed the depth of the lake as 110m giving an average melting rate of about 2m $year^{-1}$.

The photo, aerial photographs, and LANDSAT TM image taken on different days in 1991 and 1992 are given in Figures 10.14–10.16. The bathymetric map and longitudinal profile of Imja Lake are shown in Figures 10.17 and 10.18 respectively. Figure 10.19 is a photograph showing Imja Glacial Lake in contact with the glacier tongue.

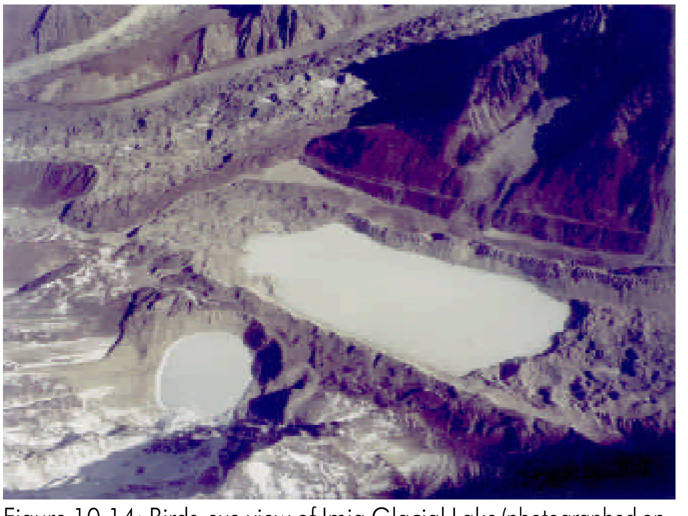


Figure 10.14: Birds-eye view of Imja Glacial Lake (photographed on 22 April 1991) (WECS 1991)

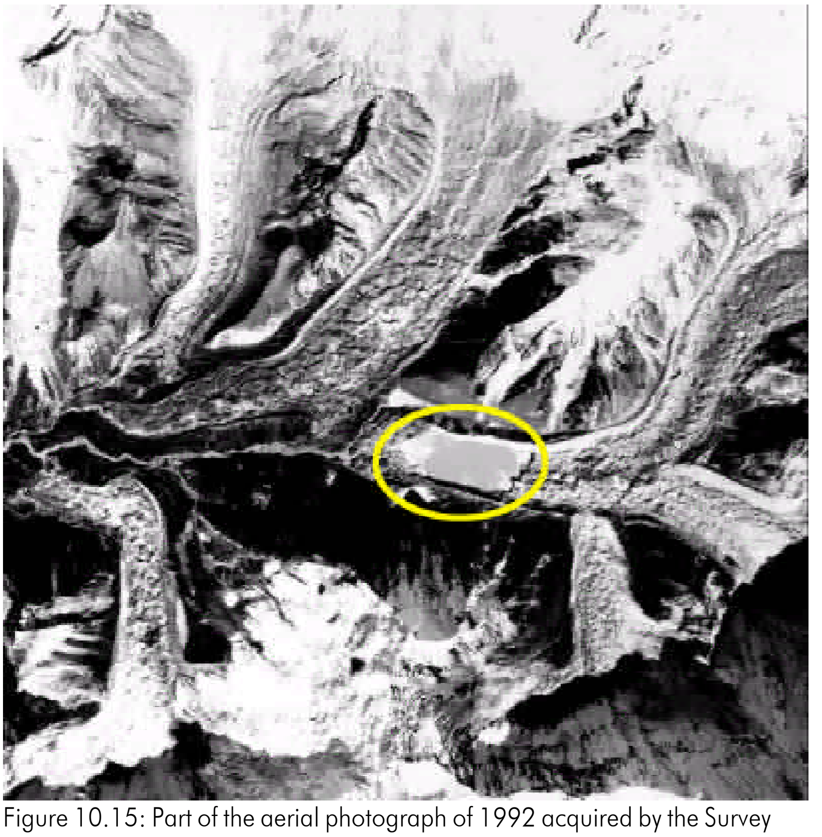


Figure 10.15: Part of the aerial photograph of 1992 acquired by the Survey Department of HMGN showing Imja Glacier and Glacial Lake area (Aerial Photo 51-30)

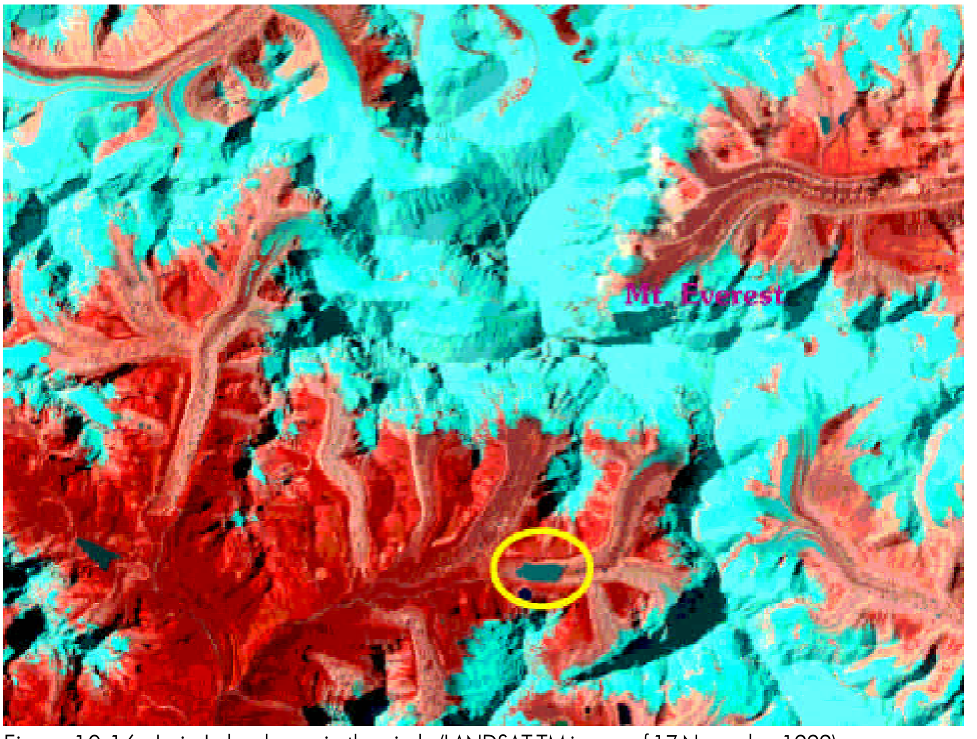


Figure 10.16: Imja Lake shown in the circle (LANDSAT TM image of 17 November 1992)

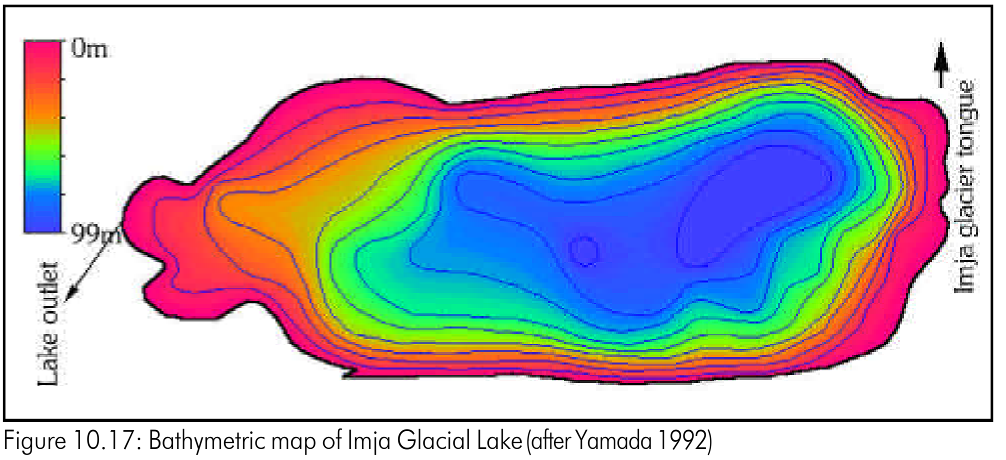


Figure 10.17: Bathymetric map of Imja Glacial Lake (after Yamada 1992)

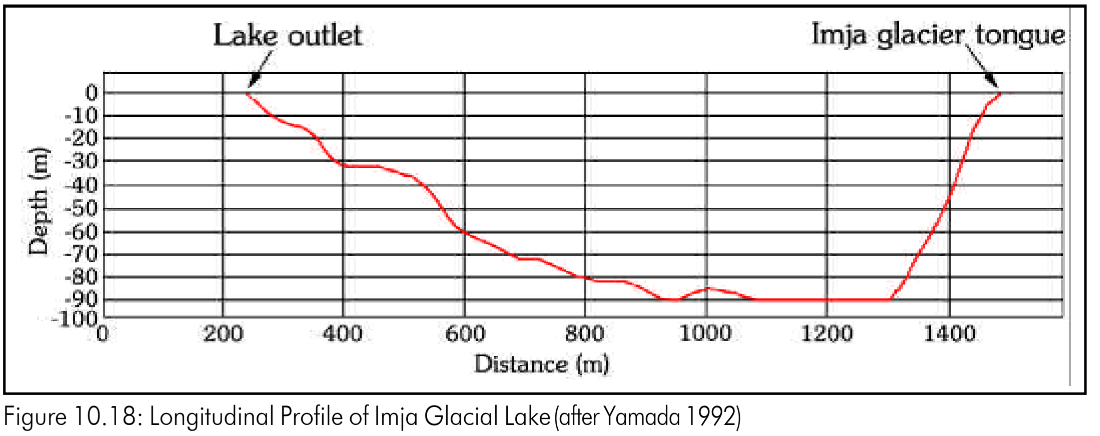


Figure 10.18: Longitudinal Profile of Imja Glacial Lake (after Yamada 1992)

10.3 Tsho Rolpa Glacial Lake

Figure 10.19: Imja Glacial Lake in contact with the glacier tongue (the photograph was taken in April 1992 [Yamada 1992])

Tsho Rolpa Glacial Lake is situated in the Rolwaling Valley, in the Tama Koshi River Basin in Dolakha District. The aerial distance from Kathmandu is about 110 km. It is at an elevation of 4,580 masl and it lies geographically at 27° 50'N latitude and 86° 28' E longitude. The lake is located at the foot of the Gauri Shankar Range, south of the Tibet (China) border.

Tsho Rolpa Glacial Lake (Figure 10.20) is east–west elongated and is located at the tongue of the Trakarding Glacier in the Rolwaling Valley. The headwaters of the valley are formed by complex valley glaciers: Ripimo Shar Glacier and Trakarding Drolambao Glacier (Figure 10.21). The northern (right bank) slope of the valley is the main Gauri Shankar Range with several peaks.

Figure 10.20: Birds-eye view of Tsho Rolpa Glacial Lake dammed by 150m high moraine dam

The highest peak of the Rowaling region is Mount Gauri Shankar (Jomo Tseringma) at 7,146 masl. The northern catchment boundary, i.e. the Gauri Shankar Range, joins with Tangapo Ridge plunging towards the Bhote-Tama Koshi River. The Yalung Range and Chukyima Go (6,259 masl) are towards the east.

The eastern catchment of the Rolwaling Valley is from the north–south ridgeline of the Gauri Shankar Range in the north to Langmoche Ri, Tengi Ragi Tau (6,943 masl), and Trashi Labtsa, Bigphera-Go, and Chukyima Go Range to the south. The ridge in the east is the divide between Rolwaling catchment and the Bhote-Dudh Koshi catchment, along which lies the famous Trashi Labtsa Pass (5,755 masl).

This glacial lake was studied by WECS, HMGN with the support of the Canadian International Development Association (CIDA) (Water and Energy Resources Development Project (WERDEP), WECS/NEA Institutional Support Project (WISP)) from 1985 to 1996. Dr Michel Damen of the International Institute for Aerospace Survey and Earth Sciences (ITC), the Netherlands, carried out the first professional field investigation of the Tsho Rolpa Glacial Lake voluntarily for the Netherlands–Nepal Association of Amsterdam in 1992. In 1993 a detailed study of Tsho Rolpa Lake and Rolwaling Valley was initiated under WECS. Technical and some financial support were also made available by JICA from 1990 to 1996 for the study of glaciers and glacial lakes in Nepal. A test siphon system at the lake was provided by the Wavin Overseas Company of the Netherlands through the efforts of the Netherlands–Nepal Association of Amsterdam. The system was installed at the site successfully in 1995 to test the materials and design mechanisms. That was followed by assurance from the Netherlands Government of financial support for mitigation work at the lake. Dutch fellowships to six Nepalese students were provided in 1995/96 to carry out a postgraduate diploma course on the possible glacial lake outburst flood hazard in Rolwaling Valley. Furthermore two similar fellowships were provided to Nepalese in 1996/97 for an MSc course in the Netherlands for glacial lake studies in Nepal. In 1996 JICA support for the study of the lake in Nepal was terminated.

Several studies on this lake have been carried out by professionals and students from different countries on different aspects: Damen (1992), Modder and van Olden (1995, 1996a, b, and c), WECS (1993), Reynolds Geosciences Ltd (1994), Mool (1995a), Budhathoki et al. (1996), Chikita et al. (1997), Yamada (1993, 1998).

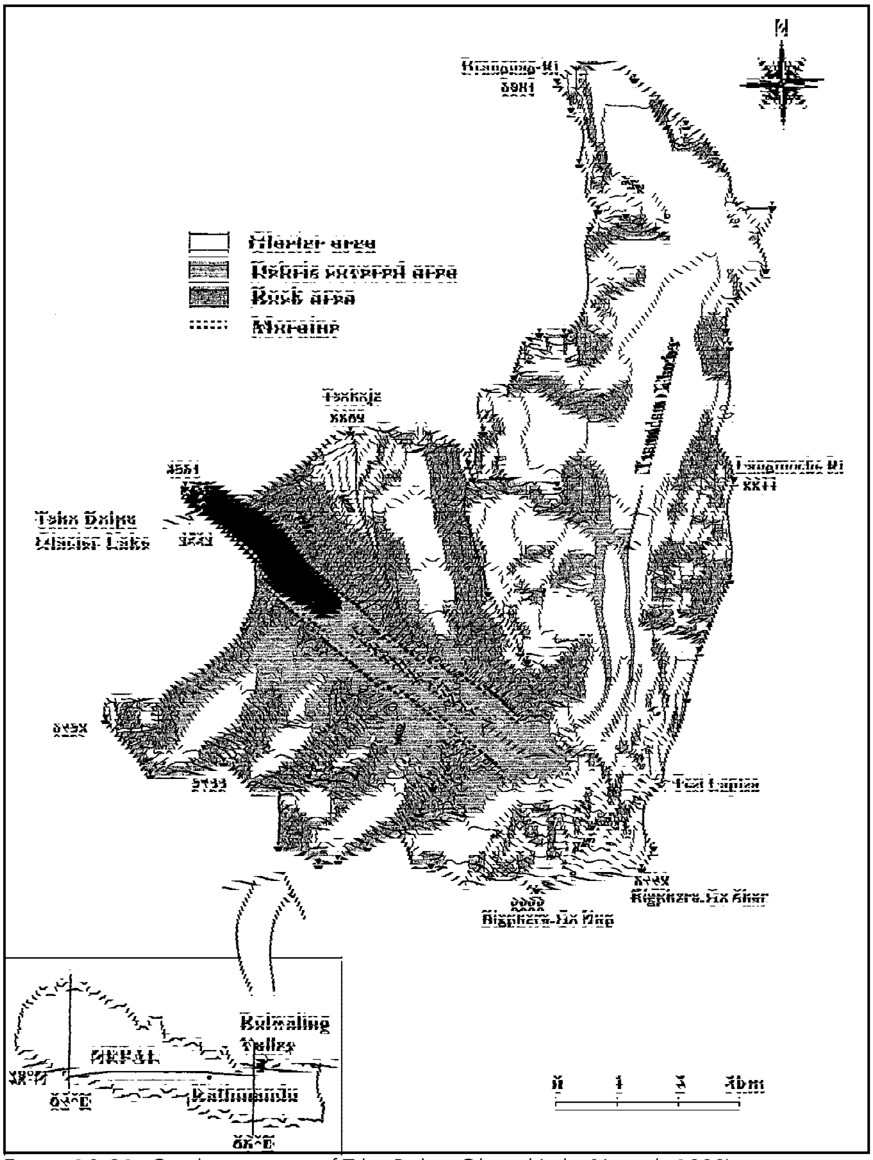


Figure 10.21: Catchment area of Tsho Rolpa Glacial Lake (Yamada 1998)

Based on the available maps, aerial photographs, satellite images, and field surveys, it can be seen that Tsho Rolpa Glacial Lake has developed from 0.23 sq.km in 1959 to 1.55 sq.km in 1999 (Table 10.2). The area of Tsho Rolpa Glacial Lake is 0.23 sq.km measured on the topographic map published by the Survey of India in 1959 (Figures 10.24 and 10.25). The lake area has increased from 0.23 to 1.55 sq.km as shown in Table 10.2 and Figures 10.24–10.29. The schematic cross section of the lake representing the development of the lake from 1950 to 1990 is shown in Figure 10.30. It can be concluded that the area of the lake is increasing. The latest field survey of the lake is from 1994. According to the surveys of 1993 and 1994, the maximum depth of the lake was 132m, the stored water volume was 71 million m^3 in 1993, and the volume was 76.6 million m^3 in. The deeper portion of the lake is closer to the glacier tongue. The average depth is about 52m. The lake is about 3 km long and about 0.5 km wide. The lake water level is at about 4,580 masl (about 4,550 masl in the 1996 topographic map of the Survey Department). The bathymetric map and the longitudinal profile of the lake are shown in Figures 10.22 and 10.23 respectively.

The lake was formed by ice-core moraine damming during the advancing phase of the glacier during the last ‘Little Ice Age’ glaciation. Trakarding Glacier, the main stem of the confluent valley glacier system in the area has actively started retreating and this might have resulted in the formation of Tsho Rolpa Glacial Lake in around AD 1950. Tsho Rolpa Glacial Lake gradually developed by damming the unconsolidated moraine and with some dead ice left by the glacier while it retreated. The end moraine is about 150m from the dam crest to the toe at the Rolwaling Khola (Figure 10.20). The base width at the dam is estimated to be at least half a kilometre. Few islands (or parts of end moraine) are there at the

Table 10.2: Development of Tsho Rolpa Glacial Lake area from 1957 to 1999 from various data sources			
Figure No.	Source	Date of survey/image	Area (km^2)
10.24(a) and 10.25	Topographic map, Survey of India	1957–59	0.23
10.24(b) and 10.26	Schneider Map	1960–68	0.61
10.24(c)	LANDSAT (earth resources technology satellite (ERTS)) MSS	14 December 1972	0.62
10.24(d)	Nepal/China Border map	1974	0.78
10.24(e)	LANDSAT MSS	2 November 1975	0.80
10.24(e)	LANDSAT MSS	20 March 1977	0.80
10.24(f)	LANDSAT MSS	24 January 1979	1.02
10.22(g)	Spacelab metric camera colour IR	3 December 1983	1.16
10.24(g)	LANDSAT MSS	9 April 1984	1.16
10.24(h)	Marine obsevation satellite (MOS) 1 multispectral electronic self scanning radiometer (MESSR)	21 October 1988	1.27
10.24(h)	MOS 1 MESSR	9 November 1990	1.27
10.27	LANDSAT MSS	17 November 1992	1.35
10.24(i)	Field survey by WECS	June 1993	1.37
10.35	Field survey by WECS	June 1994	1.39
10.29	Topographic map, HMGN	1996	1.46
6.6	IRS1D LISS3	1999	1.55

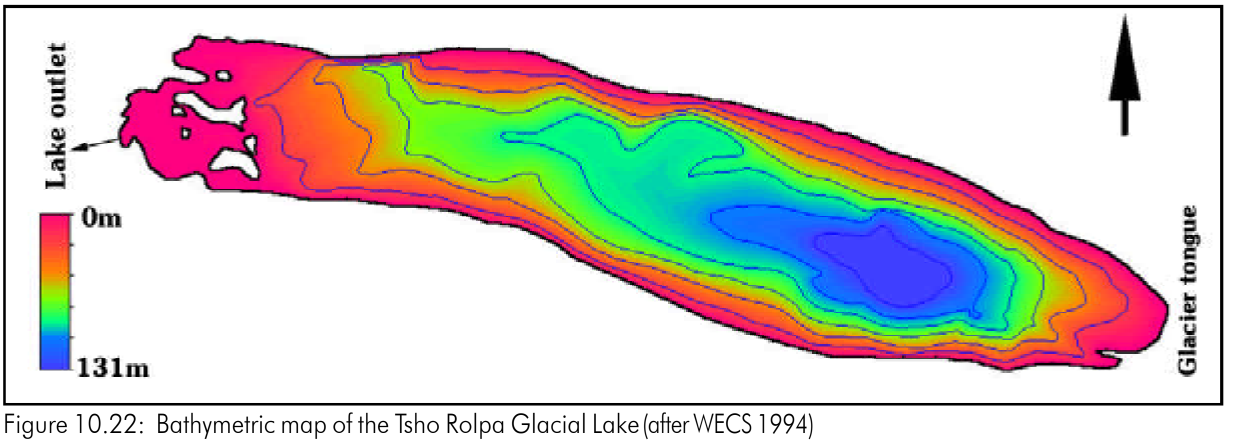


Figure 10.22: Bathymetric map of the Tsho Rolpa Glacial Lake (after WECS 1994)

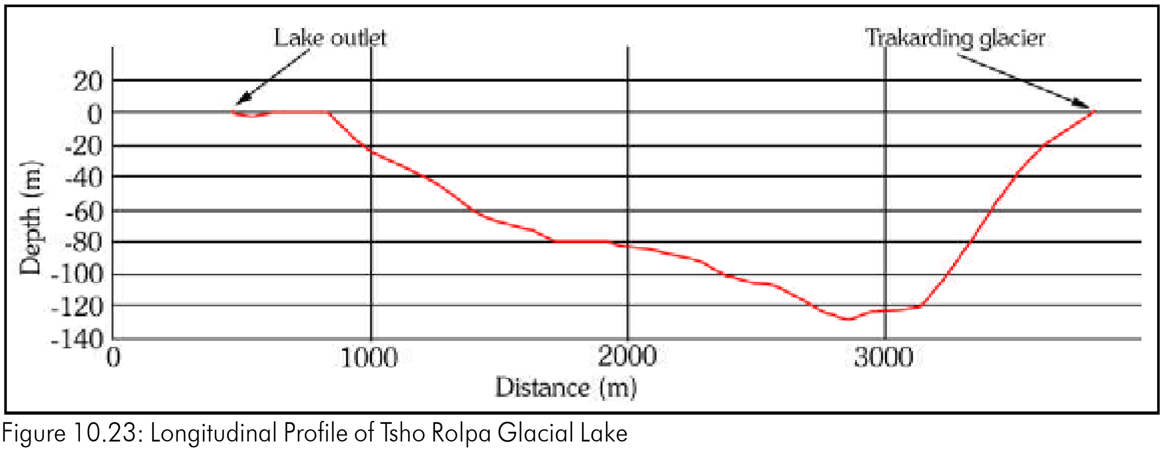


Figure 10.23: Longitudinal Profile of Tsho Rolpa Glacial Lake

lower part of the lake near the end moraine. The electrical resistivity survey has shown the presence of thick dead ice mass at a depth of 5–10m under the lake bottom near the end moraine (WECS 1995b). It is reported that the ice mass of 4–6m depth does exist just near the surface at the end moraine only below 4–6m. The deepening (bottom sinking) rate of the lake near the island is reported as 25 cm year^{-1}.

The tongue of the debris covered Trakarding Glacier in contact with the lake seems very thick (Figure 10.31). Several supraglacial ponds exist at Trakarding Glacier and most of these drain into the lake. There are several cracks at the tongue of the glacier. The glacier is retreating relatively fast. The glacial retreat rate is about 100m year^{-1}. The lake volume is increasing every year due to glacial retreat. Deepening of the lake and narrowing of the damming moraines have also occurred. Looking at the present day lake development (Figure 10.32) and comparative studies with other similar glacial lakes in the Himalayas it could be said that Tsho Rolpa Glacial Lake is definitely a dangerous lake with high potential to become a source of GLOF events.

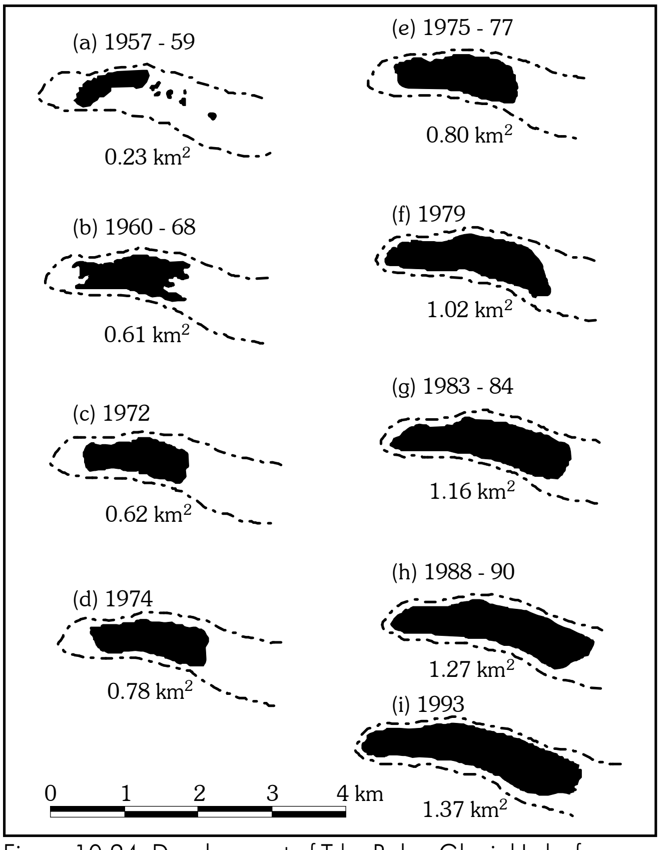


Figure 10.24: Development of Tsho Rolpa Glacial Lake from 1957 to 1993 (WECS 1993a)

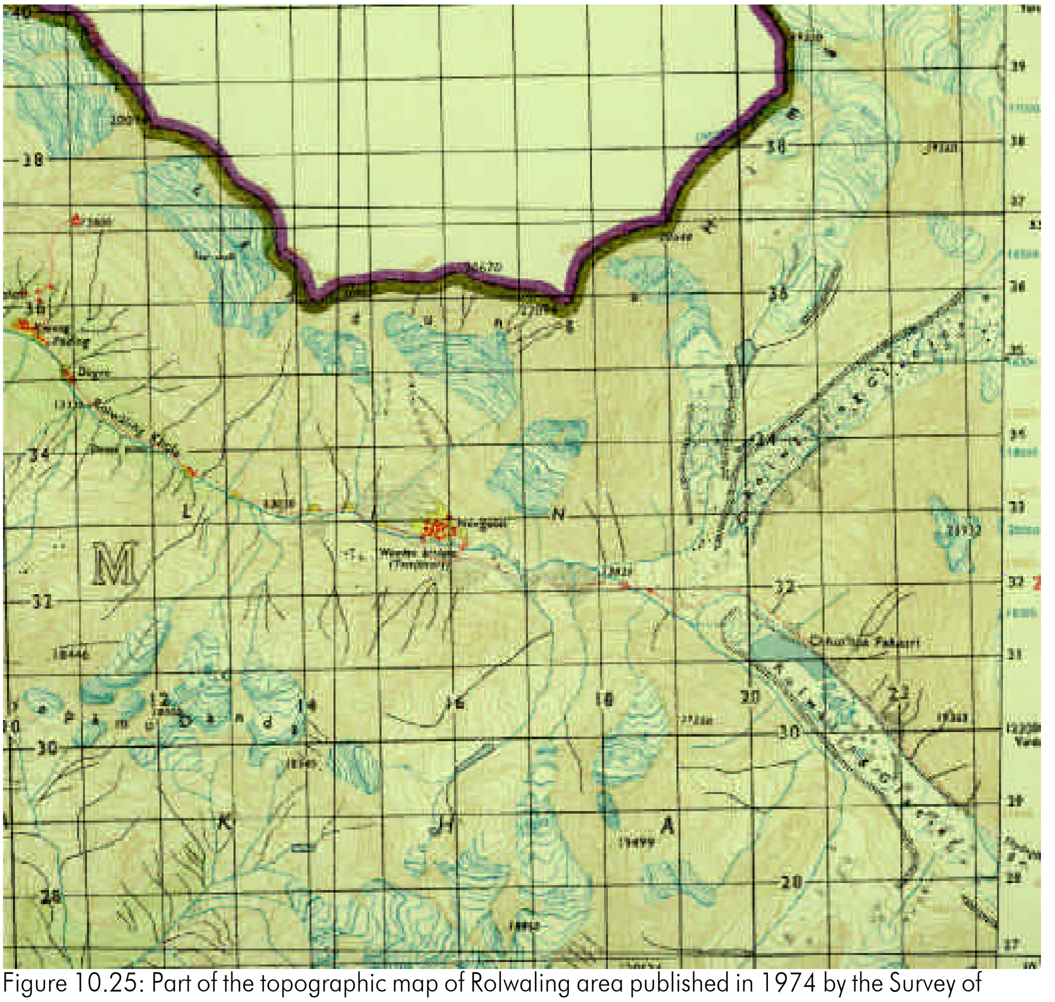


Figure 10.25: Part of the topographic map of Rolwaling area published in 1974 by the Survey of India on a scale of 1:63,360, based on aerial photographs of 1957–59 and a survey in 1963

Figure 10.26: Part of the topographic map of Rolwaling area, from the survey in 1960–68, published in 1981 by Nepal-Kartenwerk der Arbeitsgenmeinschaft für vergleichende Hochgebirgsforschung on a scale of 1:50,000 (Schneider Map, 1992 edition)

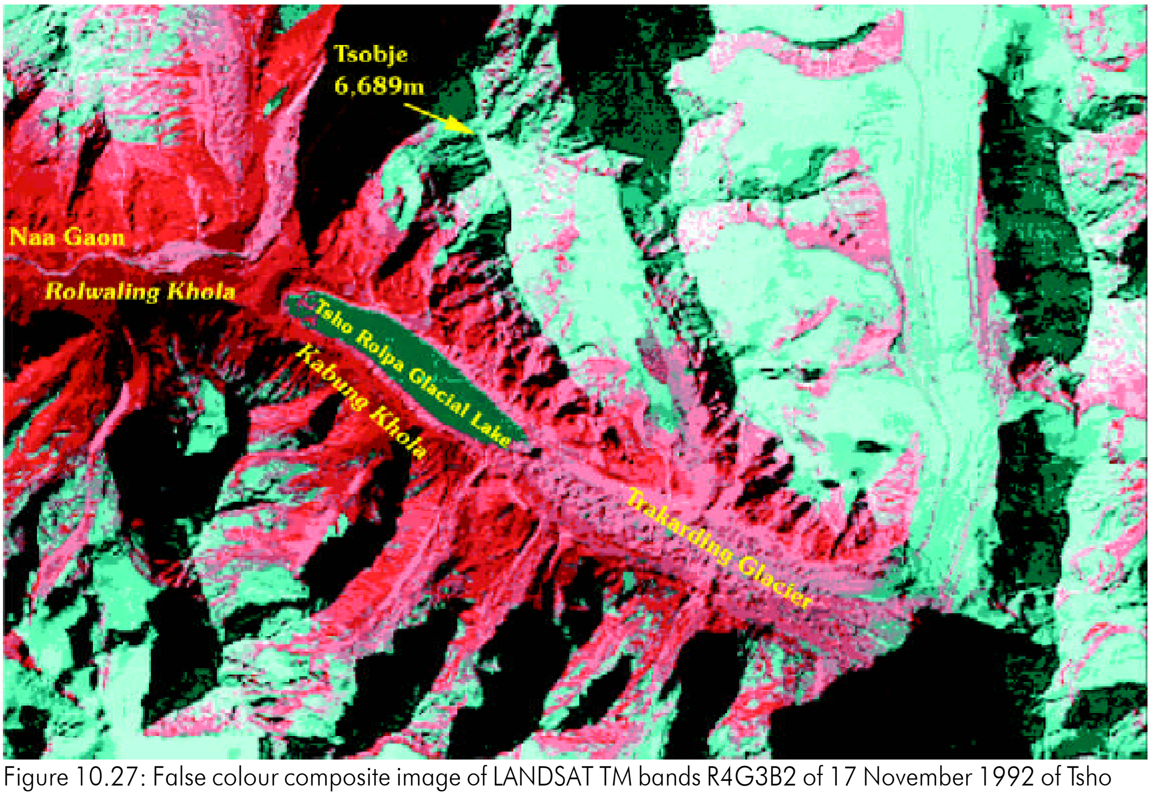


Figure 10.27: False colour composite image of LANDSAT TM bands R4G3B2 of 17 November 1992 of Tsho Rolpa area

Figure 10.28: Part of aerial photograph of 1992 acquired by the Survey Department of HMGN showing the tongue of Rolwaling Glacier and Tsho Rolpa Glacial Lake area (Aerial Photo 52-52)

Figure 10.29: Part of the topographic map of Rolwaling area published in 1996 by the Survey Department of HMGN on a scale of 1:50,000 based on aerial photos of 1992 and field verification in 1996

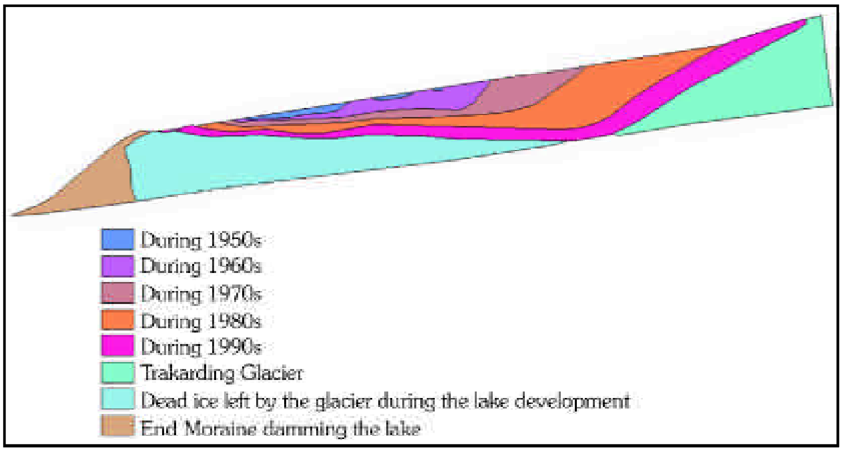


Figure 10.30: Schematic representation of the development of the Tsho Rolpa Glacial Lake

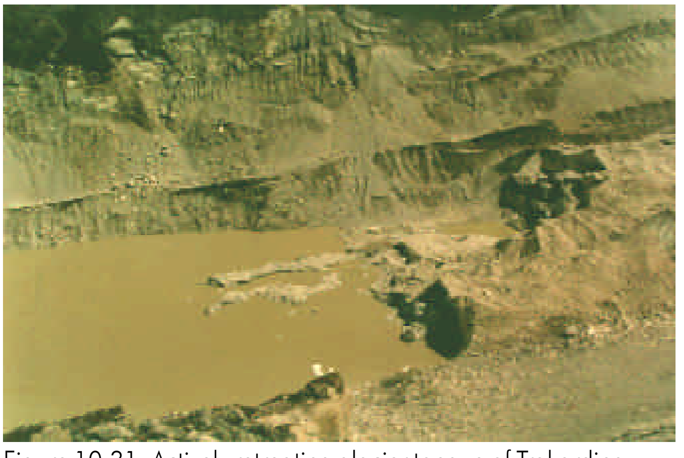


Figure 10.31: Actively retreating glacier tongue of Trakarding Glacier in contact with Tsho Rolpa Glacial Lake (WECS 1994)

Figure 10.32: Tsho Rolpa Glacial Lake in contact with Trakarding Glacier (WECS 1994)

There are seven leakage points reported from the outer wall of the end moraine dam: three at the right bank and four at the left bank of the outflow (Figure 10.33). The leakage points are about 50m below the lake level. The lake is frozen during the mid-winter period. The minimum discharge recorded at the outlet is 0.05 $m^3 s^{-1}$ (12 March 1994), 0.09 $m^3 s^{-1}$ (23 March 1995), and the maximum discharge recorded at the outlet is 19.0 $m^3 s^{-1}$ on 17 July 1993 and 16.4 $m^3 s^{-1}$ on 2 July 1994. The annual amount of lake discharge calculated was 95.5 million m^3 which corresponds to an average discharge of 3.03 $m^3 s^{-1}$.

The drainage basin area of the lake is 77.6 sq.km. The discharge on 14 June 1993 was 3.12 $m^3 s^{-1}$ at Naa village (4,183 masl elevation and 4 km downstream from the lake). On 17 June 1993, the discharge was 14.12 $m^3 s^{-1}$ at Beding (3,693 masl elevation and 10 km downstream from the lake), and on 19 June 1993 it was 27.14 $m^3 s^{-1}$. Most of the upper parts of the Rolwaling Valley are wide, while the lower parts are narrow and steeper. The distance from the lake outlet (4,580 masl) to the junction of Rolwaling Khola and Tama Koshi at Chetchet (1,380 masl) is about 26 km and to the junction of Khimti Khola and Tama Koshi (590 masl) it is about 75 km. The downstream valley after the confluence of the Tama Koshi and Rolwaling Khola is wider and gentler in slope.

The melt water and liquid precipitation overflow through the outlet in the western end of the lake throughout the year. Discharge data measured at the lake outlet are available from June 1993 to March 1995 and from June 1999 to October 1999. The base flow suddenly starts to increase in the beginning of melting season at the end of April and reaches the maximum level in July/August. After the rainy season, the lake level then starts to decrease until the end of March. About 2m of lake-level fluctuation was observed from the winter to peak monsoon period. Diurnal variations were observed during the melting season. Unexpected fluctuations of the lake level were also reported with the amplitude of about 40 cm. Discharge measurements at the lake outlet were carried out mainly during July and November and revealed a maximum discharge of about 20 $m^3 s^{-1}$ in the peak flow period and a minimum of 0.30 $m^3 s^{-1}$. The rating curve derived from the lake level and discharge measurements has the following type of relationship (WECS 1996):

$$Q = 0.9012\ (H + 199.4)^{4.2605}$$

where
Q = discharge in $m^3 s^{-1}$
H = lake level in cm

The annual amount of lake discharge is estimated to be 93–130 million m^3 and the annual average discharge is 3.5 $m^3 s^{-1}$ (Yamada 1998).

Figure 10.33: Overflow of lake water from the moraine dam of Tsho Rolpa Glacial Lake (photograph source: Mool and Yamada 1997)

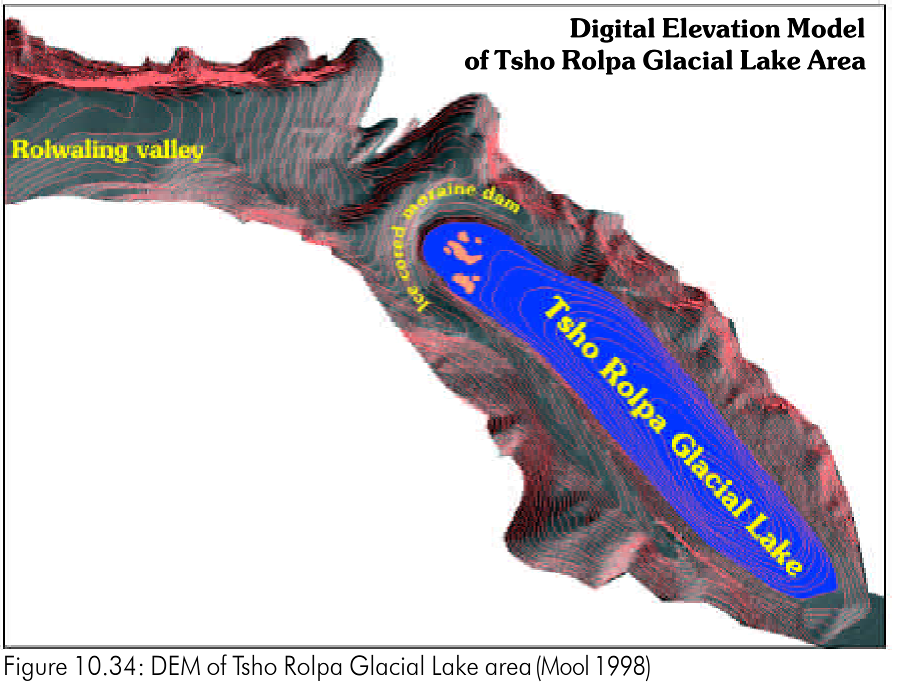


Figure 10.34: DEM of Tsho Rolpa Glacial Lake area (Mool 1998)

Meteorological conditions at the lake have been observed from June 1993 to August 1996 and from June 1999 to October 1999. Air temperature, relative humidity, wind direction, air pressure, precipitation, and global radiation data were recorded during that period.

The area receives about 400–700 mm of yearly precipitation, about 72% of the precipitation occurs in the monsoon period. Daily mean air temperature keeps above 0°C during May to October and below 0°C during October to May. Air temperature is almost constant at around 5– 6°C during the monsoon season. Annual mean air temperature is –1.6°C. The warmest month is July and the coldest are January and February with average temperatures of 5.4°C and –10.3°C respectively. The maximum temperature recorded is 14.6°C and the minimum is –23.2°C.

Daily mean wind speeds are quite stable and vary between 1.7 to 2.9m s^{-1} throughout the year and annual mean values range from 2.1 to 2.4m s^{-1}. Wind gusts of more than 20m s^{-1} often occur in the dry season and the maximum wind speed recorded is 32.8m s^{-1} in March 1994. Wind direction is characterised by up-valley wind in the daytime from May to November.

Mean annual solar radiation is 253 W m^{-2}. Solar radiation reaches a minimum of 169 W m^{-2} in December/January and an hourly maximum of 454 W m^{-2} in May.

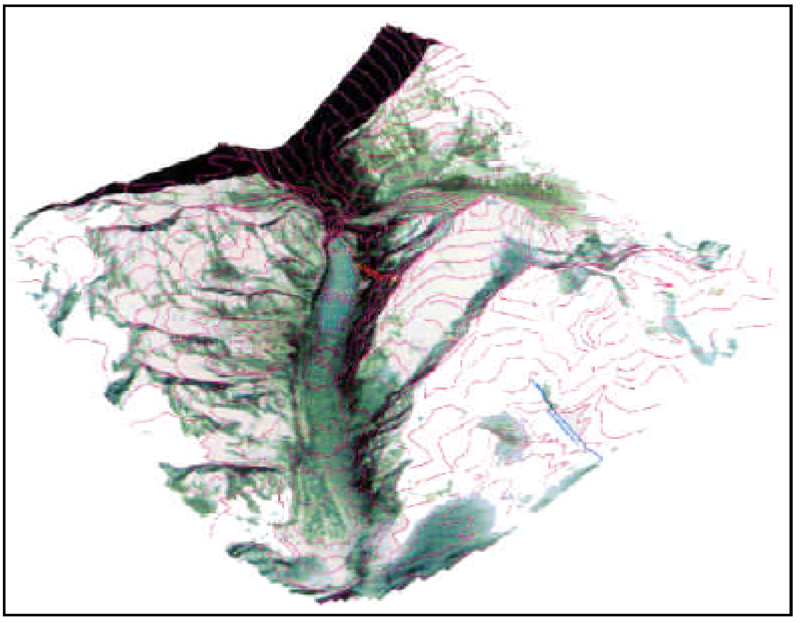


Figure 10.35: 3D view with the overlay of LANDSAT TM of 12 April 1988 with a view angle of 45° and rotation from the north of 130° (Mool 1998)

Mean annual air pressure is 587 hPa. The monthly mean of 580–583 hPa occurs in February/March and the maximum of 590 hPa in September. The periodic fluctuation amplitude is small in the monsoon and high in the dry season.

WECS (1995d), Modder and van Olden (1995) and the Department of Hydrology and Meteorology (DHM) (1999a) have conducted topographic mapping of Tsho Rolpa Glacier Lake to study moraine stability. The digital elevation model (DEM) developed from the contours of the Rolwaling area is given in Figure 10.34.

The DEM of the Rowaling area and the end moraine are given in Figures 10.35 and 10.36 respectively. Tsho Rolpa is the only glacial lake where detailed study and mitigation measures are undertaken in Nepal. HMGN have implemented an early warning system at the lake and identified the area of a potential GLOF hit downstream. A detailed multidisciplinary study on the stability of the moraine dam was conducted and the appropriate method for lowering the lake was chosen. The excavation of an open cut channel in the end moraine dam was carried out. For the mitigation work at Tsho Rolpa Glacial Lake, the major funding

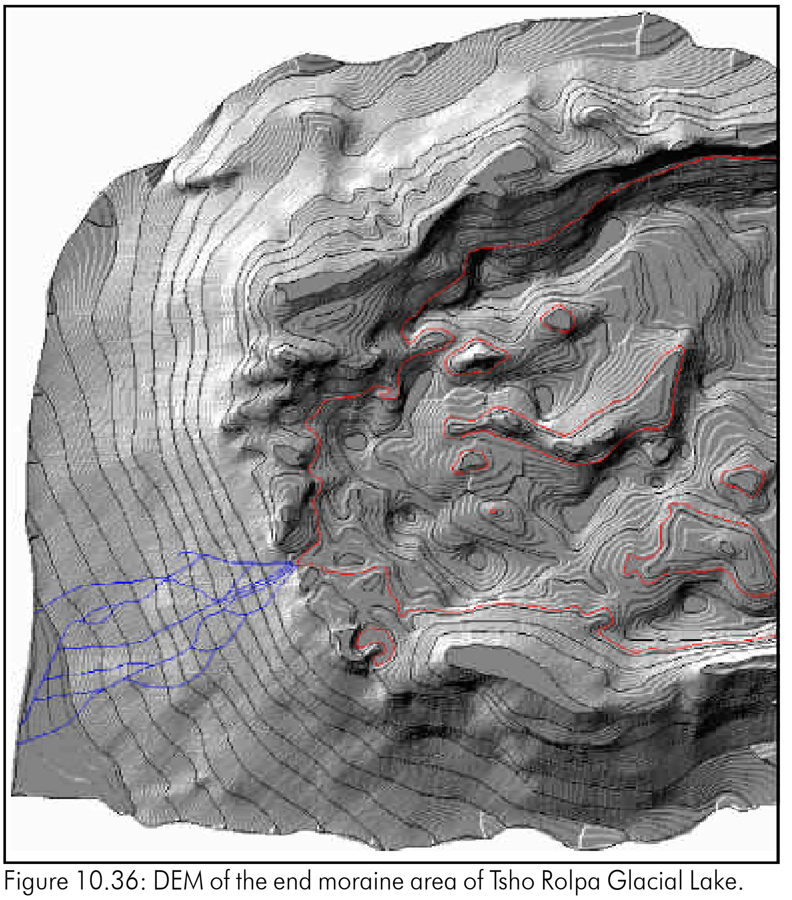


Figure 10.36: DEM of the end moraine area of Tsho Rolpa Glacial Lake. The red line indicates the lake water level (June 1994). The blue line is the overflow and outlet of the lake, the source of Rolwaling Khola (modified after Modder and Olden, in Mool 1998)

is from the Netherlands Government with a contribution of US$ 2,988,625 and HMG with a contribution of US$ 115,414. Mitigation of a potential Tsho Rolpa GLOF would be achieved only when the lake level is lowered by a total of 20m phase wise, i.e. by discharging 35 million m^3 of water through gated canal openings. In the first phase the lowering will be done for 3m through a canal 3m deep and 70m long along the moraine dam. All the construction work of the first phase mitigation work (see Figures 12.1– 12.5) was completed by the end of June 2000.

10.4 Thulagi Glacial Lake

Thulagi Glacial Lake lies at an elevation of 4,146 masl to the southwest of Mount Manasalu in the headwaters of the Dhana Khola, a tributary of the Marsyangdi River (Figure 10.37). This lake is located at 28° 30' N and 84° 30' E (Figures 10.38 and 10.39). The lake is rectangular in shape and has a length of 2.25 km and a width of up to 400m. Similar to Tsho Rolpa Glacial Lake, the volume of this lake is also increasing due to the fast retreat of Thulagi Glacier.

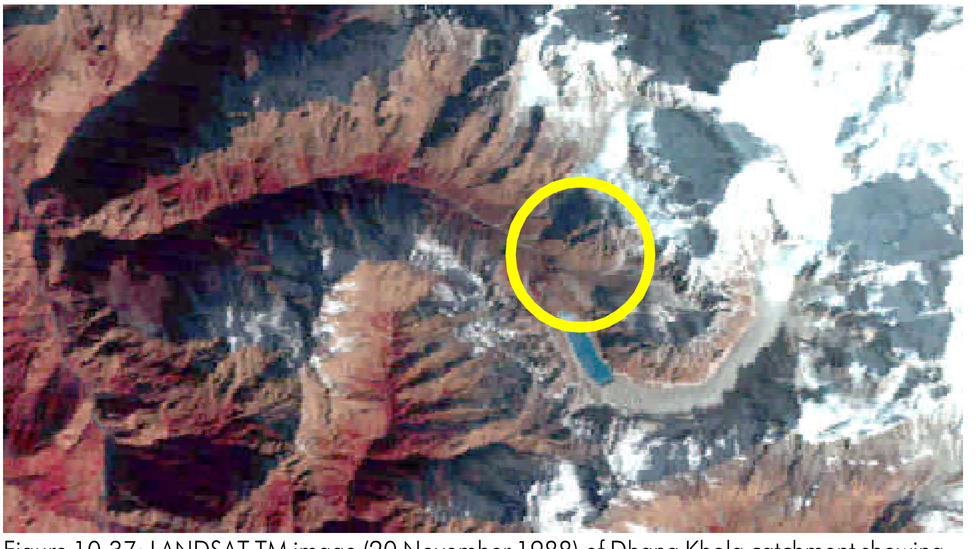


Figure 10.37: LANDSAT TM image (20 November 1988) of Dhana Khola catchment showing Thulagi Glacial Lake

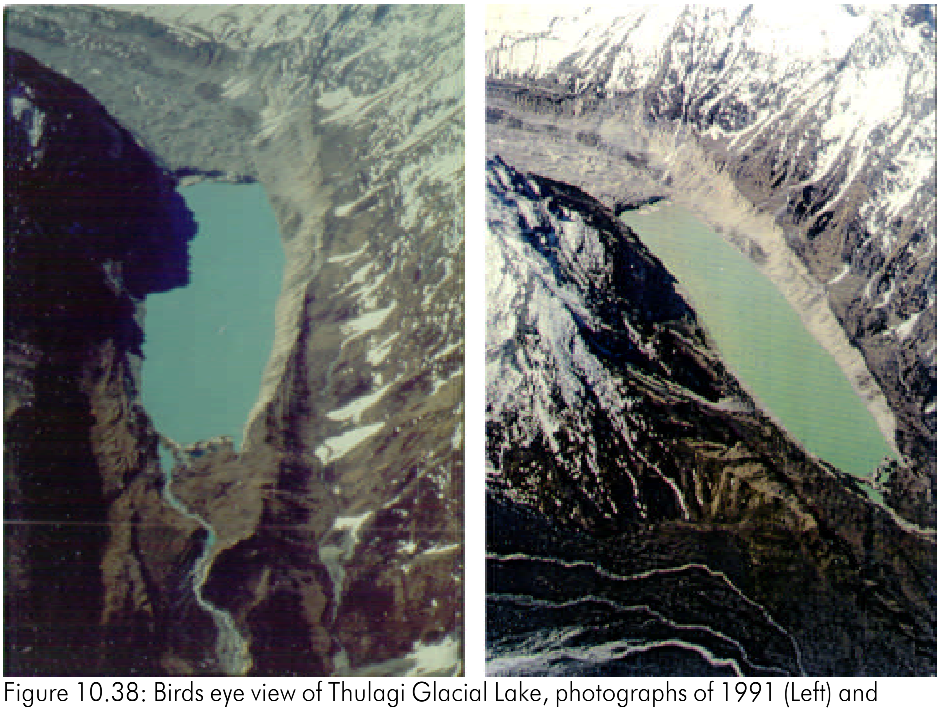


Figure 10.38: Birds eye view of Thulagi Glacial Lake, photographs of 1991 (Left) and 1994 (Right)

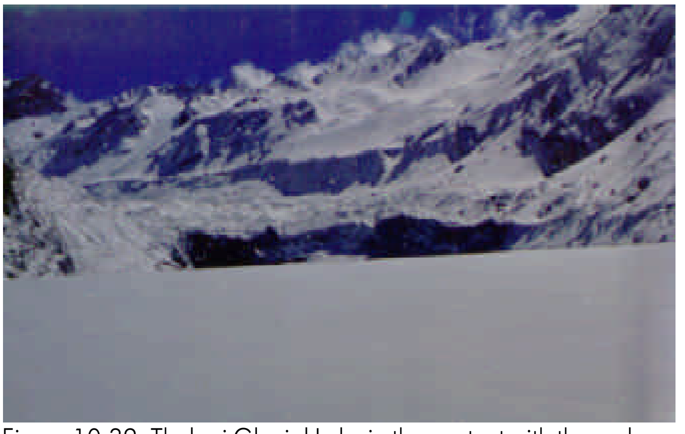


Figure 10.39: Thulagi Glacial Lake in the contact with the end moraine of the Thulagi Glacier (WECS 1995c)

The development process of the Thulagi Lake is reported by Mool et al. (WECS 1995c) on the basis of the field survey made in March 1995. The paper states that: "the comparison of topographical map (1958, Survey of India) and field work in 1995 shows that the lake surface area has been increased from 0.22 sq.km to 0.76 sq.km and the corresponding length of lake from 0.6 km to 1.97 km, but the width of lake is not changed much. The glacier has retreated by 1.37 km within the last 3 decades."

By extrapolating the above information to the past, the age of Thulagi Glacial Lake has been estimated to be at least 45 years. After the geophysical investigation, Hanisch et al. (1998) reported that a huge mass of dead ice is lying below the lake-damming area.

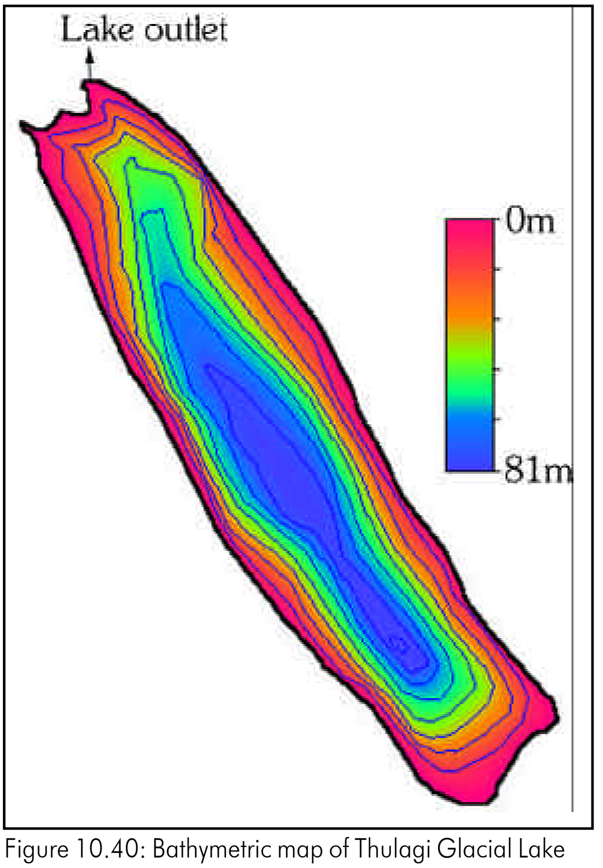


Figure 10.40: Bathymetric map of Thulagi Glacial Lake (after WECS 1995c)

The bathymetric study carried out in 1995 and 1996 by WECS (1995c) shows that the lake is rectangular in shape (Figure 10.40). The lake area is 0.76 sq.km with a maximum depth of 81m close to the Thulagi Glacier. The volume of stored water was thus estimated to be 30 million m^3. The cross section drawn along the length of the lake from the bathymetric map is given in Figure 10.41. The photograph of lake taken in February 1995 is shown in Figure 10.42.

The lake water contains some clay and fine silt giving it a pale greenish colour. The water temperature measured to a depth of 19m revealed that the winter temperatures lie between 0 and 3°C and the autumn temperatures between 1.9 and 3°C. The catchment area of the lake is approximately 56 sq.km and is 55% glacierised.

Hydrometeorological observations carried out in this area have been for a short duration only. Discharge measurements carried out at the confluence of the Marsyangdi River on 30 August and 4 September 1996 were 12.8 and 13.0 $m^3 s^{-1}$ respectively. The discharge in November decreased to 3.1 $m^3 s^{-1}$. A similar trend of discharge was observed 2 km downstream from the lake: 12.3 $m^3 s^{-1}$ in August to 6.5 $m^3 s^{-1}$ on 4 September and 1.8 $m^3 s^{-1}$ on 9 November. The discharge at the lake in November showed very little variation over the days with an average discharge of 1.6 $m^3 s^{-1}$.

Air temperature observations during August and November 1996 recorded a maximum temperature of 14.4°C and a minimum of –5.2°C.

The geophysical methods and geomorphic field observations provided evidence for a hidden ice body up to 100m thick covered by 35m of debris which provides an effective insulation and covers an area of at least 25,000 m^2 (DHM 1997c).

The glacial lake is dammed by the extended ice body. The stability of the barrier depends on the melting rate of the ice body. The dead ice dam can neither be breached rapidly by water pressure of the lake nor

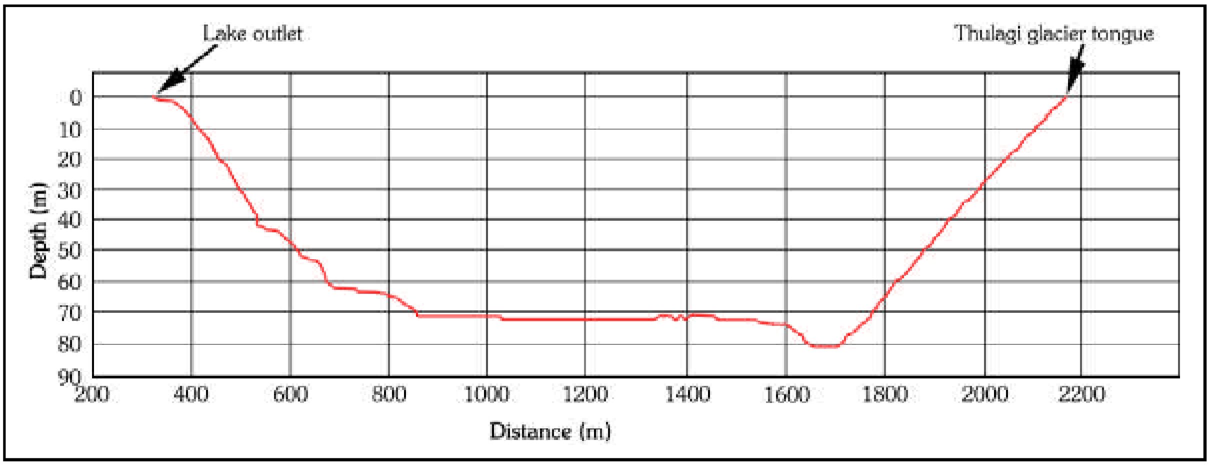


Figure 10.41: Cross section along the length of Thulagi Glacial Lake (after WECS 1995c)

by erosional forces of the river from the lake to the spillway. It can only be removed by large scale melting which requires a time period of hundreds to thousands of years. Hence, the dead ice dam of this lake will be stable for the foreseeable future (DHM 1997b).

Figure 10.42: Photographs of Thulagi Glacial Lake (taken in February 1995) (WECS 1995c)

10.5 Dig Tsho Glacial Lake

Dig Tsho Glacial Lake is located in Langmoche Valley at 27° 52' 25" N latitude and 86° 35' 37" E longitude. The lake elevation is 4,365 masl. The headwaters of the lake are the western mountain range of Langmoche Ri–Tengi Ragi Tau (6,943 masl) and Trashi Labtsa, Bigphera-Go Shar. The Langmoche Khola of Khumbu Himal is one of the tributaries of the Dudh Koshi River (Figure 10.43).

The lake is crescent in shape and was dammed by 50m high terminal moraine. The lake had a length of 0.605 km and a width of up to 0.230 km in 1974 (Annex II, Dudh Koshi Basin, Gl_Nr 55).

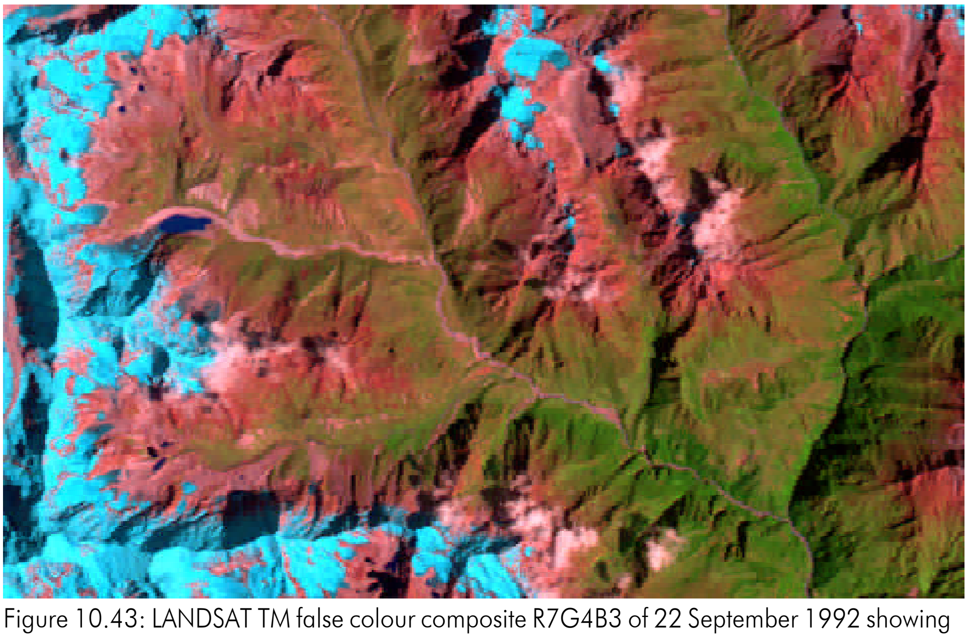


Figure 10.43: LANDSAT TM false colour composite R7G4B3 of 22 September 1992 showing Dig Tsho Glacial Lake in the Dudh Koshi Basin

The lake was breached on 4 August 1985 and emptied the lake water within four to six hours. The flood water surged 10–15m high in the valley for more than 90 km in the form of a huge 'black' mass of debris (Galay 1985). The water originated in a dish-shaped basin elongated from east to west between the sub-recent end moraines and snout of the Langmoche Glacier, which formed a classic moraine-dammed lake. The Langmoche Glacier receives part of its mass from the periodic avalanching of the frontal face of a hanging glacier perched on the north-east face of Tangi Ragi Tau (6,940 masl).

A large ice mass detached from the upper part of the Langmoche Glacier (probably in the beginning of August after a long period of warm and clear weather in July). It overran the Langmoche Glacier and splashed into Dig Tsho Lake, which was then full to its rim. The impact of the ice mass produced a surge and caused a significant rise in the lake level overtopping the moraine dam and cutting a V-shaped trench. This triggered the catastrophic flood surge. The evidence of the 1985 GLOF is clearly seen on the images, aerial photographs, and field photographs of later dates (Figures 10.43–10.45).

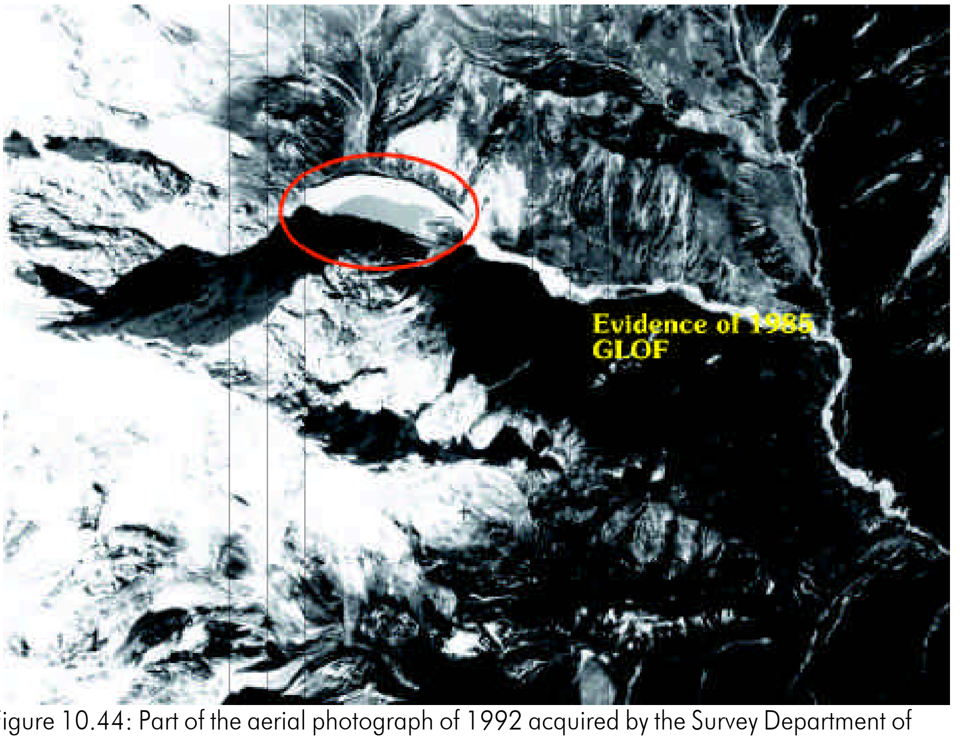


Figure 10.44: Part of the aerial photograph of 1992 acquired by the Survey Department of HMGN showing the Dig Tsho Glacial Lake and the effect of the 1985 GLOF (Aerial Photo 52–49)

Vuichard and Zimmermann studied details of the GLOF along the Dudh Koshi River Basin (Zimmermann et al. 1986; Vuichard and Zimmerman 1986, 1987). Vuichard and Zimmermann (1986) estimate that 6–10 million m^3 of water drained from Dig Tsho Lake within about four hours, giving an average discharge of $500m^3\ s^{-1}$. However, considering the character of the triggering mechanism, it is assumed that the initial peak discharge was probably at least $2{,}000m^3\ s^{-1}$.

Local witnesses reported that the surge front moved rather slowly down-valley as a huge 'black' mass of water full of debris. There were several separate surges, for instance the bridge at Jubing, 40 km downstream, was washed out in 90 min after the passage of the first surge.

The surge wave from the GLOF of Dig Tsho Glacial Lake eroded the right bank of Bhote-Dudh Koshi at the Namche Small Hydel Project site (Figure 10.46). Shock waves of 5–10m high developed at obstructions such as river banks, constrictions, bends, and boulders. Velocities were exceptionally high. The photograph (Figure 10.46) shows the site of civil structures of Namche (Thame) Small Hydel Project (estimated cost of US $1.5 million), which were completely destroyed by the GLOF (WECS 1987b). Beside the Hydel Project, the GLOF destroyed 14 bridges, trails, cultivated land, and swept away many lives along the valley (Figure 10.47).

Figure 10.45: Evidence of breached moraine by the Dig Tsho GLOF (photograph taken on 25 April 1991) (WECS 1991)

Figure 10.46: The photograph shows the site of civil structures of Namche (Thame) Small Hydel Project, which were completely destroyed by the GLOF (photograph taken on 4 August 1985 [WECS 1987b])

The sudden breaching of the Dig Tsho Glacial Lake in 1985 emptied the lake. The photograph (Figure 10.48) taken in March 1986 shows that it has been drained completely. WECS (1987b) concluded that the lake was considered safe as it had already had an outburst event.

The dam height was 50m and the estimated reserved volume of water was around 8 million m^3 before the outburst. The size and shape of the lake can be clearly seen in the map (Figure 10.49). The lake was at the contact with Langmoche Glacier. In the topographical map (1993 edition with selective revision in 1988) by Nepal-Kartenwerk der Arbeitsgenmeinschaft für vergleichende Hochgebirgsforschung Nr. 2 on a scale of 1:50,000, the lake area is completely dry and covered by glacier moraines (Figure 10.50).

The topographic map published in 1996 by the Survey Department of HMGN on a scale of 1:50,000 based on aerial photographs taken in 1992 and field verification in 1996 shows again the Dig Tsho Glacial Lake at the tongue of Langmoche Glacier (Figure 10.51).

The dimensions of the lake in 1974 were 605m x 230m and in 1992 they were 1,285m x 336m. This shows that the length has increased by two times and the width by 100m. The lake area in 1974 was around 0.14 sq.km whereas in 1992 it was 0.43 sq.km (three times larger than in 1974). The lake area is measured in the satellite image of IRS LISS3 (15 January 1999) and is equivalent to the area measured in 1992. The lake is associated with a hanging glacier and has past outburst history. Reappearance of this lake poses concern. The surrounding moraine and the activity of the lake should be studied in detail.

10.6 Tam Pokhari Glacial Lake

The lake is located at latitude 27° 44' 32.7" N and longitude 86° 50' 49" E. Tam Pokhari (Sabai Tsho) is a moraine-dammed glacial lake (Figure 10.52) situated at an elevation of 4,432 masl at the headwaters of the Inkhu Khola, one of the tributaries of the Dudh Koshi River.

The dimensions of the lake in 1963 were 515m long and 270m wide with an area of about 0.138 sq.km. The lake area increased to 0.472 sq.km (Figure 10.53) with a length of 1,150m in 1992, measured on the topographic map published in 1996 based on the aerial photographs of 1992 and the satellite images of 1992 and 1993 (Figures 10.54 and 10.55). The lake is numbered Kdu_gl 399 in the inventory of glacial lakes (Annex II).

Tam Pokhari Glacial Lake is formed at the tongue of the Sha (Sabai) Glacier. The very steep mother glacier tongue approaches the lake. The huge ice avalanche might cause a breach of the end moraine from the steep hanging glacier. The volume of water released due to the lake burst on 3 September 1998 was 17 million m^3 by a breach 42m deep (Dwivedi et al. 1999). Two persons were killed, four suspension bridges and two wooden bridges were damaged, and farmlands were buried. The photographs of the Sabai Glacier and Tam Pokhari Glacial Lake after the burst are shown in Figures 10.56–10.58.

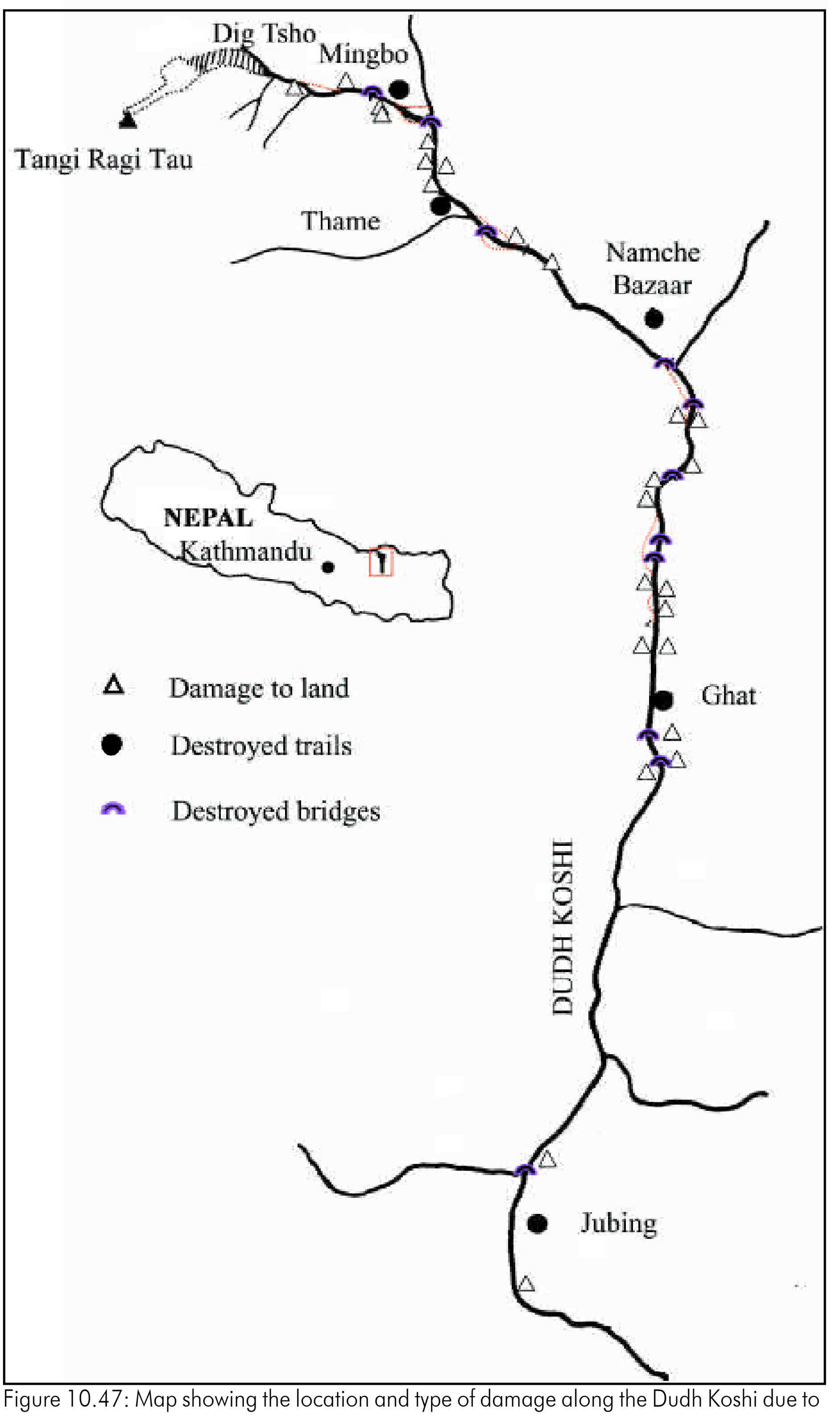


Figure 10.47: Map showing the location and type of damage along the Dudh Koshi due to the GLOF of 4 August 1985 from Dig Tsho Glacial Lake (Vuichard and Zimmerman 1986)

Figure 10.48: A view of the breached end moraine of Dig Tsho Glacial Lake after the 4 August 1985 GLOF event. The lake has been completely drained. Photograph taken in March 1986 (WECS 1987b)

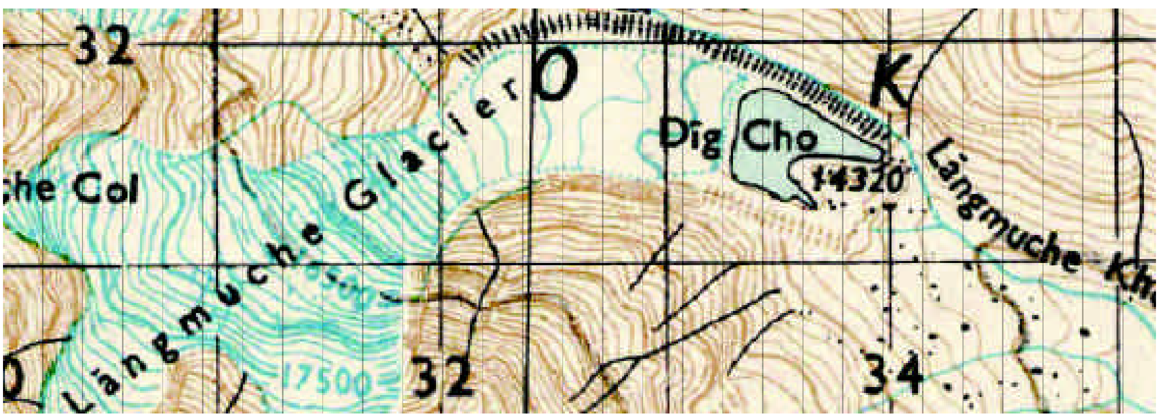


Figure 10.49: Langmoche Glacier showing the presence of Dig Tsho Glacial Lake at the tongue of the glacier in topographic map sheet number 72I/9 published in 1974 by the Survey of India on a scale of 1:63,360 based on aerial photographs taken in 1957–59 and a survey in 1963

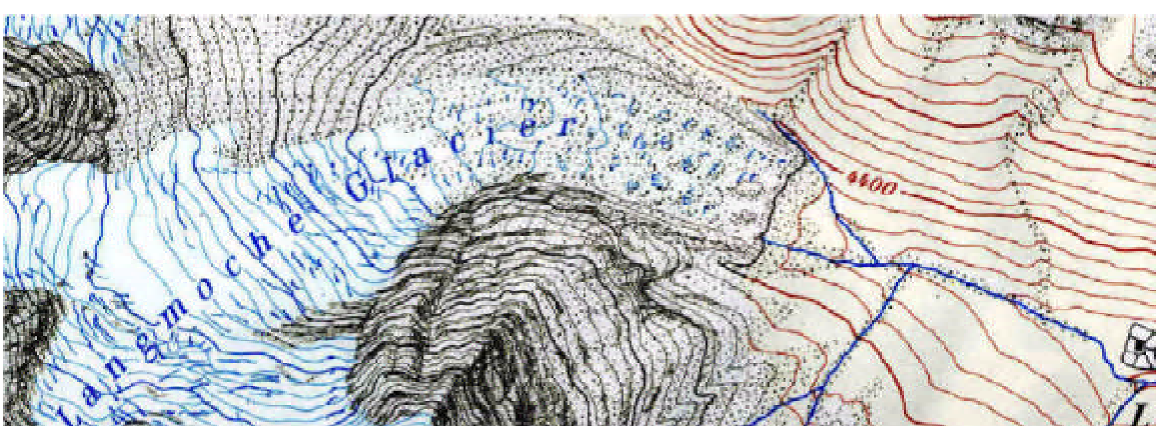


Figure 10.50: Topographic map (1993 edition), published by Nepal-Kartenwerk der Arbeitsgenmeinschaft für vergleichende Hochgebirgsforschung Nr. 2 at the scale of 1:50,000 (first published in 1965 with selective revisions in 1988 and 1993 editions), of Langmoche Glacier which does not show the Dig Tsho Glacial Lake

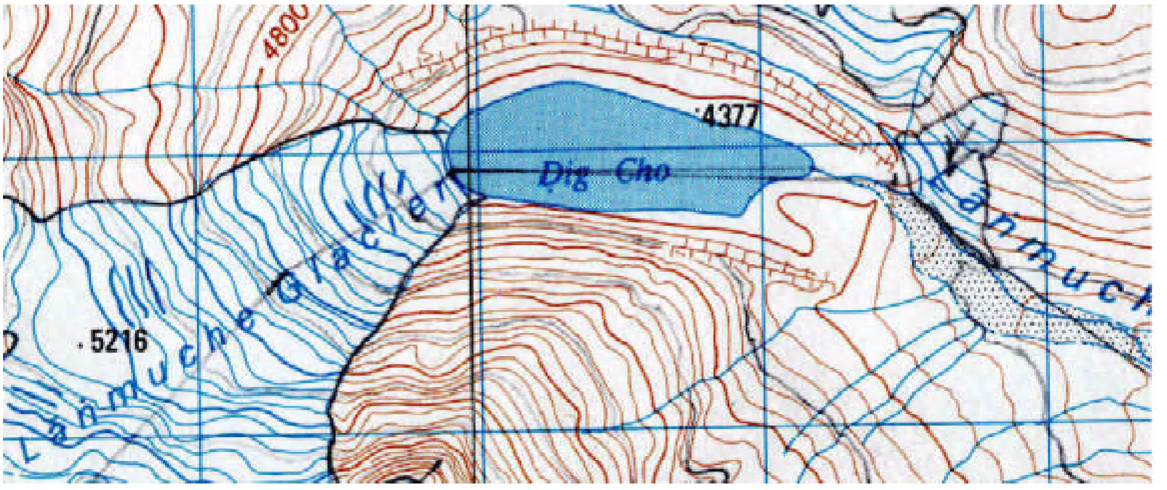


Figure 10.51: Dig Tsho Glacial Lake at the tongue of Langmoche Glacier in the topographic map published in 1996 by the Survey Department of HMGN on a scale of 1:50,000 based on aerial photographs taken in 1992 and field verification in 1996

Figure 10.52: Tam Pokhari (Sabai Tsho) Glacial Lake below the Sabai Glacier in the Inkhu Sub-basin of Dudh Koshi Basin before the burst (WECS 1991)

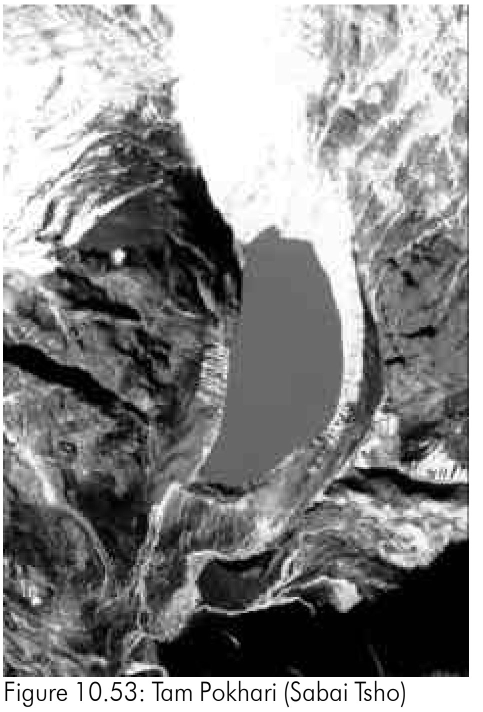


Figure 10.53: Tam Pokhari (Sabai Tsho) Glacial Lake area and surroundings in part of the aerial photograph of 1992 acquired by the Survey Department of HMGN

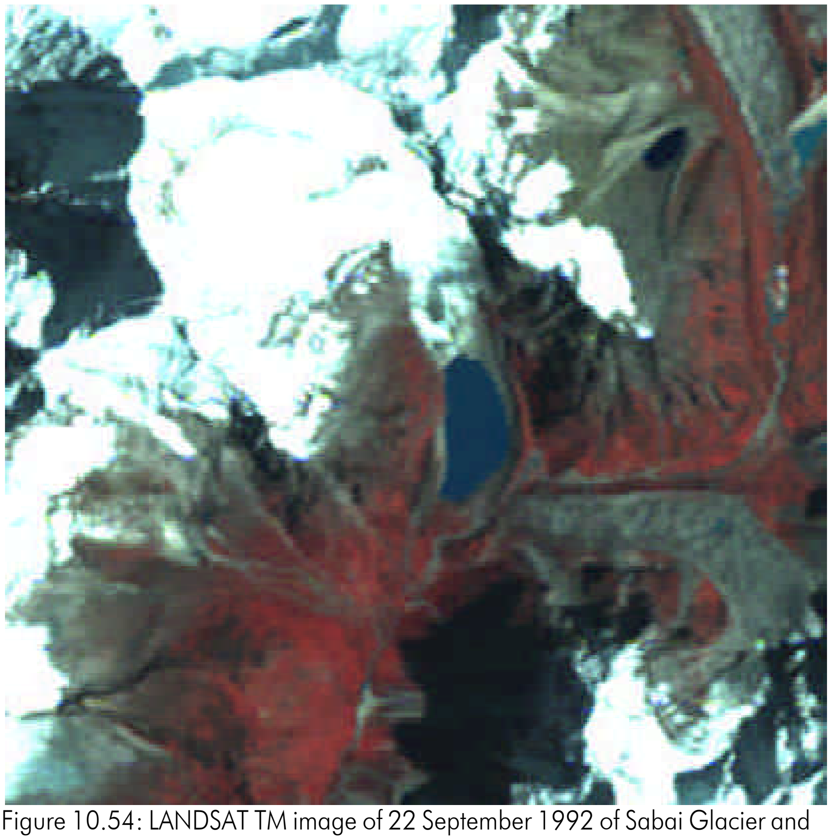


Figure 10.54: LANDSAT TM image of 22 September 1992 of Sabai Glacier and Tam Pokhari Glacial Lake

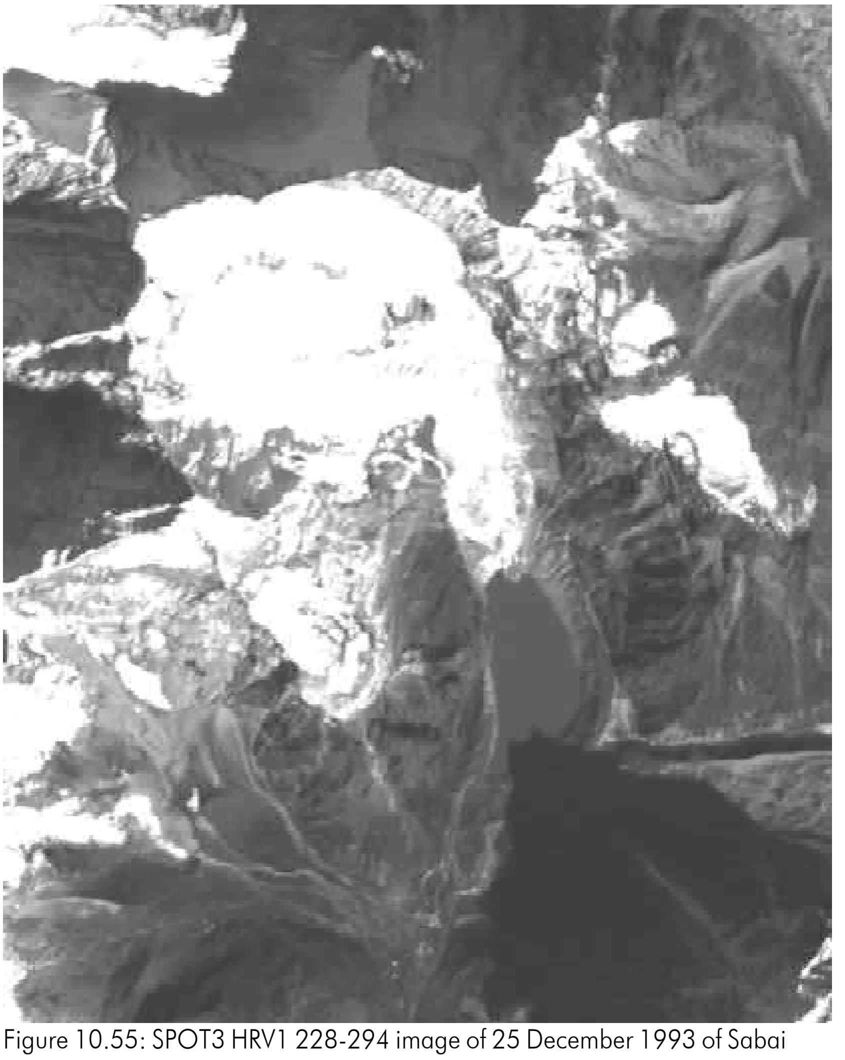


Figure 10.55: SPOT3 HRV1 228-294 image of 25 December 1993 of Sabai Glacier and Tam Pokhari Glacial Lake

Figure 10.56: Sabai Glacier tongue in contact with Tam Pokhari (Sabai Tsho) Glacial Lake in the Inkhu Sub-basin of Dudh Koshi Basin after the burst (photograph May 1999)

Figure 10.57: Opening of the end moraine of the Tam Pokhari (Sabai Tsho) Glacial Lake in the Inkhu Sub-basin of Dudh Koshi basin after the burst (photograph May 1999)

Figure 10.58: Breaching of the end moraine dam of the Tam Pokhari (Sabai Tsho) Glacial Lake in the Inkhu Sub-basin of Dudh Koshi Basin after the burst (viewing upstream, photograph May 1999)

Chapter 11
The Potentially Dangerous Glacial Lakes

On the basis of actively retreating glaciers and other criteria, the potentially dangerous glacial lakes were identified using the spatial and attribute database complemented by multi-temporal remote-sensing data sets. Medium- to large-scale aerial photographs were used for detailed geomorphic studies and evaluation of the active glaciers and potentially dangerous lakes.

In general, based on geomorphological characteristics, glacial lakes can be grouped into three types: glacial erosion lakes, glacial cirque lakes, and moraine-dammed lakes. The former two types of glacial lakes occupy the lowlands or emptying cirques eroded by ancient glaciers. These glacial lakes are more or less located away from present-day glaciers and the downstream banks are usually made of bedrock or covered with a thinner layer of loose sediment. Both of these glacial lakes do not generally pose an outburst danger. On the other hand, the moraine-dammed glacial lakes have the potential for bursting. A standard index to define a lake that is a source of potential danger because of possible bursting does not exist.

Moraine-dammed glacial lakes, which are still in contact or very near to the glaciers, are usually dangerous. In most of the literature/reports, the term 'glacier lake' is used for such lakes, and the term 'glacial lakes' used for glacier erosion lakes and glacier cirque lakes. The present study defines all the lakes formed by the activity of glaciers as 'glacial lakes'. Moraine-dammed glacial lakes are usually dangerous. These glacial lakes were partly formed between present-day glaciers and Little Ice Age moraine. The depositions of Little Ice Age moraines are usually about 300 years old, form high and narrow arch-shaped ridges usually with a height of 20–150m, and often contain dead glacier ice layers beneath them. These end moraines are loose and unstable in nature. The advance and retreat of the glacier affect the hydrology between the present-day glacier and the lake dammed by the moraines. Sudden natural phenomena with a direct effect on a lake, like ice avalanches or rock and lateral moraine material collapsing on a lake, cause moraine breaches with subsequent lake outburst events. Such phenomena have been well known in the past in several cases of moraine-dammed lakes, although the mechanisms at play are not fully understood.

11.1 Criteria for Identification

The criteria for identifying the potentially dangerous glacial lakes are based on field observations, processes and records of past events, geomorphological and geo-technical characteristics of the lake and surroundings, and other physical conditions. The potentially dangerous lakes were identified based on the condition of lakes, dams, associated mother glaciers, and topographic features around the lakes and glaciers.

Rise in lake water level

In general the lakes which have a volume of more than 0.01 km^3 are found to have past events. A lake which has a larger volume than this, is deeper, with a deeper part near the dam (lower part of lake) rather than near the glacier tongue, and has rapid increase in lake water volume is an indication that a lake is potentially dangerous.

Activity of supraglacial lakes

Groups of closely spaced supraglacial lakes of smaller size at glacier tongues merge as time passes and form bigger lakes such as Tsho Rolpa Glacial Lake which is associated with many supraglacial lakes in the topographic map of 1974 (Figure 10.25). The merging of supraglacial lakes in the Tsho Rolpa Glacial Lake has formed a bigger lake in the topographic map of 1981, aerial photograph of 1992, and topographic map of 1996 (Figures 10.26 and 10.29).

Some new lakes of considerable size are also formed at glacier tongues such as the lake at Lower Barun Glacier. The lake is not visible in the topographic map published by the Survey of India in 1967 (Figure 10.1) nor is it visible in the topographic map published by Nepal-Kartenwerk der Arbeitsgenmeinschaft für vergleichende Hochgebirgsforschung Nr. 2 (Figure 10.2). The lake is more distinct and sufficiently large enough in the topographic map of 1996 published by the Department of Survey, Nepal (Figure 10.10). These activities of supraglacial lakes are an indication that the lakes are becoming potentially dangerous.

Position of lakes

The potentially dangerous lakes are generally at the lower part of the ablation area of the glacier near to the end moraine, and the mother glacier should be sufficiently large to create a potentially dangerous lake environment. Regular monitoring needs to be carried out for such lakes with the help of multi-temporal satellite images, aerial photographs, and field observations.

In general, the potentially dangerous status of moraine-dammed lakes can be defined by the conditions of the damming material and the nature of the mother glacier. The valley lakes with an area bigger than 0.1 sq.km and a distance less than 0.5 km from the mother glacier of considerable size are considered to be potentially dangerous. Cirque lakes even smaller than 0.1 sq.km associated (in contact or distance less than 0.5 km) with steep hanging glaciers are considered to be potentially dangerous. Even the smaller size steep hanging glacier may pose a danger to the lake.

Dam conditions

The natural conditions of the moraine damming the lake determine the lake stability. Lake stability will be less if the moraine dam has a combination of the following characteristics:

- narrower in the crest area
- no drainage outflow or outlet not well defined
- steeper slope of the moraine walls
- ice cored
- very tall (from toe to crest)
- mass movement or potential mass movement in the inner slope and/or outer slope
- breached and closed in the past and refilled again with water
- seepage flow at moraine walls

A moraine-dammed lake, which has breached and closed subsequently in the past and has refilled again with water, can breach again. Nagma Pokhari Lake in the Tamor Basin burst out in 1980. The study of recent aerial photographs and satellite images shows a very quick regaining of lake water volume. Zhangzangbo Lake in the Sun Koshi Basin (the Poiqu Basin in Tibet (China)) burst out in 1964 and again in 1981. Recent satellite images show that the lake has refilled with water and, therefore, could pose danger. Ayaco Lake in the Pumqu Basin in Tibet (China) burst out in 1968, 1969, and 1970 and at present it is refilled again with water and poses danger. Regular monitoring of such lakes is necessary using multi-temporal satellite images.

Condition of associated mother glacier

Generally, the bigger valley glaciers with tongues reaching an elevation below 5,000 masl have well-developed glacial lakes. Even the actively retreating and steep hanging glaciers on the banks of lakes may be a potential cause of danger. The following general characteristics of associated mother glaciers can create danger to moraine-dammed lakes:

- hanging glacier in contact with the lake,
- bigger glacier area,
- fast retreating,
- debris cover at glacier tongue area,
- steep gradient at glacier tongue area,
- presence of crevasses and ponds at glacier tongue area,
- toppling/collapses of glacier masses at the glacier tongue, and
- ice blocks draining to lake.
- hanging glacier in contact with the lake

Physical conditions of surroundings

Besides moraines, mother glaciers, and lake conditions, other physical conditions of the surrounding area as given below may also cause the lake to be potentially dangerous:

- potential rockfall/slide (mass movements) site around the lake which can fall into the lake suddenly
- snow avalanches of large size around the lake which can fall into the lake suddenly
- neo-tectonic and earthquake activities around or near the lake area
- climatic conditions of successive years being a relatively wet and cold year followed by a hot and wet or hot and arid year
- very recent moraines damming the lake at the tributary glaciers that used to be just a part of a former complex of valley glacier middle moraines as a result of the fast retreat of a complex mother valley glacier (e.g. Lunana area in Pho Chu Basin in Bhutan)
- sudden advance of a glacier towards the lower tributary or mother glacier having a well-developed lake at its tongue

11.2 Major Glacial Lakes Associated with the Glaciers

For identification of potentially dangerous glacial lakes, the glacial lakes associated with glaciers like supraglacial lakes and/or dammed by lateral moraine or end moraine with an area larger than 0.02 sq.km have been considered and they have been defined as major glacial lakes. The area of the inventoried glacial lakes is larger than 0.003 sq.km. There are 2,323 such glacial lakes in Nepal. Among these lakes, glacial lakes having an area larger than 0.02 sq.km number 347. Most of the major glacial lakes are in contact with or at a distance of less than 500m away from the glaciers and some of them are 1,500m away from the glaciers.

The Tamor Sub-basin of the Koshi Basin comprises 33 major glacial lakes associated with glaciers. The glaciers are at a contact distance of less than 1 km (Table 11.1). Seven major glacial lakes are found in contact with the mother glacier. The areas of the major glacial lakes range from 0.020 sq.km to 0.184 sq.km and the location of these lakes are between the elevations of 4,602 masl and 5,601 masl. Considering the different criteria as mentioned above in Section 11.1 only two glacial lakes are identified as potentially dangerous in the Tamor River Valley. The potentially dangerous glacial lakes are Ktr_gl 146 and Ktr_gl 192 (Nagma Pokhari). Nagma Pokhari Lake had an outburst event in 1980 and its size is growing to the potentially dangerous stage again.

Altogether 14 major glacial lakes are associated with the glaciers within the range of 1 km in the Arun Sub-basin of the Koshi Basin (Table 11.2). Not a single lake is in contact with the mother glacier. The areas of the major glacial lakes range from 0.020 sq.km to 0.119 sq.km and their altitudinal locations lie

Table 11.1: Major glacial lakes associated with the glaciers in the Tamor Sub-basin						
Lake number	Lake name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to Glacier (m)
Ktr_gl 146		4877	Moraine- dammed	181 147	Ktr_gr 30	0
Ktr_gl 148		4938	LM dammed	21 660	Ktr_gr 35	215
Ktr_gl 152		4785	Valley	25 373	Ktr_gr 39	355
Ktr_gl 162		4688	Valley	184 728	Ktr_gr 42	450
Ktr_gl 174		5273	Valley	58 413	Ktr_gr 67	475
Ktr_gl 179		5121	Valley	63 048	Ktr_gr 79	537
Ktr_gl 180		5151	Valley	41 585	Ktr_gr 80	160
Ktr_gl 181		5334	Block	20 738	Ktr_gr 81	45
Ktr_gl 189		5174	Valley	20 979	Ktr_gr 85	475
Ktr_gl 192	Nagama*	4884	Moraine-dammed	149 689	Ktr_gr 87	980
Ktr_gl 200		5121	Supraglacial	37 477	Ktr_gr 98	40
Ktr_gl 214		5090	Cirque	36 642	Ktr_gr 102	290
Ktr_gl 237		4602	Valley	36 972	Ktr_gr 126	560
Ktr_gl 249		4938	Valley	20 386	Ktr_gr 132	980
Ktr_gl 250		5060	Moraine- dammed	22 275	Ktr_gr 135	0
Ktr_gl 251		5151	Erosion	26 361	Ktr_gr 137	430
Ktr_gl 254	Nupchu	4877	Cirque	140 287	Ktr_gr 146	225
Ktr_gl 255		4846	Erosion	44 002	Ktr_gr 148	425
Ktr_gl 256		5121	Erosion	30 469	Ktr_gr 151	280
Ktr_gl 260		5395	Valley	22 473	Ktr_gr 175	850
Ktr_gl 262		5502	Block	58 676	Ktr_gr 177	275
Ktr_gl 263		5014	Moraine- dammed	30 425	Ktr_gr 171	0
Ktr_gl 265		5601	Erosion	26 647	Ktr_gr 182	100
Ktr_gl 266		5593	Moraine- dammed	153 094	Ktr_gr 183	20
Ktr_gl 270		4671	Supraglacial	21 880	Ktr_gr 193	0
Ktr_gl 291		4816	Supraglacial	57 731	Ktr_gr 193	0
Ktr_gl 297	Dudh Pokhari	4607	Valley	24 296	Ktr_gr 227	760
Ktr_gl 314		4999	Valley	24 604	Ktr_gr 237	425
Ktr_gl 316		5019	Cirque	24 560	Ktr_gr 238	405
Ktr_gl 320		4447	Supraglacial	28 295	Ktr_gr 248	0
Ktr_gl 328		4874	Supraglacial	45 671	Ktr_gr 248	455
Ktr_gl 332		5075	Supraglacial	33 633	Ktr_gr 255	0
Ktr_gl 336		5029	Valley	26 142	Ktr_gr 258	135
* In Nagma Ktr_gl 191 has been merged.						

Table 11.2: Major glacial lakes associated with the glaciers in the Arun Sub-basin						
Lake number	Lake name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Kar_gl 27		4862	Erosion	20 205	Kar_gr 25	410
Kar_gl 28		4862	Erosion	23 669	Kar_gr 25	630
Kar_gl 29		4862	Valley	119 114	Kar_gr 31	610
Kar_gl 30		5273	Moraine dammed	117 190	Kar_gr 40	100
Kar_gl 32		4968	Erosion	48 685	Kar_gr 46	295
Kar_gl 57	Chhawa	4940	Erosion	84 477	Kar_gr 63	1000
Kar_gl 67		5040	Cirque	41 757	Kar_gr 72	115
Kar_gl 68		5040	Erosion	33 290	Kar_gr 74	110
Kar_gl 71		5100	Erosion	26 555	Kar_gr 80	250
Kar_gl 77		4910	Erosion	33 098	Kar_gr 83	15
Kar_gl 79		4935	Valley	25 401	Kar_gr 84	705
Kar_gl 81		4785	Erosion	35 599	Kar_gr 87	660
Kar_gl 82		4764	Erosion	20 782	Kar_gr 89	455
	Lower Barun	4570	Valley	666 000	Kar_gr 20	0

between the elevations of 4,764 masl and 5,273 masl. There is only one major glacial lake which is dammed by an end moraine and no supraglacial lakes are observed in the Arun River Sub-basin. Two major glacial lakes (Kar_gl 29 and Kar_gl 30) in the topographic map published by the Survey of India and one (Lower Barun) from the satellite images are identified as potentially dangerous lakes in the Arun Sub-basin. The first two lakes have been found with outburst events in the aerial photographs and satellite images of later dates. The Lower Barun Glacial Lake was not formed in the 1960s. The rapid growth of the lake at the tongue of the Lower Barun Glacier is the reason it is considered a potentially dangerous lake.

The Dudh Koshi Sub-basin is the one that contains the highest number of glacial lakes as well as lakes associated with glaciers. Altogether 98 major glacial lakes are associated with the glaciers. This includes also the blocked lakes within the range of 1.65 km (Table 11.3). The areas of the major glacial lakes range from 0.021 sq.km to 0.529 sq.km and their elevations are between 4,349 masl and 5,636 masl. There are 267 supraglacial lakes, out of which only 31 lakes are larger than 0.02 sq.km in area. The sub-basin consists of 10 blocked lakes and 33 moraine-dammed lakes which are susceptible to lake outburst. Thirteen lakes are identified as potentially dangerous in the Dudh Koshi Sub-basin. The potentially dangerous lakes of the Dudh Koshi Sub-basin are Kdu_gl 28 (Lumding Tsho), Kdu_gl 55 (Dig Tsho), Kdu_gl 349 (Chokarma Cho), Kdu_gl 350 (Imja Tsho), Kdu_gl 399 (Tam Pokhari), Kdu_gl 449 (Hungu Lake), Kdu_gl 459 (East Hungu 1), Kdu_gl 462 (East Hungu 2), Kdu_gl 464 and Kdu_gl 466 (West Chamjang). Among these, Dig Tsho and Tam Pokhari already had outburst events in 1985 and

Table 11.3: Major glacial lakes associated with glaciers in the Dudh Koshi Sub-basin

Lake number	Lake name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Kdu_gl 18		4,901	Cirque	25,467	Kdu_gr 1	220
Kdu_gl 19		4,816	Block	78,177	Kdu_gr 5	1,305
Kdu_gl 20		4,822	Block	103,007	Kdu_gr 5	870

Table 11.3: Cont….

Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Kdu_gl 159	Dudh Pokhari	4,734	Valley	426,38	Kdu_gr 86	1410
Kdu_gl 164		5,246	Erosion	21,541	Kdu_gr 90	125
Kdu_gl 165		5,267	Erosion	21,620	Kdu_gr 91	270
Kdu_gl 169		4,956	LM dammed	32,178	Kdu_gr 94	1565
Kdu_gl 170		5,145	Erosion	20,586	Kdu_gr 95	1105
Kdu_gl 173		5,148	Erosion	55,363	Kdu_gr 95	545
Kdu_gl 174		5,209	Cirque	35,123	Kdu_gr 95	85
Kdu_gl 175		5,410	Erosion	20,586	Kdu_gr 96	270
Kdu_gl 184		4,798	Supraglacial	24,750	Kdu_gr 100	0
Kdu_gl 206	Kyajumba Cho	5,364	Moraine-dammed	160,785	Kdu_gr 106	0
Kdu_gl 216	Diwanare Cho	5,066	Block	197,340	Kdu_gr 106	645
Kdu_gl 227		4,715	Block	36,608	Kdu_gr 100	250
Kdu_gl 228		4,892	Valley	25,042	Kdu_gr 100	0
Kdu_gl 232		5,343	Erosion	33,160	Kdu_gr 112	180
Kdu_gl 233	Naktok Cho	4,947	Moraine-dammed	84,783	Kdu_gr 113	85
Kdu_gl 234		4,874	Erosion	28,279	Kdu_gr 114	250
Kdu_gl 240		5,450	Erosion	30,931	Kdu_gr 118	780
Kdu_gl 243	Chola Cho	4,499	Block	529,069	Kdu_gr 120	75
Kdu_gl 249	Nire Cho	5,102	Erosion	35,361	Kdu_gr 128	140
Kdu_gl 252		4,980	Erosion	37,298	Kdu_gr 129	810
Kdu_gl 253		4,993	Cirque	45,734	Kdu_gr 129	335
Kdu_gl 269		5,322	Erosion	27,881	Kdu_gr 133	0
Kdu_gl 271		5,215	Supraglacial	45,071	Kdu_gr 133	0
Kdu_gl 272		5,223	Supraglacial	25,414	Kdu_gr 133	0
Kdu_gl 280		5,273	Erosion	25,812	Kdu_gr 134	520
Kdu_gl 283	Gorakashep Cho	5,145	LM dammed	81,626	Kdu_gr 133	0
Kdu_gl 287		5,304	Supraglacial	48,811	Kdu_gr 133	0
Kdu_gl 298		5,328	Erosion	38,731	Kdu_gr 137	70
Kdu_gl 304		4,907	LM dammed	33,611	Kdu_gr 133	235
Kdu_gl 308		5,441	LM dammed	31,966	Kdu_gr 148	0
Kdu_gl 310		5,456	Erosion	25,997	Kdu_gr 149	450
Kdu_gl 311		5,191	Erosion	28,040	Kdu_gr 150	850
Kdu_gl 320		5,636	Supraglacial	21,514	Kdu_gr 152	0
Kdu_gl 339		5,032	Supraglacial	20,426	Kdu_gr 156	0
Kdu_gl 341		5,051	Supraglacial	22, 681	Kdu_gr 156	0
Kdu_gl 349	Chokarma Cho	4,987	LM dammed	52,790	Kdu_gr 160	0
Kdu_gl 350	Imja Cho	5,023	Supraglacial	48,811	Kdu_gr 160	0
Kdu_gl 351		5,032	Supraglacial	21,992	Kdu_gr 160	0
Kdu_gl 364		5,236	Supraglacial	34,168	Kdu_gr 160	0
Kdu_gl 388		5,264	Supraglacial	31,860	Kdu_gr 174	0
Kdu_gl 399	Tam Pokhari	4,432	Moraine-dammed	138,846	Kdu_gr 202	45
Kdu_gl 400		4,481	Valley	83,828	Kdu_gr 205	0
Kdu_gl 401		4,871	Supraglacial	84,305	Kdu_gr 205	0
Kdu_gl 403		4,932	Supraglacial	70,352	Kdu_gr 205	0
Kdu_gl 406		5,127	LM dammed	56,265	Kdu_gr 203	35
Kdu_gl 419		5,145	Moraine-dammed	108,233	Kdu_gr 216	0
Kdu_gl 422	Dudh Pokhari	4,761	LM dammed	274,297	Kdu_gr 229	655
Kdu_gl 423		4,685	Erosion	155,161	Kdu_gr 231	705
Kdu_gl 428		4,349	LM dammed	105,368	Kdu_gr 233	335
Kdu_gl 435		4,883	Cirque	120,569	Kdu_gr 240	330
Kdu_gl 442		5,267	Supraglacial	133,753	Kdu_gr 247	0
Kdu_gl 443		5,023	Valley	75,392	Kdu_gr 249	0
Kdu_gl 444		5,057	Moraine-dammed	112,398	Kdu_gr 249	0
Kdu_gl 445		5,230	Supraglacial	79,955	Kdu_gr 249	0
Kdu_gl 446		5,352	Supraglacial	207,314	Kdu_gr 249	0
Kdu_gl 447		5,389	Supraglacial	67,407	Kdu_gr 249	0
Kdu_gl 448		5,456	Moraine-dammed	22,61	Kdu_gr 250	0
Kdu_gl 449		5,182	Supraglacial	198,905	Kdu_gr 249	0
Kdu_gl 451		5,425	Moraine-dammed	107,782	Kdu_gr 252	25

Table 11.3: Cont....

Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Kdu_gl 452		5,441	Moraine-dammed	37,935	Kdu_gr 254	125
Kdu_gl 454		5,480	Moraine-dammed	209,834	Kdu_gr 255	115
Kdu_gl 455		5,441	Moraine-dammed	88,788	Kdu_gr 249	0
Kdu_gl 456		5,410	Erosion	84,146	Kdu_gr 258	70
Kdu_gl 457		5,419	Moraine-dammed	27,403	Kdu_gr 258	0
Kdu_gl 459		5,380	Supraglacial	78,761	Kdu_gr 260	0
Kdu_gl 460		5,389	Supraglacial	58,043	Kdu_gr 260	0
Kdu_gl 462		5,483	Block	211,877	Kdu_gr 260	0
Kdu_gl 464		5,206	Erosion	349,397	Kdu_gr 263	325

1998 respectively. The glacial lake Kdu_gl 349 (Chokarma Cho) has also drained out in the past but this is not recorded.

Seven major glacial lakes in the Tama Koshi Sub-basin of the Koshi Basin are associated with glaciers within the range of 1 km (Table 11.4). Out of them, 2 lakes are supraglacial in contact with the mother glacier. The areas of the major glacial lakes range from 0.020 sq.km to 0.231 sq.km and their elevations are between 4,423 and 5,496 masl. The Tama Koshi Sub-basin comprises Tsho Rolpa Glacial Lake in the Rolwaling Valley. Tsho Rolpa Glacial Lake is identified as being a supraglacial lake in the 1960s. The area of the lake has increased from 0.23 to 1.39 sq.km and has developed into a moraine-dammed lake. Tsho Rolpa Glacial Lake is identified as one of the most potentially dangerous glacial lakes in Nepal. The most recent area of the lake is detected from the Indian remote sensing (IRS) linear imaging and self scanning sensor (LISS) 3D satellite image of 1999. Tsho Rolpa Glacial Lake has received wide media coverage and is known even to laymen. Mitigation measures have been applied recently to prevent possible glacial lake outburst flood (GLOF) hazards along the downstream valley. The Rolwaling Valley of the Tama Koshi Sub-basin already had a GLOF event from the Chhubung Glacial Lake, which was not mapped in the 1960s topographic map published by the Survey of India and the Survey Department of Nepal in 1995. This lake might have formed around the 1970s and the outburst event occurred in 1991.

Table 11.4: Major glacial lakes associated with glaciers in the Tama Koshi Sub-basin

Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Kta_gl 8		4,423	Erosion	22,893	Kta_gr 18	940
Kta_gl 9		4,862	Block	48,201	Kta_gr 20	45
Kta_gl 15	Omai Tsho	4,801	Block	91,653	Kta_gr 38	340
Kta_gl 26	Tsho Rolpa	4,557	Supraglacial	231,693	Kta_gr 46	0
Kta_gl 35		5,496	Supraglacial	20,639	Kta_gr 46	0
Kta_gl 42		4,563	Cirque	113,618	Kta_gr 67	805
Kta_gl 43		4,901	Erosion	27,615	Kta_gr 73	745

The Sun Koshi, Likhu, and Indrawati Sub-basins consist of 35, 14, and 18 glacial lakes respectively (Table 11.5). All these three sub-basins consist of only one major glacial lake each. From the parameters considered for the identification of the potentially dangerous lakes, none of the major lakes are potentially dangerous in these sub-basins.

Table 11.5: Major glacial lakes associated with the glaciers in the Sun Koshi, Likhu, and Indrawati sub-basins

Lake number	Sub-basin	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Ksun_gl 3	Sun Koshi	4,718	Supraglacial	21,381	Ksun_gr 2	0
Klik_gl 4	Likhu	4,951	Erosion	26,316	KlikGr_8	250
Kin_gl 9	Indrawati	4,572	Supraglacial	12,337	Kin_gr 8	0

The Trishuli and Seti Sub-basins of the Gandaki Basin consist of 117 and 10 glacial lakes respectively (Table 11.6). Only six glacial lakes are major glacial lakes in the Trishuli Sub-basin, whereas only one glacial lake is a major glacial lake in the Seti River Sub-basin. The major glacial lakes are of the erosion, blocked, supraglacial, and valley type. None of these lakes are potentially dangerous lakes.

Table 11.6: Major glacial lakes associated with glaciers in the Trisuli and Seti Sub-basins

Lake number	Sub-basin	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Gtri_gl 5	Trishuli	4705	Erosion	214 714	Gtri_gr 7	215
Gtri_gl 6		4731	Block	52 452	Gtri_gr 9	415
Gtri_gl 8		4596	Supraglacial	19 430	Gtri_gr 19	0
Gtri_gl 9		4603	Valley	29 969	Gtri_gr 33	515
Gtri_gl 12		3655	Erosion	20 024	Gtri_gr 37	1065
Gtri_gl 27		4749	Supraglacial	16 045	Gtri_gr 44	0
Gset_gl 7	Seti	2377	Valley	28 165	Gset_gr 52	0

Three major glacial lakes are in contact with the glaciers in the Budhi Gandaki Sub-basin (Table 11.7). The glacial lakes extend down to 3,472 masl. There are 27 supraglacial lakes of which only two lakes have areas greater than 0.02 sq.km. The supraglacial lakes in the Budhi Gandaki Sub-basin do not fall in the potentially dangerous category, but the moraine-dammed glacial lake Gbu_gl 9 is identified as a potentially dangerous lake in this sub-basin.

Table 11.7: Major glacial lakes associated with glaciers in the Budi Gandaki Sub-basin

Lake number	Lake name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Gbu_gl 3		3472	Supraglacial	22 018	Gbu_gr 22	0
Gbu_gl 6		3536	Supraglacial	54 415	Gbu_gr 22	0
Gbu_gl 9		3591	Moraine-dammed	81 545	Gbu_gr 32	0

There are 76 glacial lakes in the Marsyangdi Sub-basin, out of which 25 lakes have areas greater than 0.02 sq.km (Table 11.8). The areas of the major glacial lakes range from 0.020 sq.km to 3.945 sq.km and their elevations are between 3,825 masl and 5,669 masl.

There are a number of supraglacial lakes in the Marsyangdi Sub-basin but none of them is potentially dangerous. The glacial lake Gmar_gl 70 (Thulagi) is the only one identified as a potentially dangerous lake in the Marsyangdi Sub-basin.

There are 96 glacial lakes in the Kali Gandaki Sub-basin, out of which 27 are major glacial lakes with areas greater than 0.02 sq.km. The major glacial lakes are formed above 5,400 masl (Table 11.9). There are two supraglacial lakes and 11 moraine-dammed lakes, but only four lakes are identified as potentially dangerous glacial lakes in the Kali Gandaki Sub-basin. All the identified potentially dangerous lakes are moraine-dammed. The potentially dangerous lakes are Gka_gl 38, Gka_gl 41, Gka_gl 42, and Gka_gl 67. Among them Gka_gl 41 and Gka_gl 42 are found to have outburst events in the aerial photographs and satellite images of 1996. The glacial lake Gka_gl 67 is found to be growing in size.

The Bheri Sub-basin is one of the bigger sub-basins in the Karnali Basin. It consists of 152 glacial lakes, out of which 25 are major glacial lakes (Table 11.10). The major glacial lakes are located at elevations ranging from 4,237 to 5,593 masl. The glacial lakes are smaller in size and the largest glacial lake is 0.396 sq.km. Among the major glacial lakes, two are moraine-dammed lakes and one is a supraglacial lake. The sub-basin does not have any potentially dangerous glacial lakes.

Out of 280 glacial lakes in the Mugu Sub-basin of the Karnali Basin, 31 glacial lakes are major glacial lakes with an area greater than 0.02 sq.km. There are three moraine-dammed and two supraglacial lakes (Table 11.11). The areas of the glacial lakes range from 0.020 sq.km to 0.681 sq.km and their locations are at elevations between 4,404 and 5,560 masl. The glacial lake Kmu_gl 129, having the largest area in the Mugu Sub-basin, has been identified as a potentially dangerous lake. It also had an outburst event in the past, but this is not recorded.

Table 11.8: Major glacial lakes associated with glaciers in the Marsyangdi Sub-basin						
Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Gmar_gl 1		5023	Erosion	59 861	Gmar_gr 35	375
Gmar_gl 2		4920	Erosion	3 945 017	Gmar_gr 37	900
Gmar_gl 3		5121	Cirque	66 752	Gmar_gr 40	455
Gmar_gl 4		5090	Valley	94 564	Gmar_gr 42	790
Gmar_gl 5		4990	Valley	175 546	Gmar_gr 44	1435
Gmar_gl 19		5517	Valley	34 213	Gmar_gr 122	150
Gmar_gl 20		5669	Supraglacial	54 129	Gmar_gr 127	345
Gmar_gl 21		5639	Supraglacial	20 363	Gmar_gr 127	0
Gmar_gl 22		5669	Supraglacial	31 692	Gmar_gr 129	0
		5636	Erosion	30 689	Gmar_gr 153	0

Table 11.9: Major glacial lakes associated with glaciers in the Kali Gandaki Sub-basin						
Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Gka_gl 17		5654	Valley	49 743	Gka_gr 82	485
Gka_gl 19		5480	Cirque	80 975	Gka_gr 103	120
Gka_gl 20		5538	Valley	24 817	Gka_gr 112	45
Gka_gl 21		5636	Erosion	21 610	Gka_gr 122	470
Gka_gl 25		5669	Supraglacial	20 821	Gka_gr 131	0
Gka_gl 28		5459	Valley	30 090	Gka_gr 142	195
Gka_gl 32			Valley	52 271	Gka_gr 174	275
Gka_gl 33		5465	Moraine-dammed	40 528	Gka_gr 176	0
Gka_gl 38		5419	Moraine-dammed	149 202	Gka_gr 184	0
Gka_gl 41		5444	Moraine-dammed	21 583	Gka_gr 183	90
Gka_gl 42		5450	Moraine-dammed	26 829	Gka_gr 183	60
Gka_gl 43		5569	Moraine-dammed	21 447	Gka_gr 190	365
Gka_gl 47		5630	Moraine-dammed	34 412	Gka_gr 195	65
Gka_gl 55			Moraine-dammed	46 291	Gka_gr 211	0
Gka_gl 56			Valley	83 612	Gka_gr 211	550
Gka_gl 57			Moraine-dammed	40 936	Gka_gr 217	45
Gka_gl 58			Moraine-dammed	54 690	Gka_gr 224	60
Gka_gl 64		5593	Valley	128 054	Gka_gr 233	785
Gka_gl 67		5453	Moraine-dammed	1 013 344	Gka_gr 247	0
Gka_gl 68		5633	Erosion	62 111	Gka_gr 248	232
Gka_gl 69		5654	Erosion	48 003	Gka_gr 248	310
Gka_gl 70			Valley	28 650	Gka_gr 259	130
Gka_gl 71		5365	Moraine-dammed	36 505	Gka_gr 276	0
Gka_gl 72		6017	Supraglacial	36 016	Gka_gr 279	0
Gka_gl 73		5313	Valley	32 401	Gka_gr 282	65
Gka_gl 83		5474	Erosion	25 959	Gka_gr 339	740
Gka_gl 84		5785	Valley	29 601	Gka_gr 338	0

Table 11.10: Major glacial lakes associated with glaciers in Bheri sub-basin						
Lake Number	Lake Name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Kbh_gl 1	Dudh Kundli	4,633	Valley	327,131	Kbh_gr 10	1,310
Kbh_gl 5		4,633	Erosion	24,065	Kbh_gr 74	880
Kbh_gl 6		4,298	Cirque	61,928	Kbh_gr 75	1,010
Kbh_gl 8		4,237	Erosion	162,017	Kbh_gr 95	415
Kbh_gl 9	Chhokarbo	4,481	Erosion	34,169	Kbh_gr 97	400
Kbh_gl 14		4,968	Erosion	31,534	Kbh_gr 143	0
Kbh_gl 19		4,923	Valley	48,374	Kbh_gr 159	1,365
Kbh_gl 23		4,968	Valley	55,816	Kbh_gr 172	330
Kbh_gl 38		5,235	Erosion	38,379	Kbh_gr 183	30
Kbh_gl 43		5,014	Valley	85,477	Kbh_gr 196	265
Kbh_gl 44		5,212	Supraglacial	24,880	Kbh_gr 207	0
Kbh_gl 58		5,532	Valley	64,807	Kbh_gr 239	365
Kbh_gl 84		5,532	Erosion	29,035	Kbh_gr 253	40
Kbh_gl 87		5,380	Erosion	26,374	Kbh_gr 262	165
Kbh_gl 88		5,540	Erosion	36,505	Kbh_gr 263	0
Kbh_gl 89		5,365	Erosion	40,742	Kbh_gr 264	80
Kbh_gl 92		5,593	Erosion	37,075	Kbh_gr 270	0
Kbh_gl 110		5,563	L M dammed	26,265	Kbh_gr 338	320
Kbh_gl 112		5,188	Valley	38,080	Kbh_gr 339	475
Kbh_gl 113		4,663	Valley	46,609	Kbh_gr 348	1,125
Kbh_gl 117		4,438	Valley	396,120	Kbh_gr 357	0
Kbh_gl 120		5,307	Valley	81,348	Kbh_gr 388	410
Kbh_gl 125		5,258	M dammed	29,714	Kbh_gr 407	90
Kbh_gl 129		4,984	Erosion	20,778	Kbh_gr 411	50
Kbh_gl 130		5,005	Erosion	22,299	Kbh_gr 413	85

Table 11.11: Major glacial lakes associated with glaciers in the Mugu Sub-basin						
Lake number	Lake name	Elevation (masl)	Type	Area (m²)	Associated glacier No.	Distance to glacier (m)
Kmu_gl 16	Dudhiya Tal	4,682	Erosion	94,035	Kmu_gr 3	100
Kmu_gl 17		4,404	Valley	49,879	Kmu_gr 5	1305
Kmu_gl 27		4,679	Valley	37,879	Kmu_gr 14	685
Kmu_gl 28		4,834	Erosion	70,123	Kmu_gr 14	345
Kmu_gl 29		4,822	Erosion	24,575	Kmu_gr 14	300
Kmu_gl 32		4,679	Erosion	24,641	Kmu_gr 22	685
Kmu_gl 37		4,843	Valley	42,498	Kmu_gr 26	700
Kmu_gl 39		4,929	Valley	68,576	Kmu_gr 27	715
Kmu_gl 73		5,099	Erosion	133,350	Kmu_gr 38	660
Kmu_gl 87		5,279	Valley	27,315	Kmu_gr 40	550
Kmu_gl 109		5,081	Erosion	70,056	Kmu_gr 70	330
Kmu_gl 111		5,145	Valley	63,603	Kmu_gr 71	255
Kmu_gl 113		5,276	Erosion	26,034	Kmu_gr 76	140
Kmu_gl 117		5,118	Valley	25,437	Kmu_gr 81	225
Kmu_gl 119		5,118	Supraglacial	23,315	Kmu_gr 82	0
Kmu_gl 120		5,145	Supraglacial	27,669	Kmu_gr 82	0
Kmu_gl 129		4,712	Moraine-dammed	681,094	Kmu_gr 85	0
Kmu_gl 133		5,105	Erosion	77,040	Kmu_gr 86	345
Kmu_gl 134		4,962	Valley	133,881	Kmu_gr 86	850
Kmu_gl 137		5,179	Valley	72,045	Kmu_gr 87	140
Kmu_gl 146		4,959	Valley	32,553	Kmu_gr 94	850
Kmu_gl 147		5,090	Moraine-dammed	37,791	Kmu_gr 94	40
Kmu_gl 168		5,544	Valley	20,332	Kmu_gr 97	780
Kmu_gl 232		5,044	Valley	36,288	Kmu_gr 129	75
Kmu_gl 240		5,267	Valley	77,836	Kmu_gr 132	755
Kmu_gl 245		5,560	Erosion	24,774	Kmu_gr 137	55
Kmu_gl 252		5,465	Erosion	25,194	Kmu_gr 143	225
Kmu_gl 259		5,380	Erosion	25,415	Kmu_gr 150	265
Kmu_gl 260		5,142	Erosion	30,851	Kmu_gr 151	115
Kmu_gl 262		5,270	Moraine-dammed	49,901	Kmu_gr 157	0
Kmu_gl 269		4,767	Erosion	25,923	Kmu_gr 249	415

The Humla Karnali is the extreme northwest sub-basin of Nepal. It lies in the Karnali Basin. This sub-basin consists of 345 glacial lakes, out of which 57 are major glacial lakes with an area larger than 0.02 sq.km (Table 11.12). The largest glacial lake in the Humla Sub-basin is Khu_gl 145 (Chhungsa Daha) with an area of 0.689 sq.km located at an elevation of 4,781 masl. Though there are 16 moraine-dammed lakes, with one blocked and one supraglacial lake in the sub-basin none of them fall into the category of potentially dangerous lakes.

Table 11.12: Major glacial lakes associated with glaciers in the Humla Sub-basin

Lake number	Lake name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Khu_gl 8		4962	Valley	35 544	Khu_gr 24	1505
Khu_gl 14		5177	Moraine-dammed	111 949	Khu_gr 41	375
Khu_gl 21		5742	Moraine-dammed	307 020	Khu_gr 49	0
Khu_gl 37		5493	Moraine-dammed	41 351	Khu_gr 56	70
Khu_gl 60		5505	Valley	155 224	Khu_gr 64	210
Khu_gl 63		5578	Moraine-dammed	68 044	Khu_gr 65	0
Khu_gl 64		5578	Moraine-dammed	83 717	Khu_gr 66	0
Khu_gl 65		5624	Moraine-dammed	22 460	Khu_gr 69	0
Khu_gl 71		5633	Moraine-dammed	77 665	Khu_gr 72	0
Khu_gl 73		5662	Valley	31 136	Khu_gr 73	95
Khu_gl 80		5584	Valley	50 167	Khu_gr 79	80
Khu_gl 81		5514	Erosion	137 592	Khu_gr 80	170
Khu_gl 82		5389	Moraine-dammed	80 254	Khu_gr 81	0
Khu_gl 84		5450	Moraine-dammed	88 335	Khu_gr 87	0
Khu_gl 85		5544	Erosion	31 836	Khu_gr 87	400
Khu_gl 100		5416	Valley	124 194	Khu_gr 101	35
Khu_gl 103		5483	Valley	48 663	Khu_gr 103	265
Khu_gl 104		5108	Valley	50 552	Khu_gr 105	230
Khu_gl 115		4892	Valley	77 700	Khu_gr 106	75
Khu_gl 120		4907	Moraine-dammed	124 473	Khu_gr 135	0
Khu_gl 145	Chhungsa Daha	4907	Moraine-dammed	689 887	Khu_gr 143	770
Khu_gl 168		4781	Moraine-dammed	50 867	Khu_gr 150	0
Khu_gl 171		4746	Valley	22 915	Khu_gr 153	520
Khu_gl 172		5026	Cirque	44 220	Khu_gr 156	160
Khu_gl 175		3969	Valley	81 233	Khu_gr 167	485
Khu_gl 177		4563	Valley	116 742	Khu_gr 168	60
Khu_gl 186		5105	Cirque	23 229	Khu_gr 182	10
Khu_gl 187		5099	Valley	25 818	Khu_gr 183	80
Khu_gl 188		4697	Moraine-dammed	35 824	Khu_gr 187	0
Khu_gl 192		5297	Supraglacial	35 684	Khu_gr 190	0
Khu_gl 195		4511	Valley	54 890	Khu_gr 193	760
Khu_gl 216		5166	Valley	71 822	Khu_gr 207	175
Khu_gl 217		5179	Valley	243 035	Khu_gr 207	325
Khu_gl 218		5218	Valley	47 054	Khu_gr 208	270
Khu_gl 222		5499	Valley	60 837	Khu_gr 211	555
Khu_gl 223		5599	Moraine-dammed	28 127	Khu_gr 214	0
Khu_gl 236		5383	Valley	35 229	Khu_gr 226	435
Khu_gl 238		5416	Moraine-dammed	62 167	Khu_gr 227	160
Khu_gl 247		5351	Moraine-dammed	76 405	Khu_gr 230	15
Khu_gl 251		unnamed	Valley	681 700	Khu_gr 270	425
Khu_gl 252	Lurupya	4404	Valley	180 798	Khu_gr 276	235
Khu_gl 276		4526	Block	319 370	Khu_gr 291	190
Khu_gl 279		4404	Valley	67 519	Khu_gr 294	280
Khu_gl 283		4865	Valley	160 052	Khu_gr 303	735
Khu_gl 284		4624	Valley	23 684	Khu_gr 310	335
Khu_gl 289		4831	Valley	29 317	Khu_gr 314	145
Khu_gl 291		4715	Valley	35 579	Khu_gr 333	930
Khu_gl 292		5066	Moraine-dammed	57 129	Khu_gr 328	0
Khu_gl 302		4944	Block	140 111	Khu_gr 348	110
Khu_gl 316		4145	Valley	83 542	Khu_gr 395	1540
Khu_gl 317		4621	Cirque	35 229	Khu_gr 401	290
Khu_gl 318		4627	Block	60 907	Khu_gr 412	15
Khu_gl 320		4688	Erosion	28 057	Khu_gr 412	20
Khu_gl 322		4840	Block	24 384	Khu_gr 413	120
Khu_gl 325		4356	Erosion	34 669	Khu_gr 418	265
Khu_gl 328		4648	Valley	31 346	Khu_gr 420	245
Khu_gl 336		4426	Valley	149 907	Khu_gr 424	940

The West Seti, Kawari, and Tila are smaller sub-basins in the Karnali Basin. These sub-basins have 15, 44, and 71 glacial lakes, of which only 4, 5, and 3 glacial lakes respectively have areas larger than 0.02 sq.km and fall into the major glacial lake category. The lakes are located at an elevation below 5,000 masl. The largest lake has an area of 0.6 sq.km. The supraglacial lakes and moraine-dammed lakes in the West Seti, Kawari, and Tila Sub-basins of the Karnali basin are smaller than 0.062 sq.km and hence none of them are potentially dangerous.

Table 11.13: Major glacial lakes associated with the glaciers in West Seti, Kawari, and Tila Sub-basins

Lake number	Sub-basin	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Kse_gl 5	West Seti	4648	Supraglacial	21 497	Kse_gr 23	0

The Mahakali River Basin consists of only 16 glacial lakes in the Nepalese portion of its catchment, out of which only 5 lakes are major glacial lakes with an area larger than 0.02 sq.km (Table 11.14). Due to unavailability of some topographic maps of that area, some elevations of lakes are unknown. The known elevations of the lakes are below 5,000 masl. Though there are three major supraglacial lakes and one blocked glacial lake, none of them is in the category of potentially dangerous lakes.

Table 11.14: Major glacial lakes associated with the glaciers in the Mahakali Basin

Lake Number	Sub-basin Name	Elevation (masl)	Type	Area (m^2)	Associated glacier No.	Distance to glacier (m)
Mkali_gl 5			Supraglacial	24 209	Mkali_gr 43	0
Mkali_gl 6			Supraglacial	52 804	Mkali_gr 43	0
Mkali_gl 7			Supraglacial	25 998	Mkali_gr 43	0
Mkali_gl 9		4206	Block	55 603	Mkali_gr 58	0
Mkali_gl 16		4724	Valley	22 507	Mkali_gr 85	100

11.3 Potentially Dangerous Glacial Lakes

Based on the analysis of inventory data using different criteria and the study of satellite images and aerial photographs, 20 glacial lakes are identified as potentially dangerous lakes in Nepal. Out of these there are three glacial lakes (i.e. Nagma, Tam Pokhari, and Dig Tsho) with past outburst events and 17 glacial lakes without a record of past GLOF events. The identified potentially dangerous lakes are recommended for further detailed investigation and field survey to understand their activity (Figure 11.1 and Table 11.15). As well as these, there are six other potentially dangerous lakes identified in the inventory, which have past GLOF events seen in the satellite images and no more danger and or existence in the present topographic maps and satellite images Table 11.16.

Beside those nine outbursts in total, two more (Nare and Chhubung) outburst events were noted in satellite images, which were not formed or mapped during topographic map preparation in the 1960s and are hence not included in the inventory.

11.4 Categorisation of Potentially Dangerous Glacial Lakes

Based on the identification and description of potentially dangerous lakes given in the sections above, potentially dangerous glacial lakes can be classified into the following three categories.

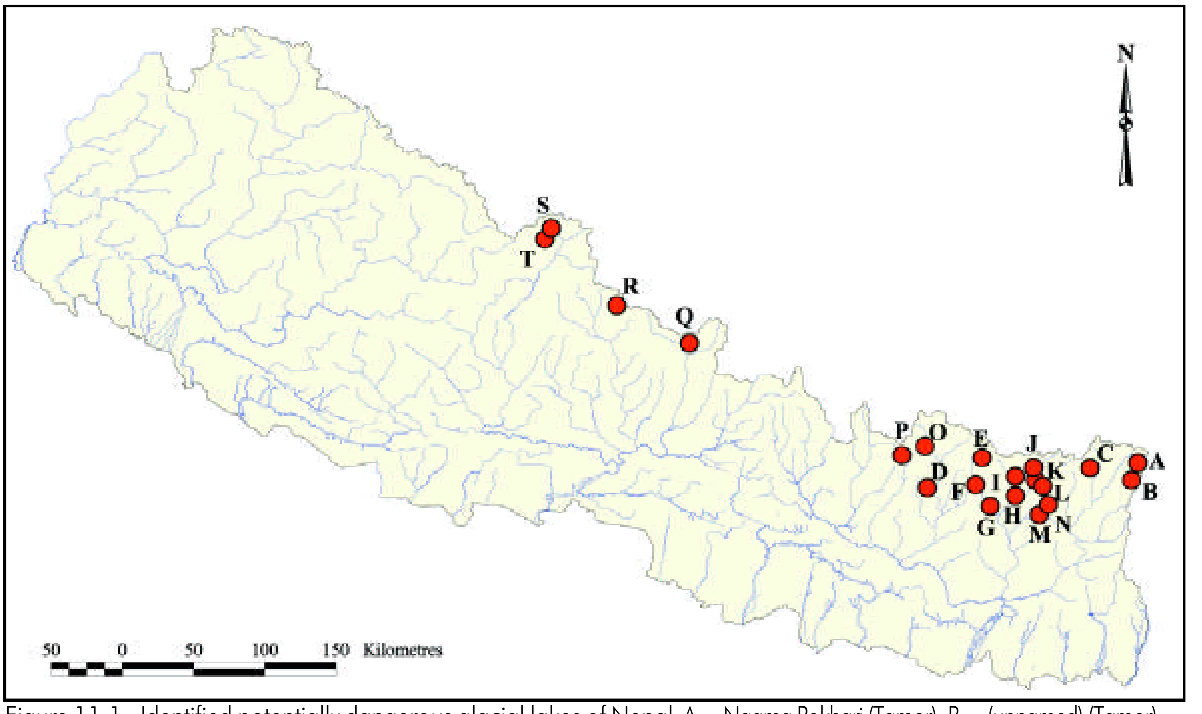


Figure 11.1: Identified potentially dangerous glacial lakes of Nepal: A = Nagma Pokhari (Tamor); B = (unnamed) (Tamor); C = Lower Barun (Arun); D = Lumding (Dudh Koshi); E = Imja (Dudh Koshi); F = Tam Pokhari (Dudh Koshi); G = Dudh Pokhari (Dudh Koshi); H = (unnamed) (Dudh Koshi); I = (unnamed) (Dudh Koshi); J = Hungu (Dudh Koshi); K = East Hungu 1 (Dudh Koshi); L = East Hungu 2 (Dudh Koshi); M = (unnamed) (Dudh Koshi); N = West Chamjang (Dudh Koshi);O = Dig Tsho (Dudh Koshi); P = Tsho Rolpa (Tama Koshi); Q = (unnamed) (Budhi Gandaki); R = Thulagi (Marsysngdi); S = (unnamed) (Kali Gandaki); T = (unnamed) (Kali Gandaki)

Table 11.15: Potentially dangerous glacial lakes of Nepal identified from the inventory and recommended for further investigation and field survey

Lake number	Lake name	Latitude	Longitude	Altitude (masl)	Length (m)	Area (m^2)	Remarks
Tamor Sub-basin							
Ktr_gl 192 (A)	Nagma Pokhari	27° 52.10'	87° 52.02'	4,907	210	149,689	Burst on 23 June 1980 and wing
Ktr_gl 146 (B)	unnamed	27° 48.83'	87° 45.09'	4,876	830	181,147	
Arun Sub-basin							
(C)	Lower Barun	27° 45.31'	87° 06.31'	4,550	1,100	666,000	Growing in size
Dudh Koshi Sub-basin							
Kdu_gl 28 (D)	Lumding Tsho	27° 46.51'	86° 37.53'	4,846	625	104,944	
Kdu_gl 350 (E)	Imja Tsho	27° 54.00'	86° 55.40'	5,023	410	48,811	
Kdu_gl 399 (F)	Tam Pokhari	27° 44.33'	86° 50.76'	4,431	515	138,846	GLOF on 3 September 1998
Kdu_gl 422 (G)	Dudh Pokhari	27° 41.21'	86° 51.68'	4,760	1,120	274,297	
Kdu_gl 442 (H)	Unnamed	27° 47.70'	86° 54.81'	5,266	840	133,753	
Kdu_gl 444 (I)	Unnamed	27° 48.23'	86° 56.61'	5,056	420	112,398	
Kdu_gl 449 (J)	Hungu	27° 50.17'	86° 56.26'	5,181	875	198,905	
Kdu_gl 459 (K)	East Hungu 1	27° 47.92'	86° 57.95'	5,379	465	78,761	
Kdu_gl 462 (L)	East Hungu 2	27° 48.30'	86° 58.65'	5,483	640	211,877	
Kdu_gl 464 (M)	Unnamed	27° 46.86'	86° 57.22'	5,205	1,100	349,397	Growing in size
Kdu_gl 466 (N)	West Chamjang	27° 45.24'	86° 57.33'	4,983	125	6,446	Kdu-gl 465 to 469 merged into one
Kdu_gl 55 (O)	Dig Tsho	27° 52.41'	86° 36.61'	4,364	605	143,250	GLOF on 4 August 1985
Tama Koshi Sub-basin							
Kta_gl 26 (P)	Tsho Rolpa	27° 52.03'	86° 28.41'	4,556	1,070	231,693	Kta_gl 26 to 32 merged
Budhi Gandaki Sub-basin							
Gbu_gl 9 (Q)	Unnamed	28° 35.79'	84° 38.09'	3,590	230	81,545	
Marsyangdi River Sub-basin							
Gmar_gl 70 (R)	Thulagi	28° 29.69'	84° 29.01'	3,825	420	223,385	Growing in size
Kali Gandaki Sub-basin							
Gka_gl 38 (S)	Unnamed	29° 2.76'	83° 40.52'	5,419	600	149,202	
Gka_gl 67 (T)	Unnamed	29° 12.79'	83° 41.79'	5,452	3,610	1,013,344	Growing in size

Table 11.16: Potentially dangerous lakes identified from the inventory but past GLOF events seen on the satellite images and pose no danger							
Lake number	Sub-basin	Latitude	Longitude	Altitude (masl)	Length (m)	Area (m^2)	Remarks
Kar_gl 29	Arun	27° 50.50'	87° 5.01'	4862	600	119 114	
Kar_gl 30	Arun	27° 49.73'	87° 5.89'	5273	615	117 190	
Kdu_gl 349	Dudh Koshi	27° 54.33'	86°54.80'	4986	460	52 790	Chokarma Cho
Gka_gl 41	Kali Gandaki	29° 04.55'	83°39.39'	5483	260	21 583	
Gka_gl 42	Kali Gandaki	29° 04.62'	83° 38.23'	5449	195	26 829	
Kmu_gl 129	Mugu Karnali	29° 39.70'	82° 47.76'	4712	2020	681 094	

Category 1: Potentially dangerous glacial lakes without a record of past GLOF events
Category 2: Potentially dangerous glacial lakes with past outburst events
Category 3: Potentially dangerous glacial lakes identified in the inventory but posing no danger at present based on GLOF events in the past

The basin-wise distribution of these three categories of lake is as follows.

Koshi River Basin

Category 1: Ktr_gl 146, Lower Barun, Kdu_gl 28 (Lumding Tsho), Kdu_gl 350 (Imja Tsho), Kdu_gl 422 (Dudh Pokhari), Kdu_gl 442, Kdu_gl 444, Kdu_gl 449 (Hungu Lake), Kdu_gl 459 (East Hungu 1), Kdu_gl 462 (East Hungu 2), Kdu_gl 464, Kdu_gl 466 (West Chamjang), and Tsho Rolpa
Category 2: Ktr_gl 191 (Nagma Pokhari), Kdu_gl 55 (Dig Tsho), and Kdu_gl 399 (Tam Pokhari)
Category 3: Chhubung, Kar_gl 29, Kar_gl 30, and Kdu_gl 349 (Chokarma Cho)

Gandaki River Basin

Category 1: Gbu_gl 9, Gmar_gl 70 (Thulagi), Gka_gl 38, and Gka_gl 67
Category 3: Gka_gl 41 and Gka_gl 42

Karnali River Basin

Category 3: Kmu_gl 129

Chapter 12
Glacial Lake Outburst Flood Mitigation Measures, Monitoring and Early Warning Systems

There are several possible methods for mitigating the impact of Glacial Lake Outburst Flood (GLOF) surges, for monitoring, and for early warning systems. The most important mitigation measure for reducing GLOF risk is to reduce the volume of water in the lake in order to reduce the peak surge discharge.

Downstream in the GLOF prone area, measures should be taken to protect infrastructure against the destructive forces of the GLOF surge. There should be monitoring systems prior to, during, and after construction of infrastructures and settlements in the downstream area.

Careful evaluation by detailed studies of the lake, mother glaciers, damming materials, and the surrounding conditions are essential in choosing an appropriate method and in starting any mitigation measure. Any measure taken must be such that it should not create or increase the risk of a GLOF during and after the mitigation measures are in place. Physical monitoring systems of the dam, lake, mother glacier, and surroundings are necessary at different stages during and after the mitigation process.

12.1 Reducing the Volume of Lake Water

Possible peak surge discharge from a GLOF could be reduced by reducing the volume of water in the lake. In general any one or combination of the following methods may be applied for reducing the volume of water in the lake:

- controlled breaching,
- construction of an outlet control structure,
- pumping or siphoning out the water from the lake, and
- making a tunnel through the moraine barrier or under an ice dam.

Controlled breaching

Controlled breaching is carried out by blasting, excavation, or even by dropping bombs from an aircraft. One of the successful examples has been that reported for Bogatyr Lake in Alatau, Kazakhastan

(Nurkadilov et al. 1986). An outflow channel was excavated using explosives and 7 million cubic metres of water was successfully released in a period of two days. These methods, however, can give strong, uncontrolled regressive erosion of the moraine wall causing a fast lowering of the lake level. Lliboutry et al. (1977a, b, c) described a case from Peru of the sudden discharge of 6–10 million cubic metres of water after two years of careful cutting of a trench in he moraine wall.

Construction of an outlet control structure

For more permanent and precise control of lake outflows, rigid structures made out of stone, concrete, or steel can be used. However, the construction and repairs of the required mitigation works at high elevations, in difficult terrain conditions and in glacial lake areas far from road points and not easily accessed, will cause logistic difficulties. Therefore, preference should be given to construction materials available locally such as boulders and stones. The boulders on the moraine walls can be held in place by wire mesh ('gabion') and/or held down by appropriate anchors.

Open cuts in a moraine dam can be excavated during the dry season when a lake's water level is lower than during the wet season. Such a method is risky as any displacement wave arising from an ice avalanche can rip through the cut and breach the moraine. This method should be attempted where there is no risk of avalanches into the lake.

Pumping or siphoning the water out from the lake

Examples given by Lliboutry et al. (1977a, b, c) from Peru and the pumping programme for the control of Spirit Lake after the eruption of Mount St Helens in Washington State in the USA are very costly because of the large amount of electricity needed for the powerful pumps. The pumping facility consisted of 20 pumps with a total capacity of 5 $m^3 s^{-1}$ and the cost of the pumping plant, operation, and maintenance for about 30 months was approximately US $11 million (Sager and Chambers 1986).

In the Hindu-Kush Himalayan region, there is no hydroelectric power distribution system at high altitudes nor a simple means of transporting fuel to high elevations. Many of the lakes are higher than the maximum flying altitude for helicopters.

The use of a turbine, propelled by the water force at the outside of the moraine dam, will lower the energy costs. The problems, of coupling the turbine and the pumps have to be solved.

Siphons with manageable component size are attractive in that they are readily transportable, relatively easy to install, and can be very effective for smaller size lakes.

Making a tunnel through the moraine dam

Tunnelling through moraines or debris barriers, although risky and difficult because of the type of material blocking the lake, has been carried out in several countries. In Peru, Lliboutry et al. (1977a, b, c) reported problems related to tunnelling through a moraine dam which had been severely affected by an earthquake.

Tunnelling can only be carried out through competent rock beneath or beside a moraine dam. The costs of such a method are very high. Unfortunately, not all moraine dams are suitable for tunnelling.

The construction of tunnels would pose difficulties in the Himalayas due to the high cost of transporting construction materials and equipment to high elevations.

12.2 Preventative Measures Around the Lake Area

Any existing and potential source of a larger snow and ice avalanche, slide, or rockfall around the lake area which has a direct impact on the lake and dam has to be studied in detail. Preventative measures have to be taken such as removing masses of loose rocks to ensure there will be no avalanches into the lake.

12.3 Protecting Infrastructure Against the Destructive Forces of the Surge

The sudden hydrostatic and dynamic forces generated by a rapid moving shock wave can be difficult to accommodate by conventionally designed river structures such as diversion weirs, intakes, bridges, settlements on the river banks, and so on. It will be necessary to build bridges with appropriate flow capacities and spans at elevations higher than those expected under GLOF events. The Nepal–China highway, after reconstruction, has arched bridges well above the 1981 GLOF levels. Also, the road has been moved to higher levels and has gabion protection at the base of the embankments. Settlements should not be built at or near low river terraces but at heights well above the riverbed in an area with GLOF potential. Slopes with potential or old landslides and scree slopes on the banks of the river near settlements should be stabilised. It is essential that appropriate warning devices for GLOF events be developed in such areas.

12.4 Monitoring and Early Warning Systems

A programme of monitoring GLOFs throughout the country should be implemented using a multi-stage approach, multi-temporal data sets, and multi-disciplinary professionals. Focus should first be on the known potentially dangerous lakes and the river systems on which infrastructure is developed. Monitoring, mitigation, and early warning system programmes could involve several phases as follow.

- Detailed inventory and development of a spatial and attribute digital database of the glaciers and glacial lakes using reliable medium- to large-scale (1:63,360 to 1:10,000) topographic maps
- Updating of the inventory of glaciers and glacial lakes and identification of potentially dangerous lakes using remote-sensing data such as the Land Observation Satellite (LANDSAT) Thematic Mapper (TM), Indian Remote Sensing Satellite (IRS)1C/D Linear Imaging and Self Scanning Sensor (LISS)3, Stéréo Système Probatoire d'Observation de la Terre (SPOT) multi-spectral (XS), SPOT panchromatic (PAN) (stereo), and IRS1C/D PAN (stereo) images.
- Semi-detailed to detailed study of the glacial lakes, identification of potentially dangerous lakes and the possible mechanism of a GLOF using aerial photos.
- Annual examination of medium- to high-resolution satellite images, e.g. LANDSAT TM, IRS1D, SPOT, ans so on to assess changes in the different parameters of potentially dangerous lakes and the surrounding terrain
- Brief over-flight reconnaissance with small format cameras to view the lakes of concern more closely and to assess their potential for bursting in the near future
- Field reconnaissance to establish clearly the potential for bursting and to evaluate the need for preventative action
- Detailed studies of the potentially dangerous lakes by multi-disciplinary professionals
- Implementation of appropriate mitigation measure(s) in the highly potentially dangerous lakes
- Regular monitoring of the site during and after the appropriate mitigation measure(s) have been carried out
- Development of a telecommunication and radio broadcasting system integrated with on-site installed hydrometeorological, geophysical, and other necessary instruments at lakes of concern and downstream as early warning mechanisms for minimising the impact of a GLOF
- Interaction/cooperation among all of the related government departments/institutions/agencies / broadcasting media, and others for detailed studies, mitigation activities, and preparedness for possible disasters arising from GLOF events.

12.5 Mitigation Measures, Monitoring, and Early Warning Systems Applied in the Country

Tsho Rolpa is the only glacial lake on which detailed study and mitigation measures are carried out in Nepal. Detailed field investigations of the lake, mother glacier, lake surroundings, and downstream area in the Rolwaling and Tama Koshi Valleys have been studied by different organisations/institutions. In the occurrence of a GLOF from Tsho Rolpa Lake, the resulting flood could cause damage up to 100 km downstream from the lake, threatening about 10,000 human lives, thousands of livestock, agricultural land, bridges, including some components of the Khimti Hydroelectric Project and other infrastructures. Siphons and early warning systems were tested and further studies were carried out to evaluate suitable mitigation measures and their cost.

Test siphon

The Netherlands–Nepal Friendship Association used siphons to test mechanisms and materials for lowering the level of Tsho Rolpa Lake in 1995. The method worked smoothly for some time, but later, due to lack of regular maintenance, the joint couplings broke frequently. The siphon method was successful but to lower the lake water to the level desired, the number of siphon pipes had to be increased substantially.

Implementation of an early warning system

Following panic created by the media in the summer of 1997 in the Rolwaling and Tama Koshi Valleys, His Majesty's Government of Nepal (HMGN) implemented an early warning system at the end of June 1997 to provide timely warning to the people. An army camp was established on the lakeside at the village of Naa, approximately 3 km downstream from the lake. A police post was also established at Naa and another police post was established in Beding, approximately 9 km downstream from the lake. Each of the army and police posts was provided with a HF radio transceiver and the army post at Naa had a back-up set. The two police posts and the army post in Naa were in regular radio contact with their respective headquarters in Kathmandu. In addition the two army posts were provided with satellite telephones. The army post at the lakeside used one of the phones to contact the disaster prevention cell at the Home Ministry twice a day to deliver a status report. In the event of a GLOF, Radio Nepal, the national broadcaster, would broadcast a warning. Radio Nepal can be received in most places along the valleys that are at risk.

The glacial lake outburst flood (GLOF) early warning system

The first flood warning system in the country was installed in May 1998 to warn the people living downstream from Tsho Rolpa Glacial Lake, in the potential GLOF hit area along the Rolwaling and Tama Kosi Valleys as well as at the Khimti Hydroelectric Project (BC Hydro 1998). The Department of Hydrology and Meteorology (DHM) implemented the project and the technical design of the system was by BC Hydro International Limited. It was financed by the World Bank. The total cost of the whole system was US $1,032,000. The operation of the warning system has been satisfactory. There have been a few false alarms due to short circuits caused by moisture in the electrical system.

The GLOF warning system can be essentially divided into two general components: the GLOF sensing system, which detects the occurrence of a GLOF and initiates the warning process, and the downstream warning system, which conveys this warning to communities at risk. These are linked by the signal transmission system. The GLOF warning system transmits its signals in two ways. All stations in the system can transmit signals from one to another using the extended line of site (ELOS) mode of the meteor burst transceivers. In addition, five stations in the GLOF warning system have the capability of transmitting radio signals to a master station located at Dhangadi in western Nepal. From the master station, the messages are relayed either to other stations forming the warning system or to a data monitoring station in Kathmandu. A second data monitoring station is located at the confluence of the Khimti and Tama Koshi.

The signal transmission system

The GLOF warning system is based on the installation of two independent meteor burst remote warning stations (MBRWS) in larger communities, and the installation of one MBRWS in smaller communities. In both cases the warning signal is transmitted via ELOS ground wave signals from a remote station to a remote station down the valley. A warning station based on ELOS ground signals does not require a master station, instead it relies on the signal being passed downstream from one station to the next. ELOS technology can reliably send signals approximately 30 km to the next station. To increase the reliability of the system, each station must be able to 'see' at least two stations within the next 30 km downstream. Thus, if one of these stations fails, the signal can bypass that station and still reach the next station downstream. The spacing of villages at risk satisfies this requirement along most segments of the system. For signal relay purpose, three additional stations were installed where they otherwise would not have been required for community risk purposes. In the vicinity of Simigaon, two remote stations were installed near the valley confluence to ensure adequate reliability that the warning signals would be transmitted beyond this sharp bend in the line of sight. A third relay station was installed at Birkot, subsequent to installation of the warning system, as system tests showed that the station at Gumu Khola would not reach Naya Pul, its second downstream station. In addition to being programmed to receive and transmit ELOS communication signals, remote station technology has been programmed to send and receive meteor burst signals at five stations. This provides additional reliability in the event of failure of two or more successive stations as well as permitting system monitoring from Kathmandu. Monitoring of the warning system is centred in Kathmandu with a back-up data monitoring centre in Khimti. The meteor burst stations cannot directly transmit data to close proximity (say Kathmandu), therefore a master station had to be located in Dhangadi, which transmits data to Kathmandu.

The glacial lake outburst flood sensing system

The GLOF sensing system consists of six sensors with three connected to each of the two remote stations with meteor burst and ELOS capability. The six GLOF sensors are located along the right bank of the river channel just downstream from Tsho Rolpa Lake. The sensors are connected by armoured and shielded cables to two transmitting stations installed within 80m of the sensors. Three sensors are connected to each station and the transmitting stations function independently of one another. Each of the six GLOF sensors is located at a different elevation above the previous high water mark. Thus operation of the different sensors should be indicative of the rising river stages. The sensors and the transmitting stations are spaced laterally along the river to minimise the chances of damage by rockfall or other damage. The sensors transmit signals directly to the remote warning station located in Naa as well as to each other. This remote station at Naa has the dual function of forming part of the GLOF sensing system and providing local warning to the residents of Naa. The warning logic is programmed into the remote station transmitters. A warning would only be transmitted downstream if the control logic determined that a GLOF warning situation existed. The sensor transmitters also send a radio signal to the master station for subsequent relay to communities. The redundancy of transmitting the GLOF warning signal directly to Naa increases the reliability of the GLOF sensing system significantly.

The glacial lake outburst flood warning system

The remote warning stations located in the villages have a Meteor Communication Corporation (MCC) 545 transceiver unit mounted on a 4.67m self-supporting standard galvanising iron power pole. The antenna is mounted on an extension to the pole and is approximately 5m above the ground. An air powered horn, back-up electric horn, lightening rod, and solar panel are also mounted on this pole. The MCC 545 unit, battery, and relay for the horn are mounted inside a sheet metal, lockable shelter attached to the pole. All cables are protected by plastic conduit, covered by galvanised sheet metal and strapped to the pole.

The air horn is designed to operate off a charged air cylinder for a period of 2 min with a reserve for an additional 1–2 min in the event of it being previously operated (false alarm). The electric back-up horn will operate for a period of 4 min. The air horn provides a sound amplitude of 80 dB up to a 150m range under the most adverse conditions. The early warning system consists of 19 warning stations, located at 17 villages along Rolwaling and Tama Koshi Valleys. The automated sirens will warn the villages in case of a GLOF from Tsho Rolpa Glacial Lake.

Mitigation measures at Tsho Rolpa Lake

A detailed multidisciplinary study on the stability of the moraine dam was conducted and an appropriate method for lowering the lake level was chosen. In August 1997, a formulation team visited the lake and recommended that the lake level be lowered by 3m by cutting an open channel in the southwest part of the end moraine (DHM 1997c). The Netherlands Government funded this project and a grant agreement was signed in August 1998 between the Netherlands and HMGN. Table 12.1 outlines the general project features.

Table 12.1: General outline of Tsho Rolpa Migitigation Project	
Donor country	The Netherlands
Donor's representative in Nepal	Netherlands Development Agency (Neda)
Grant amount	NGL 5,977,263.60 (US $2,988,625)
Implementing agency	DHM
Duration of project	4 years (August 1998 to December 2002)
Completion of construction	30 June 2000 (lake level lowered by 3 m)
HMGN contribution (Years 3 and 4)	US $115 414
International technical advisor (ITA)	Reynolds Geo-Sciences Ltd (RGSL), UK
Contractor (design/build)	Butwal Power Company Ltd (BPC)
Contractor (civil construction)	Himal Hydro and General Construction Ltd (HH)

The objective of lowering the lake water by 3m immediately and tangibly is to reduce the risk of breach through the natural moraine dam. This GLOF risk reduction system consists of a lined channel constructed through the western end moraine (DHM 1998b). Some information about the project construction are given below.

- The channel will pass through a depression in the moraine commonly referred to as the Horseshoe Lake (Figures 12.1 and 12.2).

Figure 12.1: Aerial view of end moraine area of Tsho Rolpa Glacial Lake showing the mitigation project construction site (photograph source: DHM 2000)

Figure 12.2: Closer view of Tsho Rolpa Glacial Lake mitigation construction site (photograph source DHM 2000)

- The channel will be 6.4m wide at the bottom.
- The bottom elevation of the channel at the gate structure will be 4.2 below datum.
- The channel bottom will be flat upstream of the gate structure and will have a gradation of 0.3% downstream of the gate.
- The channel sides will be sloped at 2H:1V.
- A gate structure will be located in the channel (Figure 12.3).
- There will be three gates, each 2m wide and capable of being opened 1.5m above the channel bottom.
- The 20m of the channel upstream of the gates will be lined with gabion mattresses extending 1m above datum. The gabion mattresses will be underlain by (in turn) a geotextile, 100 mm of sand, a geomembrane, a geotextile, and a further 100 mm of sand (Figure 12.3).
- The channel is designed to convey the design flood flow of 14.6 $m^3 s^{-1}$ and the extreme flood flow of 30 $m^3 s^{-1}$.

The work was 90% complete when the construction was halted for the winter shut-down in October 1999 (DHM 2000). The construction work began again in April 2000. The status of construction work as of 30 June 2000 is given below.

- All construction work in the canal area was complete by the middle of May.
- The filling of the canal section between the gates and the cofferdam began at the end of May.
- Between 1 and 6 June, several tests for canal stability, stability of the downstream moraine slope, and flow conditions were conducted by releasing the ponded water.

- After 6 June the filling of the canal upstream with water began and continued until June 8 (Figure 12.4).
- The official beginning of drawdown was at 11 am on 8 June. The daily drawdown rate was maintained well below the allowed 25 cm. By late June a drawdown of 3m was achieved (Figure 12.5).
- After drawdown the unlined portion of the canal was given the specified configuration.
- The downstream part of the moraine, where the new flow took place, was closely monitored for the possibility of erosion. No erosion occurred on the slope. Some toe erosion of talus slopes opposite the moraine occurred.

Figure 12.3: Gate structure with partially erected gates. In the foreground geomembrane and geotextile are being laid (photo credit: Shrestha 2000)

Figure 12.4: Synoptic view of mitigation construction activity at the end moraine of Tsho Rolpa Glacial Lake to reduce the lake water level (photo credit: Shrestha 2000)

- The moraine slopes were monitored for possible failure due to drawdown of the lake water. No abnormal activities were seen.
- Due to water flowing over the moraine slope the location of the third bridge, as planned initially, had to be abandoned. Later, after much discussion with the local people, a decision was made to construct the bridge just downstream of the gate and to improve the approach trail to the bridge.

While the lowering of the lake by 3m is expected to reduce the risk of GLOF, it is not a permanent solution. The formulation mission also postulated a second project, the Tsho Rolpa GLOF Permanent Remediation Project (TRPRP), that would have the objective of lowering the water level in the lake by a further 17m (giving a total of 20m). Lowering the water level by 20m is considered sufficient to permanently eliminate the possibility of a GLOF emanating from Tsho Rolpa Lake. Among other options, BPC has investigated the possibility of a 20m lake level lowering by micro-tunnelling through the southern lateral moraine (Neda 2000).

Figure 12.5: Downstream view of outlet canal and gate structure (photo credit: Shrestha 2000)

Chapter 13
Conclusions

Databases of the glaciers and glacial lakes of Nepal, based on medium- to large-scale topographic maps, have not been developed prior to the present study. For the glacier inventory the study used the methodology developed by the Temporary Technical Secretary for the World Glacier Inventory (Muller et al. 1977), and for the glacial lake inventory, the methodology developed by the Lanzhou Institute of Glaciology and Geocryology (LIGG) (LIGG/Water and Energy Commission Secretariat (WECS)/Nepal Electricity Authority [NEA] 1988) was used with modification. The present methodology for the compilation of inventories of glaciers and glacial lakes of Nepal is applied using medium-scale maps.

The topographic maps published by the Survey of India in the 1950s–1970s on a scale of 1:63,360, based on aerial photographs and field verification, are the only map series that cover the whole of Nepal on a medium scale. Based on this map series, spatial and attribute databases of glaciers and glacial lakes were developed.

Creating inventories of and monitoring glaciers and glacial lakes can be done quickly and correctly using a combination of satellite images and aerial photographs simultaneously with topographic maps. The multi-stage approach of using remotely-sensed data and field data increases the ability and accuracy of the work. The integration of visual and digital image analysis with a geographic information system (GIS) can provide very useful tools for the study of glaciers, glacial lakes, and Glacial Lake Outburst Floods (GLOFs).

Analysts' experiences and adequate field knowledge of the physical characteristics of the glacier and lake and their associated features are always necessary for the interpretation of the topographic maps, satellite images, and aerial photographs. Evaluation of spectral responses by different surface cover types in different bands of satellite images is necessary. Different techniques of digital image enhancement and spectral classification of ground features are useful for the study of glaciers and lakes. Different spectral band combinations in False Colour Composite (FCC) and individual spectral bands were used to study glaciers and glacial lakes using knowledge of image interpretation keys.

The Digital Elevation Model (DEM) is useful to decide the rules for discrimination of features and land-cover types in GIS techniques and for better perspective viewing and presentations. A DEM suitable for the present study of the whole country is not yet available.

The inventory of glaciers and glacial lakes of Nepal as a whole is divided into four major basins, namely, the Mahakali, Karnali, Gandaki, and Koshi Basins from west to east. Among the basins only 35% of the

Mahakali River Basin lies within the territory of Nepal and comprises 87 glaciers with an area of 143 sq.km and an estimated ice reserve of 10 km^3. The Karnali River Basin consists of 1,361 glaciers 1,740 sq.km area and an estimated ice reserve of 128 km^3. The Gandaki River Basin consists of 1,025 glaciers covering an area of 2,029 sq.km with an ice reserve of 191 km^3. Similarly the Koshi River Basin comprises 779 glaciers with an area of 1,410 sq.km and an estimated ice reserve of 152 km^3. There are 3,252 glaciers altogether, which cover an area of 5,322 sq.km with approximately 481 km^3 of ice reserves within the territory of Nepal. The largest glacier found is Ktr 193 located in Tamor Sub-basin. It has an area of 94.52 sq.km and is of the valley type.

Prior to the present study, there was hardly an inventory of lakes of the country. In the present study, lakes at an elevation higher than 3,500 masl are considered as glacial lakes. Some of the lakes inventoried are isolated and far behind the ice mass, which may or may not be the glacial origin. The Mahakali River Basin within the territory of Nepal consists of 16 lakes, the Karnali River Basin consists of 907 lakes, the Gandaki River Basin consists of 338 lakes, and the Koshi River Basin contains 1,062 lakes. Altogether 2,323 glacial lakes were identified in Nepal. The largest glacial lake found is (Kbh_gl 10) (Phoksondo Tal) located in the Bheri Sub-basin. It has an area of 4.528 sq.km and is of the valley type.

Altogether 21 GLOF events were identified by the present study, of which nine events occurred in the Tibetan catchment of rivers flowing into Nepal. Dates of only 14 GLOF events are known. Out of these, five GLOF events occurred inside Nepal. The 14 GLOF events were described and in some of them damage was also quantified.

The study of glacial lakes in Nepal started in 1985 after the outburst of Dig Tsho Lake on 4 August 1985. So far six lakes have been studied, of which Tsho Rolpa Glacial Lake is the only one where detailed study and mitigation measures have been carried out.

The characteristic features of the identified potentially dangerous lakes in general are:

- moraine-dammed glacial lakes in contact or very near to large glaciers,
- merging of supraglacial lakes at the glacier tongue, such as Tsho Rolpa Lake of Tama Koshi River Basin and West Chamjang Lake in the Dudh Koshi River Basin,
- some new lakes of considerable size formed at glacier tongues such as Lower Barun Lake,
- lakes rapidly growing in size, and
- rejuvenation of lakes after a past glacial lake outburst event.

All these potentially dangerous lakes have been classified into the following three categories.

Category 1: Potentially dangerous glacial lakes without a record of past GLOF events

Category 2: Potentially dangerous glacial lakes with past outburst events

Category 3: Potentially dangerous glacial lakes identified in the inventory but posing no danger at present based on GLOF events in the past

It was found that 16 lakes belong to category 1, three lakes to category 2, and seven lakes to category 3. Out of these, three lakes have been found with known outburst events, and six GLOF events were seen in satellite images. Two more outburst events (Nare and Chubung) were noted in satellite images that were not formed or mapped during topographic mapping in the 1960s.

Altogether 20 glacial lakes are identified as potentially dangerous; and these include 16 glacial lakes in category 1, 3 glacial lakes in category 2, and 1 glacial lake (Lower Barun) not shown in the topographic map tabulated in the 1960s. It is recommended that these lakes are subjected to further field survey and investigation.

Among the potentially dangerous lakes, the only lake for which mitigation measures are taken is Tsho Rolpa. As a mitigation measure, an appropriate method for lowering the water level was chosen. For the mitigation work at Tsho Rolpa Lake, the major funding is from the Netherlands Government (US $2,988,625) and His Majesty's Government of Nepal (HMGN) contributes US $115,414. Mitigation of a Tsho Rolpa GLOF will be achieved only when the lake level is lowered by a total of 20m, phase-wise, i.e.

by discharging 35 million m^3 of water through gated canal openings. In its first phase the lowering was planned for 3m through a gated canal 3m deep and 70m long along the moraine dam. The first phase of mitigation work was completed by the end of June 2000.

There are several possible methods for mitigating the impact of GLOF surge, for monitoring, and for early warning systems. Careful evaluation by detailed studies of lakes, mother glaciers, damming materials, and the surrounding conditions are essential in choosing the appropriate method and in starting mitigation measures.

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SUMMARY OF GLACIERS AND GLACIAL LAKES OF NEPAL

S.N.	All Nepal	Glaciers			Glacial Lakes	
		Number	Area (km^2)	Ice Reserves (km^3)	Number	Area (km^2)
	Total	**3,252**	**5,323.89**	**481.23**	**2,323**	**75.70**

Koshi River Basin

S.N.	Sub basins Name	Glaciers			Glacial Lakes	
		Number	Area (km^2)	Ice Reserves (km^3)	Number	Area (km^2)
1	Tamor River	261	474.15	56.64	356	7.32
2	Arun River	91	216.07	23.47	109	2.53
3	Dudh Koshi River	278	482.20	51.01	473	13.07
4	Likhu River	28	30.19	1.94	14	0.22
5	Tama Koshi River	80	109.69	10.37	57	1.26
6	Sun Koshi River	23	74.56	7.19	35	0.41
7	Indrawati River	18	22.98	1.44	18	0.28
	Total	**779**	**1,409.84**	**152.06**	**1,062**	**25.09**

Gandaki River Basin

S.N.	Sub basins Name	Glaciers			Glacial Lakes	
		Number	Area (km^2)	Ice Reserves (km^3)	Number	Area (km^2)
1	Trishuli River	74	246.65	27.47	117	2.03
2	Budhi Gandaki River	180	442.14	40.40	37	0.64
3	Marsyangdi River	311	614.31	54.99	78	6.28
4	Seti River	61	164.48	16.88	10	0.26
5	Kali Gandaki River	399	562.67	51.65	96	3.29
	Total	**1,025**	**2,030.25**	**191.39**	**338**	**12.50**

Karnali River Basin

S.N.	Sub basins Name	Glaciers			Glacial Lakes	
		Number	Area (km^2)	Ice Reserves (km^3)	Number	Area (km^2)
1	Bheri River	452	583.40	47.77	152	9.16
2	Mugu Karnali River	254	220.39	12.52	280	8.56
3	Tila River	58	54.69	3.75	71	4.97
4	Humla Karnali River	424	534.53	36.00	345	13.01
5	Kawari River	39	53.33	3.29	44	1.57
6	West Seti River	134	294.13	24.48	15	0.40
	Total	**1,361**	**1,740.47**	**127.81**	**907**	**37.67**

Mahakali River Basin

S.N.	Sub basin Name	Glaciers			Glacial Lakes	
		Number	Area (km^2)	Ice Reserves (km^3)	Number	Area (km^2)
1	Mahakali River	87	143.33	10.06	16	0.38
	Total	**87**	**143.33**	**10.06**	**16**	**0.38**

Annex 1
Database of Glacier Inventory

Glacier Inventory of Tamor Basin

Total Number : 261 Total Area : 474.15 (km^2) Ice Reserve : 56.64 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Ktr_gr 1		72 M/10	2787/07	68_44	27º39.46'	87º38.34'	0.13	360	5323	5176	5029	NE	NE	750225	18	0.0023
Ktr_gr 2		72 M/10	2787/07	68_44	27º39.58'	87º37.94'	0.32	635	5323	5206	5090	NW	NW	630214	26	0.0085
Ktr_gr 3		72 M/10	2787/07	68_44	27º40.33'	87º37.32'	1.00	760	5182	4953	4724	NE	NE	630113	42	0.0419
Ktr_gr 4		72 M/10	2787/07	68_44	27º40.74'	87º37.13'	0.53	1203	5182	4983	4785	NE	NE	630113	33	0.0173
Ktr_gr 5		72 M/10	2787/07	50_22	27º41.50'	87º37.32'	0.70	823	5182	5136	5090	SE	SE	630113	36	0.0255
Ktr_gr 6		72 M/10	2787/07	50_22	27º41.99'	87º37.54'	0.80	1584	5486	5273	5060	SE	SE	630313	38	0.0308
Ktr_gr 7		72 M/10	2787/07	50_22	27º42.29'	87º37.68'	0.25	633	5486	5380	5273	SE	SE	630213	24	0.0059
Ktr_gr 8		72 M/10	2787/07	50_22	27º42.31'	87º38.11'	0.55	1520	5334	5044	4755	S	S	630314	33	0.0182
Ktr_gr 9		72 M/10	2787/07	50_22	27º42.32'	87º38.67'	0.15	887	5334	5182	5029	SE	SE	750124	19	0.0028
Ktr_gr 10		72 M/10	2787/07	50_22	27º42.82'	87º38.79'	0.45	887	5304	5151	4999	E	E	630213	31	0.0137
Ktr_gr 11		72 M/10	2787/07	50_22	27º43.16'	87º38.74'	0.43	1013	5182	4968	4755	NE	NE	630214	30	0.0129
Ktr_gr 12		72 M/10	2787/07	68_8	27º40.58'	87º42.42'	0.09	443	5139	4886	4633	NW	NW	753225	15	0.0013
Ktr_gr 13		72 M/10	2787/07	68_8	27º40.49'	87º43.15'	0.05	253	4877	4831	4785	NE	NE	750224	10	0.0005
Ktr_gr 14		72 M/9	2787/07	50_22	27º44.05'	87º39.83'	0.11	253	5029	4999	4968	NE	NE	750125	16	0.0018
Ktr_gr 15		72 M/9	2787/03	51_46	27º45.47'	87º39.62'	1.01	1585	5436	5278	5120	S	S	630213	42	0.0425
Ktr_gr 16		72 M/9	2787/03	51_46	27º45.56'	87º40.33'	2.13	2660	5691	5405	5120	S	S	620214	55	0.1181
Ktr_gr 17		72 M/9	2787/03	51_46	27º45.08'	87º40.80'	0.14	317	5480	5340	5200	S	S	770213	18	0.0025
Ktr_gr 18		72 M/9	2787/03	51_46	27º45.08'	87º41.21'	0.17	1205	5403	5251	5100	NE	NE	630213	20	0.0034
Ktr_gr 19		72 M/9	2787/03	51_46	27º45.29'	87º41.10'	0.19	890	5300	5210	5120	NE	NE	630213	21	0.0040
Ktr_gr 20		72 M/9	2787/03	51_46	27º46.22'	87º40.97'	0.64	2280	5440	5120	4800	NE	NE	630214	35	0.0225
Ktr_gr 21		72 M/9	2787/03	51_41	27º46.35'	87º40.77'	0.31	1900	5250	5105	4960	NE	NE	630211	26	0.0081
Ktr_gr 22		72 M/9	2787/03	51_41	27º46.76'	87º40.44'	0.69	1900	5500	5250	5000	NE	NE	630214	36	0.0250
Ktr_gr 23		72 M/9	2787/03	51_41	27º47.38'	87º40.35'	0.84	1585	5428	5224	5020	NE	NE	630214	39	0.0329
Ktr_gr 24		72 M/9	2787/03	51_41	27º47.87'	87º40.45'	0.73	1460	5300	5180	5060	NE	NE	630213	37	0.0271
Ktr_gr 25		72 M/9	2787/03	51_41	27º48.24'	87º40.21'	0.61	1400	5599	5309	5020	NE	NE	630114	35	0.0211
Ktr_gr 26		72 M/9	2787/03	51_41	27º48.52'	87º41.74'	0.38	1077	5300	5200	5100	NW	NW	620213	28	0.0108
Ktr_gr 27		72 M/9	2787/03	51_41	27º47.95'	87º43.22'	0.15	635	5180	5080	4980	SW	SW	770213	19	0.0028
Ktr_gr 28		72 M/9	2787/03	51_41	27º48.21'	87º43.33'	0.08	510	5360	5230	5100	SE	SE	770213	14	0.0011
Ktr_gr 29		72 M/9	2787/03	51_41	27º49.48'	87º44.45'	0.28	1270	5600	5450	5300	SW	SW	650213	25	0.0070
Ktr_gr 30		72 M/9	2787/03	51_41	27º49.77'	87º45.24'	2.81	2985	5750	5565	5380	SE	SE	520213	61	0.1720

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 31		72 M/13	2787/04	51_48	27º48.64'	87º46.44'	8.03	5700	6233	5467	4700	SW	SW	520313	88	0.7073
Ktr_gr 32		72 M/13	2787/04	51_48	27º47.40'	87º45.93'	0.12	506	5486	5410	5334	SW	SW	753211	17	0.0020
Ktr_gr 33		72 M/13	2787/04	51_48	27º47.13'	87º46.08'	0.19	887	5486	5349	5212	SW	SW	750213	21	0.0040
Ktr_gr 34		72 M/13	2787/04	51_48	27º48.45'	87º47.34'	0.15	510	5425	5349	5273	SE	SE	750223	19	0.0028
Ktr_gr 35		72 M/13	2787/04	51_48	27º47.75'	87º47.94'	5.72	3170	5547	5212	4877	NW	NW	520323	78	0.4488
Ktr_gr 36		72 M/13	2787/04	51_48	27º46.71'	87º48.47'	0.06	190	5182	5105	5029	W	W	750213	12	0.0007
Ktr_gr 37		72 M/13	2787/04	51_48	27º46.41'	87º48.38'	0.61	1140	5334	5151	4968	NW	NW	630213	35	0.0211
Ktr_gr 38		72 M/13	2787/04	51_48	27º45.74'	87º48.28'	0.58	890	5486	5243	4999	NW	NW	630213	34	0.0196
Ktr_gr 39		72 M/13	2787/04	51_48	27º45.42'	87º47.93'	0.55	890	5456	5197	4938	NW	NW	630113	33	0.0182
Ktr_gr 40		72 M/14	2787/08	51_48	27º44.86'	87º47.62'	0.06	380	5425	5319	5212	NW	NW	750221	12	0.0007
Ktr_gr 41		72 M/14	2787/08	50_18	27º44.39'	87º47.44'	0.18	255	5029	4968	4907	NW	NW	640223	20	0.0037
Ktr_gr 42		72 M/14	2787/08	50_18	27º43.94'	87º47.15'	0.07	445	4968	4892	4816	NW	NW	750223	13	0.0009
Ktr_gr 43		72 M/14	2787/08	50_18	27º43.51'	87º46.99'	0.07	315	5029	4938	4846	SW	SW	750223	13	0.0009
Ktr_gr 44		72 M/13	2787/04	51_48	27º45.90'	87º48.74'	0.15	696	5365	5197	5029	S	S	630213	19	0.0028
Ktr_gr 45		72 M/13	2787/04	51_48	27º45.67'	87º49.08'	0.10	190	5182	5121	5060	S	S	750123	15	0.0015
Ktr_gr 46		72 M/14	2787/08	50_18	27º44.90'	87º49.22'	0.07	380	5151	5014	4877	NW	NW	750223	13	0.0009
Ktr_gr 47		72 M/14	2787/08	50_18	27º44.17'	87º49.22'	0.04	190	5121	5060	4999	W	W	630211	9	0.0004
Ktr_gr 48		72 M/13	2787/04	51_48	27º45.64'	87º49.47'	0.15	630	5151	5029	4907	N	N	620213	19	0.0028
Ktr_gr 49		72 M/13	2787/04	51_48	27º46.29'	87º48.85'	0.66	1270	5365	5212	5060	NE	NE	750213	36	0.0235
Ktr_gr 50		72 M/13	2787/04	51_48	27º46.60'	87º48.81'	0.07	380	5486	5380	5273	E	E	750222	13	0.0009
Ktr_gr 51		72 M/13	2787/04	51_48	27º46.86'	87º48.94'	0.09	315	5365	5273	5182	SE	SE	750222	15	0.0013
Ktr_gr 52		72 M/13	2787/04	51_48	27º47.28'	87º49.34'	1.03	1900	5669	5273	4877	SE	SE	633113	42	0.0436
Ktr_gr 53		72 M/13	2787/04	51_48	27º47.94'	87º48.89'	0.16	630	5365	5273	5182	NE	NE	750224	19	0.0031
Ktr_gr 54		72 M/13	2787/04	51_48	27º48.80'	87º49.34'	0.69	950	5547	5380	5212	SE	SE	620224	36	0.0250
Ktr_gr 55		72 M/13	2787/04	51_48	27º48.95'	87º49.71'	0.10	506	5730	5563	5395	SE	SE	750224	15	0.0015
Ktr_gr 56		72 M/13	2787/04	51_48	27º49.90'	87º49.47'	0.27	1460	5578	5273	4968	NE	NE	633212	25	0.0066
Ktr_gr 57		72 M/13	2787/04	51_48	27º49.59'	87º49.37'	0.10	315	5578	5456	5334	W	W	633212	15	0.0015
Ktr_gr 58		72 M/13	2787/04	51_48	27º49.27'	87º48.81'	0.13	510	5395	5273	5151	NW	NW	750221	18	0.0023
Ktr_gr 59		72 M/13	2787/04	51_48	27º48.97'	87º48.36'	0.54	1460	5334	5182	5029	N	N	630213	33	0.0178
Ktr_gr 60		72 M/13	2787/04	51_48	27º49.37'	87º48.01'	0.06	250	5547	5441	5334	NW	NW	750124	12	0.0007
Ktr_gr 61		72 M/13	2787/04	51_48	27º49.29'	87º47.81'	0.06	510	5730	5502	5273	N	N	750223	12	0.0007
Ktr_gr 62		72 M/13	2787/04	52_17	27º49.50'	87º47.68'	0.20	625	5608	5425	5243	N	N	750225	22	0.0043
Ktr_gr 63		72 M/13	2787/04	52_17	27º49.96'	87º47.50'	0.11	445	5486	5334	5182	N	N	770224	16	0.0018
Ktr_gr 64		72 M/13	2787/04	52_17	27º49.70'	87º46.88'	1.06	1584	5730	5410	5090	N	N	520214	43	0.0454
Ktr_gr 65		72 M/13	2787/04	52_17	27º50.89'	87º46.76'	4.36	2525	6233	5585	4938	SE	SE	520314	71	0.3115
Ktr_gr 66		72 M/13	2787/04	52_17	27º50.32'	87º46.63'	0.15	825	6096	5715	5334	N	N	670213	19	0.0028
Ktr_gr 67		72 M/13	2787/04	52_17	27º51.62'	87º47.63'	0.22	445	5730	5578	5425	S	S	370212	22	0.0049
Ktr_gr 68		72 M/13	2787/04	52_17	27º51.62'	87º47.81'	0.09	380	5730	5578	5425	SE	SE	370212	15	0.0013
Ktr_gr 69		72 M/13	2787/04	52_17	27º51.29'	87º48.16'	0.20	510	5090	5166	5243	E	E	640212	22	0.0043
Ktr_gr 70		72 M/13	2787/04	52_17	27º51.99'	87º47.89'	0.45	950	5730	5395	5060	E	E	670214	31	0.0137
Ktr_gr 71		72 M/13	2787/04	52_16	27º52.28'	87º47.57'	1.14	1585	5639	5349	5060	NE	NE	623214	44	0.0502
Ktr_gr 72		72 M/13	2787/04	52_16	27º52.75'	87º48.22'	0.16	825	4968	4831	4694	NE	NE	750224	19	0.0031
Ktr_gr 73		72 M/13	2787/04	52_16	27º52.11'	87º47.12'	0.08	445	5944	5791	5639	E	E	750214	14	0.0011

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 74		72 M/13	2787/04	52_16	27º52.72'	87º46.94'	1.80	4520	6401	5669	4938	NE	NE	603214	52	0.0939
Ktr_gr 75		72 M/13	2787/04	52_16	27º52.84'	87º47.41'	0.05	255	5913	5745	5578	NE	NE	750214	10	0.0005
Ktr_gr 76		72 M/13	2787/04	52_16	27º54.03'	87º47.70'	0.55	825	5791	5578	5364	SE	SE	673214	33	0.0182
Ktr_gr 77		72 M/13	2787/04	53_54	27º54.71'	87º48.73'	0.05	380	5425	5334	5243	SW	SW	750211	10	0.0005
Ktr_gr 78		72 M/13	2787/04	53_54	27º54.94'	87º48.72'	0.08	380	5639	5532	5425	E	E	673211	14	0.0011
Ktr_gr 79		72 M/13	2787/04	53_54	27º55.18'	87º49.05'	0.19	760	5700	5593	5486	SE	SE	630213	21	0.0040
Ktr_gr 80		72 M/13	2787/04	53_54	27º54.87'	87º49.51'	0.32	695	5639	5441	5243	SW	SW	643213	26	0.0085
Ktr_gr 81		72 M/13	2787/04	53_55 & 56	27º54.12'	87º50.33'	9.10	8430	6279	5532	4785	SW	SW	510123	92	0.8362
Ktr_gr 82		72 M/13	2787/04	53_55 & 56	27º55.23'	87º51.04'	0.68	950	6157	5715	5273	SW	SW	633213	36	0.0245
Ktr_gr 83		72 M/13	2787/04	53_55 & 56	27º54.85'	87º51.63'	1.63	2220	6005	5624	5243	SW	SW	630214	50	0.0820
Ktr_gr 84		72 M/13	2787/04	53_55 & 56	27º53.00'	87º51.01'	0.40	570	5791	5517	5243	W	W	603213	29	0.0116
Ktr_gr 85		72 M/13	2787/04	53_55 & 56	27º53.13'	87º51.31'	0.43	825	5852	5578	5304	E	E	633213	30	0.0129
Ktr_gr 86		72 M/13	2787/04	53_55 & 56	27º53.37'	87º51.53'	0.17	190	5852	5669	5486	SE	SE	770413	20	0.0034
Ktr_gr 87		72 M/13	2787/04	53_55 & 56	27º53.51'	87º53.13'	7.58	5080	6035	5486	4938	S	S	520113	86	0.6548
Ktr_gr 88		72 M/13	2787/04	53_55 & 56	27º52.05'	87º52.80'	0.08	190	5578	5456	5334	W	W	750221	14	0.0011
Ktr_gr 89		72 M/13	2787/04	53_55 & 56	27º51.63'	87º52.64'	0.14	570	5700	5502	5304	N	N	750214	18	0.0025
Ktr_gr 90		72 M/13	2787/04	53_55 & 56	27º51.21'	87º52.52'	0.15	380	5791	5486	5182	W	W	370213	19	0.0028
Ktr_gr 91		72 M/13	2787/04	103_3	27º51.13'	87º52.71'	0.10	320	5791	5715	5639	S	S	370213	15	0.0015
Ktr_gr 92		72 M/13	2787/04	103_3	27º51.28'	87º52.74'	0.07	190	5791	5715	5639	E	E	370213	13	0.0009
Ktr_gr 93		72 M/13	2787/04	103_3	27º53.16'	87º53.86'	1.01	1270	5944	5593	5243	E	E	630213	42	0.0425
Ktr_gr 94		72 M/13	2787/04	103_3	27º53.31'	87º54.29'	0.03	150	5791	5700	5608	SE	SE	750221	7	0.0002
Ktr_gr 95		72 M/13	2787/04	103_3	27º53.61'	87º55.41'	10.44	6330	5974	5456	4938	SW	SW	520113	96	1.0046
Ktr_gr 96		72 M/13	2787/04	53_58	27º54.45'	87º54.84'	1.31	1900	5883	5639	5395	S	S	530513	46	0.0608
Ktr_gr 97		72 M/13	2787/04	53_58	27º54.96'	87º55.63'	0.06	320	5791	5685	5578	S	S	750513	12	0.0007
Ktr_gr 98		72 M/13	2787/04	53_58	27º51.75'	87º55.45'	2.17	1710	6035	5669	5304	SE	SE	630213	56	0.1211
Ktr_gr 99		72 M/13	2787/04	53_58	27º49.98'	87º57.99'	30.76	9630	6553	5578	4602	W	W	510113	137	4.2266
Ktr_gr 100		72 M/13	2787/04	53_58	27º50.99'	87º57.32'	0.26	760	5669	5425	5182	NW	NW	630213	24	0.0063
Ktr_gr 101		72 M/13	2787/04	52_11	27º51.39'	87º57.67'	0.09	445	5822	5700	5578	S	S	370511	15	0.0013
Ktr_gr 102		72 M/13	2787/04	52_11	27º51.39'	87º58.34'	5.30	5440	6401	5867	5334	S	S	520213	76	0.4051
Ktr_gr 103		72 M/13	2787/04	52_11	27º51.83'	87º59.54'	0.26	445	6447	6271	6096	SW	SW	370514	24	0.0063
Ktr_gr 104		72 M/13	2787/04	52_11	27º50.82'	87º59.12'	0.17	695	5974	5776	5578	SW	SW	750514	20	0.0034
Ktr_gr 105		72 M/13	2787/04	51_54	27º49.81'	87º59.20'	0.08	255	6005	5898	5791	NW	NW	750215	14	0.0011
Ktr_gr 106		72 M/13	2787/04	51_54	27º49.60'	87º55.52'	2.99	2850	6096	5319	4542	NW	NW	525114	63	0.1871
Ktr_gr 107		72 M/13	2787/04	51_54	27º48.88'	87º54.30'	1.32	1900	5883	5334	4785	NW	NW	530114	47	0.0614
Ktr_gr 108		72 M/13	2787/04	51_54	27º48.52'	87º53.88'	0.37	1390	5883	5349	4816	W	W	530214	28	0.0104
Ktr_gr 109		72 M/13	2787/04	51_54	27º48.47'	87º54.35'	0.23	825	5883	5685	5486	W	W	630212	23	0.0053
Ktr_gr 110		72 M/13	2787/04	51_54	27º48.20'	87º54.36'	0.37	1260	5883	5532	5182	SW	SW	630214	28	0.0104
Ktr_gr 111		72 M/13	2787/04	51_54	27º47.65'	87º54.63'	3.23	3160	6005	5258	4511	W	W	632114	64	0.2078
Ktr_gr 112		72 M/13	2787/04	51_54	27º46.58'	87º53.87'	0.03	150	5334	5258	5182	S	S	750214	7	0.0002
Ktr_gr 113		72 M/13	2787/04	51_54	27º46.34'	87º54.91'	3.19	1590	6005	5593	5182	SW	SW	633214	64	0.2043
Ktr_gr 114		72 M/13	2787/04	51_54	27º45.17'	87º54.66'	0.79	1015	6410	5659	4907	N	N	630213	38	0.0302
Ktr_gr 115		72 M/13	2787/04	51_54	27º45.94'	87º53.38'	1.21	3515	4846	4557	4267	NW	NW	530123	45	0.0545
Ktr_gr 116		72 M/14	2787/08	50_15	27º44.99'	87º54.11'	0.21	320	6492	5974	5456	S	S	370213	22	0.0046

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 117		72 M/14	2787/08	50_15	27º44.43'	87º54.47'	2.30	4430	6096	5349	4602	W	W	520113	57	0.1311
Ktr_gr 118		72 M/14	2787/08	50_15	27º44.23'	87º54.96'	0.08	250	5883	5776	5669	NW	NW	370215	14	0.0011
Ktr_gr 119		72 M/14	2787/08	50_15	27º43.84'	87º54.30'	0.07	190	6218	6126	6035	NW	NW	370215	13	0.0009
Ktr_gr 120		72 M/14	2787/08	50_15	27º43.86'	87º53.92'	0.11	255	5791	5654	5517	NE	NE	370213	16	0.0018
Ktr_gr 121		72 M/14	2787/08	50_15	27º43.71'	87º53.90'	0.15	190	5883	5745	5608	W	W	370213	19	0.0028
Ktr_gr 122		72 M/14	2787/08	50_15	27º43.07'	87º54.25'	1.72	3250	6218	5425	4633	W	W	520114	51	0.0882
Ktr_gr 123		72 M/14	2787/08	50_15	27º42.78'	87º54.71'	0.32	630	6157	5989	5822	NW	NW	630512	26	0.0085
Ktr_gr 124		72 M/14	2787/08	50_15	27º42.60'	87º54.38'	0.26	380	5486	5410	5334	W	W	640213	24	0.0063
Ktr_gr 125		72 M/14	2787/08	50_15	27º42.26'	87º54.51'	0.27	825	5486	5227	4968	SW	SW	630213	25	0.0066
Ktr_gr 126		72 M/14	2787/08	50_15	27º41.45'	87º54.45'	0.92	1710	5700	5334	4968	SW	SW	633214	41	0.0373
Ktr_gr 127		72 M/14	2787/08	50_15	27º41.10'	87º54.36'	0.10	190	5243	5182	5121	SE	SE	370211	15	0.0015
Ktr_gr 128		72 M/14	2787/08	50_15	27º41.24'	87º54.82'	0.31	890	5700	5410	5121	S	S	630213	26	0.0081
Ktr_gr 129		72 M/14	2787/08	50_15	27º41.31'	87º55.31'	0.59	1900	5700	5243	4785	SE	SE	630113	34	0.0201
Ktr_gr 130		72 M/14	2787/08	50_15	27º41.52'	87º55.71'	0.07	380	5365	5288	5212	E	E	750214	13	0.0009
Ktr_gr 131		72 M/14	2787/08	50_15	27º41.66'	87º55.46'	0.09	380	5486	5349	5212	E	E	750214	15	0.0013
Ktr_gr 132		72 M/14	2787/08	50_15	27º42.06'	87º55.18'	1.98	2410	5910	5569	5227	E	E	623314	54	0.1069
Ktr_gr 133		72 M/14	2787/08	50_15	27º42.55'	87º55.76'	0.23	825	5578	5380	5182	NE	NE	630213	23	0.0053
Ktr_gr 134		72 M/14	2787/08	50_15	27º42.74'	87º55.36'	0.34	890	6157	5608	5060	E	E	630213	27	0.0092
Ktr_gr 135	Naphumba	72 M/14	2787/08	50_15	27º43.01'	87º55.11'	1.42	1900	5974	5601	5227	NE	NE	630314	48	0.0679
Ktr_gr 136		72 M/14	2787/08	50_15	27º43.51'	87º54.99'	0.37	1835	5974	5654	5334	SE	SE	630213	28	0.0104
Ktr_gr 137		72 M/14	2787/08	50_15	27º43.82'	87º55.02'	0.90	1900	5974	5601	5227	E	E	630313	40	0.0362
Ktr_gr 138		72 M/14	2787/08	50_15	27º44.55'	87º55.27'	0.03	200	6142	5989	5837	SE	SE	370213	7	0.0002
Ktr_gr 139		72 M/14	2787/08	50_15	27º44.45'	87º55.92'	2.16	2350	5761	5372	4983	SE	SE	520313	56	0.1204
Ktr_gr 140		72 M/14	2787/08	50_15	27º44.10'	87º56.23'	0.08	380	5486	5395	5304	SE	SE	750211	14	0.0011
Ktr_gr 141		72 M/14	2787/08	50_15	27º44.89'	87º56.06'	0.26	825	6410	5796	5182	SE	SE	773213	24	0.0063
Ktr_gr 142		72 M/13	2787/04	51_52	27º45.38'	87º56.00'	1.23	1590	5791	5304	4816	NE	NE	630313	45	0.0557
Ktr_gr 143		72 M/13	2787/04	51_52	27º45.81'	87º55.69'	1.06	2410	6279	5547	4816	NE	NE	630313	43	0.0454
Ktr_gr 144		72 M/13	2787/04	51_52	27º46.39'	87º55.79'	0.39	760	5944	5685	5425	E	E	770213	29	0.0112
Ktr_gr 145		72 M/13	2787/04	51_52	27º46.81'	87º55.54'	1.68	1900	6005	5517	5029	NE	NE	673213	51	0.0854
Ktr_gr 146		72 M/13	2787/04	51_52	27º48.31'	87º55.45'	5.49	3160	5974	5547	5121	SW	SW	623214	77	0.4248
Ktr_gr 147		72 M/13	2787/04	51_53	27º48.05'	87º57.19'	3.03	2780	5974	5532	5090	SW	SW	620313	63	0.1905
Ktr_gr 148		72 M/13	2787/04	51_53	27º47.63'	87º57.62'	1.56	2910	5913	5410	4907	SW	SW	630313	49	0.0772
Ktr_gr 149		72 M/13	2787/04	51_53	27º47.13'	87º57.88'	0.91	1710	5822	5425	5029	SW	SW	620214	40	0.0368
Ktr_gr 150		72 M/13	2787/04	51_53	27º46.48'	87º58.11'	0.11	630	5608	5425	5243	SW	SW	750214	16	0.0018
Ktr_gr 151		72 M/13	2787/04	51_53	27º46.16'	87º58.48'	0.02	190	5456	5364	5273	SW	SW	75021	5	0.0001
Ktr_gr 152		72 M/13	2787/04	51_53	27º45.98'	87º58.67'	0.09	445	5608	5471	5334	SW	SW	750212	15	0.0013
Ktr_gr 153		72 M/13	2787/04	51_53	27º47.80'	87º58.11'	0.02	190	5639	5578	5517	NE	NE	750214	5	0.0001
Ktr_gr 154		72 M/13	2787/04	51_53	27º48.39'	87º58.43'	1.83	2660	6187	5685	5182	S	S	522214	52	0.0960
Ktr_gr 155		72 M/13	2787/04	51_53	27º47.76'	87º59.04'	0.14	760	5791	5593	5395	SW	SW	770213	18	0.0025
Ktr_gr 156		72 M/13	2787/04	51_53	27º47.51'	87º59.19'	0.17	825	5822	5578	5334	SW	SW	750213	20	0.0034
Ktr_gr 157		72 M/13	2787/04	51_53	27º47.37'	87º59.35'	0.08	640	5852	5654	5456	SW	SW	750213	14	0.0011
Ktr_gr 158		72 A/1	2788/01	51_53	27º46.86'	88º 0.01'	0.41	1585	5121	5243	5364	SE	SE	630211	29	0.0121
Ktr_gr 159		72 M/13	2787/04	51_53	27º48.08'	87º59.33'	0.37	950	5791	5578	5364	E	E	630213	28	0.0104

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 160		72 M/13	2787/04	51_53	27º48.78'	87º59.53'	4.53	6330	6187	5502	4816	SE	SE	520213	72	0.3280
Ktr_gr 161		72 M/13	2787/04	51_54	27º48.87'	87º58.85'	0.12	320	6187	5989	5791	SE	SE	37051	17	0.0020
Ktr_gr 162		78 A/1	2788/01	51_55	27º48.92'	88º 0.08'	0.02	150	5913	5867	5822	S	S	37021	5	0.0001
Ktr_gr 163		78 A/1	2788/01	51_55	27º48.40'	88º 0.58'	0.77	1900	5974	5578	5182	S	S	53051	38	0.0292
Ktr_gr 164		78 A/1	2788/01	51_55	27º49.04'	88º 0.70'	0.24	500	5852	5776	5700	NE	NE	77051	23	0.0056
Ktr_gr 165		78 A/1	2788/01	51_55	27º48.97'	88º 0.11'	0.02	150	5913	5883	5852	NE	NE	37021	5	0.0001
Ktr_gr 166		78A/1	2788/01	51_55	27º49.14'	87º59.96'	0.06	315	5944	5883	5822	SE	SE	37021	12	0.0007
Ktr_gr 167		78 A/1	2788/01	51_55	27º49.51'	88º 0.05'	0.85	1585	5944	5700	5456	SE	SE	63021	39	0.0335
Ktr_gr 168		78 A/1	2788/01	51_56	27º49.84'	88º 0.89'	3.82	5320	6294	5707	5121	SE	SE	52021	68	0.2606
Ktr_gr 169		78 A/1	2788/01	51_56	27º50.17'	88º 1.30'	0.10	315	5791	5715	5639	SW	SW	77321	15	0.0015
Ktr_gr 170		78 A/1	2788/01	51_56	27º50.17'	88º 1.59'	0.29	1260	5974	5669	5364	NE	NE	63021	25	0.0074
Ktr_gr 171	Lhonak	78 A/1	2788/01	52_10	27º50.50'	88º 2.58'	16.70	11400	6767	5867	4968	SE	SE	51011	113	1.8788
Ktr_gr 172		72 M/13	2787/04	52_10	27º51.90'	87º59.70'	0.09	190	6447	6317	6187	NE	NE	37021	15	0.0013
Ktr_gr 173		72 M/13	2787/04	52_10	27º53.04'	87º59.41'	0.36	760	6614	6477	6340	SE	SE	77351	28	0.0100
Ktr_gr 174		78 A/1	2788/01	52_10	27º52.87'	88º 1.65'	0.89	1460	6224	5931	5639	SW	SW	63021	40	0.0357
Ktr_gr 175		78 A/1	2788/01	52_10	27º53.40'	88º 2.18'	4.00	3800	6331	5939	5547	S	S	52051	69	0.2773
Ktr_gr 176		78 A/1	2788/01	52_10	27º51.61'	88º 2.48'	0.24	630	6130	5884	5639	SW	SW	75021	23	0.0056
Ktr_gr 177		78 A/1	2788/01	52_10	27º51.76'	88º 2.89'	0.55	1250	6130	5854	5578	SE	NE	63031	33	0.0182
Ktr_gr 178		78 A/1	2788/01	52_10	27º52.95'	88º 3.18'	3.43	3420	6553	6037	5520	SE	SE	62031	66	0.2253
Ktr_gr 179		78 A/1	2788/01	52_10	27º53.64'	88º 4.96'	0.44	380	6791	6443	6096	SE	SE	37021	30	0.0133
Ktr_gr 180		78 A/1	2788/01	52_10	27º50.48'	88º 3.46'	0.09	315	6178	6091	6005	NW	NW	37021	15	0.0013
Ktr_gr 181		78 A/1	2788/01	52_11	27º50.13'	88º 3.58'	0.37	1140	6178	5954	5730	SE	SE	63021	28	0.0104
Ktr_gr 182		78 A/1	2788/01	52_11	27º50.49'	88º 3.96'	0.90	1455	6178	5909	5639	SE	SE	63021	40	0.0362
Ktr_gr 183		78 A/1	2788/01	52_11	27º50.77'	88º 4.53'	1.83	3340	6117	5848	5578	SE	SE	63021	52	0.0960
Ktr_gr 184		78 A/1	2788/01	52_11	27º50.29'	88º 5.79'	10.32	10130	6117	5573	5029	SW	SW	52031	96	0.9892
Ktr_gr 185		78 A/1	2788/01	52_11	27º52.02'	88º 6.74'	1.52	2215	6889	6645	6401	SW	SW	62051	49	0.0745
Ktr_gr 186		78 A/1	2788/01	51_56	27º49.46'	88º 6.16'	0.37	630	6885	6765	6645	NW	NW	37021	28	0.0104
Ktr_gr 187		78 A/1	2788/01	51_56	27º48.48'	88º 4.32'	0.10	640	6224	5916	5608	SW	SW	37021	15	0.0015
Ktr_gr 188		78 A/1	2788/01	51_56	27º48.57'	88º 5.15'	1.13	2215	6187	5761	5334	S	S	63021	44	0.0496
Ktr_gr 189		78 A/1	2788/01	51_56	27º48.60'	88º 5.94'	1.98	2785	6035	5700	5364	S	S	63021	54	0.1069
Ktr_gr 190		72 A/1	2788/01	51_56	27º48.92'	88º 6.90'	0.21	190	6559	6267	5974	SW	SW	37021	22	0.0046
Ktr_gr 191		78 A/1	2788/01	102_17	27º48.22'	88º 6.86'	2.15	2280	5974	5639	5304	S	S	63031	56	0.1196
Ktr_gr 192	Kanchenjunga	78 A/1	2788/01	102_17	27º47.95'	88º 7.54'	0.97	1585	5974	5730	5486	S	S	63031	41	0.0402
Ktr_gr 193		78 A/1	2788/01	102_17	27º46.63'	88º 7.70'	94.51	20900	8586	6518	4450	W	W	51032	197	18.6142
Ktr_gr 194		78 A/1	2788/01	52_7	27º52.36'	88º 8.00'	3.55	2026	7459	7159	6858	SW	SW	63021	66	0.2361
Ktr_gr 195		78 A/1	2788/01	51_59	27º47.92'	88º 9.45'	0.31	825	6431	6218	6005	SW	SW	75021	26	0.0081
Ktr_gr 196		78 A/1	2788/01	51_59	27º46.46'	88º10.48'	0.31	255	6910	6655	6401	SW	SW	37021	26	0.0081
Ktr_gr 197		78 A/1	2788/01	51_59	27º45.80'	88º10.69'	0.89	1585	6401	6005	5608	NW	NW	63021	40	0.0357
Ktr_gr 198		78 A/1	2788/01	51_59	27º46.00'	88º 9.14'	0.04	250	6096	6020	5944	NE	NE	75022	9	0.0004
Ktr_gr 199		78 A/1	2788/01	51_59	27º45.91'	88º 8.37'	0.58	1140	6005	5669	5334	NW	NW	64321	34	0.0196
Ktr_gr 200		78 A/1	2788/01	51_59	27º45.41'	88º 8.35'	0.54	1450	5944	5685	5425	W	W	63022	33	0.0178
Ktr_gr 201		78 A/2	2788/05	51_59	27º44.58'	88º 9.14'	0.90	630	7350	6708	6066	SW	SW	67321	40	0.0362
Ktr_gr 202		78 A/1	2788/01	51_56	27º42.84'	88º 8.28'	0.05	315	7529	7483	7437	N	N	77022	10	0.0005

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 203		78 A/1	2788/01	51_56	27º45.53'	88º 6.29'	2.71	2780	6096	5776	5456	SE	SE	63331	60	0.1638
Ktr_gr 204		78 A/1	2788/01	51_56	27º46.27'	88º 3.04'	0.05	250	6032	5942	5852	N	N	37021	10	0.0005
Ktr_gr 205		78 A/1	2788/01	51_56	27º46.14'	88º 3.00'	0.04	250	6032	5927	5822	S	S	37021	9	0.0004
Ktr_gr 206		78 A/1	2788/01	51_56	27º45.70'	88º 3.76'	0.70	1900	6005	5593	5182	S	S	63021	36	0.0255
Ktr_gr 207		78 A/1	2788/01	51_56	27º45.74'	88º 4.25'	1.25	2150	6248	5791	5334	S	S	63021	46	0.0570
Ktr_gr 208		78 A/1	2788/01	51_56	27º45.46'	88º 5.01'	1.98	2520	6812	6165	5517	S	S	60021	54	0.1069
Ktr_gr 209		72 A/2	2788/05	50_12	27º44.91'	88º 5.61'	0.03	250	6248	6020	5791	W	W	75021	7	0.0002
Ktr_gr 210		78 A/2	2788/05	50_12	27º44.24'	88º 2.61'	0.39	950	6127	5791	5456	N	N	63021	29	0.0112
Ktr_gr 211	Merra	78 A/2	2788/05	50_12	27º44.84'	88º 1.40'	1.99	3160	6334	5910	5486	NW	NW	53511	54	0.1076
Ktr_gr 212		78 A/2	2788/05	50_12	27º44.05'	88º 0.46'	0.15	890	5578	5471	5364	W	W	37021	19	0.0028
Ktr_gr 213		78 A/2	2788/05	50_12	27º43.87'	88º 0.88'	0.57	1450	5913	5624	5334	SW	SW	63051	34	0.0192
Ktr_gr 214	Kumbhakarna	78 A/2	2788/05	50_12	27º42.28'	88º 2.55'	18.13	13305	6706	5410	4115	W	W	51012	116	2.0957
Ktr_gr 215		78 A/2	2788/05	50_11	27º42.45'	88º 5.27'	0.46	440	7385	7198	7010	NW	NW	37021	31	0.0142
Ktr_gr 216		78 A/2	2788/05	50_11	27º41.48'	88º 4.18'	0.13	440	6614	6355	6096	NW	NW	37021	18	0.0023
Ktr_gr 217		78 A/2	2788/05	50_11	27º41.46'	88º 3.97'	0.06	505	6584	6264	5944	NW	NW	75021	12	0.0007
Ktr_gr 218		78 A/2	2788/05	50_11	27º41.45'	88º 3.78'	0.04	380	6523	6264	6005	NW	NW	75022	9	0.0004
Ktr_gr 219		78 A/2	2788/05	50_12	27º41.50'	88º 1.43'	0.52	1205	5608	5410	5212	NE	NE	64051	32	0.0169
Ktr_gr 220		78 A/2	2788/05	50_12	27º41.60'	88º 0.66'	0.24	950	5608	5471	5334	NE	NE	75021	23	0.0056
Ktr_gr 221		72 M/14	2787/08	50_13	27º41.34'	87º59.12'	0.27	820	5486	5281	5075	W	W	640214	25	0.0066
Ktr_gr 222		72 M/14	2787/08	50_13	27º40.34'	87º59.05'	1.86	4435	5578	5166	4755	W	W	520312	53	0.0982
Ktr_gr 223		78 A/2	2788/05	50_13	27º40.33'	88º 0.34'	0.09	190	6401	6294	6187	NW	NW	37021	15	0.0013
Ktr_gr 224		72 M/14	2787/08	68_13	27º40.13'	87º59.87'	0.23	630	5986	5614	5243	NW	NW	670214	23	0.0053
Ktr_gr 225		72 M/14	2787/08	68_13	27º39.77'	87º58.63'	0.68	1390	5395	5197	4999	N	N	633213	36	0.0245
Ktr_gr 226		72 M/14	2787/08	68_13	27º39.19'	87º58.16'	0.03	250	5334	5273	5212	NW	NW	750214	7	0.0002
Ktr_gr 227		72 M/14	2787/08	68_13	27º39.38'	87º59.00'	0.34	1390	5425	5304	5182	W	W	620214	27	0.0092
Ktr_gr 228		72 M/14	2787/08	68_13	27º39.17'	87º59.58'	0.11	630	5304	5121	4938	W	W	750213	16	0.0018
Ktr_gr 229		72 M/14	2787/08	68_13	27º38.95'	87º59.50'	0.05	380	5029	4923	4816	W	W	750213	10	0.0005
Ktr_gr 230		72 M/14	2787/08	68_13	27º39.35'	87º59.84'	0.52	1520	5517	5364	5212	S	S	630214	32	0.0169
Ktr_gr 231	Yamatari	78 A/2	2788/05	68_14	27º38.72'	88º 0.66'	14.08	10130	6401	5258	4115	S	S	51031	106	1.4971
Ktr_gr 232		78 A/2	2788/05	68_14	27º40.25'	88º 0.35'	0.05	190	6401	6325	6248	S	S	37021	10	0.0005
Ktr_gr 233		78 A/2	2788/05	68_14	27º41.00'	88º 1.88'	0.35	630	6669	6443	6218	SW	SW	37021	28	0.0096
Ktr_gr 234		78 A/2	2788/05	68_14	27º37.23'	88º 0.81'	0.20	950	5486	5090	4694	NW	NW	63051	22	0.0043
Ktr_gr 235	Lasampa	72 M/14	2787/08	67_9	27º36.83'	87º59.07'	1.03	2220	5487	5410	5334	W	W	620113	42	0.0436
Ktr_gr 236		72 M/14	2787/08	67_9	27º35.38'	87º57.84'	0.04	190	5517	5319	5121	S	S	370211	9	0.0004
Ktr_gr 237		72 M/14	2787/08	67_9	27º36.06'	87º58.48'	0.80	1580	5517	5380	5243	SW	SW	630213	38	0.0308
Ktr_gr 238		72 M/14	2787/08	67_9	27º35.83'	87º59.03'	0.46	950	5365	5334	5304	SE	SE	633213	31	0.0142
Ktr_gr 239		72 M/14	2787/08	67_9	27º36.17'	87º59.16'	0.01	150	5944	5441	4938	E	E	750211	2	0.0000
Ktr_gr 240		72 M/14	2787/08	67_9	27º36.69'	87º59.80'	0.74	1900	5425	5334	5243	S	S	630113	37	0.0276
Ktr_gr 241		78 A/2	2788/05	67_8	27º36.54'	88º 0.30'	0.03	315	5456	5227	4999	S	S	75021	7	0.0002
Ktr_gr 242		78 A/2	2788/05	67_8	27º36.72'	88º 0.48'	0.31	1330	6142	6058	5974	SE	SE	63011	26	0.0081
Ktr_gr 243		78 A/2	2788/05	67_8	27º37.12'	88º 0.56'	0.06	315	5761	5456	5151	S	S	37021	12	0.0007
Ktr_gr 244		78 A/2	2788/05	67_8	27º36.94'	88º 1.08'	0.25	950	5486	5349	5212	SE	SE	63021	24	0.0059
Ktr_gr 245		78 A/2	2788/05	67_8	27º37.16'	88º 1.65'	0.38	630	5425	5212	4999	S	S	64021	28	0.0108

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Ktr_gr 246		78 A/2	2788/05	67_7	27º36.75'	88º 2.11'	0.46	1320	5639	5364	5090	S	S	63021	31	0.0142
Ktr_gr 247		78 A/2	2788/05	67_7	27º37.03'	88º 2.38'	0.56	1390	8473	6370	4267	SE	SE	63321	33	0.0187
Ktr_gr 248	Yalung	78 A/2	2788/05	67_7	27º36.87'	88º 4.17'	81.91	23435	7710	7436	7163	SW	SW	51300	188	15.4158
Ktr_gr 249		78 A/2	2788/05	67_7	27º41.24'	88º 3.14'	0.44	320	6142	5784	5425	SE	SE	37051	30	0.0133
Ktr_gr 250		78 A/2	2788/05	102_11	27º41.47'	88º 9.20'	0.04	250	8184	8115	8047	SW	SW	75021	9	0.0004
Ktr_gr 251		78 A/2	2788/05	102_11	27º40.83'	88º 8.53'	0.04	315	6797	6721	6645	W	W	77021	9	0.0004
Ktr_gr 252		78 A/2	2788/05	67_6	27º35.79'	88º 5.24'	0.57	760	6679	6113	5547	NW	NW	67021	34	0.0192
Ktr_gr 253		78 A/2	2788/05	67_6	27º35.47'	88º 5.07'	0.51	950	6679	6082	5486	SW	SW	67021	32	0.0164
Ktr_gr 254		78 A/2	2788/05	67_6	27º34.43'	88º 3.33'	0.42	1070	4968	4831	4694	NW	NW	63011	30	0.0125
Ktr_gr 255		78 A/2	2788/05	102_7 & 67_55	27º33.71'	88º 2.38'	1.75	2530	5395	5166	4938	W	W	62031	52	0.0903
Ktr_gr 256		78 A/2	2788/05	102_7 & 67_55	27º33.32'	88º 1.84'	0.06	440	5334	5212	5090	W	W	75021	12	0.0007
Ktr_gr 257		78 A/2	2788/05	102_7 & 67_55	27º32.85'	88º 2.38'	0.34	1520	5404	5247	5090	S	S	63031	27	0.0092
Ktr_gr 258		78 A/2	2788/05	102_7 & 67_55	27º32.98'	88º 3.54'	3.93	2215	5416	5223	5029	SW	SW	75011	69	0.2708
Ktr_gr 259		78 A/2	2788/05	102_7 & 67_55	27º32.17'	88º 3.18'	0.10	440	5212	5151	5090	W	W	62311	15	0.0015
Ktr_gr 260		78 A/2	2788/05	102_7 & 67_55	27º31.96'	88º 3.59'	0.38	630	5416	5352	5288	SW	SW	75021	28	0.0108
Ktr_gr 261		78 A/2	2788/05	102_7 & 67_55	27º31.68'	88º 3.99'	0.15	690	5334	5227	5120	SW	SW	77021	19	0.0028

Glacier Inventory of Arun Basin

Total Number :91 Total Area : 216.07 (km^2) Ice Reserve : 23.47 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kar_gr 1		72 I/14	2786_08	68_28	27º39.05'	86º59.34'	0.04	315	5273	5151	5029	SE	SE	75021	9	0.0004
Kar_gr 2		72 I/14	2786_08	68_28	27º40.93'	86º59.59'	0.30	1580	5005	4887	4770	NE	NE	75021	26	0.0077
Kar_gr 3		72 I/14	2786_08	68_28	27º41.81'	87º 0.09'	0.53	630	6212	5697	5182	SE	SE	37021	33	0.0173
Kar_gr 4		72 M/2	2787_05	50_37	27º39.33'	87º 2.40'	0.14	380	6212	5651	5090	NE	NE	77021	18	0.0027
Kar_gr 5		72 M/2	2787_05	50_37	27º42.23'	87º 0.50'	1.48	1140	6212	5651	5090	SE	SE	37021	49	0.0718
Kar_gr 6		72 M/2	2787_05	50_37	27º43.18'	87º 0.74'	1.58	640	6291	5721	5151	SE	SE	37021	50	0.0787
Kar_gr 7		72 M/2	2787_05	50_37	27º44.51'	87º 2.62'	0.91	570	6291	5706	5121	S	S	37021	40	0.0369
Kar_gr 8		72 M/2	2787_05	50_37	27º44.67'	87º 2.32'	0.63	440	6291	5706	5121	N	N	37021	35	0.0221
Kar_gr 9		72 M/2	2787_05	50_37	27º43.85'	87º 0.85'	1.75	1260	6291	5721	5151	NE	NE	63021	52	0.0901
Kar_gr 10		72 M/1	2787_01	50_38	27º46.07'	87º 1.70'	27.55	7600	7235	5599	3962	SE	SE	52031	133	3.6522
Kar_gr 11		72 M/1	2787_01	51_30	27º47.01'	87º 3.48'	0.24	760	5639	5471	5304	SE	SE	75021	23	0.0057
Kar_gr 12		72 M/1	2787_01	51_30	27º46.65'	87º 4.17'	1.40	1070	6096	5608	5121	NW	NW	63321	48	0.0665
Kar_gr 13		72 M/1	2787_01	51_30	27º46.06'	87º 3.92'	0.47	760	5852	5441	5029	NW	NW	63031	31	0.0148
Kar_gr 14		72 M/1	2787_01	50_36	27º45.77'	87º 5.63'	7.31	2530	6757	5832	4907	SW	SW	37021	85	0.6238
Kar_gr 15		72 M/2	2787_05	50_36	27º44.89'	87º 7.03'	0.84	950	5944	5639	5334	S	S	37021	39	0.0330
Kar_gr 16		72 M/2	2787_05	50_36	27º44.80'	87º 7.97'	0.87	630	6044	5674	5304	S	S	37021	40	0.0345
Kar_gr 17		72 M/1	2787_01	51_32	27º45.61'	87º 7.24'	7.61	2850	6757	5863	4968	NE	NE	63021	86	0.6580
Kar_gr 18		72 M/1	2787_01	51_32	27º46.58'	87º 6.60'	1.30	1450	6757	5970	5182	NE	NE	63021	46	0.0599
Kar_gr 19		72 M/1	2787_01	51_32	27º46.79'	87º 6.08'	1.05	820	6757	5970	5182	NE	NE	67021	43	0.0449
Kar_gr 20	West Barun	72 M/1	2787_01	51_32	27º48.99'	87º 1.65'	36.99	15840	6675	5563	4450	SE	E	52032	146	5.3963
Kar_gr 21		72 M/1	2787_01	51_31	27º47.70'	87º 2.85'	0.65	690	6489	6110	5730	NE	NE	67021	35	0.0229
Kar_gr 22		72 M/1	2787_01	51_31	27º48.11'	87º 2.40'	0.48	630	6553	6203	5852	N	N	67021	31	0.0152
Kar_gr 23		72 M/1	2787_01	52_36	27º50.22'	87º 2.16'	0.76	1260	6523	6187	5852	SW	SW	63021	38	0.0287
Kar_gr 24		72 M/1	2787_01	52_36	27º49.09'	87º 2.95'	1.26	1070	6858	6248	5639	S	S	67321	46	0.0579
Kar_gr 25		72 M/1	2787_01	52_36	27º49.82'	87º 3.29'	2.46	1390	6858	6126	5395	E	E	67321	58	0.1437
Kar_gr 26		72 M/1	2787_01	52_36	27º50.66'	87º 3.71'	0.42	950	6407	5916	5425	E	E	67321	30	0.0126
Kar_gr 27		72 M/1	2787_01	52_36	27º50.51'	87º 2.77'	1.99	2215	6523	5913	5304	N	N	63321	54	0.1080
Kar_gr 28		72 M/1	2787_01	52_36	27º50.70'	87º 1.79'	2.03	2520	6523	5959	5395	NE	NE	63021	54	0.1107
Kar_gr 29		72 M/1	2787_01	52_36	27º51.37'	87º 1.08'	2.87	2340	6465	5991	5517	NE	NE	63321	62	0.1771
Kar_gr 30		72 M/1	2787_01	52_36	27º51.99'	87º 1.35'	0.45	630	6105	5872	5639	NE	NE	63321	30	0.0136

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kar_gr 31	Barun	72 M/1	2787_01	53_34	27º52.79'	87º 1.11'	52.41	16470	6949	5913	4877	S	SE	51032	163	8.5537
Kar_gr 32		72 M/1	2787_01	53_34	27º55.47'	87º 2.32'	4.69	3800	6885	6323	5761	SW	SW	63051	73	0.3436
Kar_gr 33		72 M/1	2787_01	53_34	27º54.65'	87º 1.80'	2.65	2530	6584	6172	5761	W	W	63051	60	0.1593
Kar_gr 34		72 M/1	2787_01	53_34	27º54.11'	87º 1.54'	0.11	315	6066	5974	5883	SW	SW	77021	16	0.0019
Kar_gr 35		72 M/1	2787_01	52_35	27º53.71'	87º 2.12'	1.02	950	5944	5685	5425	SW	SW	63021	42	0.0432
Kar_gr 36		72 M/1	2787_01	52_35	27º52.53'	87º 3.71'	0.45	690	6431	6172	5913	S	S	63321	31	0.0137
Kar_gr 37		72 M/1	2787_01	52_35	27º52.52'	87º 4.91'	5.37	3350	8077	6629	5182	SW	SW	63321	77	0.4122
Kar_gr 38		72 M/1	2787_01	52_35	27º51.56'	87º 5.91'	6.33	3800	7772	6477	5182	SW	SW	62321	81	0.5143
Kar_gr 39		72 M/1	2787_01	52_35	27º50.58'	87º 5.80'	0.45	570	6248	5745	5243	W	W	67021	31	0.0139
Kar_gr 40		72 M/1	2787_01	52_35	27º50.65'	87º 6.52'	2.08	2530	6684	5963	5243	SW	SW	63031	55	0.1143
Kar_gr 41		72 M/1	2787_01	52_34	27º50.07'	87º 7.12'	1.17	2090	6425	5895	5364	W	W	63531	44	0.0517
Kar_gr 42		72 M/1	2787_01	52_34	27º49.55'	87º 6.71'	0.73	1640	6108	5660	5212	W	W	63501	37	0.0271
Kar_gr 43		72 M/1	2787_01	52_34	27º48.82'	87º 7.13'	0.04	190	5334	5288	5243	SW	SW	75021	10	0.0004
Kar_gr 44		72 M/1	2787_01	52_34	27º49.34'	87º 8.02'	5.93	4240	6425	5514	4602	S	S	62011	79	0.4714
Kar_gr 45		72 M/1	2787_01	52_34	27º49.41'	87º 8.98'	2.43	2090	6419	5617	4816	S	S	63021	58	0.1416
Kar_gr 46		72 M/1	2787_01	52_32	27º48.81'	87º 9.90'	4.07	2530	6370	5624	4877	SW	SW	63021	70	0.2842
Kar_gr 47		72 M/1	2787_01	52_32	27º48.01'	87º10.51'	1.30	1580	5639	5273	4907	SW	SW	63021	46	0.0602
Kar_gr 48		72 M/1	2787_01	52_32	27º47.44'	87º11.09'	0.26	570	5182	5029	4877	SW	SW	64021	24	0.0063
Kar_gr 49		72 M/1	2787_01	52_32	27º46.22'	87º11.92'	0.46	885	5182	5060	4938	S	S	64321	31	0.0141
Kar_gr 50		72 M/1	2787_01	52_32	27º49.15'	87º12.11'	0.06	315	5182	5060	4938	S	S	75021	12	0.0007
Kar_gr 51		72 M/1	2787_01	52_31	27º49.22'	87º12.36'	0.06	315	5212	5075	4938	S	S	75021	11	0.0006
Kar_gr 52		72 M/1	2787_01	52_31	27º49.00'	87º13.26'	0.56	1393	5182	4968	4755	SW	SW	63021	33	0.0185
Kar_gr 53		72 M/1	2787_01	52_31	27º49.16'	87º14.01'	0.43	380	5151	5060	4968	NE	NE	77021	30	0.0127
Kar_gr 54		72 M/5	2787_02	52_30	27º50.22'	87º15.24'	1.53	2020	5108	4704	4300	SW	SW	67021	49	0.0753
Kar_gr 55		72 M/5	2787_02	52_30	27º50.57'	87º15.77'	1.98	1900	5108	4704	4300	SE	SE	67021	54	0.1066
Kar_gr 56		72 M/9	2787_03	52_22	27º51.93'	87º33.69'	0.08	630	5300	5200	5100	S	S	75021	14	0.0012
Kar_gr 57		72 M/9	2787_03	52_22	27º51.75'	87º33.97'	0.08	440	5180	5070	4960	S	S	75021	13	0.0010
Kar_gr 58		72 M/9	2787_03	52_22	27º51.49'	87º34.47'	0.75	1450	5650	5295	4940	SW	SW	63331	37	0.0280
Kar_gr 59		72 M/9	2787_03	52_22	27º51.07'	87º34.60'	0.25	630	5120	5020	4920	SW	SW	67021	24	0.0061
Kar_gr 60		72 M/9	2787_03	52_22	27º50.67'	87º34.83'	0.77	1015	5500	5160	4820	SW	SW	63321	38	0.0291
Kar_gr 61		72 M/9	2787_03	51_44	27º48.91'	87º35.20'	0.36	440	5340	5150	4960	S	S	67021	28	0.0101
Kar_gr 62		72 M/9	2787_03	51_44	27º49.12'	87º35.87'	0.66	630	5680	5350	5020	S	S	67321	36	0.0237
Kar_gr 63		72 M/9	2787_03	51_44	27º48.39'	87º36.90'	0.59	1580	5642	5451	5260	SE	SE	60321	34	0.0201
Kar_gr 64		72 M/9	2787_03	51_44	27º48.57'	87º37.19'	0.23	760	5500	5400	5300	NE	NE	60021	23	0.0053
Kar_gr 65		72 M/9	2787_03	51_44	27º48.83'	87º37.00'	0.34	1260	5640	5490	5340	NE	NE	60021	27	0.0091
Kar_gr 66		72 M/9	2787_03	52_19	27º49.88'	87º39.77'	0.47	950	5500	5370	5240	SW	SW	60021	31	0.0146
Kar_gr 67		72 M/9	2787_03	52_19	27º48.96'	87º39.66'	0.23	630	5514	5377	5240	NW	NW	60021	23	0.0053
Kar_gr 68		72 M/9	2787_03	52_19	27º48.67'	87º39.69'	0.28	950	5514	5367	5220	W	W	60021	25	0.0071
Kar_gr 69		72 M/9	2787_03	52_19	27º48.22'	87º39.75'	0.03	315	5240	5180	5120	NW	NW	77021	7	0.0002
Kar_gr 70		72 M/9	2787_03	51_47	27º47.75'	87º40.00'	0.63	1260	5360	5210	5060	SW	SW	60021	35	0.0221
Kar_gr 71		72 M/9	2787_03	51_47	27º47.02'	87º40.18'	0.17	820	5340	5180	5020	SW	SW	77321	20	0.0034
Kar_gr 72		72 M/9	2787_03	51_47	27º46.69'	87º39.85'	0.02	250	5040	5020	5000	NW	NW	77021	5	0.0001
Kar_gr 73		72 M/9	2787_03	51_47	27º46.64'	87º40.11'	0.05	315	5300	5260	5220	W	W	77021	10	0.0005

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kar_gr 74		72 M/9	2787_03	51_47	27º46.17'	87º39.92'	0.19	950	5500	5250	5000	SW	SW	63321	21	0.0041
Kar_gr 75		72 M/9	2787_03	51_47	27º45.94'	87º39.67'	0.04	190	5496	5378	5260	N	N	77021	9	0.0004
Kar_gr 76		72 M/9	2787_03	51_47	27º45.78'	87º39.41'	0.06	250	5440	5370	5300	N	N	77021	11	0.0006
Kar_gr 77		72 M/9	2787_03	51_47	27º45.93'	87º39.06'	0.08	315	5400	5340	5280	N	N	77021	14	0.0011
Kar_gr 78		72 M/9	2787_03	51_47	27º45.66'	87º38.79'	0.04	315	5260	5210	5160	NW	NW	75021	9	0.0004
Kar_gr 79		72 M/9	2787_03	51_47	27º45.72'	87º37.18'	0.13	630	5060	4980	4900	N	N	75021	17	0.0023
Kar_gr 80		72 M/9	2787_03	51_47	27º45.49'	87º39.17'	0.47	950	5300	5150	5000	SW	SW	63021	31	0.0146
Kar_gr 81		72 M/10	2787_07	50_22	27º44.76'	87º39.31'	0.78	1450	5300	5149	4999	SW	SW	63321	38	0.0295
Kar_gr 82		72 M/10	2787_07	50_22	27º43.48'	87º38.54'	0.15	380	5182	5075	4968	NW	NW	77021	19	0.0028
Kar_gr 83		72 M/10	2787_07	50_22	27º43.09'	87º38.13'	1.02	1900	5425	5182	4938	N	N	63021	42	0.0431
Kar_gr 84		72 M/10	2787_07	50_22	27º43.16'	87º37.37'	0.87	1580	5425	5243	5060	NW	NW	63321	40	0.0344
Kar_gr 85		72 M/10	2787_07	50_22	27º43.12'	87º36.95'	0.46	1260	5486	5304	5121	N	N	63321	31	0.0143
Kar_gr 86		72 M/10	2787_07	50_22	27º43.71'	87º36.74'	0.11	315	5243	5182	5121	NE	NE	75021	16	0.0017
Kar_gr 87		72 M/10	2787_07	50_22	27º43.50'	87º36.56'	0.16	440	5212	5105	4999	W	W	77021	20	0.0032
Kar_gr 88		72 M/10	2787_07	50_22	27º42.97'	87º36.51'	0.69	1450	5822	5517	5212	W	W	63021	36	0.0250
Kar_gr 89		72 M/10	2787_07	68_43	27º42.49'	87º36.94'	0.78	1900	5517	5182	4846	W	W	63011	38	0.0298
Kar_gr 90		72 M/10	2787_07	68_43	27º41.38'	87º36.80'	0.53	1140	5304	5105	4907	W	W	63011	33	0.0174
Kar_gr 91		72 M/10	2787_07	68_43	27º40.74'	87º36.48'	0.55	1260	5212	4999	4785	NW	NW	62011	33	0.0183

Glacier Inventory of Dudh Koshi Basin

Total Number : 278   Total Area : 482.20 (km^2)   Ice Reserve : 51.01 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kdu_gr 1		72I/10	2786_07	50_48	27º42.97'	86º33.52'	0.65	1580	5517	5364	5212	SE	SE	63021	35	0.0230
Kdu_gr 2		72I/10	2786_07	50_48	27º43.41'	86º33.57'	0.61	1260	5608	5319	5029	SE	SE	63321	35	0.0211
Kdu_gr 3		72I/10	2786_07	50_48	27º43.86'	86º33.85'	0.61	1260	5639	5410	5182	SE	SE	63321	35	0.0211
Kdu_gr 4		72I/10	2786_07	50_48	27º44.06'	86º33.95'	0.03	315	5608	5547	5486	SE	SE	75021	7	0.0002
Kdu_gr 5		72I/10	2786_07	50_48	27º44.37'	86º34.59'	4.19	3800	6096	5456	4816	SE	SE	52512	70	0.2952
Kdu_gr 6		72I/10	2786_07	50_48	27º44.68'	86º35.34'	0.43	950	5639	5456	5273	SE	SE	60311	30	0.0129
Kdu_gr 7		72I/9	2786_03	50_48	27º45.30'	86º35.54'	0.37	630	6782	6469	6157	S	S	63021	28	0.0104
Kdu_gr 8		72I/10	2786_07	50_48	27º44.26'	86º36.33'	3.19	1580	6511	5816	5121	W	W	60041	64	0.2043
Kdu_gr 9		72I/10	2786_07	50_48	27º43.38'	86º37.02'	1.47	1820	6511	5770	5029	SW	SW	63321	48	0.0712
Kdu_gr 10		72I/10	2786_07	50_48	27º42.81'	86º37.33'	1.42	1900	5944	5486	5029	S	S	63031	48	0.0679
Kdu_gr 11		72I/10	2786_07	50_47	27º42.08'	86º38.09'	0.11	505	5334	5182	5029	S	S	64021	16	0.0018
Kdu_gr 12		72I/10	2786_07	50_47	27º42.37'	86º38.14'	0.12	440	5486	5364	5243	E	E	64021	17	0.0020
Kdu_gr 13		72I/10	2786_07	50_47	27º42.63'	86º38.27'	0.57	2530	5578	4892	4206	E	E	77021	34	0.0192
Kdu_gr 14		72I/10	2786_07	50_47	27º43.27'	86º37.84'	1.82	1900	6096	5563	5029	E	E	67341	52	0.0953
Kdu_gr 15		72I/10	2786_07	51_19	27º44.42'	86º37.40'	6.39	3420	6511	5481	4450	NE	NE	67321	82	0.5208
Kdu_gr 16		72I/9	2786_03	51_19	27º45.39'	86º36.72'	0.48	1260	5791	5395	4999	NE	NE	63021	31	0.0151
Kdu_gr 17		72I/9	2786_03	51_19	27º45.82'	86º36.56'	0.86	1580	5761	5380	4999	E	E	63321	40	0.0340
Kdu_gr 18		72I/9	2786_03	51_19	27º46.23'	86º36.05'	0.48	690	5486	5258	5029	N	N	67321	31	0.0151
Kdu_gr 19		72I/9	2786_03	51_19	27º45.48'	86º35.81'	0.08	315	6782	6591	6401	N	N	37021	14	0.0011
Kdu_gr 20		72I/9	2786_03	51_19	27º45.39'	86º35.08'	0.21	630	6614	6355	6096	N	N	63321	22	0.0046
Kdu_gr 21	Lumdin	72I/9	2786_03	51_19	27º46.36'	86º35.38'	4.13	6015	5944	5395	4846	NE	E	52012	70	0.2895
Kdu_gr 22		72I/9	2786_03	51_19	27º47.33'	86º34.91'	5.40	3160	6696	5939	5182	SE	SE	62051	77	0.4154
Kdu_gr 23		72I/9	2786_03	51_19	27º47.62'	86º36.33'	1.20	1900	6066	5669	5273	SE	SE	63321	45	0.0539
Kdu_gr 24		72I/9	2786_03	51_19	27º47.91'	86º36.78'	0.16	950	5913	5639	5364	SE	SE	75021	19	0.0031
Kdu_gr 25		72I/9	2786_03	51_19	27º48.00'	86º37.05'	0.06	505	5547	5410	5273	SE	SE	75021	12	0.0007
Kdu_gr 26		72I/9	2786_03	51_20	27º47.58'	86º38.06'	0.90	1710	6005	5593	5182	S	S	63321	40	0.0362
Kdu_gr 27		72I/9	2786_03	51_20	27º47.17'	86º38.45'	0.07	440	5639	5471	5304	SW	SW	75021	13	0.0009
Kdu_gr 28		72I/9	2786_03	51_20	27º46.83'	86º39.02'	1.48	2400	5974	5578	5182	S	S	63021	49	0.0718
Kdu_gr 29		72I/9	2786_03	51_20	27º46.26'	86º39.42'	0.42	1260	5730	5319	4907	SW	SW	63021	30	0.0125
Kdu_gr 30		72I/9	2786_03	51_20	27º46.24'	86º39.76'	0.04	190	5880	5729	5578	SW	SW	37021	9	0.0004

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 31		72I/9	2786_03	51_20	27º46.20'	86º39.89'	0.06	250	5880	5653	5425	E	E	37021	12	0.0007
Kdu_gr 32		72I/9	2786_03	52_49	27º49.10'	86º35.51'	0.59	2215	4633	4496	4359	NE	NE	53012	34	0.0201
Kdu_gr 33	Thyangbo	72I/9	2786_03	52_49	27º49.07'	86º34.12'	0.77	2470	5334	4983	4633	NE	NE	53012	38	0.0292
Kdu_gr 34		72I/9	2786_03	52_49	27º49.21'	86º33.26'	0.84	1900	5730	5380	5029	NE	NE	63331	39	0.0329
Kdu_gr 35	Thyangbo	72I/9	2786_03	52_49	27º50.47'	86º33.97'	3.47	3290	5883	5319	4755	SE	SE	52011	66	0.2289
Kdu_gr 36		72I/9	2786_03	52_49	27º50.32'	86º35.03'	0.41	950	5608	5364	5121	S	S	64321	29	0.0121
Kdu_gr 37		72I/9	2786_03	52_49	27º50.67'	86º35.17'	0.35	250	6151	5834	5517	N	N	37021	28	0.0096
Kdu_gr 38		72I/9	2786_03	52_49	27º51.40'	86º35.42'	1.12	1580	5273	4953	4633	NE	NE	62021	44	0.0490
Kdu_gr 39		72I/9	2786_03	52_49	27º51.39'	86º34.14'	0.21	440	6657	6437	6218	N	N	37021	22	0.0046
Kdu_gr 40	Langmuche	72I/9	2786_03	52_49	27º52.13'	86º34.29'	2.23	3160	5669	5029	4389	NE	NE	52011	56	0.1257
Kdu_gr 41		72I/9	2786_03	53_20	27º52.73'	86º33.98'	0.29	950	5578	5334	5090	E	E	75021	25	0.0074
Kdu_gr 42		72I/9	2786_03	53_20	27º53.35'	86º33.75'	0.15	630	5761	5563	5364	E	E	75021	19	0.0028
Kdu_gr 43		72I/9	2786_03	53_20	27º53.88'	86º33.85'	1.09	1900	6035	5639	5243	SE	SE	63011	43	0.0472
Kdu_gr 44		72I/9	2786_03	53_20	27º54.38'	86º34.13'	0.97	1900	5791	5563	5334	SE	SE	63011	41	0.0402
Kdu_gr 45		72I/9	2786_03	53_20	27º54.61'	86º34.45'	0.18	630	5578	5456	5334	SE	SE	64021	20	0.0037
Kdu_gr 46		72I/9	2786_03	53_20	27º54.97'	86º35.22'	2.16	2850	5791	5486	5182	SE	SE	63311	56	0.1204
Kdu_gr 47	Langdak	72I/9	2786_03	54_21	27º55.47'	86º34.11'	1.95	4430	5883	5349	4816	NE	NE	53022	54	0.1047
Kdu_gr 48	Chhule	72I/9	2786_03	54_21	27º57.22'	86º32.76'	6.40	7600	5974	5395	4816	E	E	52012	82	0.5219
Kdu_gr 49		72I/9	2786_03	54_21	27º56.50'	86º32.93'	0.75	2205	6096	5624	5151	NE	NE	63021	37	0.0281
Kdu_gr 50		72I/9	2786_03	54_21	27º58.32'	86º32.19'	0.42	1580	5608	5395	5182	E	E	63021	30	0.0125
Kdu_gr 51		72I/9	2786_03	54_22	27º58.62'	86º32.21'	0.23	760	5639	5456	5273	NE	NE	63021	23	0.0053
Kdu_gr 52	Melung	72I/9	2786_03	54_22	27º59.41'	86º32.97'	10.19	8870	5944	5435	4926	SE	SE	52012	95	0.9726
Kdu_gr 53		72I/9	2786_03	54_22	27º59.57'	86º34.81'	0.48	970	5456	5319	5182	NW	NW	63311	31	0.0151
Kdu_gr 54	Bhote Kosi	71L/12	2886_15	55_6	28º 1.33'	86º34.80'	35.63	17100	6450	5602	4755	S	S	51032	144	5.1347
Kdu_gr 55		71L/12	2886_15	55_6	28º 0.17'	86º33.97'	0.11	315	5578	5456	5334	NE	NE	77021	16	0.0018
Kdu_gr 56		71L/12	2886_15	55_6	28º 0.42'	86º33.66'	0.21	440	5486	5349	5212	NE	NE	63021	22	0.0046
Kdu_gr 57		71L/12	2886_15	55_6	28º 2.05'	86º34.00'	0.10	380	5883	5761	5639	SW	SW	75021	15	0.0015
Kdu_gr 58		71L/12	2886_15	55_6	28º 2.94'	86º33.45'	0.82	1900	6885	6582	6279	SE	SE	63021	39	0.0318
Kdu_gr 59		71L/12	2886_15	55_6	28º 6.05'	86º36.20'	0.18	440	6553	6325	6096	SW	SW	37321	20	0.0037
Kdu_gr 60		72I/9	2786_03	55_6	28º 3.67'	86º36.18'	0.02	190	5578	5517	5456	SW	SW	77021	5	0.0001
Kdu_gr 61		71L/12	2886_15	55_7	28º 2.73'	86º36.69'	0.07	290	6126	5959	5791	W	W	37021	13	0.0009
Kdu_gr 62		71L/12	2886_15	55_7	28º 1.19'	86º36.06'	0.43	2215	5486	5273	5060	W	W	53022	30	0.0129
Kdu_gr 63		71L/12	2886_15	55_7	28º 1.37'	86º36.61'	0.12	440	5486	5425	5364	NE	NE	63021	17	0.0020
Kdu_gr 64		71L/12	2886_15	55_7	28º 1.77'	86º36.35'	0.19	440	5669	5532	5395	NE	NE	75021	21	0.0040
Kdu_gr 65		71L/12	2886_15	55_7	28º 2.07'	86º36.20'	0.08	380	5730	5624	5517	NE	NE	75021	14	0.0011
Kdu_gr 66		71L/12	2886_15	55_7	28º 2.67'	86º36.78'	0.07	500	6126	5959	5791	SW	SW	37021	13	0.0009
Kdu_gr 67	Lumsamba	71L/12	2886_15	55_7	28º 2.36'	86º37.92'	11.83	9500	6919	5913	4907	S	S	51012	100	1.1870
Kdu_gr 68		71L/12	2886_15	55_8	28º 4.28'	86º36.87'	0.18	380	7346	7026	6706	SE	SE	77021	20	0.0037
Kdu_gr 69		71L/12	2886_15	55_8	28º 3.61'	86º39.57'	0.40	1390	6949	6690	6431	S	S	63051	29	0.0116
Kdu_gr 70		71L/12	2886_15	55_8	28º 1.95'	86º39.55'	0.09	380	5547	5471	5395	SE	SE	75021	15	0.0013
Kdu_gr 71		71L/12	2886_15	55_9	28º 1.46'	86º39.25'	0.26	1140	5364	5273	5182	SW	SW	63021	24	0.0063
Kdu_gr 72		71L/12	2886_15	55_9	28º 0.11'	86º38.82'	0.58	1260	5578	5304	5029	N	N	63021	34	0.0196
Kdu_gr 73		72I/9	2786_03	54_19	27º59.13'	86º38.47'	0.31	950	5761	5410	5060	W	W	63021	26	0.0081

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 74		72I/9	2786_03	54_19	27º58.98'	86º38.36'	0.12	760	5608	5456	5304	W	W	37021	17	0.0020
Kdu_gr 75		72I/9	2786_03	54_19	27º58.77'	86º38.44'	0.13	630	5608	5456	5304	SW	SW	37021	18	0.0023
Kdu_gr 76		72I/9	2786_03	54_19	27º55.79'	86º40.00'	0.09	505	5547	5395	5243	W	W	75021	15	0.0013
Kdu_gr 77		72I/9	2786_03	53_24	27º55.39'	86º40.11'	0.23	950	5730	5532	5334	SW	SW	63011	23	0.0053
Kdu_gr 78		72I/9	2786_03	53_24	27º54.68'	86º40.02'	0.39	1140	5593	5281	4968	SW	SW	63011	29	0.0112
Kdu_gr 79		72I/9	2786_03	53_24	27º53.40'	86º40.27'	0.16	630	5761	5563	5364	NW	NW	62011	19	0.0031
Kdu_gr 80		72I/9	2786_03	53_24	27º51.58'	86º40.86'	0.17	380	5639	5456	5273	SW	SW	37021	20	0.0034
Kdu_gr 81		72I/9	2786_03	53_24	27º53.20'	86º40.47'	0.35	950	5761	5624	5486	S	S	62021	28	0.0096
Kdu_gr 82		72I/9	2786_03	53_24	27º53.88'	86º40.76'	1.13	1750	5547	5403	5258	E	E	63011	44	0.0496
Kdu_gr 83		72I/9	2786_03	53_24	27º54.34'	86º40.96'	0.18	630	5547	5364	5182	N	N	75021	20	0.0037
Kdu_gr 84		72I/9	2786_03	53_24	27º54.66'	86º40.64'	0.09	440	5700	5547	5395	E	E	75021	15	0.0013
Kdu_gr 85		72I/9	2786_03	53_24	27º55.34'	86º40.59'	1.29	2340	5852	5517	5182	S	S	63011	46	0.0595
Kdu_gr 86		72I/9	2786_03	54_18	27º56.56'	86º40.21'	1.09	1390	5486	5288	5090	N	N	62321	43	0.0472
Kdu_gr 87		72I/9	2786_03	54_18	27º57.37'	86º39.52'	0.43	1270	5608	5380	5151	SE	SE	63021	30	0.0129
Kdu_gr 88		72I/9	2786_03	54_18	27º58.82'	86º38.75'	0.08	250	5608	5471	5334	E	E	37021	14	0.0011
Kdu_gr 89		72I/9	2786_03	54_18	27º59.22'	86º38.77'	0.36	950	5608	5410	5212	NE	NE	63021	28	0.0100
Kdu_gr 90		72I/9	2786_03	54_18	27º59.68'	86º38.72'	0.47	1070	5791	5547	5304	SE	SE	63021	31	0.0146
Kdu_gr 91		72I/9	2786_03	101_21	27º59.73'	86º39.24'	0.58	1580	5639	5471	5304	E	E	63021	34	0.0196
Kdu_gr 92		72I/9	2786_03	101_21	27º59.90'	86º40.31'	0.07	250	5730	5654	5578	S	S	37021	13	0.0009
Kdu_gr 93		71L/12	2886_15	55_10	28º 0.26'	86º39.19'	0.09	315	5547	5471	5395	NE	NE	75021	15	0.0013
Kdu_gr 94		71L/12	2886_15	55_10	28º 1.12'	86º39.87'	0.20	820	5608	5441	5273	S	S	75011	22	0.0043
Kdu_gr 95		71L/12	2886_15	55_10	28º 1.58'	86º40.00'	1.13	1770	5517	5410	5304	E	E	63022	44	0.0496
Kdu_gr 96		71L/12	2886_15	55_10	28º 2.18'	86º40.08'	0.28	1140	5517	5364	5212	NE	NE	63521	25	0.0070
Kdu_gr 97		71L/12	2886_15	55_10	28º 2.67'	86º39.92'	0.69	1710	5730	5471	5212	SE	SE	63521	36	0.0250
Kdu_gr 98		71L/12	2886_15	55_10	28º 2.45'	86º39.55'	0.40	1260	5791	5669	5547	SE	SE	63021	29	0.0116
Kdu_gr 99		71L/12	2886_15	60_52, 101_21	28º 3.53'	86º39.76'	0.11	250	6767	6660	6553	SE	SE	77021	16	0.0018
Kdu_gr 100	Ngojumba	71L/12	2886_15	60_52, 101_21	28º 1.30'	86º42.43'	82.61	22500	7897	6204	4511	S	S	51032	189	15.5896
Kdu_gr 101		71L/12	2886_15	60_52	28º 4.49'	86º39.44'	0.43	820	7163	6888	6614	SE	SE	63021	30	0.0129
Kdu_gr 102		71L/12	2886_15	60_52	28º 4.58'	86º40.04'	0.07	315	6492	6325	6157	SE	SE	75021	13	0.0009
Kdu_gr 103		71L/12	2886_15	60_52	28º 4.54'	86º40.30'	0.08	315	6096	6035	5974	SE	SE	75021	14	0.0011
Kdu_gr 104		71L/12	2886_15	60_52	28º 4.91'	86º40.39'	0.22	630	6645	6447	6248	SE	SE	75021	22	0.0049
Kdu_gr 105	Cho Oyu	71L/12	2886_15	60_52	28º 5.58'	86º40.06'	0.56	820	5410	6500	7590	SE	SE	77021	33	0.0187
Kdu_gr 106		71L/12	2886_15	55_11	28º 2.76'	86º42.15'	0.77	1450	5791	5578	5364	SE	SE	62021	38	0.0292
Kdu_gr 107		71L/12	2886_15	55_11	28º 2.66'	86º44.69'	0.15	820	6005	5761	5517	SW	SW	75021	19	0.0028
Kdu_gr 108		71L/12	2886_15	55_11	28º 2.33'	86º44.93'	0.30	1010	6675	6264	5852	W	W	63021	26	0.0077
Kdu_gr 109		71L/12	2886_15	55_11	28º 2.00'	86º45.27'	0.80	1450	6553	6096	5639	SW	SW	63021	38	0.0308
Kdu_gr 110		71L/16	2886_16	55_11	28º 1.67'	86º45.12'	0.05	315	5974	5867	5761	W	W	75022	10	0.0005
Kdu_gr 111		72I/9	2786_03	54_18	27º59.04'	86º43.82'	0.20	440	5639	5502	5364	N	N	75021	22	0.0043
Kdu_gr 112		72I/9	2786_03	54_18	27º58.83'	86º44.07'	0.32	950	5639	5517	5395	S	S	63021	26	0.0085
Kdu_gr 113		72I/13	2786_04	53_26	27º55.88'	86º45.36'	0.41	1260	5517	5258	4999	NW	NW	63021	29	0.0121
Kdu_gr 114		72I/13	2786_04	53_26	27º55.30'	86º45.37'	0.67	950	5791	5395	4999	SW	SW	62021	36	0.0240
Kdu_gr 115	Cholotse	72I/13	2786_04	53_26	27º54.39'	86º45.45'	1.55	2850	5578	5227	4877	SW	SW	52011	49	0.0765
Kdu_gr 116	Taweche	72I/13	2786_04	53_26	27º53.38'	86º46.21'	0.81	1900	5243	5060	4877	S	S	53012	39	0.0313

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 117		72I/13	2786_04	53_26	27º54.20'	86º46.19'	0.23	630	6157	6050	5944	W	W	37021	23	0.0053
Kdu_gr 118		72I/13	2786_04	53_26	27º53.71'	86º47.03'	0.31	630	6462	6126	5791	S	S	77021	26	0.0081
Kdu_gr 119		72I/13	2786_04	53_26	27º53.95'	86º47.53'	0.20	950	5364	5243	5121	E	E	63021	22	0.0043
Kdu_gr 120	Cholo	72I/13	2786_04	53_26	27º54.56'	86º47.43'	1.19	2520	5151	4831	4511	SW	SW	53022	45	0.0532
Kdu_gr 121		72I/13	2786_04	53_26	27º54.81'	86º46.45'	0.15	440	5547	5441	5334	SE	SE	64021	19	0.0028
Kdu_gr 122		72I/13	2786_04	53_26	27º56.73'	86º45.46'	0.16	630	5517	5380	5243	E	E	75021	19	0.0031
Kdu_gr 123		72I/13	2786_04	53_26	27º57.27'	86º45.38'	0.10	440	5425	5304	5182	E	E	75021	15	0.0015
Kdu_gr 124		72I/13	2786_04	54_16	27º57.67'	86º45.52'	0.47	1260	5486	5304	5121	SE	SE	63021	31	0.0146
Kdu_gr 125		72I/13	2786_04	54_16	27º58.21'	86º45.62'	1.10	1900	6139	5675	5212	SE	SE	63021	43	0.0478
Kdu_gr 126		72I/13	2786_04	54_16	27º58.18'	86º46.34'	0.19	630	5669	5471	5273	SE	SE	63021	21	0.0040
Kdu_gr 127		72I/13	2786_04	54_16	27º58.23'	86º46.56'	0.04	315	5639	5486	5334	SW	SW	75021	9	0.0004
Kdu_gr 128		72I/13	2786_04	54_16	27º57.96'	86º46.68'	0.20	630	5364	5182	4999	SW	SW	64021	22	0.0043
Kdu_gr 129		72I/13	2786_04	54_16	27º57.04'	86º47.65'	0.49	950	5913	5532	5151	SW	SW	77021	32	0.0155
Kdu_gr 130	Lobuje	72I/13	2786_04	54_16	27º57.58'	86º47.97'	1.72	3170	5761	5258	4755	SE	SE	53321	51	0.0882
Kdu_gr 131		72I/13	2786_04	54_16	27º57.96'	86º48.12'	0.09	315	5852	5730	5608	SE	SE	75021	15	0.0013
Kdu_gr 132		72I/13	2786_04	54_16	27º58.36'	86º47.16'	0.07	315	5639	5532	5425	NE	NE	75021	13	0.0009
Kdu_gr 133	Khumbu	72I/13	2786_04	54_16	27º58.51'	86º49.88'	45.39	12040	8230	6523	4816	S	S	51312	156	7.0727
Kdu_gr 134		71L/16	2786_16	55_14	28º 0.51'	86º49.66'	0.89	1260	7107	6266	5425	S	S	63321	40	0.0357
Kdu_gr 135		71L/16	2786_16	55_14	28º 0.89'	86º49.64'	0.06	315	7107	6952	6797	S	S	77021	12	0.0007
Kdu_gr 136		71L/16	2786_16	55_14	28º 0.42'	86º50.71'	0.13	630	5730	5578	5425	SE	SE	75021	18	0.0023
Kdu_gr 137		71L/16	2786_16	55_14	28º 0.56'	86º50.93'	0.03	190	5486	5425	5364	SE	SE	75021	7	0.0002
Kdu_gr 138		71L/16	2786_16	55_14	28º 0.68'	86º50.78'	0.08	250	5822	5700	5578	SE	SE	75021	14	0.0011
Kdu_gr 139		71L/16	2786_16	55_14	28º 0.80'	86º50.94'	0.03	190	5730	5639	5547	SE	SE	75021	7	0.0002
Kdu_gr 140		71L/16	2786_16	55_14	28º 1.44'	86º51.20'	0.48	950	6650	6343	6035	NW	NW	77021	31	0.0151
Kdu_gr 141		72I/13	2786_04	54_10	27º59.06'	86º55.26'	0.28	630	8382	7925	7468	SW	SW	63021	25	0.0070
Kdu_gr 142		72I/13	2786_04	54_10	27º58.17'	86º53.17'	0.09	440	7757	7567	7376	NW	NW	75021	15	0.0013
Kdu_gr 143		72I/13	2786_04	54_13	27º57.71'	86º51.30'	0.07	190	5913	5837	5761	NW	NW	37021	13	0.0009
Kdu_gr 144		72I/13	2786_04	54_13	27º57.62'	86º51.08'	0.05	315	5730	5624	5517	W	W	37321	10	0.0005
Kdu_gr 145		72I/13	2786_04	54_13	27º57.19'	86º51.01'	0.30	630	5849	5576	5304	NW	NW	62321	26	0.0077
Kdu_gr 146		72I/13	2786_04	54_13	27º55.60'	86º49.99'	0.15	540	5608	5441	5273	N	N	77021	19	0.0028
Kdu_gr 147		72I/13	2786_04	54_13	27º55.60'	86º49.78'	0.07	440	5517	5425	5334	N	N	75021	13	0.0009
Kdu_gr 148		72I/13	2786_04	54_13	27º55.58'	86º50.30'	0.05	315	5304	5227	5151	NE	NE	75021	10	0.0005
Kdu_gr 149		72I/13	2786_04	54_13	27º56.26'	86º50.51'	0.14	630	5730	5624	5517	SE	SE	75021	18	0.0025
Kdu_gr 150		72I/13	2786_04	54_13	27º56.44'	86º51.24'	0.32	1260	5547	5410	5273	SE	SE	53022	26	0.0085
Kdu_gr 151		72I/13	2786_04	54_12	27º56.93'	86º51.26'	0.10	630	5700	5578	5456	NE	NE	75021	15	0.0015
Kdu_gr 152	Nuptse	72I/13	2786_04	54_12	27º57.05'	86º52.17'	5.48	6330	5791	5349	4907	S	S	52022	77	0.4237
Kdu_gr 153	West Lhotse	72I/13	2786_04	54_12	27º56.04'	86º53.55'	2.43	4110	5761	5349	4938	S	S	52022	58	0.1413
Kdu_gr 154		72I/13	2786_04	54_11	27º57.39'	86º53.69'	0.58	1900	7468	6584	5700	S	S	62021	34	0.0196
Kdu_gr 155		72I/13	2786_04	54_11	27º57.13'	86º54.55'	1.03	1260	7163	6614	6066	SE	SE	63321	42	0.0436
Kdu_gr 156	Lhotse	72I/13	2786_04	54_11	27º55.17'	86º54.89'	8.84	8870	6160	5465	4770	SW	SW	52512	91	0.8044
Kdu_gr 157		72I/13	2786_04	54_10	27º56.90'	86º56.72'	0.92	1260	7437	6797	6157	SW	SW	63321	41	0.0373
Kdu_gr 158		72I/13	2786_04	54_10	27º56.27'	86º56.41'	0.15	630	6005	5745	5486	SW	SW	77021	19	0.0028
Kdu_gr 159		72I/13	2786_04	54_10	27º54.93'	86º56.07'	0.28	950	6020	5738	5456	SE	SE	63321	25	0.0070

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 160	Imja	72I/13	2786_04	54_10	27º53.93'	86º56.57'	19.43	10770	7864	6431	4999	SW	W	51512	118	2.2978
Kdu_gr 161		72I/13	2786_04	53_32	27º55.22'	86º58.72'	0.07	380	6187	6111	6035	SW	SW	75021	13	0.0009
Kdu_gr 162		72I/13	2786_04	53_32	27º54.66'	86º58.41'	0.04	315	6401	6355	6309	W	W	37021	9	0.0004
Kdu_gr 163		72I/13	2786_04	53_32	27º54.43'	86º57.86'	0.63	950	6187	5745	5304	W	W	77321	35	0.0221
Kdu_gr 164		72I/13	2786_04	53_32	27º52.85'	86º58.02'	0.03	250	5791	5700	5608	W	W	75021	7	0.0002
Kdu_gr 165		72I/13	2786_04	53_32	27º52.74'	86º57.87'	0.03	250	5791	5685	5578	W	W	75021	7	0.0002
Kdu_gr 166	Ombigaichain	72I/13	2786_04	53_29	27º52.93'	86º53.93'	4.46	4110	6200	5508	4816	NW	NW	53051	72	0.3212
Kdu_gr 167		72I/13	2786_04	53_29	27º52.26'	86º53.06'	6.02	5060	6309	5525	4740	N	N	52052	80	0.4807
Kdu_gr 168		72I/13	2786_04	53_29	27º51.72'	86º51.82'	0.08	315	6812	6683	6553	E	E	37021	14	0.0011
Kdu_gr 169	Amadabalam	72I/13	2786_04	53_28	27º52.78'	86º51.54'	1.95	2530	5425	5052	4679	NW	NW	53022	54	0.1047
Kdu_gr 170	Setta	72I/13	2786_04	53_28	27º52.51'	86º50.14'	0.70	2215	5273	4869	4465	NW	NW	53021	36	0.0255
Kdu_gr 171		72I/13	2786_04	52_43	27º51.71'	86º50.85'	1.00	1900	5730	5334	4938	SW	SW	63021	42	0.0419
Kdu_gr 172	Tingbo	72I/13	2786_04	52_43	27º50.89'	86º50.13'	0.21	950	4877	4755	4633	NW	NW	63021	22	0.0046
Kdu_gr 173	Nareyargaip	72I/13	2786_04	52_44	27º50.77'	86º52.38'	5.02	3800	6187	5624	5060	SW	SW	52511	75	0.3766
Kdu_gr 174	Nare	72I/13	2786_04	52_44	27º49.37'	86º52.79'	5.02	6330	5944	5319	4694	W	W	52011	75	0.3766
Kdu_gr 175		72I/13	2786_04	52_44	27º48.99'	86º53.47'	0.18	500	6410	6253	6096	NW	NW	37021	20	0.0037
Kdu_gr 176		72I/13	2786_04	51_23	27º48.52'	86º49.13'	0.19	630	5304	5090	4877	N	N	75021	21	0.0040
Kdu_gr 177		72I/13	2786_04	51_23	27º48.49'	86º48.80'	0.09	440	5334	5166	4999	N	N	75021	15	0.0013
Kdu_gr 178		72I/13	2786_04	51_23	27º48.32'	86º48.47'	0.35	1550	6157	5547	4938	N	N	63011	28	0.0096
Kdu_gr 179		72I/13	2786_04	51_23	27º47.99'	86º47.90'	0.67	1390	5334	5083	4831	NW	NW	63321	36	0.0240
Kdu_gr 180		72I/13	2786_04	51_23	27º48.30'	86º47.31'	0.09	440	4846	4663	4481	N	N	75021	15	0.0013
Kdu_gr 181		72I/13	2786_04	51_23	27º48.03'	86º46.23'	0.43	1260	5364	5029	4694	NW	NW	63021	30	0.0129
Kdu_gr 182		72I/13	2786_04	51_23	27º47.59'	86º46.87'	0.30	70	6623	5902	5182	open	open	37021	26	0.0077
Kdu_gr 183		72I/13	2786_04	51_23	27º47.42'	86º46.03'	0.07	380	5273	5166	5060	SW	SW	75021	13	0.0009
Kdu_gr 184		72I/13	2786_04	51_23	27º46.97'	86º46.56'	0.79	950	5334	5067	4801	SW	SW	63321	38	0.0302
Kdu_gr 185		72I/13	2786_04	51_23	27º46.41'	86º46.59'	0.80	950	5486	5105	4724	W	W	63021	38	0.0308
Kdu_gr 186	Kyashar	72I/13	2786_04	51_23	27º45.91'	86º47.99'	4.10	6330	6779	5538	4298	SW	SW	51012	70	0.2867
Kdu_gr 187		72I/13	2786_04	51_23	27º45.16'	86º48.34'	0.32	1450	5547	5166	4785	W	W	63021	26	0.0085
Kdu_gr 188		72I/14	2786_08	50_44	27º44.59'	86º47.74'	0.15	440	5212	5105	4999	NW	NW	75022	19	0.0028
Kdu_gr 189		72I/14	2786_08	50_44	27º44.09'	86º47.69'	0.17	1260	6367	5896	5425	N	N	63021	20	0.0034
Kdu_gr 190		72I/14	2786_08	50_44	27º42.36'	86º47.03'	0.06	315	5182	5121	5060	NW	NW	75021	12	0.0007
Kdu_gr 191		72I/14	2786_08	50_44	27º40.85'	86º47.52'	0.42	1260	5273	5128	4983	SE	SE	63011	30	0.0125
Kdu_gr 192		72I/14	2786_08	50_44	27º41.64'	86º47.43'	1.07	1260	5669	5319	4968	E	E	70321	43	0.0460
Kdu_gr 193		72I/14	2786_08	50_44	27º42.27'	86º47.64'	0.03	315	5304	5243	5182	SE	SE	75021	7	0.0002
Kdu_gr 194		72I/14	2786_08	50_44	27º42.62'	86º47.69'	0.19	950	5486	5212	4938	E	E	75021	21	0.0040
Kdu_gr 195		72I/14	2786_08	50_44	27º43.10'	86º47.98'	0.30	950	5700	5288	4877	SE	SE	63021	26	0.0077
Kdu_gr 196		72I/14	2786_08	50_44	27º43.45'	86º47.93'	1.38	1900	5883	5410	4938	E	E	63011	47	0.0653
Kdu_gr 197		72I/14	2786_08	50_44	27º43.83'	86º48.43'	0.65	1580	5608	5273	4938	E	E	63011	35	0.0230
Kdu_gr 198		72I/14	2786_08	50_44	27º44.27'	86º48.41'	0.27	1070	5944	5563	5182	E	E	63011	25	0.0066
Kdu_gr 199		72I/14	2786_08	50_44	27º44.66'	86º48.84'	0.28	950	5273	5075	4877	E	E	63011	25	0.0070
Kdu_gr 200		72I/14	2786_08	50_44	27º44.83'	86º49.95'	0.27	950	5761	5425	5090	E	E	63021	25	0.0066
Kdu_gr 201		72I/14	2786_08	50_42	27º45.30'	86º49.51'	0.02	170	6767	6736	6706	E	E	37021	5	0.0001
Kdu_gr 202		72I/13	2786_04	50_42	27º45.61'	86º50.31'	3.66	4110	6614	5608	4602	S	S	52021	67	0.2460

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 203		72I/13	2786_04	50_42	27º45.14'	86º51.58'	0.86	1900	5608	5380	5151	NE	NE	62021	40	0.0340
Kdu_gr 204		72I/13	2786_04	50_42	27º45.50'	86º51.40'	0.12	630	5822	5334	4846	NE	NE	75021	17	0.0020
Kdu_gr 205	Inkhu	72I/13	2786_04	50_42	27º46.65'	86º52.23'	19.90	10770	6523	5685	4846	S	S	51032	119	2.3719
Kdu_gr 206		72I/13	2786_04	51_24	27º47.11'	86º49.92'	0.52	1260	6096	5730	5364	E	E	63021	32	0.0169
Kdu_gr 207		72I/13	2786_04	51_24	27º48.42'	86º50.18'	0.54	1260	5913	5707	5502	E	E	63021	33	0.0178
Kdu_gr 208		72I/13	2786_04	51_24	27º48.69'	86º50.71'	0.26	760	5791	5677	5563	E	E	63021	24	0.0063
Kdu_gr 209		72I/13	2786_04	51_24	27º48.27'	86º51.89'	0.13	630	6309	6172	6035	S	S	37021	18	0.0023
Kdu_gr 210		72I/13	2786_04	51_24	27º47.58'	86º51.55'	1.10	1900	6218	5806	5395	S	S	63321	43	0.0478
Kdu_gr 211		72I/13	2786_04	51_25	27º47.87'	86º52.46'	0.73	1580	6096	5761	5425	SE	SE	63021	37	0.0271
Kdu_gr 212		72I/13	2786_04	51_25	27º46.81'	86º53.38'	0.09	315	6120	6047	5974	open	open	37021	15	0.0013
Kdu_gr 213		72I/13	2786_04	51_25	27º46.54'	86º53.41'	0.06	385	5913	5715	5517	W	W	77021	12	0.0007
Kdu_gr 214		72I/13	2786_04	51_26	27º46.17'	86º54.59'	0.36	150	6654	6299	5944	open	open	37021	28	0.0100
Kdu_gr 215		72I/13	2786_04	51_26	27º45.57'	86º54.29'	0.15	630	6096	5913	5730	NW	NW	77021	19	0.0028
Kdu_gr 216		72I/13	2786_04	51_26	27º45.34'	86º53.97'	0.50	1260	5700	5425	5151	NW	NW	63021	32	0.0160
Kdu_gr 217		72I/14	2786_08	50_41	27º44.91'	86º53.51'	0.50	880	5486	5273	5060	SW	SW	63011	32	0.0160
Kdu_gr 218		72I/14	2786_08	50_41	27º43.69'	86º53.42'	2.91	4435	6437	5627	4816	NE	NE	62311	62	0.1804
Kdu_gr 219		72I/14	2786_08	50_41	27º43.68'	86º52.77'	0.07	315	5639	5471	5304	NW	NW	75021	13	0.0009
Kdu_gr 220		72I/14	2786_08	50_41	27º42.72'	86º52.37'	0.77	1450	6437	6084	5730	NE	NE	63351	38	0.0292
Kdu_gr 221		72I/14	2786_08	50_42	27º43.53'	86º52.06'	1.91	3160	5822	5136	4450	NW	W	52011	53	0.1018
Kdu_gr 222		72I/14	2786_08	50_42	27º43.19'	86º51.31'	0.15	630	5883	5685	5486	NE	NE	75021	19	0.0028
Kdu_gr 223		72I/14	2786_08	50_42	27º42.80'	86º51.28'	0.15	480	6224	6084	5944	NW	NW	37021	19	0.0028
Kdu_gr 224		72I/14	2786_08	50_42	27º42.44'	86º50.75'	0.09	570	5608	5395	5182	W	W	75021	15	0.0013
Kdu_gr 225		72I/14	2786_08	50_42	27º42.23'	86º51.30'	1.11	1260	5791	5547	5304	SE	SE	63321	44	0.0484
Kdu_gr 226		72I/14	2786_08	50_42	27º42.35'	86º51.86'	0.49	1900	6066	5745	5425	S	S	63021	32	0.0155
Kdu_gr 227		72I/14	2786_08	50_42	27º41.98'	86º52.23'	0.37	1260	6401	5852	5304	SW	SW	77021	28	0.0104
Kdu_gr 228		72I/14	2786_08	50_42	27º41.82'	86º52.55'	0.29	760	5852	5593	5334	S	S	77021	25	0.0074
Kdu_gr 229		72I/14	2786_08	50_42	27º41.40'	86º53.62'	5.38	1900	6253	5656	5060	W	W	52321	77	0.4134
Kdu_gr 230		72I/14	2786_08	50_42	27º40.27'	86º52.04'	0.37	950	5837	5448	5060	N	N	77021	28	0.0104
Kdu_gr 231		72I/14	2786_08	68_25	27º39.99'	86º51.69'	0.61	1260	5837	5372	4907	N	N	77021	35	0.0211
Kdu_gr 232		72I/14	2786_08	68_25	27º39.88'	86º51.23'	0.11	440	5639	5456	5273	NW	NW	77021	16	0.0018
Kdu_gr 233		72I/14	2786_08	68_25	27º39.23'	86º52.33'	0.76	1900	5029	4770	4511	SW	SW	53022	38	0.0286
Kdu_gr 234		72I/14	2786_08	68_25	27º39.98'	86º52.91'	3.39	2215	5700	5441	5182	SW	SW	62051	65	0.2218
Kdu_gr 235		72I/14	2786_08	68_25	27º39.13'	86º53.00'	0.73	1450	5700	5288	4877	W	W	77021	37	0.0271
Kdu_gr 236		72I/14	2786_08	68_25	27º38.35'	86º52.10'	0.20	630	5334	5197	5060	N	N	77021	22	0.0043
Kdu_gr 237		72I/14	2786_08	68_26	27º40.98'	86º55.95'	0.10	250	5151	5044	4938	NE	NE	77021	15	0.0015
Kdu_gr 238		72I/14	2786_08	68_26	27º41.21'	86º55.33'	0.89	950	5700	5410	5121	N	N	63311	40	0.0357
Kdu_gr 239		72I/14	2786_08	68_26	27º41.55'	86º54.86'	1.00	1450	5791	5448	5105	NE	NE	63311	42	0.0419
Kdu_gr 240		72I/14	2786_08	68_26	27º42.57'	86º53.97'	6.96	2215	6358	5686	5014	NE	NE	77321	84	0.5840
Kdu_gr 241		72I/14	2786_08	50_40	27º43.42'	86º53.63'	0.77	1450	5822	5608	5395	NE	NE	77321	38	0.0292
Kdu_gr 242		72I/14	2786_08	50_40	27º44.53'	86º54.05'	0.27	630	5596	5404	5212	E	E	63021	25	0.0066
Kdu_gr 243		72I/13	2786_04	51_27	27º45.15'	86º54.52'	0.24	950	5913	5639	5364	SE	SE	63011	23	0.0056
Kdu_gr 244		72I/13	2786_04	51_27	27º45.28'	86º54.91'	0.36	1140	6066	5745	5425	SE	SE	63021	28	0.0100
Kdu_gr 245		72I/13	2786_04	51_27	27º45.83'	86º55.23'	0.80	1900	5791	5547	5304	SE	SE	77021	38	0.0308

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kdu_gr 246	Mera	72I/13	2786_04	51_27	27º48.13'	86º54.49'	4.86	5700	5822	5364	4907	SE	SE	52012	74	0.3605
Kdu_gr 247		72I/13	2786_04	51_27	27º48.38'	86º55.07'	1.38	2215	6035	5685	5334	SE	SE	53021	47	0.0653
Kdu_gr 248		72I/13	2786_04	51_27	27º49.08'	86º55.71'	0.07	315	5578	5441	5304	NE	NE	75021	13	0.0009
Kdu_gr 249	Hungu & Merala	72I/13	2786_04	52_40	27º51.07'	86º57.84'	22.91	9500	7129	6110	5090	S	S	51022	125	2.8597
Kdu_gr 250		72I/13	2786_04	52_40	27º50.31'	86º55.58'	0.12	440	5639	5563	5486	S	S	75021	17	0.0020
Kdu_gr 251		72I/13	2786_04	52_40	27º50.67'	86º55.57'	0.55	820	5761	5578	5395	NE	NE	77021	33	0.0182
Kdu_gr 252		72I/13	2786_04	52_40	27º51.53'	86º54.74'	0.94	1580	5791	5608	5425	E	E	63021	41	0.0385
Kdu_gr 253		72I/13	2786_04	52_40	27º52.07'	86º55.03'	0.12	440	5761	5700	5639	SE	SE	64021	17	0.0020
Kdu_gr 254		72I/13	2786_04	52_39	27º51.85'	86º56.36'	0.59	1390	5944	5715	5486	SW	SW	63021	34	0.0201
Kdu_gr 255		72I/13	2786_04	52_39	27º51.71'	86º56.67'	0.29	950	5822	5669	5517	S	S	63321	25	0.0074
Kdu_gr 256		72I/13	2786_04	52_39	27º51.62'	86º56.99'	0.72	1390	6005	5715	5425	S	S	63021	37	0.0266
Kdu_gr 257		72I/13	2786_04	52_39	27º52.05'	86º57.76'	0.12	440	6309	6126	5944	S	S	75021	17	0.0020
Kdu_gr 258		72I/13	2786_04	51_28	27º49.38'	86º58.04'	0.85	1650	5700	5563	5425	SW	SW	63021	39	0.0335
Kdu_gr 259		72I/13	2786_04	51_28	27º48.65'	86º58.01'	0.45	1260	5913	5715	5517	SW	SW	63021	31	0.0137
Kdu_gr 260	East Hungu	72I/13	2786_04	51_28	27º48.07'	86º59.28'	8.84	6330	6730	6017	5304	SW	SW	52022	91	0.8044
Kdu_gr 261		72I/13	2786_04	51_28	27º49.43'	86º59.41'	0.08	440	6523	6309	6096	SE	SE	77021	14	0.0011
Kdu_gr 262		72I/13	2786_04	51_28	27º46.77'	86º59.09'	0.29	505	7624	7226	6828	S	S	77021	25	0.0074
Kdu_gr 263		72I/13	2786_04	51_28	27º46.70'	86º58.06'	3.25	1900	6858	6066	5273	NW	NW	62021	64	0.2095
Kdu_gr 264	West Chamian	72I/13	2786_04	51_28	27º45.45'	86º58.06'	4.42	3800	7319	6144	4968	S	S	52021	72	0.3173
Kdu_gr 265		72I/14	2786_08	50_38	27º44.46'	86º57.87'	0.56	950	5913	5593	5273	NW	NW	63021	33	0.0187
Kdu_gr 266		72I/14	2786_08	50_38	27º44.07'	86º58.06'	0.23	880	5913	5730	5547	S	S	63021	23	0.0053
Kdu_gr 267		72I/14	2786_08	50_38	27º43.36'	86º57.74'	0.19	630	5456	5304	5151	SW	SW	77021	21	0.0040
Kdu_gr 268		72I/14	2786_08	50_38	27º43.73'	86º58.36'	0.79	1260	5639	5410	5182	S	S	77021	38	0.0302
Kdu_gr 269		72I/14	2786_08	50_38	27º44.17'	86º59.02'	2.34	2215	5608	5334	5060	S	S	63011	57	0.1342
Kdu_gr 270	West Chamang	72I/14	2786_08	50_38	27º43.07'	86º59.92'	5.63	2530	6292	5569	4846	W	W	62321	78	0.4394
Kdu_gr 271		72I/14	2786_08	50_38	27º41.64'	86º59.20'	1.34	1900	5863	5355	4846	NW	NW	63311	47	0.0627
Kdu_gr 272		72I/14	2786_08	50_38	27º40.75'	86º59.23'	0.30	1140	5273	5090	4907	NW	NW	63021	26	0.0077
Kdu_gr 273		72I/14	2786_08	50_38	27º40.31'	86º59.29'	0.26	950	5461	5169	4877	NW	NW	63021	24	0.0063
Kdu_gr 274		72I/14	2786_08	50_38	27º39.64'	86º59.29'	0.04	315	5243	5166	5090	NW	NW	75021	9	0.0004
Kdu_gr 275		72I/14	2786_08	47_28	27º39.51'	86º59.16'	0.10	570	5182	5044	4907	W	W	75021	15	0.0015
Kdu_gr 276		72I/14	2786_08	47_28	27º39.15'	86º58.91'	0.10	570	5182	5044	4907	SW	SW	63021	15	0.0015
Kdu_gr 277		72I/14	2786_08	47_28	27º38.85'	86º59.04'	0.09	500	5273	5151	5029	W	W	63021	15	0.0013
Kdu_gr 278		72I/14	2786_08	47_28	27º38.58'	86º58.93'	0.04	315	5304	5197	5090	W	W	75011	9	0.0004

Glacier Inventory of Likhu Basin

Total Number : 28   Total Area : 30.19 (km^2)   Ice Reserve : 1.94 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Klik_gr 1		72 I/5	2786_02	51_14	27º45.35'	86º24.96'	0.22	315	5197	5113	5029	E	E	71021	22	0.0049
Klik_gr 2		72 I/5	2786_02	51_14	27º45.89'	86º25.14'	0.11	550	5319	5235	5151	SE	SE	75011	16	0.0018
Klik_gr 3		72 I/5	2786_02	51_14	27º47.00'	86º25.72'	0.14	570	5334	5212	5090	S	S	75011	18	0.0025
Klik_gr 4		72 I/5	2786_02	51_14	27º47.50'	86º25.41'	0.77	1580	5273	5121	4968	NE	NE	63011	38	0.0292
Klik_gr 5		72 I/5	2786_02	51_15	27º48.45'	86º25.77'	0.48	1260	5456	5258	5060	SE	SE	63011	31	0.0151
Klik_gr 6		72 I/5	2786_02	51_15	27º49.01'	86º26.51'	0.61	1070	5925	5630	5334	E	E	62011	35	0.0211
Klik_gr 7		72 I/5	2786_02	51_15	27º49.40'	86º26.80'	3.13	2215	5730	5365	4999	SE	SE	52311	64	0.1991
Klik_gr 8		72 I/5	2786_02	51_15	27º48.96'	86º28.15'	2.79	3160	5608	5304	4999	S	S	62011	61	0.1704
Klik_gr 9		72 I/5	2786_02	51_15	27º48.35'	86º28.69'	0.15	670	5304	5228	5151	S	S	75011	19	0.0028
Klik_gr 10		72 I/5	2786_02	51_15	27º48.38'	86º29.15'	0.45	1070	5885	5564	5243	S	S	63011	31	0.0138
Klik_gr 11		72 I/5	2786_02	51_16	27º48.30'	86º29.51'	0.31	505	5486	5334	5182	E	E	60011	26	0.0081
Klik_gr 12		72 I/9	2786_03	51_16	27º47.98'	86º30.14'	2.22	2150	5456	5045	4633	SW	SW	52011	56	0.1249
Klik_gr 13		72 I/9	2786_03	51_16	27º47.10'	86º30.11'	0.41	1070	5456	5212	4968	SW	SW	63011	29	0.0121
Klik_gr 14		72 I/9	2786_03	51_16	27º45.84'	86º30.48'	0.50	1710	4785	4572	4359	SE	SE	53012	32	0.0160
Klik_gr 15		72 I/9	2786_03	51_16	27º46.85'	86º30.61'	1.27	2025	5730	5380	5029	S	S	63021	46	0.0582
Klik_gr 16		72 I/9	2786_03	51_16	27º47.54'	86º30.72'	0.21	380	6231	6072	5913	Open	Open	37011	22	0.0046
Klik_gr 17		72 I/9	2786_03	51_16	27º46.34'	86º30.92'	0.35	630	5425	5258	5090	S	S	60011	28	0.0096
Klik_gr 18		72 I/9	2786_03	51_17	27º46.70'	86º31.31'	0.47	1325	5425	5197	4968	S	S	62021	31	0.0146
Klik_gr 19		72 I/9	2786_03	51_17	27º46.63'	86º32.86'	10.66	7915	6718	5424	4130	SW	SW	52011	97	1.0330
Klik_gr 20		72 I/9	2786_03	51_17	27º46.61'	86º33.95'	0.16	500	6553	6325	6096	W	W	37011	19	0.0031
Klik_gr 21		72 I/9	2786_03	51_17	27º46.51'	86º33.37'	0.36	630	5578	5212	4846	NW	NW	63021	28	0.0100
Klik_gr 22		72 I/9	2786_03	51_17	27º45.35'	86º33.83'	0.55	1570	6309	6005	5700	SW	SW	63311	33	0.0182
Klik_gr 23		72 I/10	2786_07	51_17	27º45.60'	86º33.31'	0.11	570	6005	5822	5639	NW	NW	63021	16	0.0018
Klik_gr 24		72 I/10	2786_07	51_17	27º44.73'	86º33.35'	1.94	3160	5669	5243	4816	NW	NW	62011	54	0.1040
Klik_gr 25		72 I/10	2786_07	51_17	27º43.82'	86º33.22'	0.68	1900	5547	5212	4877	NW	NW	63311	36	0.0245
Klik_gr 26		72 I/10	2786_07	50_49	27º43.41'	86º33.07'	0.54	1580	5364	5151	4938	NW	NW	63011	33	0.0178
Klik_gr 27		72 I/10	2786_07	50_49	27º42.80'	86º33.07'	0.04	315	5273	5228	5182	N	N	75011	9	0.0004
Klik_gr 28		72 I/10	2786_03	50_49	27º42.49'	86º32.70'	0.58	1260	5273	5121	4968	N	N	63011	34	0.0196

Glacier Inventory of Tama Koshi Basin

Total Number : 80   Total Area : 109.69 (km^2)   Ice Reserve : 10.37 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kta_gr 1		72 I/1	2786_01	58_13	27°55.81'	86° 7.72'	0.10	380	5243	5121	4999	E	E	63021	15	0.0015
Kta_gr 2		72 I/1	2786_01	58_13	27°56.08'	86° 7.80'	0.02	190	5060	4999	4938	E	E	75021	5	0.0001
Kta_gr 3		72 I/1	2786_01	58_13	27°56.36'	86° 7.67'	0.04	250	5029	4953	4877	E	E	75021	9	0.0004
Kta_gr 4		72 I/1	2786_01	58_13	27°58.01'	86° 7.15'	0.14	505	6066	5532	4999	E	E	75021	18	0.0025
Kta_gr 5		72 I/1	2786_01	58_13	27°58.31'	86° 6.84'	0.81	1900	6005	5502	4999	NE	NE	63021	39	0.0313
Kta_gr 6		72 I/1	2786_01	58_13	27°58.87'	86° 6.78'	1.48	1900	5669	5227	4785	NE	NE	63321	49	0.0718
Kta_gr 7		72 I/1	2786_01	58_13	27°59.29'	86° 6.62'	0.45	1260	5685	5464	5243	NE	NE	63321	31	0.0137
Kta_gr 8		72 I/1	2786_01	58_13	28° 0.14'	86° 6.34'	2.85	3200	5685	5174	4663	NE	NE	52021	62	0.1754
Kta_gr 9		71 L/4	2886_13	55_37	28° 0.93'	86° 5.96'	1.71	2850	5792	5319	4846	NE	NE	62011	51	0.0875
Kta_gr 10		71 L/4	2886_13	55_37	28° 1.01'	86° 5.49'	1.02	1750	5730	5357	4983	NE	NE	63021	42	0.0431
Kta_gr 11		71 L/4	2886_13	55_37	28° 1.30'	86° 5.16'	0.58	1710	5974	5487	4999	NE	NE	63021	34	0.0196
Kta_gr 12		71 L/4	2886_13	60_35	28° 3.26'	86° 5.97'	0.85	950	5456	5105	4755	SE	SE	60321	39	0.0335
Kta_gr 13		71 L/4	2886_13	60_35	28° 4.42'	86° 6.15'	0.85	2850	5700	4968	4237	NE	NE	53011	39	0.0335
Kta_gr 14		71 L/4	2886_13	60_35	28° 4.98'	86° 5.66'	1.35	2250	5669	5273	4877	E	E	52011	47	0.0633
Kta_gr 15		71 L/4	2886_13	60_35	28° 5.61'	86° 6.05'	0.42	950	5334	5151	4968	S	S	63021	30	0.0125
Kta_gr 16		71 L/4	2886_13	60_35	28° 5.50'	86° 6.60'	0.06	380	5334	5227	5121	S	S	75021	12	0.0007
Kta_gr 17		71 L/4	2886_13	60_35	28° 5.31'	86° 6.92'	0.19	950	5425	5227	5029	SW	SW	75021	21	0.0040
Kta_gr 18		71 L/4	2886_13	60_38	28° 6.12'	86°12.86'	0.78	1580	5090	4923	4755	NW	NW	63021	38	0.0297
Kta_gr 19		71 L/4	2886_13	60_38	28° 5.73'	86°12.61'	0.08	570	5273	5326	5380	NW	NW	75021	14	0.0011
Kta_gr 20		71 L/4	2886_13	60_38	28° 5.72'	86°12.15'	0.31	1260	5486	5182	4877	W	W	63021	26	0.0081
Kta_gr 21		71 L/4	2886_13	55_41	28° 5.41'	86°12.32'	0.62	1260	5639	5334	5029	W	W	63021	35	0.0216
Kta_gr 22		71 L/4	2886_13	55_41	28° 4.66'	86°12.38'	0.35	950	5913	5639	5364	W	W	62021	28	0.0096
Kta_gr 23		71 L/4	2886_13	55_41	28° 4.18'	86°12.68'	0.33	820	5486	5288	5090	W	W	62021	27	0.0089
Kta_gr 24		71 L/4	2886_13	55_41	28° 3.30'	86°12.69'	0.12	505	5364	5288	5212	W	W	64021	17	0.0020
Kta_gr 25		71 L/4	2886_13	55_41	28° 2.93'	86°12.67'	0.71	1580	5608	5319	5029	W	W	63321	37	0.0261
Kta_gr 26		72 I/5	2786_02	54_28	27°57.81'	86°17.92'	0.75	1900	5423	5150	4877	NW	NW	63021	37	0.0281
Kta_gr 27		72 I/5	2786_02	54_28	27°56.80'	86°18.69'	1.07	2215	5639	5029	4420	NW	NW	63021	43	0.0460
Kta_gr 28		72 I/5	2786_02	54_28	27°56.59'	86°19.63'	0.32	950	5852	5517	5182	S	S	63021	26	0.0085
Kta_gr 29		72 I/5	2786_02	54_28	27°56.36'	86°19.95'	0.35	820	5578	5334	5090	SW	SW	63021	28	0.0096
Kta_gr 30		72 I/5	2786_02	54_28	27°55.68'	86°20.66'	0.50	630	5486	5197	4907	SW	SW	63021	32	0.0160

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kta_gr 31		72 I/5	2786_02	53_15	27°56.13'	86°22.39'	3.36	1250	5639	5288	4938	S	S	60021	65	0.2191
Kta_gr 32		72 I/5	2786_02	53_15	27°54.75'	86°24.16'	1.84	950	5639	5304	4968	SW	SW	60021	53	0.0967
Kta_gr 33		72 I/5	2786_02	53_15	27°54.03'	86°24.93'	0.33	760	5730	5380	5029	SE	SE	63021	27	0.0089
Kta_gr 34		72 I/5	2786_02	53_15	27°53.93'	86°25.95'	1.20	880	5669	5334	4999	SW	SW	60021	45	0.0539
Kta_gr 35		72 I/5	2786_02	53_16	27°53.23'	86°26.54'	0.93	1580	5608	5136	4663	SW	SW	63021	41	0.0379
Kta_gr 36		72 I/5	2786_02	53_16	27°54.07'	86°27.67'	1.57	3350	5913	5273	4633	S	S	53011	50	0.0779
Kta_gr 37		72 I/5	2786_02	53_17	27°55.58'	86°28.36'	0.28	760	5791	5578	5364	S	S	63021	25	0.0070
Kta_gr 38		72 I/5	2786_02	53_17	27°55.18'	86°28.83'	2.54	4050	5822	5372	4923	SW	SW	53021	59	0.1500
Kta_gr 39		72 I/5	2786_02	53_17	27°54.79'	86°29.69'	0.25	820	5425	5258	5090	SE	SE	63021	24	0.0059
Kta_gr 40	Ripimo Shar	72 I/5	2786_02	53_17	27°54.30'	86°29.91'	20.41	7600	6370	5471	4572	SW	SW	51522	120	2.4530
Kta_gr 41		72 I/9	2786_03	54_21	27°54.83'	86°31.69'	0.08	380	6401	6157	5913	SW	SW	75011	14	0.0011
Kta_gr 42		72 I/9	2786_03	54_21	27°53.94'	86°30.57'	0.08	630	5578	5380	5182	NW	NW	75011	14	0.0011
Kta_gr 43		72 I/9	2786_03	53_18	27°52.55'	86°30.71'	0.12	760	6782	6652	6523	NW	NW	37011	17	0.0020
Kta_gr 44		72 I/9	2786_03	53_18	27°51.70'	86°30.27'	2.11	2530	5883	5517	5151	S	S	62321	55	0.1166
Kta_gr 45		72 I/5	2786_02	53_18	27°52.82'	86°29.66'	0.32	630	6523	6309	6096	W	W	37021	26	0.0085
Kta_gr 46	Rolwaling	72 I/9	2786_03	53_18	27°49.75'	86°31.82'	38.16	22170	6718	5630	4542	NW	S	51012	147	5.6226
Kta_gr 47		72 I/9	2786_03	53_18	27°48.52'	86°31.57'	0.60	950	6660	6104	5547	N	N	67321	34	0.0206
Kta_gr 48		72 I/9	2786_03	53_18	27°48.47'	86°31.18'	0.12	500	6248	5944	5639	N	N	77021	17	0.0020
Kta_gr 49		72 I/5	2786_02	52_52	27°49.80'	86°28.97'	0.80	1900	5334	5121	4907	NE	NE	63021	38	0.0308
Kta_gr 50		72 I/5	2786_02	52_52	27°49.72'	86°27.88'	0.15	630	5243	5197	5151	NE	NE	64021	19	0.0028
Kta_gr 51		72 I/5	2786_02	52_53	27°50.49'	86°27.52'	0.38	820	5578	5380	5182	NE	NE	63021	28	0.0108
Kta_gr 52		72 I/5	2786_02	52_53	27°51.40'	86°27.23'	0.73	1580	5547	5288	5029	NE	NE	63011	37	0.0271
Kta_gr 53		72 I/5	2786_02	52_53	27°50.96'	86°27.06'	0.09	440	5883	5745	5608	NW	NW	75021	15	0.0013
Kta_gr 54		72 I/5	2786_02	52_53	27°50.46'	86°26.66'	1.67	3160	5639	5212	4785	N	N	63011	51	0.0847
Kta_gr 55		72 I/5	2786_02	52_53	27°50.41'	86°26.06'	0.55	1260	5730	5441	5151	N	N	63321	33	0.0182
Kta_gr 56		72 I/5	2786_02	52_53	27°50.55'	86°25.86'	0.02	190	5364	5227	5090	NW	NW	77021	5	0.0001
Kta_gr 57		72 I/5	2786_02	52_53	27°50.60'	86°25.63'	0.08	380	5304	5197	5090	N	N	75021	14	0.0011
Kta_gr 58		72 I/5	2786_02	52_54	27°51.24'	86°25.14'	0.28	570	5517	5364	5212	NE	NE	64021	25	0.0070
Kta_gr 59		72 I/5	2786_02	52_54	27°51.60'	86°24.57'	0.63	1260	5182	5029	4877	N	N	63031	35	0.0221
Kta_gr 60		72 I/5	2786_02	52_54	27°51.78'	86°23.99'	0.59	1330	5212	5014	4816	N	N	63011	34	0.0201
Kta_gr 61		72 I/5	2786_02	52_55	27°51.63'	86°23.48'	0.07	440	5395	5273	5151	N	N	75021	13	0.0009
Kta_gr 62		72 I/5	2786_02	52_55	27°51.91'	86°23.45'	0.58	1710	5456	5166	4877	NE	NE	63011	34	0.0196
Kta_gr 63		72 I/5	2786_02	52_55	27°52.47'	86°21.25'	0.08	630	5121	4999	4877	NW	NW	75021	14	0.0011
Kta_gr 64		72 I/5	2786_02	52_55	27°52.38'	86°21.57'	0.03	250	5182	5105	5029	S	S	75021	7	0.0002
Kta_gr 65		72 I/5	2786_02	52_55	27°52.22'	86°21.80'	0.11	250	5364	5197	5029	NW	NW	37021	16	0.0018
Kta_gr 66		72 I/5	2786_02	52_55	27°51.93'	86°21.63'	0.68	1260	5212	4999	4785	NW	NW	63011	36	0.0245
Kta_gr 67		72 I/5	2786_02	52_55	27°51.35'	86°22.17'	0.17	500	5364	5212	5060	SW	SW	37321	20	0.0034
Kta_gr 68		72 I/5	2786_02	52_55	27°51.65'	86°22.82'	0.12	315	5334	5273	5212	S	S	64011	17	0.0020
Kta_gr 69		72 I/5	2786_02	52_55	27°51.42'	86°23.15'	0.09	380	5395	5288	5182	SW	SW	75011	15	0.0013
Kta_gr 70		72 I/5	2786_02	52_55	27°51.32'	86°23.76'	0.40	630	5334	5121	4907	SE	SE	63011	29	0.0116
Kta_gr 71		72 I/5	2786_02	52_55	27°51.29'	86°24.42'	0.05	250	5182	5121	5060	S	S	77021	10	0.0005
Kta_gr 72		72 I/5	2786_02	52_55	27°51.21'	86°24.60'	0.02	190	5090	5060	5029	S	S	75011	5	0.0001
Kta_gr 73		72 I/5	2786_02	52_54	27°50.11'	86°25.38'	2.95	4100	5925	5355	4785	NW	NW	62011	62	0.1838

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kta_gr 74		72 I/5	2786_02	52_54	27°49.29'	86°25.25'	1.86	2520	5834	5447	5060	NW	NW	62011	53	0.0982
Kta_gr 75		72 I/5	2786_02	52_54	27°48.32'	86°24.98'	0.59	1390	5304	5113	4923	NW	NW	63311	34	0.0201
Kta_gr 76		72 I/5	2786_02	51_14	27°47.64'	86°24.86'	0.90	1580	5243	5075	4907	NW	NW	63311	40	0.0362
Kta_gr 77		72 I/5	2786_02	51_14	27°46.99'	86°25.09'	0.48	950	5334	5166	4999	SW	SW	63011	31	0.0151
Kta_gr 78		72 I/5	2786_02	51_14	27°46.51'	86°24.76'	0.62	950	5376	5142	4907	NW	NW	63311	35	0.0216
Kta_gr 79		72 I/5	2786_02	51_14	27°46.29'	86°24.02'	0.30	760	5121	4999	4877	NW	NW	63311	26	0.0077
Kta_gr 80		72 I/5	2786_02	51_14	27°45.83'	86°24.66'	0.11	315	5090	5014	4938	NW	NW	64011	16	0.0018

Glacier Inventory of Sun Koshi Basin

Total Number : 23   Total Area : 74.56 (km^2)   Ice Reserve :7.19 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Ksun_gr 1		71 H/12	2885_15	61_33	28º7.76'	85º42.09'	0.18	630	5090	4953	4816	NE	NE	64011	20	0.0037
Ksun_gr 2		71 H/12	2885_15	61_33	28º8.53'	85º42.35'	3.70	5060	5547	4923	4298	SE	SE	52021	67	0.2496
Ksun_gr 3		71 H/16	2885_16	61_32	28º9.10'	85º44.56'	12.93	8230	6973	5544	4115	SW	SW	52021	103	1.3364
Ksun_gr 4		71 H/16	2885_16	61_32	28º8.16'	85º45.06'	0.05	190	5151	5121	5090	SE	SE	77021	10	0.0005
Ksun_gr 5		71 H/16	2885_16	61_32	28º8.27'	85º45.52'	0.64	1450	5273	5136	4999	SW	SW	63011	35	0.0225
Ksun_gr 6		71 H/16	2885_16	61_32	28º8.20'	85º46.33'	1.84	2530	5639	5212	4785	SW	SW	60021	53	0.0967
Ksun_gr 7		71 H/16	2885_16	61_32	28º7.55'	85º46.72'	0.10	315	4999	4900	4801	SE	SE	75021	15	0.0015
Ksun_gr 8		71 H/16	2885_16	61_32	28º7.67'	85º46.99'	0.43	1260	5212	4938	4663	SE	SE	63321	30	0.0129
Ksun_gr 9		71 H/16	2885_16	61_32	28º8.78'	85º48.11'	19.63	8870	6980	5486	3993	S	S	52021	119	2.3293
Ksun_gr 10		71 H/16	2885_16	61_31	28º9.84'	85º49.07'	0.04	190	5669	5563	5456	NW	NW	77021	9	0.0004
Ksun_gr 11		71 H/16	2885_16	61_31	28º7.50'	85º48.98'	0.13	630	5182	4983	4785	W	W	75021	18	0.0023
Ksun_gr 12		71 H/16	2885_16	61_31	28º7.92'	85º49.32'	0.17	315	5182	5090	4999	SE	SE	75022	20	0.0034
Ksun_gr 13		71 H/16	2885_16	60_29	28º9.50'	85º48.88'	0.04	190	5669	5547	5425	E	E	37021	9	0.0004
Ksun_gr 14		71 H/16	2885_16	60_29	28º9.14'	85º50.27'	17.94	10130	6757	5299	3840	S	S	52011	115	2.0666
Ksun_gr 15		71 H/16	2885_16	60_29	28º8.18'	85º51.38'	5.16	3800	6657	5645	4633	SW	SW	62021	76	0.3908
Ksun_gr 16		71 H/16	2885_16	60_29	28º7.08'	85º51.02'	0.58	1260	5304	4831	4359	SW	SW	60021	34	0.0196
Ksun_gr 17		71 H/16	2885_16	60_29	28º6.82'	85º52.06'	3.25	2400	5944	5212	4481	W	W	62011	64	0.2095
Ksun_gr 18		71 H/16	2885_16	60_29	28º5.75'	85º52.34'	0.44	950	5243	4953	4663	SE	SE	63021	30	0.0133
Ksun_gr 19		71 H/16	2885_16	60_29	28º5.98'	85º53.24'	4.11	5060	6075	5224	4374	SW	SW	52011	70	0.2877
Ksun_gr 20		71 H/16	2885_16	60_29	28º5.04'	85º53.66'	2.13	1900	5486	5197	4907	NW	NW	62021	55	0.1181
Ksun_gr 21		71 H/16	2885_16	60_29	28º4.36'	85º53.56'	0.36	1015	5364	5044	4724	W	W	63011	28	0.0100
Ksun_gr 22		71 H/16	2885_16	59_32	28º2.92'	85º54.30'	0.41	1260	5542	5225	4907	SW	SW	63021	29	0.0121
Ksun_gr 23		71 H/16	2885_16	59_32	28º2.63'	85º55.16'	0.28	1140	5334	5121	4907	SE	SE	37021	25	0.0070

Glacier Inventory of Indrawati Basin

Total Number : 18 Total Area : 22.98 (km^2) Ice Reserve : 1.44 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kin_gr 1		71 H/8	2885_14	61_39	28º6.10'	85º28.99'	0.78	1710	5304	5121	4938	SE	SE	63021	38	0.0297
Kin_gr 2		71 H/12	2885_15	61_39	28º7.38'	85º30.33'	1.23	2025	5486	5197	4907	NE	NE	63021	45	0.0557
Kin_gr 3		71 H/12	2885_15	61_39	28º7.82'	85º30.12'	0.70	1580	5486	5227	4968	NE	NE	63021	36	0.0255
Kin_gr 4		71 H/12	2885_15	61_39	28º8.19'	85º30.00'	0.31	880	5456	5258	5060	NE	NE	63021	26	0.0081
Kin_gr 5		71 H/12	2885_15	61_39	28º8.65'	85º30.01'	0.37	1070	5486	5029	4572	NE	NE	60021	28	0.0104
Kin_gr 6		71 H/12	2885_15	61_37,38	28º8.78'	85º31.58'	3.56	3160	5791	5243	4694	SE	SE	52011	67	0.2370
Kin_gr 7		71 H/12	2885_15	61_37,38	28º8.18'	85º33.71'	0.30	1260	4938	4862	4785	NE	NE	63021	26	0.0077
Kin_gr 8		71 H/12	2885_15	61_37,38	28º9.47'	85º33.14'	5.95	4745	5846	5118	4389	SE	SE	52011	80	0.4732
Kin_gr 9		71 H/12	2885_15	61_37,38	28º9.53'	85º34.27'	0.13	505	5243	5152	5060	S	S	75021	18	0.0023
Kin_gr 10		71 H/12	2885_15	61_37,38	28º9.15'	85º35.38'	0.11	315	5486	5365	5243	S	S	77021	16	0.0018
Kin_gr 11		71 H/12	2885_15	61_36	28º8.87'	85º36.58'	1.59	2340	5552	5199	4846	S	S	63021	50	0.0792
Kin_gr 12		71 H/12	2885_15	61_36	28º7.75'	85º36.95'	0.30	690	5395	5167	4938	SW	SW	63321	26	0.0077
Kin_gr 13		71 H/12	2885_15	61_36	28º7.39'	85º37.07'	0.11	315	5151	5075	4999	SW	SW	64021	16	0.0018
Kin_gr 14		71 H/12	2885_15	61_36	28º6.94'	85º36.93'	0.23	440	4999	4953	4907	W	W	65021	23	0.0053
Kin_gr 15		71 H/12	2885_15	61_36	28º7.54'	85º37.68'	1.07	2215	5395	5106	4816	SE	SE	63011	43	0.0460
Kin_gr 16		71 H/12	2885_15	61_36	28º7.47'	85º38.24'	0.31	630	5151	5029	4907	SE	SE	63011	26	0.0081
Kin_gr 17		71 H/12	2885_15	61_35	28º8.86'	85º40.24'	5.11	3925	5761	5243	4724	SW	SW	63311	75	0.3857
Kin_gr 18		71 H/12	2885_15	61_35	28º8.23'	85º40.39'	0.82	1580	5639	5273	4907	S	S	63011	39	0.0318

Glacier Inventory of Trishuli Basin

Total Number : 74 Total Area : 246.65 (km^2) Ice Reserve : 27.47 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Gtri_gr 1		71 H/3,H/4	2885_09	62_15	28º15.20'	85º11.66'	0.86	1710	5456	5179	4903	SE	SE	63021	40	0.0340
Gtri_gr 2		71 H/4	2885_13	62_15	28º14.72'	85º12.23'	0.31	690	5182	4968	4755	SW	SW	77021	26	0.0081
Gtri_gr 3		71 H/3,H/4	2885_09	62_15	28º15.19'	85º12.53'	2.32	3170	5764	5480	5197	S	S	63021	57	0.1326
Gtri_gr 4		71 H/4	2885_13	62_15	28º15.82'	85º12.73'	0.36	760	5304	5105	4907	NE	NE	60021	28	0.0100
Gtri_gr 5		71 H/4	2885_13	62_15	28º16.24'	85º12.11'	2.49	3350	5765	5260	4755	NE	NE	60021	59	0.1460
Gtri_gr 6		71 H/4	2885_13	62_15	28º17.18'	85º11.34'	1.31	2030	5895	5249	4602	NE	NE	67021	46	0.0608
Gtri_gr 7		71 H/4	2885_13	63_9	28º16.62'	85º10.29'	1.16	1640	5151	4938	4724	N	N	62021	44	0.0514
Gtri_gr 8		71 H/4	2885_13	63_9	28º17.32'	85º 9.74'	0.13	630	5456	5189	4923	E	E	75021	18	0.0023
Gtri_gr 9		71 H/4	2885_13	63_9	28º18.65'	85º 8.78'	8.75	5830	7049	5887	4724	SE	SE	52012	91	0.7934
Gtri_gr 10		71 H/4	2885_13	101_69	28º19.70'	85º 8.88'	0.15	500	6499	6237	5974	SE	SE	77021	19	0.0028
Gtri_gr 11		71 H/3	2885_09	101_69	28º19.68'	85º 9.63'	0.66	820	6500	6146	5791	SW	SW	60021	36	0.0235
Gtri_gr 12		71 H/3	2885_09	101_69	28º19.13'	85º 9.99'	0.73	820	6801	5961	5121	SW	SW	67021	37	0.0271
Gtri_gr 13		71 H/3	2885_09	101_69	28º19.15'	85º10.64'	2.25	2215	6157	5471	4785	SE	SE	63021	57	0.1272
Gtri_gr 14		71 H/3	2885_09	101_69	28º19.17'	85º12.06'	0.52	950	5525	5399	5273	NE	NE	60021	32	0.0169
Gtri_gr 15		71 H/3	2885_09	101_69	28º19.51'	85º11.67'	1.13	1580	5685	5250	4816	NE	NE	60021	44	0.0496
Gtri_gr 16		71 H/11	2885_11	62_25	28º18.12'	85º35.15'	0.58	1550	5791	5357	4923	SW	SW	63021	34	0.0196
Gtri_gr 17		71 H/11	2885_11	62_25	28º17.90'	85º35.60'	0.89	1740	6727	5909	5090	SW	SW	63021	40	0.0357
Gtri_gr 18		71 H/11	2885_11	62_25	28º17.56'	85º35.77'	0.2	505	5685	5509	5334	SW	SW	77021	22	0.0043
Gtri_gr 19	Chumsundo g	71 H/11	2885_11	62_25	28º16.14'	85º35.71'	6.13	5700	6195	5163	4130	N	NW	52012	80	0.4926
Gtri_gr 20		71 H/11	2885_11	62_25	28º16.78'	85º33.42'	0.02	315	5608	5433	5258	NE	NE	75012	5	0.0001
Gtri_gr 21		71 H/11	2885_11	62_24	28º16.60'	85º31.16'	16.52	6330	7051	5233	3414	NW	NW	52012	112	1.8519
Gtri_gr 22		71 H/7	2885_10	62_24	28º16.88'	85º29.77'	0.63	1140	5791	5410	5029	NE	NE	67021	35	0.0221
Gtri_gr 23		71 H/7	2885_10	101_51	28º17.13'	85º29.54'	0.23	690	5486	5121	4755	NE	NE	67021	23	0.0053
Gtri_gr 24		71 H/7	2885_10	101_51	28º17.14'	85º29.26'	0.33	633	5486	5166	4846	N	N	77021	27	0.0089
Gtri_gr 25		71 H/7	2885_10	101_51	28º17.04'	85º28.80'	0.17	820	5014	4900	4785	S	S	77021	20	0.0034
Gtri_gr 26		71 H/7	2885_10	101_51	28º16.77'	85º29.22'	0.25	760	5532	5159	4785	SW	SW	77021	24	0.0059
Gtri_gr 27		71 H/7	2885_10	101_51	28º16.52'	85º29.15'	0.09	600	5486	5151	4816	SW	SW	77021	15	0.0013
Gtri_gr 28		71 H/7	2885_10	101_51	28º15.97'	85º28.68'	5.07	4055	6672	5470	4267	NW	NW	51012	75	0.3816
Gtri_gr 29		71 H/7	2885_10	101_51	28º15.49'	85º27.51'	3.26	3610	6553	5601	4648	NW	NW	63021	65	0.2104
Gtri_gr 30		71 H/8	2885_14	62_22	28º14.64'	85º27.53'	0.56	1070	5441	5212	4983	NW	NW	63021	33	0.0187
Gtri_gr 31		71 H/8	2885_14	62_22	28º14.18'	85º27.40'	0.57	820	5334	5182	5029	NW	NW	60021	34	0.0192

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gtri_gr 32		71 H/8	2885_14	62_22	28º13.77'	85º27.55'	0.39	1200	5334	5182	5029	SW	SW	77021	29	0.0112
Gtri_gr 33		71 H/8	2885_14	62_22	28º13.60'	85º26.85'	1.05	760	5288	5083	4877	NW	NW	60021	43	0.0448
Gtri_gr 34		71 H/8	2885_14	62_22	28º13.49'	85º27.41'	0.26	2090	6581	5653	4724	S	S	77021	24	0.0063
Gtri_gr 35		71 H/8	2885_14	62_22	28º14.03'	85º28.32'	2.5	3420	6581	5577	4572	SE	SE	60021	59	0.1468
Gtri_gr 36		71 H/8	2885_14	62_22	28º14.66'	85º30.03'	11.03	1070	5547	5288	5029	S	S	60021	98	1.0811
Gtri_gr 37		71 H/12	2885_15	62_23	28º15.20'	85º32.66'	12.02	6580	7051	5522	3993	SE	S	52012	101	1.2125
Gtri_gr 38		71 H/12	2885_15	62_24	28º15.57'	85º34.39'	6.25	5830	6005	5136	4267	SW	SW	60021	81	0.5055
Gtri_gr 39		71 H/12	2885_15	62_24	28º14.57'	85º36.77'	4.99	1520	6561	5841	5121	SW	SW	60021	75	0.3736
Gtri_gr 40		71 H/12	2885_15	62_25	28º14.76'	85º38.18'	16.46	11590	5852	4991	4130	SE	SE	52012	112	1.8430
Gtri_gr 41		71 H/12	2885_15	62_27	28º14.85'	85º39.35'	2.11	1260	5951	5627	5304	SW	SW	60021	55	0.1166
Gtri_gr 42		71 H/12	2885_15	62_27	28º14.38'	85º40.28'	2.09	1645	5951	5448	4945	SE	SE	60021	55	0.1151
Gtri_gr 43		71 H/12	2885_15	62_28	28º15.35'	85º40.02'	4.69	4050	5950	5230	4511	SE	SE	53012	73	0.3437
Gtri_gr 44	Langtang glac	71 H/12	2885_15	62_28	28º14.58'	85º42.69'	67.93	17740	7218	5834	4450	S	S	51012	177	12.0447
Gtri_gr 45		71 H/12	2885_15	62_28	28º15.95'	85º44.27'	4.39	2150	6568	5738	4907	SW	SW	60021	72	0.3144
Gtri_gr 46		71 H/11	2885_11	62-29	28º16.68'	85º44.26'	0.01	150	5715	5585	5456	W	W	75021	2	0.0000
Gtri_gr 47		71 H/15	2885_12	62_29	28º16.40'	85º44.53'	0.07	315	6157	6050	5944	SW	SW	75021	13	0.0009
Gtri_gr 48		71 H/16	2885_16	62_29	28º11.21'	85º44.33'	25.65	1580	6279	5243	4206	SW	SW	53021	130	3.3221
Gtri_gr 49		71 H/16	2885_16	62_29	28º12.26'	85º45.86'	0.79	760	5886	5625	5364	S	S	67021	38	0.0302
Gtri_gr 50		71 H/16	2885_16	62_29	28º12.35'	85º46.62'	0.84	880	6892	6494	6096	SW	SW	67021	39	0.0329
Gtri_gr 51		71 H/16	2885_16	62_29	28º12.03'	85º46.50'	0.18	410	6248	6020	5791	SW	SW	67021	20	0.0037
Gtri_gr 52		71 H/12	2885_15	61_33	28º10.35'	85º43.67'	0.53	690	5639	5502	5364	NE	NE	60021	33	0.0173
Gtri_gr 53		71 H/12	2885_15	61_33	28º13.01'	85º43.77'	0.14	750	6279	6096	5913	NE	NE	77021	18	0.0025
Gtri_gr 54		71 H/12	2885_15	61_33	28º13.49'	85º42.61'	0.38	1070	5364	5075	4785	W	W	63021	28	0.0108
Gtri_gr 55		71 H/12	2885_15	61_33	28º12.77'	85º42.45'	0.18	410	6145	5983	5822	NW	NW	67021	20	0.0037
Gtri_gr 56		71 H/12	2885_15	61_34	28º10.93'	85º41.18'	0.41	760	5334	5144	4953	NE	NE	64021	29	0.0121
Gtri_gr 57		71 H/12	2885_15	61_34	28º11.13'	85º40.01'	0.38	500	5288	5113	4938	W	W	60021	28	0.0108
Gtri_gr 58		71 H/12	2885_15	61_34	28º10.37'	85º40.00'	1.17	2850	5791	5334	4877	W	W	63021	44	0.0520
Gtri_gr 59		71 H/12	2885_15	61_34	28º 9.99'	85º40.48'	0.42	4050	6172	5433	4694	SW	SW	60021	30	0.0125
Gtri_gr 60		71 H/12	2885_15	61_35	28º 9.56'	85º38.82'	6.55	5130	5563	5128	4694	N	N	62021	82	0.5384
Gtri_gr 61		71 H/12	2885_15	61_36	28º 9.48'	85º37.40'	0.25	820	5563	5433	5304	SE	SE	75021	24	0.0059
Gtri_gr 62		71 H/12	2885_15	61_36	28º 9.95'	85º37.38'	0.55	1580	5669	5380	5090	SE	SE	63021	33	0.0182
Gtri_gr 63		71 H/12	2885_15	61_36	28º 9.75'	85º35.45'	3.82	3735	5486	5037	4587	N	N	60021	68	0.2606
Gtri_gr 64		71 H/12	2885_15	61_37,38	28º10.19'	85º34.05'	1.4	2340	5685	5204	4724	NE	NE	62021	48	0.0666
Gtri_gr 65		71 H/12	2885_15	61_37,38	28º10.34'	85º32.40'	1.07	2050	5723	5277	4831	NE	NE	63021	43	0.0460
Gtri_gr 66		71 H/12	2885_15	61_37,38	28º 9.86'	85º31.24'	2.04	2750	5631	5292	4953	NE	NE	60021	55	0.1113
Gtri_gr 67		71 H/12	2885_15	61_37,38	28º 9.96'	85º30.33'	2.09	2470	5639	5319	4999	NE	NE	60021	55	0.1151
Gtri_gr 68		71 H/8	2885_14	61_41	28º10.49'	85º29.84'	0.09	410	5243	5144	5044	NE	NE	75021	15	0.0013
Gtri_gr 69		71 H/8	2885_14	61_41	28º 9.84'	85º29.47'	0.43	660	5304	5151	4999	SW	SW	75021	30	0.0129
Gtri_gr 70		71 H/8	2885_14	61_41	28º 8.87'	85º29.54'	1.36	1480	5304	5151	4999	NE	NE	60021	47	0.0640
Gtri_gr 71		71 H/8	2885_14	61_41	28º 6.36'	85º29.35'	0.19	630	5243	5144	5044	N	N	75021	21	0.0040
Gtri_gr 72		71 H/8	2885_14	61_41	28º 6.46'	85º28.48'	0.41	725	5534	5266	4999	NE	NE	67021	29	0.0121
Gtri_gr 73		71 H/8	2885_14	61_41	28º 6.89'	85º28.25'	0.07	315	5227	5159	5090	N	N	37021	13	0.0009
Gtri_gr 74		71 H/8	2885_14	61_41	28º 6.40'	85º28.10'	0.42	1580	5425	5159	4892	NW	NW	63021	30	0.0125

Glacier Inventory of Budhi Gandaki Basin

Total Number : 180 Total Area : 442.14 (km^2) Ice Reserve : 40.4 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Gbu_gr 1		71D/15	2884_12	161_6	28°22.34'	84°45.45'	1.06	760	5669	5410	5151	S	S	37021	43	0.0454
Gbu_gr 2		71D/15	2884_12	161_6	28°23.13'	84°46.16'	1.60	630	5669	5410	5151	SE	SE	37021	50	0.0799
Gbu_gr 3		71D/15	2884_12	161_6	28°23.26'	84°47.46'	1.33	990	5669	5410	5151	S	S	37021	47	0.0620
Gbu_gr 4		71D/15	2884_12	161_6	28°23.48'	84°47.76'	0.30	440	5669	5410	5151	NE	NE	37021	26	0.0077
Gbu_gr 5		71D/15	2884_12	161_6	28°23.67'	84°47.09'	0.44	440	5456	5304	5151	NE	NE	37321	30	0.0133
Gbu_gr 6		71D/15	2884_12	161_6	28°23.23'	84°45.86'	1.55	500	5669	5410	5151	N	N	37021	49	0.0765
Gbu_gr 7		71D/11	2884_11	161_9	28°22.36'	84°45.04'	0.65	760	5669	5410	5151	NW	NW	37021	35	0.0230
Gbu_gr 8		71D/11	2884_11	161_9	28°23.04'	84°41.98'	10.77	8545	6672	5180	3688	E	NE	53021	97	1.0472
Gbu_gr 9		71D/11	2884_11	161_9	28°25.68'	84°40.79'	35.97	14570	7893	5379	2865	NE	E	52311	145	5.1996
Gbu_gr 10		71D/11	2884_11	161_9	28°25.03'	84°40.87'	0.30	1140	5608	5364	5121	NE	NE	75022	26	0.0077
Gbu_gr 11		71D/11	2884_11	162_10	28°27.60'	84°41.90'	1.56	2340	6693	5922	5151	SE	SE	60021	49	0.0772
Gbu_gr 12		71D/11	2884_11	162_10	28°27.40'	84°42.95'	1.10	1260	5822	5486	5151	S	S	60321	43	0.0478
Gbu_gr 13		71D/11	2884_11	162_10	28°27.31'	84°43.49'	0.73	1260	5947	5549	5151	S	S	60321	37	0.0271
Gbu_gr 14		71D/11	2884_11	162_10	28°28.39'	84°44.08'	10.63	6330	6693	5709	4724	E	SE	52021	97	1.0291
Gbu_gr 15		71D/15	2884_12	163_13	28°28.46'	84°46.30'	0.64	820	5675	5413	5151	SE	SE	37021	35	0.0225
Gbu_gr 16		71D/10	2884_07	163_13	28°28.53'	84°47.09'	0.33	440	5486	5319	5151	S	S	37021	27	0.0089
Gbu_gr 17		71D/15	2884_12	163_13	28°28.65'	84°45.79'	2.09	630	5675	5398	5121	N	N	37021	55	0.1151
Gbu_gr 18		71D/11	2884_11	162_10	28°29.25'	84°42.75'	5.19	1580	6693	5922	5151	N	N	67021	76	0.3938
Gbu_gr 19		71D/11	2884_11	162_10	28°30.73'	84°43.69'	0.45	1395	5197	5037	4877	N	N	63021	31	0.0137
Gbu_gr 20		71D/11	2884_11	162_9	28°27.83'	84°39.77'	4.28	1260	6462	5806	5151	N	N	60021	71	0.3038
Gbu_gr 21		71D/11	2884_11	162_8	28°27.83'	84°35.90'	20.88	3800	7893	6522	5151	N	N	60021	121	2.5283
Gbu_gr 22	Lanjam	71D/11	2884_11	162_8	28°29.25'	84°39.23'	15.68	15200	5029	4084	3139	E	NE	52012	110	1.7277
Gbu_gr 23		71D/10	2884_07	163_16	28°30.59'	84°37.90'	2.48	2530	5813	5269	4724	S	S	60321	59	0.1452
Gbu_gr 24		71D/10	2884_07	163_16	28°31.08'	84°39.57'	0.37	1140	5608	5197	4785	E	E	75022	28	0.0104
Gbu_gr 25		71D/10	2884_07	163_16	28°32.40'	84°40.47'	0.06	315	5060	4968	4877	N	N	75022	12	0.0007
Gbu_gr 26		71D/10	2884_07	163_16	28°31.94'	84°39.93'	0.66	880	5425	5075	4724	N	N	63321	36	0.0235
Gbu_gr 27		71D/10	2884_07	163_16	28°31.77'	84°38.76'	1.33	2850	5944	5052	4161	NE	NE	67021	47	0.0620
Gbu_gr 28		71D/10	2884_07	163_16	28°31.53'	84°38.06'	0.20	950	5029	4770	4511	N	N	75022	22	0.0043
Gbu_gr 29		71D/10	2884_07	164_34	28°32.08'	84°35.65'	26.67	11400	8163	5986	3810	E	NE	52021	131	3.4984
Gbu_gr 30		71D/10	2884_07	164_34	28°33.95'	84°36.13'	0.21	380	5912	5592	5273	S	S	37021	22	0.0046

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gbu_gr 31		71D/10	2884_07	164_31	28°34.35'	84°36.72'	0.45	690	4999	4907	4816	NE	NE	75022	31	0.0137
Gbu_gr 32		71D/10	2884_07	164_31	28°34.63'	84°35.09'	16.67	9500	7986	5791	3597	E	E	62321	112	1.8743
Gbu_gr 33		71D/10	2884_07	165_24	28°37.08'	84°36.13'	3.68	2850	5962	5191	4420	SE	SE	62021	67	0.2478
Gbu_gr 34		71D/10	2884_07	165_24	28°37.82'	84°36.82'	0.57	1330	5639	5258	4877	NE	NE	67021	34	0.0192
Gbu_gr 35		71D/10	2884_07	165_24	28°38.33'	84°36.45'	0.12	690	5029	4831	4633	N	N	75022	17	0.0020
Gbu_gr 36		71D/10	2884_07	165_24	28°36.41'	84°35.08'	0.37	630	6005	5669	5334	NW	NW	64322	28	0.0104
Gbu_gr 37		71D/10	2884_07	165_24	28°36.86'	84°34.66'	0.24	630	4877	4770	4663	NW	NW	64022	23	0.0056
Gbu_gr 38		71D/10	2884_07	165_24	28°36.31'	84°33.97'	9.71	9185	5852	4983	4115	N	NE	52021	94	0.9119
Gbu_gr 39		71D/10	2884_07	165_24	28°36.31'	84°33.47'	0.09	505	5273	5151	5029	E	E	75022	15	0.0013
Gbu_gr 40		71D/10	2884_07	165_24	28°37.91'	84°33.60'	0.91	1645	5578	5349	5121	S	S	63022	40	0.0368
Gbu_gr 41		71D/10	2884_07	165_23	28°38.87'	84°34.25'	0.41	1260	5639	5212	4785	NE	NE	75022	29	0.0121
Gbu_gr 42		71D/10	2884_07	165_23	28°38.30'	84°32.86'	4.03	8230	6625	5720	4816	NE	E	52521	70	0.2801
Gbu_gr 43		71D/10	2884_07	165_23	28°39.39'	84°32.14'	0.05	380	5151	5075	4999	NE	NE	75022	10	0.0005
Gbu_gr 44		71D/10	2884_07	165_23	28°39.27'	84°31.60'	0.19	820	5669	5410	5151	NE	NE	63021	21	0.0040
Gbu_gr 45		71D/10	2884_07	166_40	28°40.50'	84°31.30'	1.40	2020	6218	5761	5304	SE	SE	63021	48	0.0666
Gbu_gr 46		71D/10	2884_07	166_40	28°40.28'	84°32.43'	4.93	7600	6035	5898	5761	SE	SE	53012	75	0.3675
Gbu_gr 47		71D/10	2884_07	166_40	28°41.07'	84°33.55'	0.14	630	5868	5769	5669	SW	SW	75021	18	0.0025
Gbu_gr 48		71D/10	2884_07	166_40	28°40.82'	84°36.21'	0.15	760	5151	5060	4968	SE	SE	75022	19	0.0028
Gbu_gr 49		71D/10	2884_07	166_40	28°41.39'	84°36.25'	0.17	760	5486	5349	5212	N	N	75022	20	0.0034
Gbu_gr 50		71D/10	2884_07	166_40	28°41.18'	84°32.90'	0.23	630	5791	5532	5273	NE	NE	63021	23	0.0053
Gbu_gr 51		71D/10	2884_07	166_40	28°41.65'	84°32.53'	0.75	1260	6096	5730	5364	NE	NE	67321	37	0.0281
Gbu_gr 52	Hindun	71D/10	2884_07	166_40	28°42.35'	84°30.49'	15.03	10770	6885	5637	4389	E	E	52022	109	1.6330
Gbu_gr 53	Tarkya	71D/10	2884_07	166_40	28°43.54'	84°31.96'	17.62	9500	6538	5616	4694	SE	SE	52522	115	2.0177
Gbu_gr 54		71D/10	2884_07	166_40	28°43.85'	84°34.93'	0.95	950	5851	5608	5364	SE	SE	67021	41	0.0390
Gbu_gr 55	Sonam	71D/10	2884_07	165_26,27	28°38.86'	84°41.54'	4.80	5060	6564	5202	3840	NW	W	52022	74	0.3546
Gbu_gr 56		71D/10	2884_07	165_26,27	28°37.75'	84°39.57'	0.58	1450	4724	4404	4084	W	W	75022	34	0.0196
Gbu_gr 57		71D/10	2884_07	165_26,27	28°38.03'	84°40.85'	0.40	1203	6564	6086	5608	SW	SW	63021	29	0.0116
Gbu_gr 58		71D/10	2884_07	165_26,27	28°37.46'	84°40.28'	0.86	950	5639	5334	5029	NW	NW	67021	40	0.0340
Gbu_gr 59		71D/10	2884_07	165_26,27	28°36.92'	84°40.58'	0.38	506	5304	5136	4968	SW	SW	75022	28	0.0108
Gbu_gr 60		71D/10	2884_07	165_26,27	28°36.76'	84°41.37'	0.40	380	6316	6130	5944	S	S	37021	29	0.0116
Gbu_gr 61		71D/10	2884_07	165_28	28°36.43'	84°41.66'	0.30	820	6309	5806	5304	SW	SW	63021	26	0.0077
Gbu_gr 62		71D/10	2884_07	165_28	28°36.39'	84°42.35'	0.14	250	5822	5700	5578	SW	SW	37021	18	0.0025
Gbu_gr 63		71D/10	2884_07	165_28	28°37.17'	84°42.54'	11.42	6300	6345	5291	4237	S	S	62021	99	1.1324
Gbu_gr 64		71D/10	2884_07	165_28	28°37.17'	84°43.84'	0.12	250	5985	5888	5791	S	S	37021	17	0.0020
Gbu_gr 65		71D/10	2884_07	165_28	28°35.91'	84°44.94'	3.54	2215	6264	5433	4602	SW	SW	62021	66	0.2352
Gbu_gr 66		71D/10	2884_07	168_29	28°35.47'	84°45.69'	1.35	1580	6219	5548	4877	SW	SW	67321	47	0.0633
Gbu_gr 67		71D/14	2884_08	168_29	28°35.09'	84°46.29'	0.68	1070	5974	5563	5151	S	S	67321	36	0.0245
Gbu_gr 68		71D/14	2884_08	168_29	28°34.92'	84°46.81'	0.32	950	5700	5441	5182	S	S	75022	26	0.0085
Gbu_gr 69		71D/14	2884_08	168_29	28°35.52'	84°46.89'	1.00	2530	5761	5182	4602	SE	SE	63011	42	0.0419
Gbu_gr 70		71D/14	2884_08	168_29	28°36.15'	84°46.59'	2.46	3490	6136	5521	4907	NE	NE	60321	58	0.1436
Gbu_gr 71		71D/14	2884_08	165_29	28°36.79'	84°45.96'	0.10	315	6136	6040	5944	E	E	37021	15	0.0015
Gbu_gr 72		71D/14	2884_08	165_29	28°36.93'	84°46.69'	1.68	1900	5883	5502	5121	E	E	63321	51	0.0854
Gbu_gr 73		71D/14	2884_08	165_29	28°37.45'	84°47.12'	2.23	2530	5639	5364	5090	SE	SE	62321	56	0.1257

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gbu_gr 74		71D/14	2884_08	164_38	28°34.80'	84°51.91'	0.32	440	5987	5691	5395	NW	NW	67021	26	0.0085
Gbu_gr 75		71D/14	2884_08	164_38	28°34.88'	84°52.26'	0.10	500	5987	5737	5486	SE	SE	37021	15	0.0015
Gbu_gr 76		71D/14	2884_08	164_38	28°35.10'	84°53.46'	0.10	250	5681	5508	5334	SE	SE	67021	15	0.0015
Gbu_gr 77		71D/14	2884_08	164_40	28°35.29'	84°55.32'	0.03	250	5182	5090	4999	SW	SW	75022	7	0.0002
Gbu_gr 78		71D/14	2884_08	164_40	28°35.57'	84°55.65'	0.18	630	5944	5776	5608	SW	SW	67021	20	0.0037
Gbu_gr 79		71D/14	2884_08	164_40	28°35.51'	84°56.71'	0.43	630	6005	5715	5425	SW	SW	67021	30	0.0129
Gbu_gr 80		71D/14	2884_08	164_40	28°35.02'	84°56.76'	0.08	315	5517	5410	5304	W	W	75022	14	0.0011
Gbu_gr 81		71D/14	2884_08	164_42	28°34.60'	84°56.86'	0.16	820	5883	5639	5395	W	W	75022	19	0.0031
Gbu_gr 82		71D/14	2884_08	164_42	28°34.78'	84°56.11'	0.97	1260	5029	4663	4298	SW	SW	75022	41	0.0402
Gbu_gr 83		71D/14	2884_08	164_42	28°34.23'	84°56.67'	0.11	440	5517	5304	5090	NW	NW	75022	16	0.0018
Gbu_gr 84		71D/14	2884_08	164_42	28°33.98'	84°56.95'	0.21	440	6157	5974	5791	NW	NW	75022	22	0.0046
Gbu_gr 85		71D/14	2884_08	164_42	28°33.83'	84°56.71'	0.07	315	6157	5944	5730	NW	NW	75022	13	0.0009
Gbu_gr 86		71D/14	2884_08	164_42	28°33.96'	84°55.59'	0.88	1260	4572	4237	3901	NW	NW	63322	40	0.0351
Gbu_gr 87		71D/14	2884_08	164_42	28°33.39'	84°56.52'	0.11	315	6157	5974	5791	NW	NW	75022	16	0.0018
Gbu_gr 88		71D/14	2884_08	164_43	28°33.20'	84°55.24'	0.65	1070	4602	4282	3962	W	W	63022	35	0.0230
Gbu_gr 89		71D/14	2884_08	164_43	28°32.88'	84°56.62'	1.21	1260	7138	6617	6096	SW	SW	67021	45	0.0545
Gbu_gr 90		71D/14	2884_08	164_43	28°32.23'	84°55.81'	0.36	1260	6614	6126	5639	SW	SW	67021	28	0.0100
Gbu_gr 91		71D/14	2884_08	163_13	28°32.05'	84°55.88'	0.22	1900	6614	6126	5639	SW	SW	37021	22	0.0049
Gbu_gr 92		71D/14	2884_08	163_13	28°31.62'	84°56.44'	1.38	2340	5486	4877	4267	SW	SW	63321	47	0.0653
Gbu_gr 93		71D/14	2884_08	163_13	28°31.00'	84°57.35'	1.06	2530	5334	4877	4420	SE	SE	63321	43	0.0454
Gbu_gr 94		71D/14	2884_08	163_13	28°31.72'	84°57.72'	0.71	1260	6640	6261	5883	SW	SW	67021	37	0.0261
Gbu_gr 95		71D/14	2884_08	163_13	28°30.71'	84°58.37'	0.09	570	5090	4907	4724	SE	SE	75022	15	0.0013
Gbu_gr 96		71D/14	2884_08	163_13	28°31.51'	84°59.19'	1.72	2650	5852	5014	4176	SE	SE	62021	51	0.0882
Gbu_gr 97		71D/14	2884_08	163_13	28°31.99'	84°59.52'	0.12	500	5182	5029	4877	SE	SE	75022	17	0.0020
Gbu_gr 98		71D/14	2884_08	163_13	28°32.36'	84°59.23'	1.81	2400	6096	5334	4572	NE	NE	67021	52	0.0946
Gbu_gr 99		71D/14	2884_08	164_43	28°33.40'	84°59.30'	11.85	10770	6767	5151	3536	NE	NE	52031	100	1.1897
Gbu_gr 100		71D/14	2884_08	164_43	28°35.28'	84°59.99'	1.65	3160	5669	5410	5151	NW	NW	63321	51	0.0834
Gbu_gr 101		71D/14	2884_08	164_43	28°34.36'	84°59.80'	0.18	630	5090	5014	4938	NW	NW	64022	20	0.0037
Gbu_gr 102		71D/14	2884_08	164_44	28°34.70'	85° 0.54'	0.17	630	5822	5715	5608	SE	SE	67021	20	0.0034
Gbu_gr 103		71D/14	2884_08	164_44	28°34.46'	85° 2.52'	7.14	3485	6070	5321	4572	SE	SE	62321	85	0.6043
Gbu_gr 104		71D/14	2884_08	218_5	28°32.11'	85° 3.65'	0.15	630	5090	4983	4877	SE	SE	64022	19	0.0028
Gbu_gr 105		71H/2	2885_05	218_5	28°32.64'	85° 3.90'	0.45	950	6139	5858	5578	SE	SE	67321	31	0.0137
Gbu_gr 106		71H/2	2885_05	218_5	28°33.18'	85° 5.32'	0.50	1580	5182	4709	4237	NE	NE	63022	32	0.0160
Gbu_gr 107		71H/2	2885_05	218_5	28°32.99'	85° 4.09'	0.05	185	6066	5326	4587	N	N	77021	10	0.0005
Gbu_gr 108		71H/2	2885_05	218_5	28°33.45'	85° 4.08'	1.59	3160	6066	5326	4587	NE	NE	63021	50	0.0792
Gbu_gr 109		71H/2	2885_05	218_5	28°33.08'	85° 3.18'	1.02	1320	6413	5995	5578	NE	NE	60021	42	0.0431
Gbu_gr 110		71H/2	2885_05	218_5	28°34.05'	85° 3.49'	3.13	5700	6413	5538	4663	NE	NE	63321	64	0.1991
Gbu_gr 111		71H/2	2885_05	218_5	28°35.39'	85° 5.26'	0.58	1520	4694	4336	3978	SE	SE	63021	34	0.0196
Gbu_gr 112		71H/2	2885_05	218_5	28°35.41'	85° 4.20'	3.58	4115	6065	5136	4206	NE	NE	53021	67	0.2388
Gbu_gr 113		71H/2	2885_05	164_45	28°35.28'	85° 2.82'	2.09	2850	6065	5448	4831	N	N	62021	55	0.1151
Gbu_gr 114		71H/2	2885_05	164_45	28°35.69'	85° 2.12'	0.54	1580	6035	5486	4938	NE	NE	63021	33	0.0178
Gbu_gr 115		71H/2	2885_05	164_45	28°36.03'	85° 1.77'	0.85	1710	5822	5471	5121	NE	NE	63021	39	0.0335
Gbu_gr 116		71H/2	2885_05	165_36	28°36.57'	85° 0.59'	6.11	3800	6020	5372	4724	NE	NE	62021	80	0.4904

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gbu_gr 117		71H/2	2885_05	165_36	28°37.79'	85° 0.86'	0.45	1580	5547	5288	5029	E	E	63321	31	0.0137
Gbu_gr 118		71H/2	2885_05	165_36	28°38.18'	85° 1.10'	0.14	630	5547	5395	5243	SE	SE	64021	18	0.0025
Gbu_gr 119		71H/2	2885_05	165_36	28°38.39'	85° 1.55'	0.25	630	5212	5090	4968	NE	NE	67022	24	0.0059
Gbu_gr 120		71H/2	2885_05	165_36	28°39.29'	85° 2.81'	0.10	315	5212	5121	5029	NE	NE	67021	15	0.0015
Gbu_gr 121		71H/2	2885_05	165_36	28°39.98'	85° 3.12'	0.29	950	5639	5410	5182	SE	SE	63021	25	0.0074
Gbu_gr 122		71H/2	2885_05	165_36	28°40.44'	85° 3.80'	0.54	1070	5791	5532	5273	S	S	62021	33	0.0178
Gbu_gr 123		71H/2	2885_05	165_36,37	28°40.50'	85° 4.22'	0.61	950	5791	5570	5349	SW	SW	67021	35	0.0211
Gbu_gr 124		71H/2	2885_05	165_36,37	28°39.92'	85° 4.25'	1.18	1580	5883	5593	5304	SW	SW	62021	45	0.0526
Gbu_gr 125		71H/2	2885_05	165_36,37	28°39.13'	85° 4.65'	0.49	1070	5364	5227	5090	SW	SW	60021	32	0.0155
Gbu_gr 126		71H/2	2885_05	165_36,37	28°38.97'	85° 5.06'	0.36	880	5334	5182	5029	SW	SW	62021	28	0.0100
Gbu_gr 127		71H/2	2885_05	165_36,37	28°39.53'	85° 5.18'	0.39	1260	5425	5258	5090	SE	SE	63021	29	0.0112
Gbu_gr 128		71H/2	2885_05	165_36,37	28°39.97'	85° 5.29'	0.95	1640	5425	5273	5121	S	S	62021	41	0.0390
Gbu_gr 129		71H/2	2885_05	165_36,37	28°39.92'	85° 5.88'	0.39	950	5578	5395	5212	S	S	62021	29	0.0112
Gbu_gr 130		71H/2	2885_05	165_36,37	28°40.35'	85° 5.92'	1.04	1260	5578	5334	5090	E	E	62021	43	0.0442
Gbu_gr 131		71H/2	2885_05	165_38	28°40.17'	85° 7.91'	0.61	1330	5913	5502	5090	NW	NW	60021	35	0.0211
Gbu_gr 132		71H/2	2885_05	165_38	28°39.54'	85° 8.54'	0.77	1260	6005	5578	5151	SW	SW	60321	38	0.0292
Gbu_gr 133		71H/2	2885_05	165_39	28°38.57'	85° 9.07'	1.07	1260	5869	5632	5395	NW	NW	60321	43	0.0460
Gbu_gr 134		71H/2	2885_05	165_39	28°38.57'	85°10.70'	0.17	630	5770	5689	5608	SW	SW	37021	20	0.0034
Gbu_gr 135		71H/2	2885_05	165_39	28°38.24'	85°11.03'	0.86	1580	5903	5588	5273	W	W	63021	40	0.0340
Gbu_gr 136		71H/2	2885_05	165_39	28°37.86'	85°10.80'	0.46	1390	5903	5497	5090	W	W	63321	31	0.0142
Gbu_gr 137		71H/2	2885_05	218_2	28°36.29'	85°10.91'	2.47	1015	5620	5218	4816	SW	SW	60021	58	0.1444
Gbu_gr 138		71H/2	2885_05	218_2	28°36.64'	85°10.00'	0.07	500	5075	4945	4816	NW	NW	75022	13	0.0009
Gbu_gr 139		71H/2	2885_05	218_2	28°35.74'	85°10.11'	1.20	1085	5121	5014	4907	NW	NW	60021	45	0.0539
Gbu_gr 140		71H/2	2885_05	218_2	28°35.94'	85° 9.19'	0.28	880	5121	4892	4663	NE	NE	63021	25	0.0070
Gbu_gr 141		71H/2	2885_05	218_2	28°36.26'	85° 8.07'	0.54	630	5256	5036	4816	NW	NW	60021	33	0.0178
Gbu_gr 142		71H/2	2885_05	218_2	28°34.87'	85°10.98'	0.36	820	5406	5141	4877	W	W	37321	28	0.0100
Gbu_gr 143		71H/2	2885_05	218_2	28°34.06'	85°11.10'	1.27	1580	5603	5133	4663	NW	NW	60021	46	0.0582
Gbu_gr 144		71H/2	2885_05	164_47	28°32.85'	85°10.03'	8.46	4745	6159	5106	4054	NW	NW	62311	90	0.7585
Gbu_gr 145		71H/2	2885_05	164_47	28°33.27'	85° 8.31'	1.12	1450	5608	5014	4420	NW	NW	60321	44	0.0490
Gbu_gr 146		71H/2	2885_05	164_47	28°33.78'	85° 7.76'	0.18	950	4907	4679	4450	N	N	75021	20	0.0037
Gbu_gr 147		71H/2	2885_05	164_47	28°32.79'	85° 8.33'	0.31	630	5578	5288	4999	SW	SW	67021	26	0.0081
Gbu_gr 148		71H/3	2885_09	163_3	28°31.02'	85° 9.25'	4.82	3800	6160	5275	4389	NW	NW	62011	74	0.3565
Gbu_gr 149		71H/3	2885_09	163_3	28°30.79'	85° 8.33'	0.23	690	6126	5837	5547	N	N	67021	23	0.0053
Gbu_gr 150		71H/3	2885_09	163_3	28°30.30'	85° 8.60'	0.13	190	6160	6082	6005	SW	SW	37021	18	0.0023
Gbu_gr 151		71H/3	2885_09	163_3	28°29.84'	85° 7.49'	7.05	5060	6664	5283	3901	NW	NW	62021	84	0.5942
Gbu_gr 152		71H/3	2885_09	163_3	28°29.44'	85° 6.57'	0.42	505	5525	5262	4999	NW	NW	67021	30	0.0125
Gbu_gr 153		71H/3	2885_09	163_3	28°28.30'	85° 6.19'	4.04	2025	6243	5270	4298	NW	NW	60021	70	0.2811
Gbu_gr 154		71H/3	2885_09	65_5	28°27.07'	85° 5.70'	1.21	1260	6195	5749	5304	NW	NW	60021	45	0.0545
Gbu_gr 155		71H/3	2885_09	65_5	28°26.62'	85° 6.29'	0.23	820	6195	5764	5334	SW	SW	63021	23	0.0053
Gbu_gr 156		71H/3	2885_09	65_5	28°26.37'	85° 6.59'	0.55	1520	6125	5577	5029	SW	SW	63021	33	0.0182
Gbu_gr 157		71H/3	2885_09	65_5	28°25.68'	85° 6.51'	3.56	3475	6248	5532	4816	NW	NW	62321	67	0.2370
Gbu_gr 158		71H/3	2885_09	65_5	28°24.76'	85° 6.48'	0.14	690	5450	5133	4816	NW	NW	75021	18	0.0025
Gbu_gr 159		71H/3	2885_09	65_5	28°24.32'	85° 6.61'	0.89	2215	6788	5528	4267	NW	NW	63021	40	0.0357

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gbu_gr 160		71H/3	2885_09	65_7	28°23.21'	85° 5.29'	21.51	11400	7424	5510	3597	NW	NW	52011	122	2.6301
Gbu_gr 161		71D/15	2885_12	65_7	28°23.39'	85° 3.77'	2.15	4435	7111	5643	4176	NE	NE	62021	56	0.1196
Gbu_gr 162		71D/15	2885_12	65_7	28°23.60'	85° 1.78'	5.45	1070	6858	5715	4572	NE	NE	60021	77	0.4206
Gbu_gr 163		71D/15	2885_12	65_8	28°24.99'	85° 2.32'	0.89	3800	4100	3620	3139	N	N	53051	40	0.0357
Gbu_gr 164		71H/3	2885_09	218_21	28°24.91'	84°59.92'	1.12	950	6032	5591	5151	N	N	60021	44	0.0490
Gbu_gr 165		71H/3	2885_09	218_21	28°24.11'	85° 0.12'	3.13	2530	6032	5591	5151	W	W	62021	64	0.1991
Gbu_gr 166		71H/3	2885_09	218_21	28°23.11'	84°59.91'	0.13	880	5212	5182	5151	SW	SW	63021	18	0.0023
Gbu_gr 167		71H/3	2885_09	65_8	28°23.28'	85° 0.92'	2.06	1580	6246	5531	4816	S	S	60021	55	0.1128
Gbu_gr 168		71H/3	2885_09	64_25	28°21.09'	85° 3.45'	16.31	6960	7101	5623	4145	NW	NW	52011	112	1.8207
Gbu_gr 169		71H/3	2885_09	64_25	28°20.83'	85° 1.46'	0.03	190	6085	5649	5212	NW	NW	37021	7	0.0002
Gbu_gr 170		71H/3	2885_09	64_25	28°20.11'	85° 2.36'	1.18	630	6085	5786	5486	SW	SW	37321	45	0.0526
Gbu_gr 171		71H/3	2885_09	63_3	28°17.06'	85° 2.54'	0.52	505	5151	4938	4724	S	S	67021	32	0.0169
Gbu_gr 172		71H/3	2885_09	63_3	28°18.18'	85° 2.61'	4.10	1260	5456	4953	4450	E	E	60021	70	0.2867
Gbu_gr 173		71H/3	2885_09	64_25	28°20.06'	85° 5.13'	11.44	2850	7101	5821	4542	S	S	60021	99	1.1351
Gbu_gr 174		71H/3	2885_09	101_60	28°18.75'	85° 6.20'	0.84	2530	4328	3993	3658	S	S	53012	39	0.0329
Gbu_gr 175		71H/3	2885_09	101_60	28°19.18'	85° 7.36'	0.08	250	5456	5319	5182	S	S	75022	14	0.0011
Gbu_gr 176		71H/3	2885_09	101_60	28°18.50'	85° 7.55'	2.58	1260	6318	5445	4572	SW	SW	60321	59	0.1532
Gbu_gr 177		71H/3	2885_09	63_10	28°17.80'	85° 8.77'	0.78	950	5669	5319	4968	SW	SW	60321	38	0.0297
Gbu_gr 178		71H/3	2885_09	63_10	28°16.90'	85° 9.41'	0.34	1015	5281	5026	4770	SW	SW	63021	27	0.0092
Gbu_gr 179		71H/3	2885_09	63_10	28°16.20'	85°10.83'	0.89	1900	5486	5052	4618	SW	SW	63021	40	0.0357
Gbu_gr 180		71H/3	2885_09	63_10	28°16.05'	85°11.30'	0.11	315	5822	5730	5639	SW	SW	37021	16	0.0018

Glacier Inventory of Marsyangdi Basin

Total Number : 311   Total Area : 614.31 (km^2)   Ice Reserve : 54.99 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Gmar_gr 1		71 D/3	2884_09	163_28	28º28.50'	84º14.68'	3.11	1260	5639	5334	5029	S	S	63021	63	0.1974
Gmar_gr 2		71 D/7	2884_10	163_27	28º28.87'	84º15.91'	0.10	990	5852	5715	5578	SW	SW	37021	15	0.0015
Gmar_gr 3		71 D/7	2884_10	163_27	28º28.27'	84º16.01'	0.92	1260	5456	5243	5029	S	S	60021	41	0.0373
Gmar_gr 4		71 D/7	2884_10	163_27	28º28.08'	84º16.63'	0.17	720	5712	5447	5182	S	S	37021	20	0.0034
Gmar_gr 5		71 D/7	2884_10	163_27	28º28.09'	84º17.07'	0.23	500	5712	5432	5151	S	S	67021	23	0.0053
Gmar_gr 6		71 D/7	2884_10	163_27	28º28.37'	84º17.06'	0.52	1260	5712	5218	4724	NE	NE	60021	32	0.0169
Gmar_gr 7		71 D/7	2884_10	163_27	28º28.64'	84º16.70'	1.43	1580	5712	5218	4724	N	N	63021	48	0.0685
Gmar_gr 8		71 D/7	2884_10	163_27	28º29.56'	84º16.47'	1.04	1330	5334	5090	4846	NE	NE	63021	43	0.0442
Gmar_gr 9		71 D/3	2884_09	163_27	28º30.02'	84º16.31'	0.17	505	5334	5182	5029	NE	NE	67021	20	0.0034
Gmar_gr 10		71 D/7	2884_10	163_27	28º30.00'	84º15.67'	1.10	1710	5334	5105	4877	NW	NW	60021	43	0.0478
Gmar_gr 11		71 D/7	2884_10	163_27	28º29.47'	84º15.64'	1.85	2530	5639	5258	4877	NW	NW	63021	53	0.0967
Gmar_gr 12		71 D/7	2884_10	163_28	28º29.44'	84º14.67'	3.69	2530	5639	5227	4816	NW	NW	60021	67	0.2496
Gmar_gr 13		71 D/3	2884_09	163_28	28º29.74'	84º13.82'	0.14	440	5212	5044	4877	N	N	64021	18	0.0025
Gmar_gr 14		71 D/2	2884_05	163_27	28º30.32'	84º13.43'	0.53	1140	4785	4572	4359	N	N	67021	33	0.0173
Gmar_gr 15		71 D/3	2884_09	163_28	28º29.52'	84º13.18'	3.05	2530	5944	5410	4877	N	N	60021	63	0.1922
Gmar_gr 16		71 D/2	2884_05	163_27	28º30.66'	84º12.50'	1.63	2530	4816	4267	3719	NE	NE	60021	50	0.0820
Gmar_gr 17		71 D/3	2884_09	163_28	28º29.45'	84º12.24'	0.71	990	6983	6387	5791	NE	NE	60021	37	0.0261
Gmar_gr 18		71 D/2	2884_05	163_28	28º31.88'	84º10.59'	7.85	4430	6401	5364	4328	N	N	60021	87	0.6862
Gmar_gr 19		71 D/2	2884_05	163_28	28º33.89'	84º 9.19'	0.09	440	5639	5532	5425	N	N	75021	15	0.0013
Gmar_gr 20		71 D/2	2884_05	163_28	28º33.57'	84º 8.52'	4.68	4430	7468	5944	4420	N	N	63021	73	0.3427
Gmar_gr 21		71 D/2	2884_05	164_20	28º33.03'	84º 6.74'	11.17	5060	7468	5700	3932	NE	NE	60021	98	1.0995
Gmar_gr 22		71 D/2	2884_05	164_20	28º34.63'	84º 5.92'	0.27	1070	5304	5212	5121	N	N	67021	25	0.0066
Gmar_gr 23		71 D/2	2884_05	164_20	28º34.57'	84º 5.77'	0.25	1070	5304	5212	5121	NW	NW	67021	24	0.0059
Gmar_gr 24		71 D/2	2884_05	164_20	28º33.83'	84º 4.70'	11.29	5060	7468	6126	4785	N	N	60021	99	1.1153
Gmar_gr 25		71 D/2	2884_05	164_20	28º34.08'	84º 3.45'	0.36	880	6096	5715	5334	NW	NW	67021	28	0.0100
Gmar_gr 26		71 D/2	2884_05	164_67	28º35.10'	84º 2.47'	0.26	630	4663	4496	4328	NE	NE	67021	24	0.0063
Gmar_gr 27		71 D/2	2884_05	164_67	28º35.10'	84º 1.75'	1.29	1450	5944	5456	4968	NE	NE	60321	46	0.0595
Gmar_gr 28		71 D/2	2884_05	164_67	28º36.42'	84º 1.60'	0.14	630	6248	6020	5791	NE	NE	75021	18	0.0025
Gmar_gr 29		71 D/2	2884_05	164_67	28º37.42'	84º 2.11'	1.13	3800	5243	4526	3810	NE	NE	53012	44	0.0496
Gmar_gr 30		71 D/2	2884_05	164_67	28º37.53'	84º 0.88'	1.57	3160	6096	5258	4420	NE	NE	63021	50	0.0779

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 31		62 P/14	2883_08	165_10	28º36.34'	83º59.79'	17.72	6330	7407	6066	4724	NW	NW	62021	115	2.0330
Gmar_gr 32		62 P/14	2883_08	165_10	28º37.32'	83º56.74'	18.95	6960	7315	6096	4877	NE	NE	52012	117	2.2227
Gmar_gr 33		62 P/14	2883_08	165_10	28º38.95'	83º56.20'	0.57	630	5944	5715	5486	NW	NW	67021	34	0.0192
Gmar_gr 34		62 P/14	2883_08	165_10	28º38.13'	83º55.10'	2.28	2850	5730	5380	5029	N	N	62021	57	0.1295
Gmar_gr 35		62 P/14	2883_08	165_11	28º37.65'	83º53.35'	22.06	4430	7468	6111	4755	NE	NE	60321	123	2.7198
Gmar_gr 36		62 P/14	2883_08	165_12	28º40.30'	83º50.98'	0.88	1260	6096	5639	5182	NE	NE	60021	40	0.0351
Gmar_gr 37		62 P/14	2883_08	165_12	28º41.28'	83º50.06'	0.88	1260	5669	5486	5304	SE	SE	63021	40	0.0351
Gmar_gr 38		62 P/14	2883_08	166_24	28º41.85'	83º49.41'	1.97	990	7134	6234	5334	NE	NE	60021	54	0.1062
Gmar_gr 39		62 P/14	2883_08	166_24	28º43.23'	83º51.69'	1.46	990	5977	5716	5456	SW	SW	60321	48	0.0705
Gmar_gr 40		62 P/14	2883_08	166_24	28º42.81'	83º52.36'	2.31	2530	5977	5549	5121	S	S	63021	57	0.1319
Gmar_gr 41		62 P/14	2883_08	166_25	28º43.28'	83º52.72'	0.66	2530	5974	5898	5822	E	E	37021	36	0.0235
Gmar_gr 42		62 P/14	2883_08	166_25	28º44.34'	83º53.70'	1.67	990	6047	5675	5304	S	S	60021	51	0.0847
Gmar_gr 43		62 P/14	2883_08	166_25	28º43.96'	83º54.56'	0.32	880	5852	5578	5304	SW	SW	63021	26	0.0085
Gmar_gr 44		62 P/14	2883_08	166_25	28º43.90'	83º54.83'	0.22	820	5852	5563	5273	SW	SW	60021	22	0.0049
Gmar_gr 45		62 P/14	2883_08	166_25	28º44.21'	83º54.70'	0.29	440	5852	5669	5486	NE	NE	37321	25	0.0074
Gmar_gr 46		62 P/14	2883_08	166_25	28º44.71'	83º54.41'	2.90	3800	6047	5462	4877	SE	SE	60021	62	0.1796
Gmar_gr 47		62 P/13	2883_04	166_25	28º45.46'	83º54.93'	4.22	3800	5913	5578	5243	SE	SE	62521	71	0.2981
Gmar_gr 48		62 P/13	2883_04	166_25	28º46.35'	83º55.54'	0.22	880	6484	6168	5852	SE	SE	37021	22	0.0049
Gmar_gr 49		62 P/13	2883_04	166_25	28º45.76'	83º55.87'	2.02	2050	5944	5456	4968	S	S	63321	54	0.1099
Gmar_gr 50		62 P/13	2883_04	167_19	28º45.43'	83º56.46'	0.73	1580	5944	5608	5273	S	S	63021	37	0.0271
Gmar_gr 51		62 P/13	2883_04	134_46	28º46.31'	83º56.58'	2.20	3160	6032	5546	5060	NE	NE	62021	56	0.1234
Gmar_gr 52		62 P/13	2883_04	134_46	28º46.85'	83º56.34'	0.88	1900	6126	5715	5304	NE	NE	60321	40	0.0351
Gmar_gr 53		62 P/13	2883_04	134_46	28º48.26'	83º56.76'	0.17	760	6462	6279	6096	S	S	77021	20	0.0034
Gmar_gr 54		62 P/13	2883_04	134_46	28º48.03'	83º57.57'	0.64	1260	5608	5532	5456	SE	SE	63321	35	0.0225
Gmar_gr 55		62 P/13	2883_04	134_46	28º49.52'	83º57.34'	4.55	3800	6462	5944	5425	SE	SE	62521	73	0.3299
Gmar_gr 56		62 P/13	2883_04	134_46	28º49.55'	83º57.75'	0.26	630	5867	5768	5669	SW	SW	63021	24	0.0063
Gmar_gr 57		62 P/13	2883_04	134_46	28º48.87'	83º58.43'	3.20	3160	6120	5712	5304	S	S	62521	64	0.2051
Gmar_gr 58		62 P/13	2883_04	134_46	28º47.86'	83º59.70'	4.81	3860	6120	5681	5243	SW	SW	62021	74	0.3555
Gmar_gr 59		71 D/1	2884_01	167_17	28º47.48'	84º 1.53'	2.01	2530	6465	5808	5151	SW	SW	62321	54	0.1091
Gmar_gr 60		71 D/3	2884_09	167_17	28º46.67'	84º 1.78'	0.46	1260	5852	5578	5304	NW	NW	63021	31	0.0142
Gmar_gr 61		71 D/1	2884_01	167_17	28º46.47'	84º 1.37'	0.75	1580	5959	5662	5364	NW	NW	63321	37	0.0281
Gmar_gr 62		71 D/1	2884_01	167_17	28º46.24'	84º 1.17'	0.79	1900	5959	5631	5304	NW	NW	63321	38	0.0302
Gmar_gr 63		71 D/1	2884_01	167_17	28º45.91'	84º 0.66'	2.00	3160	5959	5464	4968	NW	NW	63021	54	0.1084
Gmar_gr 64		71 D/1	2884_01	167_17	28º45.34'	84º 0.94'	0.06	1900	6005	5532	5060	NW	NW	63021	12	0.0007
Gmar_gr 65		71 D/1	2884_01	167_17	28º44.87'	84º 0.79'	0.93	1140	6005	5517	5029	NW	NW	63321	41	0.0379
Gmar_gr 66		71 D/2	2884_05	167_17	28º44.46'	84º 0.63'	0.60	380	6005	5593	5182	S	S	67021	34	0.0206
Gmar_gr 67		71 D/2	2884_05	167_17	28º44.47'	84º 1.02'	0.16	380	6096	5867	5639	SW	SW	75021	19	0.0031
Gmar_gr 68		71 D/2	2884_05	167_17	28º43.95'	84º 1.80'	0.21	1710	6340	6066	5791	W	W	63321	22	0.0046
Gmar_gr 69		71 D/2	2884_05	167_17	28º43.22'	84º 2.48'	1.33	1260	5441	5235	5029	NW	NW	60021	47	0.0614
Gmar_gr 70		71 D/2	2884_05	167_16	28º42.94'	84º 2.01'	0.49	510	6340	5913	5486	S	S	60021	32	0.0155
Gmar_gr 71		71 D/2	2884_05	167_16	28º43.32'	84º 3.13'	0.77	510	5791	5624	5456	SE	SE	67021	38	0.0292
Gmar_gr 72		71 D/2	2884_05	167_15	28º43.32'	84º 4.16'	0.18	315	6059	5895	5730	S	S	67021	20	0.0037
Gmar_gr 73		71 D/2	2884_05	167_15	28º43.72'	84º 5.35'	0.44	1710	5880	5500	5121	S	S	63321	30	0.0133

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 74		71 D/2	2884_05	167_15	28º43.27'	84º 6.43'	1.88	2530	5880	5439	4999	S	S	63321	53	0.0996
Gmar_gr 75		71 D/2	2884_05	165_14	28º42.51'	84º 7.16'	2.66	630	6091	5865	5639	NW	NW	63021	60	0.1597
Gmar_gr 76		71 D/2	2884_05	165_14	28º38.96'	84º11.31'	0.33	510	6066	5852	5639	SW	SW	67021	27	0.0089
Gmar_gr 77		71 D/2	2884_05	165_14	28º38.63'	84º11.10'	0.20	1070	5090	4831	4572	S	S	63021	22	0.0043
Gmar_gr 78		71 D/2	2884_05	165_14	28º37.77'	84º11.70'	0.38	510	5273	5151	5029	E	E	67021	28	0.0108
Gmar_gr 79		71 D/2	2884_05	167_13	28º38.38'	84º11.85'	0.23	1580	5837	5464	5090	S	S	63321	23	0.0053
Gmar_gr 80		71 D/2	2884_05	167_13	28º42.30'	84º 7.82'	1.61	1260	5852	5517	5182	SW	SW	63021	50	0.0758
Gmar_gr 81		71 D/2	2884_05	167_13	28º42.71'	84º 8.73'	0.77	1200	5867	5555	5243	SW	SW	63321	38	0.0292
Gmar_gr 82		71 D/2	2884_05	167_13	28º42.58'	84º 9.29'	0.59	880	5758	5470	5182	NE	NE	60021	34	0.0201
Gmar_gr 83		71 D/2	2884_05	167_13	28º42.57'	84º10.22'	0.41	1260	5758	5485	5212	NE	NE	63021	29	0.0121
Gmar_gr 84		71 D/2	2884_05	167_13	28º42.58'	84º 9.83'	0.67	630	5425	5288	5151	NE	NE	75021	36	0.0240
Gmar_gr 85		71 D/2	2884_05	167_13	28º43.01'	84º 9.68'	0.14	1260	5867	5555	5243	NE	NE	63021	18	0.0025
Gmar_gr 86		71 D/2	2884_05	167_13	28º43.07'	84º 9.12'	0.57	1900	5837	5494	5151	NE	NE	60021	34	0.0192
Gmar_gr 87		71 D/2	2884_05	167_13	28º43.22'	84º 8.22'	1.91	880	5182	5060	4938	NE	NE	75021	53	0.1040
Gmar_gr 88		71 D/2	2884_05	167_13	28º44.04'	84º 8.58'	0.12	1450	5182	4999	4816	NE	NE	75021	17	0.0020
Gmar_gr 89		71 D/2	2884_05	167_13	28º44.44'	84º 7.61'	0.21	260	5791	5685	5578	NW	NW	77021	22	0.0046
Gmar_gr 90		71 D/2	2884_05	167_13	28º43.48'	84º 7.64'	0.07	1260	5883	5608	5334	N	N	63021	13	0.0009
Gmar_gr 91		71 D/2	2884_05	167_13	28º43.38'	84º 7.33'	0.41	990	5730	5486	5243	NE	NE	63021	29	0.0121
Gmar_gr 92		71 D/2	2884_05	167_14	28º43.64'	84º 6.69'	0.60	1710	5791	5471	5151	NE	NE	63021	34	0.0261
Gmar_gr 93		71 D/2	2884_05	167_14	28º43.80'	84º 6.03'	0.89	315	5425	5349	5273	NE	NE	75021	40	0.0357
Gmar_gr 94		71 D/2	2884_05	167_14	28º44.05'	84º 5.66'	0.08	1260	6035	5578	5121	NE	NE	60021	14	0.0011
Gmar_gr 95		71 D/2	2884_05	167_14	28º44.21'	84º 5.23'	0.35	3800	6005	5563	5121	NE	NE	52012	28	0.0096
Gmar_gr 96		71 D/2	2884_05	167_15	28º43.78'	84º 4.54'	2.58	8230	6401	5715	5029	SE	SE	52012	59	0.1532
Gmar_gr 97		71 D/1	2884_01	167_15	28º45.61'	84º 2.83'	18.17	315	5852	5745	5639	S	S	52031	116	2.1019
Gmar_gr 98		71 D/1	2884_01	167_15	28º46.62'	84º 3.70'	0.11	315	5852	5791	5730	S	S	77021	16	0.0018
Gmar_gr 99		71 D/1	2884_01	167_15	28º46.15'	84º 5.33'	0.15	190	6066	5898	5730	S	S	77021	19	0.0028
Gmar_gr 100		71 D/1	2884_01	167_15	28º46.11'	84º 6.54'	0.15	630	6005	5867	5730	E	E	63021	19	0.0028
Gmar_gr 101		71 D/1	2884_01	167_14	28º45.99'	84º 7.89'	0.06	380	5517	5425	5334	N	N	75021	12	0.0007
Gmar_gr 102		71 D/1	2884_01	167_14	28º46.44'	84º 7.51'	0.38	1260	5578	5349	5121	N	N	63021	28	0.0108
Gmar_gr 103		71 D/1	2884_01	167_14	28º46.55'	84º 7.15'	0.02	290	5456	5395	5334	N	N	75021	5	0.0001
Gmar_gr 104		71 D/1	2884_01	167_14	28º46.40'	84º 6.27'	1.32	1520	6066	5837	5608	N	N	63321	47	0.0614
Gmar_gr 105		71 D/1	2884_01	167_14	28º46.39'	84º 5.46'	0.50	1260	5852	5669	5486	NE	NE	62021	32	0.0160
Gmar_gr 106		71 D/1	2884_01	167_15	28º46.86'	84º 5.49'	0.09	440	5791	5685	5578	NW	NW	75021	15	0.0013
Gmar_gr 107		71 D/1	2884_01	167_15	28º46.65'	84º 5.39'	0.01	150	5730	5700	5669	NW	NW	75021	2	0.0000
Gmar_gr 108		71 D/1	2884_01	167_15	28º46.59'	84º 5.02'	0.46	1580	5791	5578	5364	N	N	63021	31	0.0142
Gmar_gr 109		71 D/1	2884_01	167_15	28º46.77'	84º 4.48'	0.35	1140	5944	5745	5547	N	N	63021	28	0.0096
Gmar_gr 110		71 D/1	2884_01	167_15	28º47.18'	84º 4.50'	0.04	250	5608	5547	5486	N	N	75021	9	0.0004
Gmar_gr 111		71 D/1	2884_01	167_16	28º47.11'	84º 4.35'	0.01	150	5669	5624	5578	N	N	75021	2	0.0000
Gmar_gr 112		71 D/1	2884_01	167_16	28º46.97'	84º 4.28'	0.02	250	5578	5532	5486	N	N	75021	5	0.0001
Gmar_gr 113		71 D/1	2884_01	167_16	28º46.91'	84º 3.84'	0.93	1260	5852	5456	5060	N	N	63321	41	0.0379
Gmar_gr 114		71 D/1	2884_01	167_16	28º47.10'	84º 2.85'	2.05	1710	5883	5563	5243	N	N	63321	55	0.1121
Gmar_gr 115		71 D/1	2884_01	167_16	28º47.93'	84º 2.26'	2.27	1900	5944	5593	5243	N	N	62321	57	0.1288
Gmar_gr 116		71 D/1	2884_01	167_16	28º48.74'	84º 2.43'	0.11	315	5752	5680	5608	SE	SE	77021	16	0.0018

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 117		71 D/1	2884_01	134_49	28º49.00'	84º 3.53'	0.10	315	5742	5645	5547	NE	NE	77021	15	0.0015
Gmar_gr 118		71 D/1	2884_01	134_49	28º49.47'	84º 3.02'	0.40	760	5529	5386	5243	N	N	63021	29	0.0116
Gmar_gr 119		71 D/1	2884_01	134_49	28º50.85'	84º 5.33'	0.15	630	6096	5883	5669	S	S	37021	19	0.0028
Gmar_gr 120		71 D/1	2884_01	134_49	28º51.15'	84º 5.46'	0.26	630	6206	6014	5822	S	S	60021	24	0.0063
Gmar_gr 121		71 D/1	2884_01	135_15	28º51.49'	84º 5.73'	1.13	1770	6206	5831	5456	E	E	63021	44	0.0496
Gmar_gr 122		71 D/1	2884_01	135_15	28º52.59'	84º 5.84'	0.87	1450	6218	5898	5578	SE	SE	63321	40	0.0346
Gmar_gr 123		71 D/1	2884_01	135_15	28º52.70'	84º 6.45'	0.90	1580	6251	5915	5578	SW	SW	63021	40	0.0362
Gmar_gr 124		71 D/1	2884_01	135_15	28º53.09'	84º 6.44'	0.14	250	6334	6230	6126	S	S	37021	18	0.0025
Gmar_gr 125		71 D/1	2884_01	135_15	28º52.71'	84º 7.07'	0.25	820	6251	6021	5791	SE	SE	37021	24	0.0059
Gmar_gr 126		71 D/1	2884_01	135_14	28º53.32'	84º 7.71'	0.14	250	6700	6626	6553	S	S	77021	18	0.0025
Gmar_gr 127		71 D/1	2884_01	135_14	28º51.95'	84º 7.38'	3.52	4430	6309	5852	5395	SW	SW	62021	66	0.2334
Gmar_gr 128		71 D/1	2884_01	135_14	28º51.28'	84º 7.28'	0.28	760	6123	5851	5578	SW	SW	37321	25	0.0070
Gmar_gr 129		71 D/1	2884_01	135_14	28º51.26'	84º 9.08'	7.94	6330	6497	5830	5163	SW	SW	52021	88	0.8423
Gmar_gr 130		71 D/1	2884_01	135_14	28º50.05'	84º 7.96'	1.00	1580	5761	5517	5273	NW	NW	67341	42	0.0419
Gmar_gr 131		71 D/1	2884_01	134_52	28º49.89'	84º 7.24'	0.05	315	5791	5715	5639	N	N	75021	10	0.0005
Gmar_gr 132		71 D/1	2884_01	134_52	28º49.81'	84º 6.99'	0.07	315	5919	5794	5669	NW	NW	75021	13	0.0009
Gmar_gr 133		71 D/1	2884_01	134_52	28º49.42'	84º 8.15'	1.37	1580	6056	5771	5486	NW	NW	63321	47	0.0646
Gmar_gr 134		71 D/1	2884_01	134_52	28º48.93'	84º 8.75'	0.18	630	5547	5441	5334	NE	NE	63021	20	0.0037
Gmar_gr 135		71 D/1	2884_01	134_52	28º50.10'	84º 8.78'	0.67	1580	6120	5834	5547	S	S	63021	36	0.0230
Gmar_gr 136		71 D/1	2884_01	134_52	28º49.98'	84º 9.08'	0.58	1900	6120	5803	5486	S	S	63021	34	0.0196
Gmar_gr 137		71 D/1	2884_01	134_53	28º50.05'	84º10.27'	0.39	505	6392	6244	6096	SW	SW	37021	29	0.0112
Gmar_gr 138		71 D/1	2884_01	134_53	28º49.70'	84º 9.89'	1.21	1900	6035	5700	5364	S	S	63321	45	0.0545
Gmar_gr 139		71 D/1	2884_01	134_53	28º49.71'	84º10.53'	0.49	1260	6066	5776	5486	SW	SW	63512	32	0.0155
Gmar_gr 140		71 D/1	2884_01	134_53	28º49.20'	84º10.67'	0.72	1900	6005	5654	5304	NW	NW	63521	37	0.0266
Gmar_gr 141		71 D/1	2884_01	134_53,54	28º48.58'	84º11.33'	0.41	950	5791	5532	5273	NW	NW	63021	29	0.0121
Gmar_gr 142		71 D/1	2884_01	134_53,54	28º48.19'	84º11.03'	0.82	1580	5822	5532	5243	E	E	63021	39	0.0318
Gmar_gr 143		71 D/1	2884_01	134_53,54	28º47.48'	84º12.54'	0.10	570	5151	4983	4816	NE	NE	75021	15	0.0015
Gmar_gr 144		71 D/1	2884_01	134_53,54	28º47.97'	84º12.28'	0.51	950	5517	5304	5090	SE	SE	63021	32	0.0164
Gmar_gr 145		71 D/1	2884_01	134_53,54	28º48.20'	84º11.71'	0.16	830	5791	5639	5486	NE	NE	37021	19	0.0031
Gmar_gr 146		71 D/1	2884_01	134_53,54	28º48.37'	84º12.08'	0.32	650	5425	5334	5243	NE	NE	63022	26	0.0085
Gmar_gr 147		71 D/1	2884_01	134_53,54	28º48.52'	84º11.62'	0.03	250	5608	5502	5395	NE	NE	75021	7	0.0002
Gmar_gr 148		71 D/1	2884_01	134_53,54	28º49.07'	84º11.47'	1.44	2215	6151	5788	5425	SE	SE	62021	48	0.0685
Gmar_gr 149		71 D/1	2884_01	134_53,54	28º50.21'	84º10.80'	4.88	5815	6096	5578	5060	SE	SE	52321	74	0.3625
Gmar_gr 150		71 D/1	2884_01	134_53,54	28º50.94'	84º10.28'	0.15	630	5913	5799	5685	E	E	63021	19	0.0028
Gmar_gr 151		71 D/1	2884_01	134_53	28º51.13'	84º10.22'	0.25	630	5913	5791	5669	E	E	63021	24	0.0059
Gmar_gr 152		71 D/1	2884_01	134_53	28º51.68'	84º10.29'	0.17	315	6497	6266	6035	SE	SE	62021	20	0.0034
Gmar_gr 153		71 D/1	2884_01	134_53	28º51.04'	84º11.02'	0.73	950	6294	6012	5730	SE	SE	63321	37	0.0271
Gmar_gr 154		71 D/1	2884_01	134_54	28º50.81'	84º12.55'	1.14	1580	5883	5700	5517	SW	SW	63021	44	0.0502
Gmar_gr 155		71 D/1	2884_01	134_54	28º50.20'	84º13.15'	0.81	950	5852	5715	5578	SW	SW	63021	39	0.0313
Gmar_gr 156		71 D/1	2884_01	134_54	28º49.29'	84º13.35'	1.45	1900	6346	5794	5243	NW	NW	63021	48	0.0692
Gmar_gr 157		71 D/1	2884_01	134_54	28º47.82'	84º13.95'	0.20	820	5791	5624	5456	W	W	63021	22	0.0043
Gmar_gr 158		71 D/5	2884_02	134_55	28º47.26'	84º15.31'	0.18	820	5182	4983	4785	NW	NW	63021	20	0.0037
Gmar_gr 159		71 D/1	2884_01	134_55	28º47.38'	84º14.80'	0.29	950	5890	5688	5486	NE	NE	63321	25	0.0074

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 160		71 D/1	2884_01	134_55	28º47.85'	84º14.67'	0.67	1900	5890	5658	5425	E	E	62021	36	0.0240
Gmar_gr 161		71 D/1	2884_01	134_55	28º48.23'	84º14.29'	1.73	1900	6346	5886	5425	NE	NE	62021	51	0.0889
Gmar_gr 162		71 D/1	2884_01	134_55	28º48.73'	84º14.33'	0.40	950	6248	6020	5791	E	E	77021	29	0.0116
Gmar_gr 163		71 D/1	2884_01	134_55	28º49.30'	84º14.74'	1.27	2215	6248	5837	5425	NE	NE	63021	46	0.0582
Gmar_gr 164		71 D/1	2884_01	134_55	28º49.39'	84º14.26'	1.90	2530	6346	5764	5182	N	N	63321	53	0.1011
Gmar_gr 165		71 D/1	2884_01	134_55	28º49.70'	84º13.81'	0.69	1070	6005	5761	5517	N	N	67321	36	0.0250
Gmar_gr 166		71 D/1	2884_01	135_10	28º51.02'	84º13.18'	0.92	1260	5883	5654	5425	SE	SE	62021	41	0.0373
Gmar_gr 167		71 D/1	2884_01	135_10	28º52.11'	84º12.94'	13.60	7600	6346	5688	5029	E	E	52012	105	1.4295
Gmar_gr 168		71 D/1	2884_01	135_11	28º52.42'	84º 9.77'	0.15	315	6581	6369	6157	E	E	77021	19	0.0028
Gmar_gr 169		71 D/1	2884_01	135_11	28º52.74'	84º10.05'	0.05	315	6401	6248	6096	SE	SE	77021	10	0.0005
Gmar_gr 170		71 D/1	2884_01	135_11	28º53.19'	84º11.49'	0.84	250	6248	6142	6035	S	S	75021	39	0.0329
Gmar_gr 171		71 D/1	2884_01	135_10	28º53.39'	84º13.31'	1.06	950	6361	6030	5700	S	S	77321	43	0.0448
Gmar_gr 172		71 D/1	2884_01	135_10	28º53.34'	84º14.27'	0.61	1070	6361	5924	5486	S	S	62321	35	0.0211
Gmar_gr 173		71 D/5	2884_02	135_9	28º52.68'	84º16.11'	4.29	3800	6902	6072	5243	S	SW	52012	71	0.3048
Gmar_gr 174		71 D/5	2884_02	135_9	28º53.31'	84º16.45'	0.24	440	6778	6437	6096	S	S	77021	23	0.0056
Gmar_gr 175		71 D/5	2884_02	135_9	28º52.57'	84º17.42'	0.25	440	6727	6411	6096	S	S	77021	24	0.0059
Gmar_gr 176		71 D/5	2884_02	217_17	28º52.04'	84º19.16'	0.51	630	6279	6005	5730	S	S	77321	32	0.0164
Gmar_gr 177		71 D/5	2884_02	217_17	28º51.20'	84º19.66'	5.21	5060	6367	5896	5425	W	W	52021	76	0.3959
Gmar_gr 178		71 D/5	2884_02	217_17	28º50.94'	84º18.23'	0.16	315	6157	6005	5852	N	N	77021	19	0.0031
Gmar_gr 179		71 D/5	2884_02	217_17	28º51.22'	84º17.83'	0.13	305	6072	5901	5730	N	N	77021	18	0.0023
Gmar_gr 180		71 D/5	2884_02	217_17	28º51.14'	84º17.76'	0.07	250	6072	5947	5822	SW	SW	77021	13	0.0009
Gmar_gr 181		71 D/5	2884_02	217_18	28º50.83'	84º17.98'	0.41	630	6157	5944	5730	SW	SW	67321	29	0.0121
Gmar_gr 182		71 D/5	2884_02	217_18	28º50.46'	84º18.44'	0.42	630	6113	5845	5578	SW	SW	67321	30	0.0125
Gmar_gr 183		71 D/5	2884_02	217_18	28º50.45'	84º18.70'	0.11	440	6113	5967	5822	SE	SE	77321	16	0.0018
Gmar_gr 184		71 D/5	2884_02	217_18	28º50.65'	84º19.54'	0.71	1070	6157	5913	5669	SW	SW	63321	37	0.0261
Gmar_gr 185		71 D/5	2884_02	217_18	28º49.88'	84º20.57'	4.06	3600	6367	5851	5334	S	S	62021	70	0.2820
Gmar_gr 186		71 D/5	2884_02	217_18	28º48.96'	84º20.61'	0.03	250	5700	5639	5578	W	W	75021	7	0.0002
Gmar_gr 187		71 D/5	2884_02	135_6	28º49.47'	84º21.22'	0.09	440	5956	5858	5761	NE	NE	75021	15	0.0013
Gmar_gr 188		71 D/5	2884_02	135_6	28º50.89'	84º21.12'	1.42	1900	6367	5988	5608	SE	SE	62521	48	0.0679
Gmar_gr 189		71 D/5	2884_02	135_6	28º51.17'	84º21.68'	0.62	1580	6157	5913	5669	S	S	62021	35	0.0216
Gmar_gr 190		71 D/5	2884_02	135_6	28º50.87'	84º22.93'	8.59	6330	7035	6215	5395	W	SW	52012	90	0.7741
Gmar_gr 191		71 D/5	2884_02	134_60	28º49.92'	84º23.37'	4.90	3610	6553	5826	5099	W	SW	52311	74	0.3645
Gmar_gr 192		71 D/5	2884_02	134_60	28º49.63'	84º24.23'	0.71	1070	6553	6157	5761	S	S	67321	37	0.0261
Gmar_gr 193		71 D/5	2884_02	134_60	28º49.18'	84º25.28'	3.20	3800	6571	6044	5517	W	SW	62021	64	0.2051
Gmar_gr 194		71 D/5	2884_02	134_60	28º48.77'	84º24.69'	0.23	505	6035	5867	5700	NW	NW	67021	23	0.0053
Gmar_gr 195		71 D/5	2884_02	134_60	28º48.40'	84º25.40'	1.25	2530	6571	6090	5608	SW	SW	63021	46	0.0570
Gmar_gr 196		71 D/5	2884_02	134_60	28º48.01'	84º25.63'	1.35	1900	6462	6081	5700	SW	SW	63021	47	0.0633
Gmar_gr 197		71 D/5	2884_02	217_20	28º47.50'	84º24.80'	9.69	6960	7120	6178	5236	NW	NW	52321	94	0.9094
Gmar_gr 198		71 D/5	2884_02	217_20	28º47.37'	84º23.99'	0.63	1900	6392	5909	5425	NW	NW	63521	35	0.0221
Gmar_gr 199		71 D/5	2884_02	217_20	28º47.50'	84º23.66'	0.95	2215	6392	5832	5273	NW	NW	63521	41	0.0390
Gmar_gr 200		71 D/5	2884_02	217_20	28º47.37'	84º23.06'	2.32	1900	6187	5761	5334	NW	NW	63321	57	0.1326
Gmar_gr 201		71 D/5	2884_02	217_21	28º47.84'	84º22.52'	0.24	1140	5931	5633	5334	NE	NE	63021	23	0.0056
Gmar_gr 202		71 D/5	2884_02	217_21	28º47.85'	84º22.27'	0.33	630	5931	5678	5425	NW	NW	63321	27	0.0089

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 203		71 D/5	2884_02	217_21	28º47.60'	84º21.92'	0.24	760	5913	5700	5486	W	W	63021	23	0.0056
Gmar_gr 204		71 D/5	2884_02	217_21	28º47.23'	84º22.25'	1.66	2215	5974	5624	5273	W	W	63321	51	0.0840
Gmar_gr 205		71 D/5	2884_02	217_21	28º46.74'	84º22.69'	1.84	2530	6218	5761	5304	SW	SW	63321	53	0.0967
Gmar_gr 206		71 D/5	2884_02	167_8,9	28º45.36'	84º21.64'	31.92	15840	7120	5770	4420	NW	NW	51012	139	4.4390
Gmar_gr 207		71 D/5	2884_02	217_21	28º45.48'	84º24.15'	0.16	440	6620	6389	6157	S	S	77321	19	0.0031
Gmar_gr 208		71 D/5	2884_02	217_21	28º45.33'	84º24.51'	0.17	505	6620	6343	6066	S	S	77321	20	0.0034
Gmar_gr 209		71 D/5	2884_02	217_21	28º45.23'	84º25.18'	0.39	380	7097	6795	6492	SW	SW	77021	29	0.0112
Gmar_gr 210		71 D/6	2884_06	167_8	28º45.30'	84º19.52'	0.11	18370	7139	7075	7010	NW	NW	77021	16	0.0018
Gmar_gr 211		71 D/6	2884_06	167_10	28º44.84'	84º19.80'	0.87	1260	6175	5816	5456	W	W	63321	40	0.0346
Gmar_gr 212		71 D/6	2884_06	167_10	28º44.11'	84º19.82'	1.91	2520	6602	5892	5182	NW	NW	63321	53	0.1018
Gmar_gr 213		71 D/6	2884_06	167_10	28º43.75'	84º19.25'	1.47	22150	6392	5741	5090	NW	NW	63321	48	0.0712
Gmar_gr 214		71 D/6	2884_06	167_10	28º43.38'	84º18.90'	1.21	1260	6392	5924	5456	NW	NW	60321	45	0.0545
Gmar_gr 215		71 D/6	2884_06	167_10	28º43.20'	84º19.12'	0.22	315	6392	6229	6066	SW	SW	37021	22	0.0049
Gmar_gr 216		71 D/6	2884_06	166_34	28º42.44'	84º21.62'	13.91	10770	6602	5602	4602	SW	W	51031	106	1.4730
Gmar_gr 217		71 D/6	2884_06	166_34	28º42.74'	84º20.87'	0.58	990	6309	5974	5639	S	S	67021	34	0.0196
Gmar_gr 218		71 D/6	2884_06	166_34	28º41.67'	84º20.70'	0.18	380	6187	5989	5791	N	N	37321	20	0.0037
Gmar_gr 219		71 D/6	2884_06	166_34	28º41.38'	84º19.68'	0.40	630	6700	6337	5974	N	N	37321	29	0.0116
Gmar_gr 220		71 D/6	2884_06	166_34	28º41.58'	84º19.05'	0.16	190	6462	6203	5944	NE	NE	77021	19	0.0031
Gmar_gr 221		71 D/6	2884_06	166_34	28º41.32'	84º18.58'	3.27	2530	6462	5898	5334	NW	NW	60321	65	0.2112
Gmar_gr 222		71 D/6	2884_06	166_34	28º41.17'	84º17.66'	0.35	1450	5962	5648	5334	NW	NW	67021	28	0.0096
Gmar_gr 223		71 D/6	2884_06	166_34	28º40.72'	84º18.53'	0.80	1900	6431	6081	5730	SW	SW	63321	38	0.0308
Gmar_gr 224		71 D/6	2884_06	166_34	28º40.16'	84º18.86'	6.49	5700	6778	5706	4633	SW	NW	62021	82	0.5219
Gmar_gr 225		71 D/6	2884_06	165_17	28º39.58'	84º18.48'	0.14	250	6933	6743	6553	N	N	37021	18	0.0023
Gmar_gr 226		71 D/6	2884_06	165_17	28º39.91'	84º17.73'	0.79	500	6981	6478	5974	NE	NE	67021	38	0.0346
Gmar_gr 227		71 D/6	2884_06	165_17	28º39.91'	84º17.02'	1.90	1900	6471	5933	5395	SW	SW	60321	53	0.1011
Gmar_gr 228		71 D/6	2884_06	165_17	28º39.25'	84º17.25'	2.71	3160	6981	6036	5090	SW	SW	63321	60	0.1638
Gmar_gr 229		71 D/6	2884_06	165_17	28º38.81'	84º17.51'	0.46	1260	6120	5636	5151	SE	SE	60321	31	0.0137
Gmar_gr 230		71 D/6	2884_06	165_17	28º38.74'	84º18.33'	2.37	2530	6933	5966	4999	NW	NW	63321	58	0.1373
Gmar_gr 231		71 D/6	2884_06	165_18,19	28º38.10'	84º19.28'	3.21	5060	6933	5905	4877	S	SW	63321	64	0.2060
Gmar_gr 232		71 D/6	2884_06	165_18,19	28º37.67'	84º19.91'	1.80	1260	5837	5555	5273	NW	NW	62021	52	0.0939
Gmar_gr 233		71 D/6	2884_06	165_18,19	28º36.77'	84º19.43'	1.55	990	5608	5349	5090	NW	NW	60021	49	0.0765
Gmar_gr 234		71 D/6	2884_06	165_18,19	28º36.49'	84º20.21'	0.91	990	5182	5029	4877	S	S	64021	40	0.0368
Gmar_gr 235		71 D/6	2884_06	165_18,19	28º37.23'	84º20.69'	0.70	1580	5639	5197	4755	E	E	63321	36	0.0255
Gmar_gr 236		71 D/6	2884_06	165_18,19	28º38.06'	84º20.15'	0.50	440	5837	5555	5273	NE	NE	37321	32	0.0160
Gmar_gr 237		71 D/6	2884_06	165_18,19	28º39.51'	84º19.37'	0.81	990	6778	6315	5852	S	S	63051	39	0.0313
Gmar_gr 238		71 D/6	2884_06	165_18,19	28º39.06'	84º22.30'	14.31	10130	6700	5087	3475	SE	SE	52012	107	1.5297
Gmar_gr 239		71 D/6	2884_06	165_18,19	28º40.05'	84º19.80'	1.65	630	6778	6330	5883	SE	SE	60321	51	0.0834
Gmar_gr 240		71 D/6	2884_06	165_20	28º40.52'	84º23.97'	0.20	630	4816	4663	4511	SW	SW	64021	22	0.0043
Gmar_gr 241		71 D/6	2884_06	165_20	28º40.22'	84º23.93'	0.18	630	4816	4663	4511	W	W	75021	20	0.0037
Gmar_gr 242		71 D/6	2884_06	165_20	28º39.77'	84º24.81'	1.90	2150	5505	5236	4968	SE	SE	62031	53	0.1011
Gmar_gr 243		71 D/6	2884_06	165_20	28º39.52'	84º25.42'	0.05	190	5730	5593	5456	SW	SW	77021	10	0.0005
Gmar_gr 244		71 D/6	2884_06	165_20	28º39.26'	84º25.69'	0.13	190	5608	5471	5334	W	W	77021	18	0.0023
Gmar_gr 245		71 D/6	2884_06	165_20	28º39.71'	84º25.89'	0.18	1580	5395	4983	4572	SE	SE	77021	20	0.0037

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 246		71 D/6	2884_06	165_20	28º40.83'	84º24.77'	0.03	440	4755	4679	4602	E	E	75021	7	0.0002
Gmar_gr 247		71 D/6	2884_06	165_20	28º41.09'	84º24.68'	0.21	820	4938	4724	4511	E	E	75021	22	0.0046
Gmar_gr 248		71 D/6	2884_06	166_37	28º42.10'	84º25.54'	46.25	19000	6885	5287	3688	S	SE	51212	157	7.2503
Gmar_gr 249		71 D/6	2884_06	167_7	28º44.19'	84º25.34'	0.39	1260	7141	6847	6553	NE	NE	67021	29	0.0112
Gmar_gr 250		71 D/6	2884_06	167_7	28º43.27'	84º25.65'	0.07	315	5852	5669	5486	SW	SW	75021	13	0.0009
Gmar_gr 251		71 D/6	2884_06	166_38	28º42.95'	84º26.41'	0.06	380	5639	5532	5425	SW	SW	75012	12	0.0007
Gmar_gr 252		71 D/6	2884_06	166_38	28º42.64'	84º29.15'	0.20	380	6218	6081	5944	SW	SW	77012	22	0.0043
Gmar_gr 253		71 D/6	2884_06	166_38	28º41.69'	84º29.94'	0.28	315	5730	5639	5547	SW	SW	77021	25	0.0070
Gmar_gr 254		71 D/10	2884_07	165_22	28º39.48'	84º31.18'	0.31	440	5456	5288	5121	N	N	60021	26	0.0081
Gmar_gr 255		71 D/10	2884_07	165_22	28º39.03'	84º30.43'	0.74	1580	5730	5364	4999	SW	SW	63321	37	0.0276
Gmar_gr 256		71 D/10	2884_07	165_22	28º38.80'	84º31.04'	1.59	2530	6248	5502	4755	SW	SW	63321	50	0.0792
Gmar_gr 257		71 D/10	2884_07	165_22	28º37.96'	84º31.68'	4.82	3160	6427	5484	4542	SW	SW	60021	74	0.3565
Gmar_gr 258		71 D/10	2884_07	164_31	28º35.71'	84º31.67'	14.01	5700	7681	5822	3962	NW	NW	60321	106	1.4872
Gmar_gr 259		71 D/10	2884_07	164_31	28º34.21'	84º31.62'	0.09	505	6187	5989	5791	NW	NW	75021	15	0.0013
Gmar_gr 260		71 D/10	2884_07	164_31	28º33.79'	84º31.54'	0.21	820	6767	6416	6066	NW	NW	75021	22	0.0046
Gmar_gr 261		71 D/10	2884_07	164_30	28º33.49'	84º31.76'	0.05	250	6767	6614	6462	NW	NW	75021	10	0.0005
Gmar_gr 262		71 D/10	2884_07	164_30	28º33.81'	84º30.94'	0.63	1580	5578	5227	4877	NW	NW	63021	35	0.0221
Gmar_gr 263		71 D/10	2884_07	164_30	28º34.83'	84º30.05'	4.18	6710	5243	4343	3444	NW	NW	52031	70	0.2943
Gmar_gr 264		71 D/10	2884_07	164_30	28º33.12'	84º31.38'	0.05	250	6553	6386	6218	NW	NW	75021	10	0.0005
Gmar_gr 265		71 D/10	2884_07	164_30	28º33.18'	84º31.10'	0.02	190	6096	6005	5913	NW	NW	75021	5	0.0001
Gmar_gr 266		71 D/10	2884_07	164_30	28º32.84'	84º30.42'	0.05	250	6248	6096	5944	N	N	75021	10	0.0005
Gmar_gr 267		71 D/6	2884_06	164_29	28º33.47'	84º28.65'	0.49	880	6534	6086	5639	W	W	67021	32	0.0155
Gmar_gr 268		71 D/6	2884_06	164_29	28º34.61'	84º28.91'	0.47	1260	5151	4770	4389	N	N	63021	31	0.0146
Gmar_gr 269		71 D/6	2884_06	164_29	28º33.84'	84º27.91'	0.32	760	4877	4679	4481	NW	NW	64021	26	0.0085
Gmar_gr 270		71 D/6	2884_06	164_29	28º32.76'	84º27.94'	0.07	315	5243	5121	4999	SW	SW	75021	13	0.0009
Gmar_gr 271		71 D/6	2884_06	164_29	28º32.65'	84º28.53'	1.70	2215	6534	5690	4846	S	S	63321	51	0.0868
Gmar_gr 272		71 D/6	2884_06	164_29	28º33.08'	84º28.92'	0.08	440	6187	5989	5791	SW	SW	75012	14	0.0011
Gmar_gr 273		71 D/6	2884_06	163_22	28º31.75'	84º29.64'	8.71	5060	7036	6185	5334	S	S	62012	91	0.7886
Gmar_gr 274		71 D/10	2884_07	163_20	28º31.08'	84º30.61'	0.03	250	5974	5806	5639	SW	SW	75021	7	0.0002
Gmar_gr 275		71 D/10	2884_07	163_20	28º30.74'	84º31.24'	0.07	315	5761	5669	5578	SE	SE	75022	13	0.0009
Gmar_gr 276		71 D/10	2884_07	163_20	28º31.04'	84º31.21'	0.30	850	6858	6447	6035	SE	SE	60021	26	0.0077
Gmar_gr 277		71 D/10	2884_07	163_20	28º30.36'	84º32.58'	34.93	9500	7871	5840	3810	SW	SW	51031	143	5.0016
Gmar_gr 278		71 D/11	2884_11	163_20	28º28.40'	84º31.89'	0.32	440	5462	5307	5151	SW	SW	37311	26	0.0085
Gmar_gr 279		71 D/11	2884_11	163_20	28º28.14'	84º32.21'	0.66	630	5462	5307	5151	S	S	37300	36	0.0235
Gmar_gr 280		71 D/11	2884_11	162_6	28º27.97'	84º35.05'	6.00	1900	6864	5993	5121	SW	SW	60021	80	0.4786
Gmar_gr 281		71 D/11	2884_11	162_6	28º26.18'	84º35.50'	4.28	4300	7371	6017	4663	SW	SW	63051	71	0.3038
Gmar_gr 282		71 D/11	2884_11	162_6	28º26.13'	84º33.43'	1.15	2530	4602	4145	3688	W	W	63022	44	0.0508
Gmar_gr 283		71 D/11	2884_11	162_6	28º25.47'	84º35.62'	5.37	5060	7540	6346	5151	SW	SW	60021	77	0.4123
Gmar_gr 284		71 D/11	2884_11	162_6	28º24.33'	84º34.91'	0.81	630	5547	5349	5151	NW	NW	60021	39	0.0313
Gmar_gr 285		71 D/11	2884_11	162_6	28º23.85'	84º34.64'	0.21	315	5364	5258	5151	SW	SW	37021	22	0.0046
Gmar_gr 286		71 D/11	2884_11	162_6	28º23.32'	84º34.57'	0.10	250	5243	5197	5151	SW	SW	75021	15	0.0015
Gmar_gr 287		71 D/11	2884_11	162_6	28º23.54'	84º34.86'	0.13	440	5243	5197	5151	S	S	37021	18	0.0023
Gmar_gr 288		71 D/11	2884_11	162_6	28º23.77'	84º34.89'	0.18	250	5243	5197	5151	NE	NE	37021	20	0.0037

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gmar_gr 289		71 D/11	2884_11	162_6	28º24.04'	84º35.05'	0.24	630	5547	5349	5151	S	S	37321	23	0.0056
Gmar_gr 290		71 D/11	2884_11	162_6	28º24.26'	84º35.20'	0.47	540	5547	5349	5151	E	E	60021	31	0.0146
Gmar_gr 291		71 D/11	2884_11	162_6	28º24.59'	84º35.40'	0.03	150	5273	5212	5151	SE	SE	75021	7	0.0002
Gmar_gr 292		71 D/11	2884_11	162_6	28º24.74'	84º35.79'	0.14	315	5425	5288	5151	S	S	77021	18	0.0025
Gmar_gr 293		71 D/11	2884_11	162_6	28º25.22'	84º36.75'	6.10	3160	7540	6346	5151	S	S	60321	80	0.4893
Gmar_gr 294		71 D/11	2884_11	162_6	28º25.04'	84º38.13'	8.57	6960	7893	6370	4846	SW	SW	63021	90	0.7717
Gmar_gr 295		71 D/11	2884_11	161_10	28º23.69'	84º38.16'	1.45	1260	6401	5776	5151	W	W	60021	48	0.0698
Gmar_gr 296		71 D/11	2884_11	161_10	28º23.57'	84º39.27'	11.30	3800	6785	5374	3962	SW	SW	60021	99	1.1166
Gmar_gr 297		71 D/11	2884_11	161_10	28º22.07'	84º38.26'	0.94	3490	4115	3581	3048	SW	W	53012	41	0.0385
Gmar_gr 298		71 D/11	2884_11	161_10	28º22.12'	84º39.54'	0.43	990	5931	5541	5151	W	W	67021	30	0.0129
Gmar_gr 299		71 D/11	2884_11	110_11	28º21.88'	84º40.55'	2.62	1900	6614	5883	5151	S	S	67021	60	0.1565
Gmar_gr 300		71 D/11	2884_11	110_11	28º21.36'	84º41.45'	1.39	3400	6005	5304	4602	S	W	53021	47	0.0659
Gmar_gr 301		71 D/11	2884_11	110_10,11	28º20.64'	84º40.82'	0.59	630	5590	5371	5151	N	N	37021	34	0.0201
Gmar_gr 302		71 D/11	2884_11	110_10,11	28º20.56'	84º40.19'	0.11	250	5486	5319	5151	N	N	37021	16	0.0018
Gmar_gr 303		71 D/11	2884_11	110_10,11	28º20.58'	84º39.45'	0.11	250	5380	5266	5151	N	N	37021	16	0.0018
Gmar_gr 304		71 D/11	2884_11	110_10,11	28º20.50'	84º39.29'	0.15	440	5380	5266	5151	W	W	37021	19	0.0028
Gmar_gr 305		71 D/11	2884_11	110_10,11	28º20.45'	84º39.43'	0.16	250	5380	5266	5151	SE	SE	37021	19	0.0031
Gmar_gr 306		71 D/11	2884_11	110_10,11	28º20.39'	84º40.16'	0.22	630	5486	5319	5151	SW	SW	37021	22	0.0049
Gmar_gr 307		71 D/11	2884_11	110_10,11	28º20.34'	84º40.72'	0.94	630	5590	5371	5151	S	S	37021	41	0.0385
Gmar_gr 308		71 D/11	2884_11	110_10,11	28º20.54'	84º41.13'	0.64	570	5590	5371	5151	E	E	37021	35	0.0225
Gmar_gr 309		71 D/11	2884_11	110_10,11	28º21.42'	84º42.02'	1.10	1070	6096	5624	5151	S	S	37021	43	0.0478
Gmar_gr 310		71 D/11	2884_11	110_10,11	28º21.13'	84º42.85'	0.19	380	5379	5265	5151	E	E	37021	21	0.0040
Gmar_gr 311		71 D/11	2884_11	110_9	28º21.57'	84º44.87'	0.07	190	5304	5227	5151	SW	SW	37021	13	0.0009

Glacier Inventory of Seti Basin

Total Number : 61 Total Area : 164.48 (km^2) Ice Reserve : 16.88 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Gset_gr 1	Kyamnu	62P/14	2883_08	163_38	28º29.89'	83º48.36'	3.15	5700	6645	4999	3353	S	SW	53011	64	0.2008
Gset_gr 2		62P/14	2883_08	163_38	28º30.84'	83º49.35'	2.26	1770	7219	6413	5608	S	S	60321	57	0.1280
Gset_gr 3		62P/14	2883_08	163_38	28º30.45'	83º50.69'	0.05	190	5791	5715	5639	SW	SW	75022	10	0.0005
Gset_gr 4		62P/14	2883_08	163_38	28º30.52'	83º51.02'	0.26	440	6441	6253	6066	SW	SW	37321	24	0.0063
Gset_gr 5		62P/14	2883_08	163_38	28º30.35'	83º51.75'	2.17	2720	6441	5278	4115	E	E	60021	56	0.1211
Gset_gr 6		62P/14	2883_08	163_38	28º30.74'	83º51.11'	0.35	315	6441	6253	6066	N	N	37321	28	0.0096
Gset_gr 7		62P/14	2883_08	163_38	28º31.39'	83º50.91'	5.24	2530	7193	5685	4176	NE	NE	67021	76	0.3990
Gset_gr 8		62P/14	2883_08	163_38	28º32.22'	83º50.90'	0.83	1580	5639	5197	4755	SE	SE	63022	39	0.0324
Gset_gr 9		62P/14	2883_08	164_61	28º33.89'	83º49.85'	7.90	5060	6523	5105	3688	SE	SE	67321	88	0.6920
Gset_gr 10		62P/14	2883_08	164_61	28º34.16'	83º48.77'	0.26	880	7620	7163	6706	E	E	63021	24	0.0063
Gset_gr 11		62P/14	2883_08	164_61,62	28º34.51'	83º48.43'	0.81	570	7647	7329	7010	E	E	67021	39	0.0313
Gset_gr 12		62P/14	2883_08	164_61,62	28º34.61'	83º48.77'	0.35	440	7041	6721	6401	E	E	67521	28	0.0096
Gset_gr 13		62P/14	2883_08	164_61,62	28º35.61'	83º49.48'	0.49	570	8092	7780	7468	S	S	67021	32	0.0155
Gset_gr 14		62P/14	2883_08	164_61,62	28º34.57'	83º50.68'	2.92	2720	6157	5441	4724	SE	SE	60021	62	0.1812
Gset_gr 15		62P/14	2883_08	164_61,62	28º35.15'	83º52.06'	10.21	12670	7485	5876	4267	S	S	52512	96	0.9752
Gset_gr 16		62P/14	2883_08	164_61,62	28º34.34'	83º52.72'	0.76	1200	6066	5547	5029	W	W	67021	38	0.0286
Gset_gr 17		62P/14	2883_08	164_61,62	28º33.80'	83º53.07'	1.53	1450	5486	5151	4816	SW	SW	60021	49	0.0752
Gset_gr 18		62P/14	2883_08	164_61,62	28º33.70'	83º53.59'	0.06	190	5663	5590	5517	E	E	37021	12	0.0007
Gset_gr 19		62P/14	2883_08	164_61,62	28º34.49'	83º53.59'	2.47	3140	6096	5486	4877	SE	SE	63321	58	0.1444
Gset_gr 20		62P/14	2883_08	164_61,62	28º35.24'	83º53.20'	0.19	315	6501	6390	6279	SE	SE	37021	21	0.0040
Gset_gr 21		62P/14	2883_08	164_63	28º35.17'	83º54.62'	11.94	8260	7069	5429	3789	S	S	52512	101	1.2017
Gset_gr 22		62P/14	2883_08	164_63	28º34.29'	83º55.79'	0.25	250	5672	5595	5517	Open	Open	37021	24	0.0059
Gset_gr 23		62P/14	2883_08	164_63	28º34.97'	83º56.47'	4.35	3800	7132	5898	4663	S	S	62521	71	0.3105
Gset_gr 24		62P/14	2883_08	164_65	28º34.50'	83º58.04'	14.73	6970	7454	5830	4206	SW	SW	52012	108	1.5898
Gset_gr 25		62P/14	2883_08	164_65	28º32.76'	83º57.58'	3.06	3160	6248	5395	4542	NW	NW	60021	63	0.1931
Gset_gr 26		62P/14	2883_08	164_65	28º32.30'	83º57.34'	0.44	440	6248	5822	5395	SW	SW	60321	30	0.0133
Gset_gr 27		62P/14	2883_08	164_65	28º31.91'	83º56.99'	1.24	1900	5913	5319	4724	W	W	60021	45	0.0563
Gset_gr 28		62P/14	2883_08	163_41	28º31.14'	83º56.99'	2.91	3215	6309	5471	4633	W	W	60021	62	0.1804
Gset_gr 29	Machhapuchh	62P/15	2883_12	163_41	28º29.64'	83º56.88'	0.15	190	6993	6849	6706	Open	Open	37021	19	0.0028
Gset_gr 30		62P/15	2883_12	163_41	28º29.36'	83º56.64'	0.09	380	6096	5441	4785	SE	SE	37021	15	0.0013

Gset_gr 31		62P/15	2883_12	163_42	28º29.95'	83º57.09'	0.26	950	6096	5486	4877	SE	SE	67021	24	0.0063
Gset_gr 32		62P/14	2883_08	163_42	28º30.23'	83º57.58'	0.31	1260	5791	5334	4877	E	E	67021	26	0.0081
Gset_gr 33		62P/14	2883_08	163_42	28º30.74'	83º57.81'	0.69	1130	6309	5517	4724	E	E	67021	36	0.0250
Gset_gr 34		62P/14	2883_08	163_42	28º31.78'	83º58.41'	0.30	630	5212	4968	4724	SE	SE	67022	26	0.0077
Gset_gr 35		62P/14	2883_08	163_42	28º32.06'	83º58.71'	0.11	990	5304	4938	4572	SE	SE	75022	16	0.0018
Gset_gr 36		62P/14	2883_08	163_42	28º32.31'	83º59.03'	0.37	1260	5547	5090	4633	SE	SE	75022	28	0.0104
Gset_gr 37		62P/14	2883_08	163_42	28º32.63'	83º59.29'	0.38	1070	5334	4435	3536	SE	S	52012	28	0.0108
Gset_gr 38		62P/14	2883_08	163_42	28º32.76'	83º59.63'	0.26	1520	5486	5014	4542	S	S	75022	24	0.0063
Gset_gr 39		71D/2	2884_05	164_66,67	28º33.52'	84º 0.87'	5.49	5700	6553	5410	4267	SW	SW	52012	77	0.4248
Gset_gr 40		62P/14	2883_08	164_66,67	28º35.01'	83º59.62'	0.44	250	7555	7420	7285	SW	SW	37021	30	0.0133
Gset_gr 41		71D/2	2884_05	164_20	28º33.51'	84º 3.27'	4.28	19000	6706	5806	4907	SW	SW	60321	71	0.3038
Gset_gr 42		71D/2	2884_05	164_20	28º32.95'	84º 4.35'	0.35	630	6858	6477	6096	SW	SW	37321	28	0.0096
Gset_gr 43		71D/2	2884_05	164_20	28º32.62'	84º 3.90'	0.14	500	5639	5486	5334	SW	SW	77022	18	0.0025
Gset_gr 44		71D/2	2884_05	164_20	28º32.23'	84º 3.65'	1.03	1770	5517	5151	4785	NW	NW	63322	42	0.0436
Gset_gr 45		71D/2	2884_05	164_20	28º32.39'	84º 4.14'	0.09	330	5974	5806	5639	SW	SW	77022	15	0.0013
Gset_gr 46		71D/2	2884_05	164_20	28º32.56'	84º 4.76'	0.29	330	7315	7041	6767	SW	SW	37321	25	0.0074
Gset_gr 47		71D/2	2884_05	164_20	28º32.32'	84º 4.39'	0.08	330	6462	6233	6005	SW	SW	77022	14	0.0011
Gset_gr 48		71D/2	2884_05	164_20	28º32.07'	84º 4.34'	0.44	1015	6614	6126	5639	SW	SW	63051	30	0.0133
Gset_gr 49		71D/2	2884_05	163_44	28º31.44'	84º 3.90'	1.53	1710	5639	5227	4816	NW	NW	60322	49	0.0752
Gset_gr 50		71D/2	2884_05	163_44	28º31.22'	84º 4.44'	0.56	2530	7010	6725	6440	S	S	37021	33	0.0187
Gset_gr 51		71D/2	2884_05	163_45	28º30.38'	84º 4.10'	2.51	2530	5791	5243	4694	SW	SW	60022	59	0.1476
Gset_gr 52		71D/2	2884_05	163_45	28º26.98'	84º 7.15'	0.56	2150	3200	2804	2408	S	S	75022	33	0.0187
Gset_gr 53		71D/2	2884_05	163_45	28º29.96'	84º 6.23'	52.77	8870	7559	5837	4115	S	S	60021	164	8.6304
Gset_gr 54		71D/2	2884_05	162_13	28º28.64'	84º 8.70'	1.41	1260	6209	5771	5334	SW	SW	60321	48	0.0672
Gset_gr 55		71D/2	2884_05	162_13	28º28.44'	84º 9.86'	0.68	630	6706	6401	6096	S	S	67021	36	0.0245
Gset_gr 56		71D/2	2884_05	162_13	28º27.14'	84º 8.83'	0.41	2530	3810	3338	2865	SW	SW	75012	29	0.0121
Gset_gr 57		71D/2	2884_05	162_13	28º27.59'	84º10.79'	0.91	1770	4877	4496	4115	SE	SE	63021	40	0.0368
Gset_gr 58		71D/2	2884_05	162_13	28º27.93'	84º11.35'	1.76	3160	6401	5243	4084	SE	SE	63021	52	0.0910
Gset_gr 59		71D/2	2884_05	162_13	28º28.65'	84º11.18'	0.92	1900	6797	5989	5182	SE	SE	60051	41	0.0373
Gset_gr 60		71D/2	2884_05	162_13	28º28.72'	84º11.92'	1.58	3160	6983	5701	4420	SE	SE	62021	50	0.0786
Gset_gr 61		71D/2	2884_05	162_13	28º28.55'	84º12.84'	2.14	3000	6553	5319	4084	S	S	62021	56	0.1188

Glacier Inventory of Kali Gandaki Basin

Total Number : 399 Total Area : 562.67 (km^2) Ice Reserve : 51.65 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Gka_gr 1		62 P/6	2883_06	166_7	28º40.25'	83º15.09'	1.84	1140	6465	6256	6046	SE	SE	60021	53	0.0967
Gka_gr 2		62 P/6	2883_06	166_9	28º38.96'	83º18.22'	0.29	697	5639	5319	4999	SW	SW	77021	25	0.0074
Gka_gr 3		62 P/6	2883_06	166_9	28º39.00'	83º18.79'	0.52	1394	6570	5861	5151	S	S	77021	32	0.0169
Gka_gr 4		62 P/6	2883_06	166_9	28º39.77'	83º19.67'	0.66	1140	6273	5686	5099	NE	NE	37321	36	0.0235
Gka_gr 5		62 P/6	2883_06	166_9	28º40.23'	83º20.21'	0.13	570	5547	5288	5029	SE	SE	75021	18	0.0023
Gka_gr 6		62 P/6	2883_06	166_9	28º42.17'	83º19.35'	57.15	12038	7661	5492	3322	S	S	63011	168	9.5887
Gka_gr 7		62 P/6	2883_06	166_9	28º40.93'	83º21.85'	0.10	634	5425	5227	5029	E	E	75021	15	0.0015
Gka_gr 8		62 P/6	2883_06	167_31	28º43.94'	83º24.05'	39.31	6843	7618	6034	4450	SE	SE	60321	149	5.8479
Gka_gr 9		62 P/5	2883_02	167_30	28º45.89'	83º27.31'	2.09	2091	6340	5731	5121	S	S	60021	55	0.1151
Gka_gr 10		62 P/5	2883_02	167_30	28º46.34'	83º28.19'	3.11	3231	6639	5606	4572	SE	SE	60021	63	0.1974
Gka_gr 11		62 P/5	2883_02	167_29	28º46.50'	83º29.01'	1.69	1647	6611	6034	5456	S	S	60321	51	0.0861
Gka_gr 12		62 P/5	2883_02	167_29	28º46.23'	83º29.68'	1.66	2788	6492	5768	5044	S	S	62021	51	0.0840
Gka_gr 13		62 P/9	2883_02	167_29	28º46.49'	83º30.05'	0.51	1014	6142	5906	5669	E	E	63321	32	0.0164
Gka_gr 14		62 P/9	2883_02	167_29	28º47.05'	83º30.22'	2.13	3548	5791	5418	5044	SE	SE	53521	55	0.1181
Gka_gr 15	Dhaulagiri	62 P/6	2883_06	167_29	28º43.67'	83º31.02'	46.05	7286	6920	5594	4267	NW	NW	52012	157	7.2089
Gka_gr 16		62 P/6	2883_06	167_29	28º42.40'	83º29.57'	0.05	317	7315	7239	7163	N	N	75021	10	0.0005
Gka_gr 17		62 P/6	2883_06	167_29	28º42.29'	83º29.29'	0.08	507	7620	7468	7315	N	N	75021	14	0.0011
Gka_gr 18		62 P/6	2883_06	167_29	28º41.89'	83º28.71'	0.75	1394	7559	6927	6294	SW	SW	67021	37	0.0281
Gka_gr 19		62 P/6	2883_06	167_29	28º41.28'	83º28.89'	0.25	1331	7803	7575	7346	SW	SW	77021	24	0.0059
Gka_gr 20		62 P/6	2883_06	166_13	28º39.70'	83º27.80'	6.90	3168	6620	5535	4450	SW	SW	60321	84	0.5773
Gka_gr 21		62 P/6	2883_06	166_13	28º38.22'	83º26.93'	1.23	2091	6379	5430	4481	NW	NW	67021	45	0.0557
Gka_gr 22		62 P/6	2883_06	166_13	28º37.56'	83º26.78'	0.75	1077	6062	5515	4968	W	W	60021	37	0.0281
Gka_gr 23		62 P/6	2883_06	164_53	28º36.75'	83º26.20'	0.69	1394	5669	5197	4724	SW	SW	67021	36	0.0250
Gka_gr 24		62 P/6	2883_06	164_53	28º36.89'	83º26.83'	0.35	2598	6062	5317	4572	Open	Open	37021	28	0.0096
Gka_gr 25		62 P/6	2883_06	164_53	28º36.59'	83º27.19'	0.95	1774	5578	5136	4694	S	S	60021	41	0.0390
Gka_gr 26		62 P/6	2883_06	164_53	28º36.39'	83º27.83'	0.26	1964	5724	5179	4633	Open	Open	37021	24	0.0063
Gka_gr 27		62 P/6	2883_06	164_53	28º36.37'	83º28.26'	0.31	570	5044	4900	4755	SE	SE	67021	26	0.0081
Gka_gr 28		62 P/6	2883_06	166_14	28º36.84'	83º28.61'	0.63	570	5639	5411	5182	NE	NE	67021	35	0.0221
Gka_gr 29		62 P/6	2883_06	166_14	28º38.20'	83º28.45'	4.39	2281	5724	5179	4633	NE	E	52521	72	0.3144
Gka_gr 30		62 P/6	2883_06	166_14	28º39.05'	83º28.81'	1.00	2408	6379	5575	4770	E	E	63021	42	0.0419

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 31		62 P/6	2883_06	166_14	28º39.99'	83º30.01'	7.22	5956	6187	5593	4999	NE	S	52321	85	0.6134
Gka_gr 32		62 P/6	2883_06	166_14	28º40.66'	83º29.09'	0.68	1331	7315	6736	6157	SE	SE	60321	36	0.0245
Gka_gr 33		62 P/6	2883_06	166_14	28º40.99'	83º28.83'	0.14	253	7620	7514	7407	SE	SE	77021	18	0.0025
Gka_gr 34		62 P/6	2883_06	166_14	28º41.44'	83º29.31'	0.94	1774	8138	7849	7559	S	S	60021	41	0.0385
Gka_gr 35		62 P/6	2883_06	166_14	28º41.19'	83º30.22'	1.50	507	7193	6873	6553	S	S	60321	49	0.0732
Gka_gr 36		62 P/6	2883_06	166_14	28º41.47'	83º29.77'	0.06	190	7468	7392	7315	S	S	75021	12	0.0007
Gka_gr 37		62 P/10	2883_07	166_15	28º41.61'	83º30.18'	0.14	444	7986	7742	7498	SW	SW	77021	18	0.0025
Gka_gr 38		62 P/10	2883_07	166_15	28º40.78'	83º30.30'	0.02	127	5791	5715	5639	S	S	75022	5	0.0001
Gka_gr 39		62 P/10	2883_07	166_15	28º40.93'	83º31.52'	0.05	444	5486	5288	5090	SW	SW	75022	10	0.0005
Gka_gr 40		62 P/10	2883_07	166_15	28º40.70'	83º31.79'	0.03	317	5334	5228	5121	SW	SW	75022	7	0.0002
Gka_gr 41		62 P/10	2883_07	166_16	28º40.50'	83º32.06'	0.53	2091	5852	5075	4298	SW	SW	62521	33	0.0173
Gka_gr 42		62 P/10	2883_07	166_16	28º41.17'	83º32.12'	0.14	1394	7711	7254	6797	Open	Open	37021	18	0.0025
Gka_gr 43		62 P/10	2883_07	166_16	28º41.88'	83º31.88'	7.41	6019	7955	6111	4267	SE	SE	60021	86	0.6352
Gka_gr 44		62 P/10	2883_07	166_16	28º41.83'	83º32.51'	0.02	317	5486	5349	5212	SE	SE	75022	5	0.0001
Gka_gr 45		62 P/10	2883_07	166_16	28º41.91'	83º32.72'	0.03	190	5182	5106	5029	SE	SE	75022	7	0.0002
Gka_gr 46		62 P/10	2883_07	166_16	28º42.73'	83º32.46'	0.55	190	6690	6165	5639	E	E	37021	33	0.0182
Gka_gr 47		62 P/10	2883_07	167_27	28º44.08'	83º33.53'	2.02	253	6920	6142	5364	S	S	60321	54	0.1099
Gka_gr 48		62 P/10	2883_07	167_27	28º43.12'	83º33.57'	0.13	760	5334	5037	4740	SE	SE	75022	18	0.0023
Gka_gr 49		62 P/10	2883_07	167_27	28º43.37'	83º34.02'	0.09	570	5304	5121	4938	SE	SE	75022	15	0.0013
Gka_gr 50		62 P/10	2883_07	167_27	28º43.97'	83º34.36'	1.60	1964	6482	5832	5182	SE	SE	60321	50	0.0799
Gka_gr 51		62 P/9	2883_03	167_27	28º46.32'	83º34.46'	0.12	380	5846	5682	5517	SE	SE	37021	17	0.0020
Gka_gr 52		62 P/9	2883_03	167_27	28º46.53'	83º34.40'	0.19	380	5846	5743	5639	NE	NE	37021	21	0.0040
Gka_gr 53		62 P/9	2883_03	134_37	28º52.00'	83º40.05'	0.50	950	5730	5487	5243	N	N	63021	32	0.0160
Gka_gr 54		62 P/9	2883_03	134_37	28º51.81'	83º39.33'	0.79	697	6343	5884	5425	N	N	67321	38	0.0302
Gka_gr 55		62 P/9	2883_03	134_37	28º51.64'	83º38.38'	2.69	4562	6386	5373	4359	N	N	52311	60	0.1622
Gka_gr 56		62 P/9	2883_03	134_37	28º51.80'	83º37.95'	0.15	380	6370	6188	6005	N	N	77021	19	0.0028
Gka_gr 57		62 P/9	2883_03	134_37	28º52.66'	83º37.48'	0.06	507	5319	5190	5060	N	N	75021	12	0.0007
Gka_gr 58		62 P/9	2883_03	134_37	28º52.02'	83º37.56'	0.17	1077	6309	6142	5974	NW	NW	77021	20	0.0034
Gka_gr 59		62 P/9	2883_03	134_37	28º51.63'	83º37.63'	0.42	760	6370	6066	5761	W	W	77321	30	0.0125
Gka_gr 60		62 P/9	2883_03	134_37	28º50.98'	83º37.41'	1.29	1901	6386	5929	5471	NW	NW	62011	46	0.0595
Gka_gr 61		62 P/9	2883_03	134_36	28º51.15'	83º36.71'	0.18	570	5944	5754	5563	NW	NW	77021	20	0.0037
Gka_gr 62		62 P/9	2883_03	134_36	28º50.84'	83º36.79'	0.40	697	6126	5898	5669	W	W	60321	29	0.0116
Gka_gr 63		62 P/9	2883_03	134_36	28º50.71'	83º38.02'	0.81	1837	6386	6058	5730	SW	SW	62021	39	0.0313
Gka_gr 64		62 P/9	2883_03	134_36	28º49.06'	83º37.27'	0.15	444	5761	5647	5532	NW	NW	70021	19	0.0028
Gka_gr 65		62 P/9	2883_03	167_27	28º48.20'	83º36.78'	1.04	1457	6012	5734	5456	NW	NW	60021	43	0.0442
Gka_gr 66		62 P/9	2883_03	167_28	28º46.47'	83º33.97'	1.86	4245	5852	5433	5014	N	N	53022	53	0.0982
Gka_gr 67		62 P/9	2883_03	167_28	28º46.27'	83º33.48'	0.35	570	6218	5898	5578	NE	NE	37021	28	0.0096
Gka_gr 68		62 P/9	2883_03	167_28	28º46.70'	83º33.13'	0.31	950	5852	5608	5364	NW	NW	60021	26	0.0081
Gka_gr 69		62 P/9	2883_03	167_29	28º48.87'	83º29.52'	9.05	5449	5669	5487	5304	SE	SE	62011	92	0.8300
Gka_gr 70		62 P/9	2883_03	134_33	28º49.88'	83º30.48'	2.75	3168	6645	6127	5608	S	S	52021	61	0.1671
Gka_gr 71		62 P/9	2883_03	134_33	28º49.33'	83º31.44'	0.50	1394	6248	5951	5654	SE	SE	63021	32	0.0160
Gka_gr 72		62 P/9	2883_03	134_33	28º49.66'	83º31.93'	2.87	3485	6383	5897	5410	SE	SE	62021	62	0.1770
Gka_gr 73		62 P/9	2883_03	134_33	28º49.44'	83º32.89'	1.52	1647	6227	5842	5456	SE	SE	63321	49	0.0745

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 74		62 P/9	2883_03	134_33	28º49.80'	83º33.23'	0.92	1774	6227	5887	5547	NE	NE	60321	41	0.0373
Gka_gr 75		62 P/9	2883_03	134_33	28º50.06'	83º32.27'	1.04	2091	6227	5903	5578	NE	NE	60021	43	0.0442
Gka_gr 76		62 P/9	2883_03	134_33	28º50.27'	83º31.78'	0.22	507	6248	6050	5852	N	N	77021	22	0.0049
Gka_gr 77		62 P/9	2883_03	134_33	28º50.40'	83º31.22'	0.63	1457	6383	5988	5593	NE	NE	62311	35	0.0221
Gka_gr 78		62 P/9	2883_03	135_30	28º51.13'	83º31.91'	6.08	3295	6401	5959	5517	SE	SE	52321	80	0.4872
Gka_gr 79		62 P/9	2883_03	135_30	28º52.19'	83º31.94'	0.54	887	6248	6035	5822	S	S	77021	33	0.0178
Gka_gr 80		62 P/9	2883_03	135_30	28º51.93'	83º32.37'	0.23	824	6096	5944	5791	S	S	75022	23	0.0053
Gka_gr 81		62 P/9	2883_03	135_30	28º51.40'	83º32.59'	0.08	190	6066	6020	5974	S	S	75022	14	0.0011
Gka_gr 82		62 P/9	2883_03	135_30	28º51.81'	83º32.87'	0.27	950	6215	5988	5761	S	S	63021	25	0.0066
Gka_gr 83		62 P/9	2883_03	135_30	28º51.61'	83º33.37'	0.13	253	6200	6072	5944	SW	SW	77021	18	0.0023
Gka_gr 84		62 P/9	2883_03	135_30	28º51.33'	83º33.66'	0.35	634	6200	5996	5791	S	S	77021	28	0.0096
Gka_gr 85		62 P/9	2883_03	135_30	28º51.46'	83º33.92'	0.20	760	6200	5920	5639	E	E	77021	22	0.0043
Gka_gr 86		62 P/9	2883_03	135_30	28º51.65'	83º33.90'	0.24	824	5944	5654	5364	NE	NE	63021	23	0.0056
Gka_gr 87		62 P/9	2883_03	135_30	28º51.83'	83º33.71'	0.37	1077	6005	5746	5486	NE	NE	63021	28	0.0104
Gka_gr 88		62 P/9	2883_03	135_30	28º52.12'	83º33.26'	0.87	1774	6215	5790	5364	E	E	63021	40	0.0346
Gka_gr 89		62 P/9	2883_03	135_30	28º52.63'	83º33.42'	0.37	1014	6005	5807	5608	NE	NE	67021	28	0.0104
Gka_gr 90		62 P/9	2883_03	135_30	28º53.38'	83º33.78'	0.24	824	5852	5685	5517	N	N	67021	23	0.0056
Gka_gr 91		62 P/9	2883_03	135_30	28º53.34'	83º33.48'	0.10	444	5892	5750	5608	N	N	77021	15	0.0015
Gka_gr 92		62 P/9	2883_03	135_30	28º52.23'	83º32.69'	0.95	2408	6126	5806	5486	N	N	53011	41	0.0390
Gka_gr 93		62 P/9	2883_03	135_30	28º52.36'	83º32.31'	0.13	570	6218	6096	5974	NE	NE	77021	18	0.0023
Gka_gr 94		62 P/9	2883_03	135_30	28º52.72'	83º32.46'	0.15	190	6297	6090	5883	E	E	77021	19	0.0028
Gka_gr 95		62 P/9	2883_03	135_30	28º52.85'	83º32.30'	0.31	950	6297	5983	5669	NW	NW	77021	26	0.0081
Gka_gr 96		62 P/9	2883_03	135_30	28º52.46'	83º31.99'	0.10	253	6096	6020	5944	NW	NW	77021	15	0.0015
Gka_gr 97		62 P/9	2883_03	135_30	28º52.58'	83º31.60'	0.22	887	5944	5807	5669	NE	NE	75021	22	0.0049
Gka_gr 98		62 P/9	2883_03	135_30	28º52.83'	83º31.03'	2.39	3295	6133	5856	5578	NE	NE	63021	58	0.1381
Gka_gr 99		62 P/9	2883_03	136_34	28º54.13'	83º31.80'	0.44	1204	6120	5880	5639	E	E	63021	30	0.0133
Gka_gr 100		62 P/9	2883_03	136_35	28º58.13'	83º37.58'	0.07	253	5971	5897	5822	SE	SE	77021	13	0.0009
Gka_gr 101		62 P/9	2883_03	136_35	28º57.76'	83º37.38'	0.52	1204	6005	5776	5547	NW	NW	63021	32	0.0169
Gka_gr 102		62 P/9	2883_03	136_35	28º57.29'	83º36.77'	1.72	2598	5913	5715	5517	NW	NW	52021	51	0.0882
Gka_gr 103		62 P/9	2883_03	136_35	28º56.58'	83º36.62'	0.61	1077	5913	5715	5517	W	W	62021	35	0.0211
Gka_gr 104		62 P/9	2883_03	136_35	28º56.33'	83º36.37'	0.11	190	5944	5868	5791	NW	NW	77021	16	0.0018
Gka_gr 105		62 P/9	2883_03	136_35	28º56.19'	83º36.15'	0.31	760	6017	5767	5517	NW	NW	63021	26	0.0081
Gka_gr 106		62 P/9	2883_03	136_35	28º56.04'	83º36.43'	0.06	444	6017	5866	5715	SE	SE	77021	12	0.0007
Gka_gr 107		62 P/9	2883_03	136_35	28º56.14'	83º36.50'	0.05	317	6005	5914	5822	E	E	77021	10	0.0005
Gka_gr 108		62 P/9	2883_03	136_35	28º56.83'	83º37.27'	0.06	507	5974	5807	5639	SE	SE	77021	12	0.0007
Gka_gr 109		62 P/9	2883_03	136_35	28º57.02'	83º37.56'	0.21	507	5852	5761	5669	SE	SE	63021	22	0.0046
Gka_gr 110		62 P/9	2883_03	136_35	28º57.42'	83º37.93'	0.62	1711	5852	5685	5517	NE	NE	63021	35	0.0216
Gka_gr 111		62 P/9	2883_03	137_22	28º57.48'	83º37.50'	0.13	317	5974	5883	5791	E	E	77021	18	0.0023
Gka_gr 112		62 P/9	2883_03	137_22	28º58.27'	83º38.12'	0.55	1140	5971	5790	5608	E	E	62011	33	0.0182
Gka_gr 113		62 P/9	2883_03	137_22	28º58.58'	83º38.12'	0.03	127	5822	5792	5761	N	N	77021	7	0.0002
Gka_gr 114		62 P/9	2883_03	137_22	28º58.43'	83º37.71'	0.53	1267	5971	5744	5517	NW	NW	63011	33	0.0173
Gka_gr 115		62 P/9	2883_03	137_22	28º59.87'	83º37.09'	0.08	190	5904	5894	5883	E	E	77021	14	0.0011
Gka_gr 116		62 O/12	2983_15	137_22	29º 0.78'	83º37.09'	0.28	760	5956	5752	5547	E	E	63021	25	0.0070

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 117		62 O/12	2983_15	137_22	29º 1.05'	83º37.13'	0.09	317	5913	5837	5761	S	S	77021	15	0.0013
Gka_gr 118		62 O/12	2983_15	137_22	29º 1.17'	83º37.19'	0.10	444	5944	5853	5761	E	E	77021	15	0.0015
Gka_gr 119		62 O/12	2983_15	137_22	29º 1.38'	83º37.16'	0.29	697	5944	5792	5639	NE	NE	60021	25	0.0074
Gka_gr 120		62 O/12	2983_15	137_22	29º 2.03'	83º37.51'	1.87	2661	5974	5654	5334	S	S	62021	53	0.0989
Gka_gr 121		62 O/12	2983_15	137_21	29º 1.98'	83º37.98'	0.14	570	6096	5959	5822	S	S	77021	18	0.0025
Gka_gr 122		62 O/12	2983_15	137_21	29º 1.47'	83º38.73'	0.80	1140	6066	5670	5273	SW	SW	62021	38	0.0308
Gka_gr 123		62 O/12	2983_15	137_21	29º 0.84'	83º38.40'	0.31	760	5944	5746	5547	NW	NW	63021	26	0.0081
Gka_gr 124		62 O/12	2983_15	137_21	29º 0.43'	83º38.36'	0.52	887	5971	5744	5517	NW	NW	63021	32	0.0169
Gka_gr 125		62 O/12	2983_15	137_21	29º 0.99'	83º38.91'	0.33	1204	6005	5815	5624	S	S	53021	27	0.0089
Gka_gr 126		62 O/12	2983_15	137_21	29º 1.52'	83º39.47'	0.51	1014	6084	5854	5624	S	S	62011	32	0.0164
Gka_gr 127		62 O/12	2983_15	137_20	29º 1.57'	83º39.77'	0.08	317	6084	6014	5944	SW	SW	77021	14	0.0011
Gka_gr 128		62 O/12	2983_15	137_20	29º 0.75'	83º39.86'	0.20	380	6014	5888	5761	W	W	77021	22	0.0043
Gka_gr 129		62 O/12	2983_15	137_20	29º 0.78'	83º40.56'	1.56	1774	6066	5792	5517	S	S	52011	49	0.0772
Gka_gr 130		62 O/12	2983_15	137_20	29º 0.78'	83º40.99'	0.06	317	6066	5990	5913	SE	SE	77021	12	0.0007
Gka_gr 131		62 O/12	2983_15	137_19	29º 0.83'	83º41.38'	1.63	2408	6126	5806	5486	S	S	52011	50	0.0820
Gka_gr 132		62 O/12	2983_15	137_19	29º 1.03'	83º42.18'	2.12	2598	6364	5925	5486	S	S	52011	55	0.1173
Gka_gr 133		62 O/12	2983_15	137_19	29º 0.70'	83º42.70'	0.07	253	6035	6005	5974	NE	NE	75021	13	0.0009
Gka_gr 134		62 O/12	2983_15	137_19	29º 1.05'	83º42.76'	0.16	317	6364	6154	5944	S	S	77021	19	0.0031
Gka_gr 135		62 O/12	2983_15	137_19	29º 0.66'	83º43.47'	0.78	1394	6096	5868	5639	SW	SW	63021	38	0.0297
Gka_gr 136		62 P/9	2883_03	137_19	28º59.62'	83º43.35'	0.72	2091	5944	5715	5486	S	S	63011	37	0.0266
Gka_gr 137		62 P/9	2883_03	137_19	28º59.74'	83º44.09'	3.49	4055	6325	6089	5852	SW	SW	52011	66	0.2307
Gka_gr 138		62 P/9	2883_03	137_19	28º58.41'	83º43.97'	0.11	507	6157	5990	5822	NW	NW	77021	16	0.0018
Gka_gr 139		62 P/9	2883_03	137_19	28º58.17'	83º43.70'	0.32	950	6157	5898	5639	W	W	63021	26	0.0085
Gka_gr 140		62 P/9	2883_03	137_19	28º58.05'	83º43.40'	0.10	507	6096	5944	5791	NW	NW	77021	15	0.0015
Gka_gr 141		62 P/9	2883_03	136_39	28º57.89'	83º43.73'	0.43	1077	6187	5974	5761	SW	SW	63021	30	0.0129
Gka_gr 142		62 P/9	2883_03	136_39	28º57.40'	83º43.60'	0.56	2408	6096	5791	5486	SW	NW	53021	33	0.0187
Gka_gr 143		62 P/9	2883_03	136_39	28º57.43'	83º42.96'	0.21	444	6096	5913	5730	N	N	77021	22	0.0046
Gka_gr 144		62 P/9	2883_03	136_39	28º57.29'	83º42.89'	0.03	127	6187	6142	6096	SW	SW	77021	7	0.0002
Gka_gr 145		62 P/9	2883_03	136_39	28º57.06'	83º43.51'	0.46	1077	6169	5965	5761	W	W	63021	31	0.0142
Gka_gr 146		62 P/9	2883_03	136_39	28º56.72'	83º43.26'	0.53	1457	6157	5868	5578	NW	NW	63021	33	0.0173
Gka_gr 147		62 P/9	2883_03	136_39	28º56.57'	83º42.81'	0.07	444	5944	5868	5791	N	N	75021	13	0.0009
Gka_gr 148		62 P/9	2883_03	136_39	28º56.88'	83º43.94'	0.33	1077	6160	5869	5578	E	E	63021	27	0.0089
Gka_gr 149		62 P/9	2883_03	136_39	28º57.17'	83º43.88'	0.20	570	6160	5991	5822	E	E	63021	22	0.0043
Gka_gr 150		62 P/9	2883_03	136_39	28º57.54'	83º44.05'	0.04	253	5944	5898	5852	E	E	75021	9	0.0004
Gka_gr 151		62 P/9	2883_03	136_39	28º57.90'	83º44.51'	0.98	2724	6197	5903	5608	E	SE	53021	42	0.0407
Gka_gr 152		62 P/13	2883_04	136_40	28º57.44'	83º45.23'	0.09	253	6120	6032	5944	S	S	77021	15	0.0013
Gka_gr 153		62 P/13	2883_04	136_40	28º57.61'	83º45.18'	0.36	760	6120	5880	5639	NE	NE	77021	28	0.0100
Gka_gr 154		62 P/13	2883_04	136_40	28º58.10'	83º44.97'	0.19	507	5974	5913	5852	N	N	60021	21	0.0040
Gka_gr 155		62 P/9	2883_03	137_19	28º58.41'	83º44.33'	0.62	1331	6157	5883	5608	NE	NE	63321	35	0.0216
Gka_gr 156		62 P/9	2883_03	137_19	28º59.41'	83º44.71'	0.15	444	6142	5982	5822	S	S	77021	19	0.0028
Gka_gr 157		62 P/9	2883_03	137_19	29º 0.35'	83º44.92'	2.89	950	6142	5906	5669	NE	NE	77021	62	0.1787
Gka_gr 158		62 O/16	2983_16	137_18	29º 0.91'	83º45.61'	0.34	1190	*	*	*	SE	SE	63021	27	0.0092
Gka_gr 159		62 O/16	2983_16	137_18	29º 1.14'	83º45.70'	0.31	360	*	*	*	S	S	63021	26	0.0081

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 160		62 O/16	2983_16	137_18	29º 0.89'	83º46.43'	0.83	1180	*	*	*	SE	SE	62021	39	0.0324
Gka_gr 161		62 O/16	2983_16	137_18	29º 1.12'	83º46.70'	0.11	340	*	*	*	SE	SE	64021	16	0.0018
Gka_gr 162		62 O/16	2983_16	137_17	29º 1.29'	83º46.97'	0.03	180	*	*	*	SE	SE	75021	7	0.0002
Gka_gr 163		62 O/16	2983_16	137_17	29º 1.56'	83º47.42'	0.02	95	*	*	*	SE	SE	75021	5	0.0001
Gka_gr 164		62 O/16	2983_16	137_17	29º 1.54'	83º47.72'	0.01	90	*	*	*	S	S	75021	2	0.0000
Gka_gr 165		62 O/16	2983_16	137_17	29º 1.77'	83º47.80'	0.04	270	*	*	*	SE	SE	77021	9	0.0004
Gka_gr 166		62 O/16	2983_16	138_16	29º 2.34'	83º47.94'	0.07	585	*	*	*	SW	SW	77021	13	0.0009
Gka_gr 167		62 O/16	2983_16	138_16	29º 2.30'	83º48.26'	0.15	145	*	*	*	SW	SW	64021	19	0.0028
Gka_gr 168		62 O/16	2983_16	138_16	29º 2.68'	83º48.21'	0.37	1055	*	*	*	NE	NE	63021	28	0.0104
Gka_gr 169		62 O/16	2983_16	138_16	29º 2.28'	83º47.50'	1.00	2505	*	*	*	NE	NE	53021	42	0.0419
Gka_gr 170		62 O/16	2983_16	138_16	29º 2.76'	83º47.10'	0.03	140	*	*	*	NE	NE	77021	7	0.0002
Gka_gr 171		62 O/16	2983_16	138_16	29º 3.21'	83º47.09'	0.10	200	*	*	*	E	E	77021	15	0.0015
Gka_gr 172		62 O/16	2983_16	138_16	29º 3.26'	83º46.93'	0.27	605	*	*	*	NW	NW	67021	25	0.0066
Gka_gr 173		62 O/16	2983_16	138_17	29º 1.85'	83º46.87'	0.93	2440	*	*	*	NW	NW	53021	41	0.0379
Gka_gr 174		62 O/16	2983_16	138_17	29º 1.65'	83º46.11'	1.31	2850	*	*	*	NW	NW	53021	46	0.0608
Gka_gr 175		62 O/16	2983_16	138_17	29º 1.79'	83º45.41'	0.61	2100	*	*	*	NW	NW	53021	35	0.0211
Gka_gr 176		62 O/12	2983_15	139_19	29º 1.16'	83º44.30'	2.82	2978	6325	5906	5486	N	N	52021	61	0.1729
Gka_gr 177		62 O/12	2983_15	139_19	29º 1.44'	83º43.65'	0.94	2408	5822	5685	5547	N	N	53021	41	0.0385
Gka_gr 178		62 O/12	2983_15	139_19	29º 1.52'	83º43.17'	1.67	2661	6355	5921	5486	N	N	52021	51	0.0847
Gka_gr 179		62 O/12	2983_15	137_20	29º 1.69'	83º42.58'	0.90	2534	6364	5941	5517	N	N	53021	40	0.0362
Gka_gr 180		62 O/12	2983_15	137_20	29º 1.79'	83º41.86'	1.97	2661	6145	5816	5486	N	N	52021	54	0.1062
Gka_gr 181		62 O/12	2983_15	137_20	29º 2.19'	83º41.50'	0.05	317	5974	5868	5761	NW	NW	75022	10	0.0005
Gka_gr 182		62 O/12	2983_15	137_20	29º 2.06'	83º41.12'	0.54	1331	6145	5862	5578	S	S	53021	33	0.0178
Gka_gr 183		62 O/12	2983_15	138_20	29º 1.60'	83º40.49'	2.27	2661	6145	5801	5456	NW	NW	52521	57	0.1288
Gka_gr 184		62 O/12	2983_15	138_20	29º 2.52'	83º38.49'	10.65	5639	6136	5781	5425	SE	SE	52011	97	1.0317
Gka_gr 185		62 O/12	2983_15	138_20	29º 3.65'	83º40.88'	0.10	190	6157	6127	6096	S	S	37011	15	0.0015
Gka_gr 186		62 O/12	2983_15	138_20	29º 3.73'	83º40.90'	0.09	190	6157	6127	6096	N	N	37011	15	0.0013
Gka_gr 187		62 O/12	2983_15	138_20	29º 3.84'	83º39.62'	0.43	1204	5974	5746	5517	NE	NE	63021	30	0.0129
Gka_gr 188		62 O/12	2983_15	138_20	29º 4.20'	83º38.65'	3.76	2408	5852	5669	5486	NE	NE	60321	68	0.2551
Gka_gr 189		62 O/12	2983_15	138_20	29º 5.00'	83º38.02'	0.16	507	5791	5700	5608	NE	NE	77021	19	0.0031
Gka_gr 190		62 O/12	2983_15	138_20	29º 5.29'	83º37.82'	0.10	380	5791	5715	5639	NE	NE	75021	15	0.0015
Gka_gr 191		62 O/12	2983_15	138_20	29º 5.49'	83º37.46'	0.19	317	5822	5761	5700	NE	NE	77021	21	0.0040
Gka_gr 192		62 O/12	2983_15	138_20	29º 6.12'	83º37.89'	0.33	824	5791	5761	5730	S	S	63021	27	0.0089
Gka_gr 193		62 O/12	2983_15	139_52	29º 7.17'	83º39.49'	0.21	760	6026	5894	5761	S	S	63021	22	0.0046
Gka_gr 194		62 O/12	2983_15	139_52	29º 7.17'	83º39.86'	0.49	1140	6096	5913	5730	S	S	63021	32	0.0155
Gka_gr 195		62 O/12	2983_15	139_52	29º 6.62'	83º41.08'	2.53	2408	6066	5990	5913	SW	SW	62021	59	0.1492
Gka_gr 196		62 O/12	2983_15	139_52	29º 5.36'	83º40.96'	0.28	634	6008	5854	5700	N	N	77021	25	0.0070
Gka_gr 197		62 O/12	2983_15	139_52	29º 6.01'	83º41.13'	0.36	697	6066	5929	5791	SE	SE	77021	28	0.0100
Gka_gr 198		62 O/12	2983_15	139_52	29º 6.55'	83º41.78'	0.67	1204	5883	5685	5486	SW	SW	63021	36	0.0240
Gka_gr 199		62 O/12	2983_15	139_50	29º 5.22'	83º42.79'	0.58	1140	5852	5746	5639	NE	NE	64021	34	0.0196
Gka_gr 200		62 O/12	2983_15	139_50	29º 5.60'	83º42.51'	0.32	1077	6087	5863	5639	E	E	63021	26	0.0085
Gka_gr 201		62 O/12	2983_15	139_50	29º 5.97'	83º42.23'	0.44	1077	6187	5974	5761	NE	NE	63021	30	0.0133
Gka_gr 202		62 O/12	2983_15	139_50	29º 6.80'	83º42.42'	0.61	950	6005	5807	5608	S	S	63021	35	0.0211

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 203		62 O/12	2983_15	139_49	29º 6.01'	83º44.06'	0.14	380	6200	6057	5913	NW	NW	37021	18	0.0025
Gka_gr 204		62 O/12	2983_15	139_49	29º 5.53'	83º44.71'	1.92	2400	6200	5996	5791	SE	SE	63021	53	0.1025
Gka_gr 205		62 O/12	2983_15	139_49	29º 6.09'	83º44.43'	0.55	1394	6200	5950	5700	E	E	63021	33	0.0182
Gka_gr 206		62 O/12	2983_15	139_49	29º 6.54'	83º44.19'	0.17	253	6126	5989	5852	NE	NE	77021	20	0.0034
Gka_gr 207		62 O/12	2983_15	139_49	29º 7.61'	83º42.25'	15.23	7033	5977	5732	5486	SE	SE	52021	109	1.6620
Gka_gr 208		62 O/12	2983_15	140_42	29º 8.63'	83º43.85'	0.91	1140	5883	5853	5822	S	S	60021	40	0.0368
Gka_gr 209		62 O/12	2983_15	140_42	29º 8.29'	83º44.90'	0.35	1014	7620	6752	5883	SE	SE	63021	28	0.0096
Gka_gr 210		62 O/16	2983_16	139_48	29º 7.19'	83º46.39'	0.18	650	*	*	*	SW	SW	67021	20	0.0037
Gka_gr 211		62 O/16	2983_16	139_48	29º 8.03'	83º46.12'	3.36	2760	*	*	*	S	S	52012	65	0.2191
Gka_gr 212		62 O/16	2983_16	139_48	29º 8.48'	83º47.01'	0.27	460	*	*	*	SE	SE	60021	25	0.0066
Gka_gr 213		62 O/16	2983_16	139_48	29º 8.36'	83º47.56'	0.05	380	*	*	*	SE	SE	64021	10	0.0005
Gka_gr 214		62 O/16	2983_16	139_47	29º 7.96'	83º47.35'	0.96	660	*	*	*	NW	NW	53021	41	0.0396
Gka_gr 215		62 O/16	2983_16	139_47	29º 7.62'	83º47.99'	0.64	910	*	*	*	SE	SE	60021	35	0.0225
Gka_gr 216		62 O/16	2983_16	139_47	29º 6.94'	83º49.05'	0.07	650	*	*	*	NE	NE	63021	13	0.0009
Gka_gr 217		62 O/16	2983_16	140_45	29º 8.74'	83º47.41'	1.15	2190	*	*	*	NE	NE	53021	44	0.0508
Gka_gr 218		62 O/16	2983_16	140_45	29º 9.15'	83º47.51'	0.06	180	*	*	*	SE	SE	77021	12	0.0007
Gka_gr 219		62 O/16	2983_16	140_45	29º 9.51'	83º48.06'	0.18	400	*	*	*	SE	SE	67021	20	0.0037
Gka_gr 220		62 O/16	2983_16	140_44	29º 9.32'	83º47.36'	0.43	1220	*	*	*	N	N	63021	30	0.0129
Gka_gr 221		62 O/16	2983_16	140_44	29º 8.93'	83º46.47'	1.72	2315	*	*	*	NE	NE	63021	51	0.0882
Gka_gr 222		62 O/16	2983_16	140_44	29º10.08'	83º46.48'	0.23	725	*	*	*	NW	NW	63021	23	0.0053
Gka_gr 223		62 O/16	2983_16	140_44	29º 9.32'	83º46.11'	0.08	440	*	*	*	NW	NW	77021	14	0.0011
Gka_gr 224		62 O/12	2983_15	140_42	29º 8.97'	83º45.38'	2.50	3405	7620	6767	5913	NE	NE	52021	59	0.1468
Gka_gr 225		62 O/12	2983_15	140_42	29º 9.42'	83º44.76'	0.54	1267	6239	5985	5730	N	N	63021	33	0.0178
Gka_gr 226		62 O/12	2983_15	140_42	29º 9.14'	83º44.10'	1.05	2091	6187	5883	5578	N	N	63021	43	0.0448
Gka_gr 227		62 O/12	2983_15	140_42	29º 8.98'	83º43.82'	0.09	380	6005	5883	5761	NW	NW	77021	15	0.0013
Gka_gr 228		62 O/12	2983_15	140_42	29º 8.94'	83º43.25'	0.52	1267	6157	5883	5608	NE	NE	62021	32	0.0169
Gka_gr 229		62 O/12	2983_15	140_42	29º 9.03'	83º41.49'	2.38	887	5977	5732	5486	N	N	67321	58	0.1373
Gka_gr 230		62 O/12	2983_15	140_40	29º10.10'	83º40.05'	0.06	380	6096	5959	5822	SW	SW	77021	12	0.0007
Gka_gr 231		62 O/12	2983_15	140_40	29º10.17'	83º40.46'	0.23	634	5791	5761	5730	SW	SW	63021	23	0.0053
Gka_gr 232		62 O/12	2983_15	140_40	29º10.65'	83º41.26'	0.08	317	6096	5929	5761	NE	NE	77021	14	0.0011
Gka_gr 233		62 O/12	2983_15	140_5	29º11.04'	83º42.09'	0.58	1331	6035	5791	5547	E	E	63021	34	0.0196
Gka_gr 234		62 O/12	2983_15	140_5	29º11.36'	83º42.32'	0.10	317	6069	5885	5700	S	S	37021	15	0.0015
Gka_gr 235		62 O/12	2983_15	140_5	29º10.79'	83º43.38'	0.17	444	6066	5929	5791	SW	SW	37021	20	0.0034
Gka_gr 236		62 O/12	2983_15	140_5	29º11.13'	83º44.08'	1.48	2661	6126	5883	5639	NE	NE	63021	49	0.0718
Gka_gr 237		62 O/12	2983_15	140_5	29º11.78'	83º44.01'	0.50	1014	6200	6011	5822	NE	NE	63021	32	0.0160
Gka_gr 238		62 O/12	2983_15	140_5	29º12.14'	83º44.34'	1.08	1774	6157	5944	5730	E	E	63021	43	0.0466
Gka_gr 239		62 O/12	2983_15	216_6	29º12.52'	83º44.41'	0.22	444	6285	6130	5974	S	S	37021	22	0.0049
Gka_gr 240		62 O/12	2983_15	216_6	29º12.57'	83º45.14'	0.99	2375	6285	6115	5944	NE	NE	63021	42	0.0413
Gka_gr 241		62 O/12	2983_15	216_6	29º12.94'	83º44.98'	0.14	295	6157	6127	6096	NE	NE	63021	18	0.0025
Gka_gr 242		62 O/12	2983_15	216_6	29º12.84'	83º44.31'	1.52	2154	6285	5962	5639	NE	NE	62021	49	0.0745
Gka_gr 243		62 O/12	2983_15	216_6	29º13.17'	83º43.76'	0.32	887	6096	5761	5425	N	N	63021	26	0.0085
Gka_gr 244		62 O/12	2983_15	216_6	29º11.97'	83º43.20'	3.76	3738	6069	5778	5486	N	N	52021	68	0.2551
Gka_gr 245		62 O/12	2983_15	216_6	29º12.52'	83º42.58'	0.28	887	6163	5840	5517	N	N	63021	25	0.0070

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 246		62 O/12	2983_15	216_6	29º11.90'	83º42.10'	0.79	1331	5852	5700	5547	NW	NW	63321	38	0.0302
Gka_gr 247		62 O/12	2983_15	140_40	29º11.36'	83º40.79'	6.45	3802	6075	5842	5608	NE	NE	52011	82	0.5274
Gka_gr 248		62 O/12	2983_15	140_40	29º11.33'	83º39.82'	0.65	950	5883	5792	5700	NE	NE	70021	35	0.0230
Gka_gr 249		62 O/16	2983_16	216_9,140_45	29º15.18'	83º47.53'	0.16	675	*	*	*	SW	SW	67021	19	0.0031
Gka_gr 250		62 O/16	2983_16	216_9,140_45	29º14.35'	83º47.93'	0.13	305	*	*	*	NW	NW	67021	18	0.0023
Gka_gr 251		62 O/16	2983_16	216_9,140_45	29º13.74'	83º48.00'	0.08	205	*	*	*	SE	SE	37021	14	0.0011
Gka_gr 252		62 O/16	2983_16	216_9,140_45	29º13.67'	83º48.37'	0.20	695	*	*	*	SE	SE	63021	22	0.0043
Gka_gr 253		62 O/16	2983_16	216_9,140_45	29º13.39'	83º48.81'	0.03	210	*	*	*	E	E	37021	7	0.0002
Gka_gr 254		62 O/16	2983_16	216_9,140_45	29º12.15'	83º49.24'	0.05	170	*	*	*	E	E	75021	10	0.0005
Gka_gr 255		62 O/16	2983_16	216_9,140_45	29º12.39'	83º49.39'	0.07	270	*	*	*	SE	SE	64021	13	0.0009
Gka_gr 256		62 O/16	2983_16	216_9,140_45	29º12.35'	83º49.61'	0.07	590	*	*	*	S	S	63021	13	0.0009
Gka_gr 257		62 O/16	2983_16	140_46	29º11.42'	83º50.68'	0.11	670	*	*	*	SW	SW	63021	16	0.0018
Gka_gr 258		62 O/16	2983_16	140_46	29º11.94'	83º50.60'	0.39	525	*	*	*	S	S	60021	29	0.0112
Gka_gr 259		62 O/16	2983_16	216_10	29º12.33'	83º50.54'	0.37	1170	*	*	*	NE	NE	60021	28	0.0104
Gka_gr 260		62 O/16	2983_16	216_10	29º12.51'	83º50.29'	0.09	580	*	*	*	NE	NE	63021	15	0.0013
Gka_gr 261		62 O/16	2983_16	216_10	29º12.59'	83º49.65'	0.28	590	*	*	*	E	E	60021	25	0.0070
Gka_gr 262		62 O/16	2983_16	216_10	29º12.89'	83º49.58'	0.07	275	*	*	*	SE	SE	67021	13	0.0009
Gka_gr 263		62 O/16	2983_16	216_10	29º13.06'	83º50.13'	0.10	435	*	*	*	SE	SE	67021	15	0.0015
Gka_gr 264		62 O/16	2983_16	216_10	29º13.05'	83º51.18'	0.06	380	*	*	*	NE	NE	37021	12	0.0007
Gka_gr 265		62 O/16	2983_16	216_10	29º13.19'	83º50.04'	0.14	450	*	*	*	N	N	37021	18	0.0025
Gka_gr 266		62 O/16	2983_16	216_10	29º12.98'	83º49.39'	0.09	340	*	*	*	NE	NE	63021	15	0.0013
Gka_gr 267		62 O/16	2983_16	216_10	29º13.31'	83º49.72'	0.74	1860	*	*	*	NE	NE	53021	37	0.0276
Gka_gr 268		62 O/16	2983_16	216_10	29º13.75'	83º49.30'	0.70	610	*	*	*	SE	SE	63021	36	0.0255
Gka_gr 269		62 O/16	2983_16	216_10	29º14.01'	83º48.94'	0.68	1170	*	*	*	NE	NE	53021	36	0.0245
Gka_gr 270		62 O/16	2983_16	216_10	29º14.20'	83º48.55'	0.38	585	*	*	*	S	S	60021	28	0.0108
Gka_gr 271		62 O/16	2983_16	216_10	29º14.43'	83º48.49'	0.34	760	*	*	*	NE	NE	60021	27	0.0092
Gka_gr 272		62 O/15	2983_12	141_44	29º14.97'	83º48.24'	2.20	1805	6187	6035	5883	SW	SW	62021	56	0.1234
Gka_gr 273		62 O/15	2983_12	141_44	29º15.03'	83º49.56'	0.47	115	6230	6011	5791	S	S	63021	31	0.0146
Gka_gr 274		62 O/15	2983_12	141_44	29º15.13'	83º50.25'	0.11	253	7620	6843	6066	SW	SW	37021	16	0.0018
Gka_gr 275		62 O/15	2983_12	141_44	29º14.97'	83º50.81'	0.40	540	6122	6033	5944	S	S	63021	29	0.0116
Gka_gr 276		62 O/15	2983_12	141_44, 142_9	29º15.28'	83º50.70'	0.53	1331	6122	5804	5486	NE	NE	63311	33	0.0173
Gka_gr 277		62 O/15	2983_12	141_44, 142_9	29º15.33'	83º50.32'	0.30	950	6122	5698	5273	NE	NE	63021	26	0.0077
Gka_gr 278		62 O/15	2983_12	141_44, 142_9	29º15.48'	83º49.74'	0.30	444	6230	6026	5822	NE	NE	77021	26	0.0077
Gka_gr 279		62 O/15	2983_12	141_44, 142_9	29º16.16'	83º48.37'	4.23	1964	6261	5950	5639	S	E	62011	71	0.2990
Gka_gr 280		62 O/15	2983_12	141_44, 142_9	29º16.68'	83º49.29'	0.45	824	6261	6072	5883	S	S	62021	31	0.0137
Gka_gr 281		62 O/15	2983_12	141_44, 142_9	29º16.38'	83º51.37'	0.16	253	6331	6138	5944	S	S	37321	19	0.0031
Gka_gr 282		62 O/15	2983_12	141_44, 142_9	29º16.79'	83º52.03'	0.94	2028	6331	5939	5547	N	N	63311	41	0.0385
Gka_gr 283		62 O/15	2983_12	141_44, 142_9	29º16.75'	83º51.38'	0.57	950	6331	5970	5608	N	N	77021	34	0.0192
Gka_gr 284		62 O/15	2983_12	141_44, 142_9	29º16.48'	83º50.90'	0.63	1204	6331	5955	5578	N	N	63520	35	0.0221
Gka_gr 285		62 O/15	2983_12	141_44, 142_9	29º17.22'	83º49.79'	6.17	4055	6157	5852	5547	SE	SE	62011	81	0.4969
Gka_gr 286		62 O/15	2983_12	142_9	29º17.76'	83º50.75'	0.38	697	6096	5990	5883	S	S	60021	28	0.0108
Gka_gr 287		62 O/15	2983_12	142_9	29º17.79'	83º51.36'	0.19	824	6706	6112	5517	E	E	63021	21	0.0040
Gka_gr 288		62 O/15	2983_12	142_9	29º18.21'	83º51.74'	0.96	1584	6370	6020	5669	S	S	60021	41	0.0396

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 289		62 O/15	2983_12	142_9	29º18.45'	83º52.19'	0.46	824	6370	6111	5852	SE	SE	62021	31	0.0142
Gka_gr 290		62 O/15	2983_12	142_9	29º18.02'	83º52.92'	0.12	444	5822	5715	5608	S	S	75022	17	0.0020
Gka_gr 291		62 O/15	2983_12	142_9	29º18.73'	83º52.82'	0.34	887	6248	6050	5852	SE	SE	77321	27	0.0092
Gka_gr 292		71 D/1	2884_01	136_51	28º55.15'	84º11.93'	32.15	10328	6504	5874	5243	NE	N	51011	139	4.4814
Gka_gr 293		71 D/1	2884_01	136_51	28º55.35'	84º 9.61'	0.53	1331	7315	6614	5913	E	E	63021	33	0.0173
Gka_gr 294		71 D/1	2884_01	136_51	28º55.94'	84º10.69'	0.90	2028	6322	5965	5608	NE	NE	63021	40	0.0362
Gka_gr 295		71 D/1	2884_01	136_51	28º55.95'	84º 9.98'	2.55	4245	6456	6002	5547	NE	NE	53021	59	0.1508
Gka_gr 296		71 D/1	2884_01	136_49	28º56.47'	84º 9.66'	0.35	1077	6066	5853	5639	N	N	75021	28	0.0096
Gka_gr 297		71 D/1	2884_01	136_49	28º55.68'	84º 8.88'	2.13	3421	6453	6005	5557	N	N	53021	55	0.1181
Gka_gr 298		71 D/1	2884_01	136_49	28º56.02'	84º 8.19'	0.64	1521	6453	6122	5791	NE	NE	63021	35	0.0225
Gka_gr 299		71 D/1	2884_01	136_49	28º56.47'	84º 8.10'	0.31	444	8230	7178	6126	SE	SE	37321	26	0.0081
Gka_gr 300		71 D/1	2884_01	136_49	28º56.88'	84º 8.40'	1.16	2154	8230	6874	5517	NE	NE	53021	44	0.0514
Gka_gr 301		71 D/1	2884_01	136_49	28º57.23'	84º 7.89'	0.87	1711	6154	5866	5578	NE	NE	53021	40	0.0346
Gka_gr 302		71 D/1	2884_01	136_49	28º57.68'	84º 7.51'	0.90	1394	7315	6462	5608	NE	NE	60321	40	0.0362
Gka_gr 303		71 D/1	2884_01	136_49	28º57.59'	84º 7.08'	0.55	1014	7315	6523	5730	N	N	60021	33	0.0182
Gka_gr 304		71 D/1	2884_01	136_49	28º58.20'	84º 7.03'	0.06	444	5456	5319	5182	N	N	75021	12	0.0007
Gka_gr 305		71 D/1	2884_01	136_49	28º57.31'	84º 7.11'	0.31	824	7315	6416	5517	SW	SW	77321	26	0.0081
Gka_gr 306		71 D/1	2884_01	136_49	28º56.68'	84º 7.80'	0.87	1521	7315	6431	5547	W	W	63021	40	0.0346
Gka_gr 307		71 D/1	2884_01	136_49	28º55.49'	84º 7.48'	3.81	3992	6401	5898	5395	NW	NW	52011	68	0.2597
Gka_gr 308		71 D/1	2884_01	136_49	28º56.23'	84º 7.00'	0.06	380	5791	5685	5578	NW	NW	75022	12	0.0007
Gka_gr 309		71 D/1	2884_01	136_49	28º55.86'	84º 6.33'	1.82	2028	7315	6325	5334	N	N	63321	52	0.0953
Gka_gr 310		71 D/1	2884_01	136_48	28º56.13'	84º 5.38'	0.47	697	5852	5746	5639	N	N	60321	31	0.0146
Gka_gr 311		71 D/1	2884_01	136_48	28º56.59'	84º 4.91'	0.11	444	5883	5761	5639	N	N	77021	16	0.0018
Gka_gr 312		71 D/1	2884_01	136_48	28º56.37'	84º 4.61'	0.85	2281	5913	5563	5212	NW	NW	52021	39	0.0335
Gka_gr 313		71 D/1	2884_01	136_48	28º56.39'	84º 4.17'	0.07	444	5517	5395	5273	NW	NW	75022	13	0.0009
Gka_gr 314		71 D/1	2884_01	136_48	28º55.87'	84º 5.33'	0.56	1077	6401	6020	5639	SW	SW	63021	33	0.0187
Gka_gr 315		71 D/1	2884_01	136_48	28º55.54'	84º 5.85'	0.72	1837	7315	6401	5486	SW	SW	63021	37	0.0266
Gka_gr 316		71 D/1	2884_01	135_6	28º54.98'	84º 6.43'	3.21	3548	6413	5980	5547	NW	NW	62011	64	0.2060
Gka_gr 317		71 D/1	2884_01	135_6	28º54.82'	84º 5.00'	0.87	1711	5944	5715	5486	NW	NW	60321	40	0.0346
Gka_gr 318		71 D/1	2884_01	135_6	28º54.52'	84º 5.59'	0.04	190	5962	5907	5852	SW	SW	75022	9	0.0004
Gka_gr 319		71 D/1	2884_01	135_6	28º53.93'	84º 4.96'	7.13	5702	6251	5776	5300	NW	NW	51011	85	0.6032
Gka_gr 320		71 D/1	2884_01	135_6	28º53.43'	84º 4.13'	1.00	1521	6334	5880	5425	N	N	63021	42	0.0419
Gka_gr 321		71 D/1	2884_01	135_17	28º53.69'	84º 3.64'	0.63	1394	6096	5776	5456	N	N	63321	35	0.0221
Gka_gr 322		71 D/1	2884_01	135_17	28º53.43'	84º 3.54'	0.22	507	6096	5852	5608	W	W	77321	22	0.0049
Gka_gr 323		71 D/1	2884_01	135_17	28º52.40'	84º 4.87'	2.38	253	6294	5784	5273	W	W	62011	58	0.1373
Gka_gr 324		71 D/1	2884_01	135_17	28º52.10'	84º 4.18'	0.40	887	6294	5814	5334	NW	NW	77321	29	0.0116
Gka_gr 325		71 D/1	2884_01	135_17	28º51.86'	84º 4.27'	0.16	634	6294	6073	5852	SW	SW	77021	19	0.0031
Gka_gr 326		71 D/1	2884_01	134_48	28º51.58'	84º 4.53'	0.67	2028	6294	5921	5547	SW	SW	63521	36	0.0240
Gka_gr 327		71 D/1	2884_01	134_48	28º50.84'	84º 4.20'	3.75	4689	6206	5755	5304	SW	NW	62011	68	0.2542
Gka_gr 328		71 D/1	2884_01	134_48	28º49.57'	84º 2.80'	0.07	380	5639	5578	5517	NW	NW	77021	13	0.0009
Gka_gr 329		71 D/1	2884_01	134_48	28º49.12'	84º 2.57'	0.10	444	5669	5593	5517	NW	NW	75022	15	0.0015
Gka_gr 330		71 D/1	2884_01	134_48	28º48.90'	84º 1.69'	2.70	3548	6465	5885	5304	NE	NE	62011	60	0.1630
Gka_gr 331		71 D/1	2884_01	134_48	28º49.62'	84º 1.54'	0.39	950	5913	5807	5700	N	N	63321	29	0.0112

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 332		71 D/1	2884_01	134_48	28º50.02'	84º 1.23'	0.07	380	5608	5547	5486	N	N	75022	13	0.0009
Gka_gr 333		71 D/1	2884_01	134_48	28º49.26'	84º 0.90'	0.91	1331	6334	5789	5243	NW	NW	60321	40	0.0368
Gka_gr 334		71 D/1	2884_01	134_48	28º49.01'	84º 0.15'	3.27	2851	6465	5824	5182	NW	NW	62021	65	0.2112
Gka_gr 335		71 D/1	2884_01	135_18	28º51.41'	83º59.99'	0.10	325	5791	5715	5639	Open	Open	37021	15	0.0015
Gka_gr 336		71 D/1	2884_01	135_18	28º51.73'	84º 0.06'	0.11	380	5813	5726	5639	Open	Open	37021	16	0.0018
Gka_gr 337		62 P/13	2883_04	135_18	28º52.77'	83º59.11'	0.09	570	5761	5624	5486	N	N	75021	15	0.0013
Gka_gr 338		62 P/13	2883_04	134_46	28º49.13'	83º59.41'	0.38	824	6120	5849	5578	E	E	60321	28	0.0108
Gka_gr 339		62 P/13	2883_04	134_46	28º49.96'	83º59.40'	0.61	1457	6157	5929	5700	N	N	63321	35	0.0211
Gka_gr 340		62 P/13	2883_04	134_46	28º50.19'	83º58.54'	2.12	1964	6157	5868	5578	N	N	62021	55	0.1173
Gka_gr 341		62 P/13	2883_04	134_46	28º50.31'	83º57.88'	0.39	887	6157	5944	5730	N	N	63021	29	0.0112
Gka_gr 342		62 P/13	2883_04	134_46	28º50.29'	83º57.51'	0.33	1077	6157	5959	5761	NE	NE	63021	27	0.0089
Gka_gr 343		62 P/13	2883_04	134_46	28º50.23'	83º56.92'	1.49	1331	6005	5822	5639	NW	NW	60321	49	0.0725
Gka_gr 344		62 P/13	2883_04	134_46	28º48.73'	83º56.33'	0.17	507	6482	6213	5944	SW	SW	77021	20	0.0034
Gka_gr 345		62 P/13	2883_04	134_46	28º48.36'	83º56.54'	0.19	634	6482	6274	6066	SW	SW	63021	21	0.0040
Gka_gr 346		62 P/13	2883_04	167_19	28º47.07'	83º56.08'	0.69	1331	6157	5807	5456	NE	NE	60321	36	0.0250
Gka_gr 347		62 P/13	2883_04	167_19	28º47.01'	83º55.54'	0.67	1647	6157	5700	5243	N	N	63021	36	0.0240
Gka_gr 348		62 P/13	2883_04	167_19	28º46.96'	83º55.14'	0.96	1647	6484	6062	5639	N	N	60321	41	0.0396
Gka_gr 349		62 P/13	2883_04	167_19	28º46.47'	83º54.05'	0.15	570	5669	5532	5395	N	N	77021	19	0.0028
Gka_gr 350		62 P/14	2883_08	167_20	28º44.66'	83º53.46'	0.39	634	6048	5874	5700	NW	NW	77321	29	0.0112
Gka_gr 351		62 P/14	2883_08	167_20	28º44.39'	83º52.97'	0.18	634	5883	5731	5578	NW	NW	77321	20	0.0037
Gka_gr 352		62 P/14	2883_08	167_20	28º44.23'	83º52.75'	0.19	570	5883	5715	5547	NW	NW	77021	21	0.0040
Gka_gr 353		62 P/14	2883_08	167_20	28º43.52'	83º51.83'	0.38	507	5974	5944	5913	N	N	77021	28	0.0108
Gka_gr 354		62 P/14	2883_08	166_22	28º41.83'	83º48.26'	2.86	3485	6096	5593	5090	NE	NE	60321	62	0.1762
Gka_gr 355		62 P/14	2883_08	166_22	28º42.05'	83º47.86'	0.02	190	5700	5639	5578	NE	NE	75022	5	0.0001
Gka_gr 356		62 P/14	2883_08	166_21	28º42.21'	83º47.73'	0.30	1774	5974	5357	4740	N	N	75022	26	0.0077
Gka_gr 357		62 P/14	2883_08	166_21	28º41.67'	83º47.38'	0.35	697	7102	6264	5425	N	N	60321	28	0.0096
Gka_gr 358		62 P/14	2883_08	166_21	28º41.42'	83º45.61'	1.61	507	6279	5883	5486	N	N	60321	50	0.0806
Gka_gr 359		62 P/14	2883_08	166_21	28º42.44'	83º46.50'	1.06	1457	4877	4557	4237	NW	NW	62022	43	0.0454
Gka_gr 360		62 P/14	2883_08	166_21	28º42.73'	83º45.61'	0.40	887	4511	4252	3993	N	N	60022	29	0.0116
Gka_gr 361		62 P/14	2883_08	166_21	28º42.08'	83º45.08'	0.51	697	5791	5106	4420	NE	NE	60021	32	0.0164
Gka_gr 362		62 P/10	2883_07	166_21	28º42.10'	83º44.71'	0.03	190	5791	5563	5334	NE	NE	75022	7	0.0002
Gka_gr 363		62 P/10	2883_07	166_21	28º42.15'	83º44.15'	0.71	2851	6858	5487	4115	Open	Open	37021	37	0.0261
Gka_gr 364		62 P/10	2883_07	166_21	28º41.44'	83º42.80'	1.85	3421	7061	5695	4328	W	W	62011	53	0.0974
Gka_gr 365		62 P/10	2883_07	166_21	28º40.98'	83º43.40'	0.17	634	5791	5639	5486	W	W	77022	20	0.0034
Gka_gr 366		62 P/10	2883_07	165_4	28º40.63'	83º43.16'	0.97	570	5334	5029	4724	SW	SW	60021	41	0.0402
Gka_gr 367		62 P/10	2883_07	165_4	28º40.44'	83º44.15'	0.56	1584	6940	6488	6035	W	W	67321	33	0.0187
Gka_gr 368		62 P/10	2883_07	165_4	28º40.12'	83º43.40'	0.16	1077	6005	5837	5669	SW	SW	77021	19	0.0031
Gka_gr 369		62 P/10	2883_07	165_4	28º39.70'	83º43.58'	0.07	570	5822	5502	5182	NW	NW	75021	13	0.0009
Gka_gr 370		62 P/10	2883_07	165_4	28º39.30'	83º43.77'	0.39	410	6839	6422	6005	NW	NW	37021	29	0.0112
Gka_gr 371		62 P/10	2883_07	165_4	28º38.56'	83º42.48'	0.04	444	6839	6163	5486	Open	Open	37021	9	0.0004
Gka_gr 372		62 P/14	2883_08	166_21	28º38.75'	83º43.09'	0.37	190	5974	5806	5639	SE	SE	37021	28	0.0104
Gka_gr 373		62 P/14	2883_08	166_21	28º39.86'	83º45.40'	11.77	5069	6645	5487	4328	SE	SE	51021	100	1.1790
Gka_gr 374		62 P/14	2883_08	166_21	28º38.59'	83º45.41'	0.38	570	5639	5563	5486	SE	SE	37321	28	0.0108

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Gka_gr 375		62 P/14	2883_08	166_21	28º41.40'	83º47.15'	0.17	634	7102	6691	6279	SW	SW	77021	20	0.0034
Gka_gr 376		62 P/14	2883_08	166_21	28º40.19'	83º46.88'	0.71	1901	5517	4892	4267	SW	SW	63022	37	0.0261
Gka_gr 377		62 P/14	2883_08	166_21	28º41.09'	83º47.67'	1.06	950	6401	6020	5639	SW	SW	60321	43	0.0454
Gka_gr 378		62 P/14	2883_08	166_22	28º40.50'	83º48.25'	2.88	3992	7134	5701	4267	SW	SW	60511	62	0.1779
Gka_gr 379		62 P/14	2883_08	166_22	28º39.49'	83º47.68'	0.04	253	4572	4496	4420	SW	SW	75022	9	0.0004
Gka_gr 380		62 P/14	2883_08	166_22	28º39.26'	83º48.26'	0.08	253	5151	5090	5029	S	S	75022	14	0.0011
Gka_gr 381		62 P/14	2883_08	166_22	28º40.13'	83º49.21'	3.33	2598	7102	6066	5029	SW	SW	60321	65	0.2165
Gka_gr 382		62 P/14	2883_08	166_22	28º39.40'	83º49.58'	0.18	190	5090	5060	5029	SW	SW	77022	20	0.0037
Gka_gr 383		62 P/14	2883_08	166_22	28º39.35'	83º50.00'	0.35	634	5669	5471	5273	SW	SW	77022	28	0.0096
Gka_gr 384		62 P/14	2883_08	164_62, 165_	28º38.29'	83º50.14'	22.69	8680	8091	6164	4237	NW	NW	52021	124	2.8233
Gka_gr 385		62 P/14	2883_08	164_61	28º37.28'	83º48.83'	0.36	380	6364	5849	5334	SW	SW	37021	28	0.0100
Gka_gr 386		62 P/14	2883_08	164_61	28º37.00'	83º48.50'	2.31	2661	5913	5106	4298	NW	NW	60021	57	0.1319
Gka_gr 387		62 P/14	2883_08	164_61	28º35.95'	83º48.90'	0.06	887	7620	6630	5639	NW	NW	75021	12	0.0007
Gka_gr 388		62 P/14	2883_08	164_61	28º36.58'	83º47.96'	0.73	507	6005	5746	5486	NW	NW	37021	37	0.0271
Gka_gr 389		62 P/14	2883_08	164_61	28º35.98'	83º48.01'	0.29	887	6187	5852	5517	W	W	77021	25	0.0074
Gka_gr 390		62 P/14	2883_08	164_61	28º35.86'	83º47.33'	1.77	887	5364	5121	4877	NW	NW	60021	52	0.0917
Gka_gr 391		62 P/14	2883_08	164_61	28º35.19'	83º47.47'	3.06	1711	7647	6567	5486	NW	NW	60051	63	0.1931
Gka_gr 392		62 P/14	2883_08	164_61	28º34.77'	83º46.26'	0.48	190	7647	6643	5639	S	S	37021	31	0.0151
Gka_gr 393		62 P/14	2883_08	164_61	28º34.46'	83º47.33'	0.24	570	6279	6005	5730	SW	SW	75022	23	0.0056
Gka_gr 394		62 P/14	2883_08	164_61	28º34.37'	83º47.85'	0.25	507	6553	6451	6349	SW	SW	75022	24	0.0059
Gka_gr 395		62 P/14	2883_08	163_38	28º32.35'	83º48.88'	8.60	2500	6721	6104	5486	W	W	60021	90	0.7753
Gka_gr 396		62 P/14	2883_08	163_38	28º33.11'	83º47.80'	0.22	2915	5791	5487	5182	NE	NE	67021	22	0.0049
Gka_gr 397		62 P/14	2883_08	163_38	28º31.47'	83º47.77'	0.99	380	6096	5558	5020	NW	NW	67021	42	0.0413
Gka_gr 398		62 P/14	2883_08	163_38	28º30.53'	83º47.33'	0.84	570	5791	5305	4819	NW	NW	67021	39	0.0329
Gka_gr 399		62 P/15	2883_12	163_38	28º29.51'	83º46.77'	0.39	1267	5334	5197	5060	SW	SW	64321	29	0.0112

Glacier Inventory of Mugu Basin

Total Number : 254 Total Area : 220.39 (km^2) Ice Reserve : 12.52 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kmu_gr 1		62K/2	2982_05	148_23	29º40.82'	82º14.69'	0.21	760	5182	5105	5029	E	E	75022	22	0.0046
Kmu_gr 2		62K/2	2982_05	148_23	29º41.14'	82º14.85'	0.16	630	5273	5136	4999	NE	NE	63022	19	0.0031
Kmu_gr 3		62K/2	2982_05	148_23	29º41.07'	82º14.42'	0.93	1390	5273	5029	4785	NE	NE	62022	41	0.0379
Kmu_gr 4		62K/6	2982_06	148_23	29º41.96'	82º15.75'	0.31	630	5711	5142	4572	S	S	67021	26	0.0081
Kmu_gr 5		62K/6	2982_06	148_22	29º42.23'	82º18.64'	0.54	500	5182	5090	4999	SE	SE	60021	33	0.0178
Kmu_gr 6		62K/6	2982_06	148_22	29º42.62'	82º21.11'	0.19	500	5331	5211	5090	SW	SW	37321	21	0.0040
Kmu_gr 7		62K/6	2982_06	148_19	29º41.92'	82º22.53'	0.17	500	5029	4983	4938	S	S	60021	20	0.0034
Kmu_gr 8		62K/6	2982_06	148_19	29º41.74'	82º23.32'	0.15	190	5395	5304	5212	W	W	37021	19	0.0028
Kmu_gr 9		62K/6	2982_06	148_19	29º41.65'	82º23.85'	0.02	190	5806	5616	5425	SW	SW	37021	5	0.0001
Kmu_gr 10		62K/6	2982_06	148_19	29º41.47'	82º23.44'	0.28	990	5624	5418	5212	SW	SW	75021	25	0.0070
Kmu_gr 11		62K/6	2982_06	147_25	29º41.18'	82º23.88'	0.84	1070	5598	5222	4846	SW	SW	60021	39	0.0329
Kmu_gr 12		62K/6	2982_06	147_25	29º40.04'	82º23.70'	0.25	1070	5441	5159	4877	SW	SW	67021	24	0.0059
Kmu_gr 13		62K/6	2982_06	147_25	29º39.80'	82º24.07'	0.58	1450	5441	5159	4877	SE	SE	63021	34	0.0196
Kmu_gr 14		62K/6	2982_06	147_25	29º40.43'	82º24.50'	1.10	1450	5441	5189	4938	SE	SE	60021	43	0.0478
Kmu_gr 15		62K/6	2982_06	147_25	29º41.16'	82º24.46'	1.25	1970	5598	5161	4724	SE	SE	62021	46	0.0570
Kmu_gr 16		62K/6	2982_06	148_18	29º42.01'	82º24.30'	1.31	1900	5669	5441	5212	NE	NE	62021	46	0.0608
Kmu_gr 17		62K/6	2982_06	148_18	29º42.71'	82º24.86'	0.69	1520	5913	5395	4877	SW	SW	67321	36	0.0250
Kmu_gr 18		62K/6	2982_06	148_18	29º43.48'	82º25.55'	0.14	440	4877	4740	4602	NE	NE	75022	18	0.0025
Kmu_gr 19		62K/6	2982_06	149_49	29º43.61'	82º25.13'	0.13	315	5486	5182	4877	NE	NE	75022	18	0.0023
Kmu_gr 20		62K/6	2982_06	149_49	29º44.35'	82º24.89'	0.07	440	5212	5121	5029	NE	NE	75022	13	0.0009
Kmu_gr 21		62K/6	2982_06	149_49	29º44.83'	82º24.87'	0.20	500	5304	5273	5243	NE	NE	64022	22	0.0043
Kmu_gr 22		62K/5	2982_02	149_49	29º45.94'	82º24.67'	0.88	880	5560	5371	5182	S	S	60021	40	0.0351
Kmu_gr 23		62K/5	2982_02	149_50	29º48.06'	82º25.00'	2.55	2025	5456	5212	4968	SE	SE	62021	59	0.1508
Kmu_gr 24		62K/5	2982_02	149_50	29º48.38'	82º25.87'	0.33	820	5212	5197	5182	E	E	75022	27	0.0089
Kmu_gr 25		62K/5	2982_02	149_50	29º47.17'	82º27.12'	0.23	630	5547	5425	5304	NW	NW	63021	23	0.0053
Kmu_gr 26		62K/5	2982_02	149_50	29º47.08'	82º26.79'	0.13	500	5273	5044	4816	N	N	75022	18	0.0023
Kmu_gr 27		62K/5	2982_02	149_50	29º47.03'	82º27.44'	0.40	820	4968	4938	4907	SW	SW	62021	29	0.0116
Kmu_gr 28		62K/5	2982_02	149_50	29º47.48'	82º27.63'	0.43	990	4999	4938	4877	NE	NE	62021	30	0.0129
Kmu_gr 29		62K/5	2982_02	149_50	29º49.03'	82º26.80'	1.29	1450	5608	5441	5273	E	E	60321	46	0.0595
Kmu_gr 30		62K/5	2982_02	150_13	29º50.31'	82º26.29'	0.36	820	5212	5166	5121	NE	NE	63021	28	0.0100

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 31		62K/5	2982_02	150_13	29º51.41'	82º27.49'	0.31	450	5182	5136	5090	SW	SW	64022	26	0.0112
Kmu_gr 32		62K/5	2982_02	151_23	29º53.36'	82º27.72'	0.93	1900	5212	5121	5029	NE	NE	63021	41	0.0379
Kmu_gr 33		62K/5	2982_02	151_23	29º53.23'	82º27.20'	0.08	440	5334	5105	4877	NE	NE	75021	14	0.0011
Kmu_gr 34		62K/9	2982_03	152_22	29º56.11'	82º30.69'	1.52	1260	5855	5335	4816	SW	SW	62021	49	0.0745
Kmu_gr 35		62K/9	2982_03	152_22	29º55.54'	82º31.15'	0.77	990	5855	5594	5334	SW	SW	60321	38	0.0292
Kmu_gr 36		62K/9	2982_03	152_22	29º56.50'	82º31.04'	0.52	990	5334	5227	5121	NE	NE	63021	32	0.0169
Kmu_gr 37		62K/9	2982_03	152_22	29º57.50'	82º31.18'	0.19	630	5639	5517	5395	S	S	63021	21	0.0040
Kmu_gr 38		62K/9	2982_03	152_23	29º56.93'	82º33.65'	0.35	630	5334	5273	5212	W	W	60021	28	0.0096
Kmu_gr 39		62K/9	2982_03	214_25	29º53.45'	82º36.14'	0.05	315	5486	5395	5304	SW	SW	75021	10	0.0005
Kmu_gr 40		62K/9	2982_03	214_25	29º53.08'	82º36.44'	0.20	190	5639	5593	5547	SE	SE	77021	22	0.0043
Kmu_gr 41		62K/9	2982_03	151_27	29º51.76'	82º37.07'	4.79	4745	6096	5395	4694	NW	SW	52021	74	0.3536
Kmu_gr 42		62K/9	2982_03	151_27	29º51.62'	82º37.88'	0.15	440	5944	5776	5608	NW	NW	67051	19	0.0028
Kmu_gr 43		62K/9	2982_03	151_27	29º49.75'	82º36.26'	1.89	3350	5029	4663	4298	W	W	53012	53	0.1003
Kmu_gr 44		62K/9	2982_03	150_7	29º48.61'	82º38.30'	5.90	6330	6096	5486	4877	S	SE	52021	79	0.4679
Kmu_gr 45		62K/9	2982_03	150_7	29º49.43'	82º38.82'	0.44	500	5852	5563	5273	SW	SW	67021	30	0.0133
Kmu_gr 46		62K/9	2982_03	150_7	29º49.02'	82º39.73'	3.25	3800	6248	5471	4694	S	S	52021	64	0.2095
Kmu_gr 47		62K/9	2982_03	150_6	29º49.78'	82º40.45'	3.11	3800	6248	5745	5243	SE	SE	52021	63	0.1974
Kmu_gr 48		62K/9	2982_03	150_6	29º50.19'	82º40.86'	0.11	360	5852	5425	4999	SW	SW	77021	16	0.0018
Kmu_gr 49		62K/9	2982_03	150_5	29º50.31'	82º41.58'	4.30	3500	5944	5410	4877	SE	SE	52021	71	0.3057
Kmu_gr 50		62K/9	2982_03	150_5	29º49.45'	82º43.11'	6.12	3800	5883	5441	4999	SE	SE	52021	80	0.4915
Kmu_gr 51		62K/9	2982_03	150_5	29º48.26'	82º42.43'	1.87	2215	6096	5639	5182	NW	NW	63021	53	0.0989
Kmu_gr 52		62K/9	2982_03	150_5	29º48.01'	82º42.05'	0.47	1450	6096	5639	5182	NW	NW	63021	31	0.0146
Kmu_gr 53		62K/9	2982_03	150_5	29º47.84'	82º41.73'	0.45	1260	6069	5579	5090	NW	NW	53021	31	0.0137
Kmu_gr 54		62K/9	2982_03	149_56	29º47.28'	82º41.08'	3.95	3160	6279	5380	4481	NW	NW	63321	69	0.2727
Kmu_gr 55		62K/9	2982_03	149_56	29º46.10'	82º39.87'	0.10	860	5578	5410	5243	NE	NE	75021	15	0.0015
Kmu_gr 56		62K/9	2982_03	149_56	29º46.92'	82º39.59'	0.36	1140	4907	4816	4724	NW	NW	75022	28	0.0100
Kmu_gr 57		62K/9	2982_03	149_56	29º46.43'	82º39.21'	0.70	1900	5151	4968	4785	NW	NW	75022	36	0.0255
Kmu_gr 58		62K/9	2982_03	149_56	29º45.96'	82º37.87'	1.07	1900	4968	4801	4633	N	N	75022	43	0.0460
Kmu_gr 59		62K/10	2982_07	149_56	29º44.76'	82º37.60'	0.81	1010	5517	5349	5182	SW	SW	60321	39	0.0313
Kmu_gr 60		62K/10	2982_07	147_20	29º38.79'	82º37.16'	1.25	630	5547	5288	5029	NW	NW	60321	46	0.0570
Kmu_gr 61		62K/10	2982_07	147_19	29º36.94'	82º33.93'	0.26	990	5791	5486	5182	S	S	63021	24	0.0063
Kmu_gr 62		62K/10	2982_07	147_19	29º36.65'	82º34.78'	0.57	1580	5639	5349	5060	SE	SE	62021	34	0.0192
Kmu_gr 63		62K/10	2982_07	147_19	29º37.32'	82º34.84'	0.24	760	5456	5319	5182	SE	SE	63021	23	0.0056
Kmu_gr 64		62K/10	2982_07	147_19	29º38.40'	82º35.91'	0.06	315	5639	5471	5304	SW	SW	77021	12	0.0007
Kmu_gr 65		62K/10	2982_07	147_20	29º38.19'	82º36.66'	0.14	500	5334	5273	5212	SE	SE	75022	18	0.0025
Kmu_gr 66		62K/10	2982_07	147_20	29º38.51'	82º37.56'	0.29	760	5852	5745	5639	SE	SE	63021	25	0.0074
Kmu_gr 67		62K/10	2982_07	147_20	29º38.83'	82º38.24'	1.66	1900	5639	5380	5121	SE	SE	62321	51	0.0840
Kmu_gr 68		62K/10	2982_07	147_20	29º39.64'	82º38.35'	0.66	760	5486	5349	5212	SE	SE	60021	36	0.0235
Kmu_gr 69		62K/10	2982_07	149_54	29º43.96'	82º37.74'	0.19	570	5334	5212	5090	SW	SW	63021	21	0.0040
Kmu_gr 70		62K/10	2982_07	149_54	29º44.38'	82º38.00'	0.96	1900	5700	5471	5243	SE	SE	63021	41	0.0396
Kmu_gr 71		62K/10	2982_07	149_56	29º44.93'	82º38.21'	1.00	1770	5517	5349	5182	SE	SE	63021	42	0.0419
Kmu_gr 72		62K/9	2982_03	149_56	29º45.55'	82º39.53'	0.03	190	5791	5654	5517	SW	SW	75022	7	0.0002
Kmu_gr 73		62K/9	2982_03	149_56	29º45.49'	82º39.92'	0.38	1260	5608	5486	5364	S	S	63021	28	0.0108

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 74		62K/10	2982_07	149_57	29º45.67'	82º40.65'	4.33	5375	5944	5486	5029	S	S	52021	71	0.3086
Kmu_gr 75		62K/10	2982_07	149_57	29º45.40'	82º41.24'	0.92	2530	6248	5745	5243	SW	SW	63321	41	0.0373
Kmu_gr 76		62K/10	2982_07	149_57	29º44.27'	82º41.74'	0.29	1260	5669	5486	5304	SW	SW	63022	25	0.0074
Kmu_gr 77		62K/10	2982_07	149_57	29º43.72'	82º41.70'	0.21	820	5578	5456	5334	SE	SE	64022	22	0.0046
Kmu_gr 78		62K/10	2982_07	149_57	29º45.01'	82º42.16'	1.05	2530	5791	5486	5182	SE	SE	53011	43	0.0448
Kmu_gr 79		62K/10	2982_07	149_58	29º45.26'	82º43.00'	2.38	3150	5700	5380	5060	SE	SE	52011	58	0.1373
Kmu_gr 80		62K/10	2982_07	149_58	29º45.67'	82º43.51'	0.12	250	6218	6157	6096	SW	SW	37021	17	0.0020
Kmu_gr 81		62K/09	2982_03	148_9	29º44.81'	82º44.84'	7.14	5060	6218	5563	4907	S	SW	52011	85	0.6043
Kmu_gr 82		62K/14	2982_08	148_9	29º42.70'	82º44.96'	0.61	1260	5243	5166	5090	SW	SW	64022	35	0.0211
Kmu_gr 83		62K/14	2982_08	148_9	29º42.98'	82º45.53'	0.07	380	5334	5288	5243	NW	NW	75021	13	0.0009
Kmu_gr 84		62K/14	2982_08	148_9	29º42.77'	82º46.71'	3.72	4430	5517	5029	4542	SE	SW	52011	68	0.2515
Kmu_gr 85		62K/14	2982_08	148_8	29º41.88'	82º48.22'	6.03	6960	6248	5486	4724	SW	SW	52011	80	0.4818
Kmu_gr 86		62K/14	2982_08	148_8	29º40.98'	82º49.50'	2.05	2530	6255	5718	5182	SW	SW	60021	55	0.1121
Kmu_gr 87		62K/14	2982_08	147_15	29º38.44'	82º47.82'	0.89	1580	5779	5511	5243	SW	SW	63021	40	0.0357
Kmu_gr 88		62K/14	2982_08	147_15	29º36.96'	82º46.07'	0.33	630	5822	5578	5334	N	N	67021	27	0.0089
Kmu_gr 89		62K/14	2982_08	147_15	29º36.58'	82º45.65'	0.13	440	5904	5665	5425	NW	NW	67021	18	0.0023
Kmu_gr 90		62K/14	2982_08	147_15	29º38.19'	82º48.25'	0.18	440	5779	5343	4907	S	S	75021	20	0.0037
Kmu_gr 91		62K/14	2982_08	148_6	29º40.89'	82º50.17'	1.12	1900	6255	5764	5273	S	S	60321	44	0.0490
Kmu_gr 92		62K/14	2982_08	148_6	29º41.21'	82º50.94'	0.46	990	6248	5898	5547	S	S	60321	31	0.0142
Kmu_gr 93		62K/14	2982_08	148_6	29º39.10'	82º52.01'	0.10	500	5639	5547	5456	NW	NW	75021	15	0.0015
Kmu_gr 94		62K/14	2982_08	148_6	29º40.38'	82º51.95'	2.61	3160	6440	5781	5121	SE	SE	52321	60	0.1556
Kmu_gr 95		62K/14	2982_08	148_6	29º40.86'	82º52.37'	0.14	630	6126	5944	5761	S	S	75021	18	0.0025
Kmu_gr 96		62K/14	2982_08	148_54	29º40.47'	82º54.07'	5.09	4430	5639	5319	4999	SE	SE	52021	75	0.3837
Kmu_gr 97		62K/14	2982_08	148_54	29º41.95'	82º55.22'	1.26	1900	6248	5867	5486	SE	SE	60021	46	0.0576
Kmu_gr 98		62K/14	2982_08	148_54	29º40.17'	82º56.39'	0.20	630	6187	5974	5761	S	S	67021	22	0.0043
Kmu_gr 99		62K/14	2982_08	214_40	29º39.56'	82º56.38'	0.87	1900	6206	5770	5334	NW	NW	62011	40	0.0357
Kmu_gr 100		62K/14	2982_08	214_40	29º38.71'	82º55.05'	0.63	2230	5486	5227	4968	W	W	63021	35	0.0221
Kmu_gr 101		62K/14	2982_08	214_40	29º39.05'	82º55.88'	0.22	630	6066	5852	5639	SW	SW	64322	22	0.0049
Kmu_gr 102		62K/14	2982_08	214_40	29º38.99'	82º56.46'	0.29	990	6187	5761	5334	S	S	62021	25	0.0070
Kmu_gr 103		62K/14	2982_08	214_40	29º39.96'	82º56.75'	0.25	1070	6096	5867	5639	SE	SE	62021	24	0.0059
Kmu_gr 104		62O/02	2983_05	214_41	29º40.12'	83º 0.55'	0.34	630	6126	5867	5608	S	S	67021	27	0.0092
Kmu_gr 105		62O/02	2983_05	147_8	29º35.69'	83º 3.39'	0.43	990	5742	5523	5304	N	N	60021	30	0.0129
Kmu_gr 106		62O/07	2983_10	143_32	29º21.71'	83º23.26'	0.20	630	5849	5607	5364	NW	NW	67011	22	0.0043
Kmu_gr 107		62O/07	2983_10	143_32	29º21.76'	83º24.90'	0.17	630	5761	5608	5456	NW	NW	63011	20	0.0034
Kmu_gr 108		62O/07	2983_10	143_32	29º20.32'	83º26.47'	0.33	820	5866	5722	5578	NW	NW	64021	27	0.0089
Kmu_gr 109		62O/07	2983_10	143_32	29º19.75'	83º26.74'	0.13	570	5847	5606	5364	NW	NW	75021	18	0.0023
Kmu_gr 110		62O/07	2983_10	143_32	29º19.22'	83º26.43'	0.28	440	5669	5608	5547	NW	NW	67021	25	0.0070
Kmu_gr 111		62O/07	2983_10	143_32	29º19.40'	83º25.39'	0.09	315	5779	5648	5517	N	N	75021	15	0.0013
Kmu_gr 112		62O/07	2983_10	214_58	29º18.70'	83º26.33'	0.09	500	5761	5672	5584	NW	NW	75021	15	0.0013
Kmu_gr 113		62O/07	2983_10	214_58	29º18.31'	83º25.86'	0.10	440	5578	5380	5182	N	N	64021	15	0.0015
Kmu_gr 114		62O/07	2983_10	214_58	29º18.07'	83º25.64'	0.06	315	5779	5663	5547	NW	NW	75021	12	0.0007
Kmu_gr 115		62O/07	2983_10	214_58	29º18.21'	83º26.58'	0.15	630	5761	5624	5486	NW	NW	63021	19	0.0028
Kmu_gr 116		62O/07	2983_10	141_34,35	29º16.79'	83º27.65'	0.36	990	5816	5621	5425	W	W	63011	28	0.0100

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 117		62O/07	2983_10	141_34,35	29º16.97'	83º24.82'	0.10	630	5895	5690	5486	N	N	75021	15	0.0015
Kmu_gr 118		62O/07	2983_10	141_34,35	29º16.78'	83º29.11'	0.26	990	5852	5700	5547	W	W	63021	24	0.0063
Kmu_gr 119		62O/07	2983_10	141_34,35	29º16.25'	83º29.56'	0.28	500	5861	5704	5547	W	W	60021	25	0.0070
Kmu_gr 120		62O/07	2983_10	141_34,35	29º15.84'	83º29.63'	0.05	315	5791	5730	5669	SW	SW	75021	10	0.0005
Kmu_gr 121		62O/07	2983_10	141_34,35	29º15.39'	83º28.52'	0.59	990	5730	5593	5456	NE	NE	60321	34	0.0201
Kmu_gr 122		62O/08	2983_14	141_34,35	29º14.87'	83º28.40'	0.11	630	5846	5681	5517	NW	NW	75021	16	0.0018
Kmu_gr 123		62O/08	2983_14	141_35	29º15.18'	83º26.97'	0.12	630	5700	5624	5547	NE	NE	75021	17	0.0020
Kmu_gr 124		62O/08	2983_14	141_34	29º14.90'	83º25.48'	0.08	315	5578	5502	5425	N	N	64021	14	0.0011
Kmu_gr 125		62O/08	2983_14	141_34	29º14.07'	83º23.67'	0.14	500	5486	5334	5182	N	N	75021	18	0.0025
Kmu_gr 126		62O/08	2983_14	141_33	29º13.80'	83º23.20'	0.17	315	5715	5570	5425	N	N	67021	20	0.0034
Kmu_gr 127		62O/08	2983_14	141_33	29º14.46'	83º22.45'	1.06	1450	5700	5471	5243	NE	NE	63021	43	0.0454
Kmu_gr 128		62O/08	2983_14	141_33	29º14.46'	83º21.80'	0.71	1580	6059	5636	5212	NW	NW	63021	37	0.0261
Kmu_gr 129		62O/08	2983_14	141_33	29º14.09'	83º20.62'	1.54	3800	5486	5364	5243	N	N	63021	49	0.0758
Kmu_gr 130		62O/07	2983_10	141_33	29º15.42'	83º20.42'	0.57	990	5861	5613	5364	NW	NW	63321	34	0.0192
Kmu_gr 131		62O/07	2983_10	141_32,33	29º15.04'	83º20.05'	0.09	315	5608	5502	5395	SW	SW	75021	15	0.0013
Kmu_gr 132		62O/08	2983_14	141_32,33	29º13.76'	83º20.73'	0.26	880	5425	5265	5105	SW	SW	63321	24	0.0063
Kmu_gr 133		62O/08	2983_14	141_32,33	29º13.84'	83º21.41'	0.11	440	5578	5486	5395	SW	SW	64021	16	0.0018
Kmu_gr 134		62O/08	2983_14	141_32,33	29º13.97'	83º21.76'	0.64	1140	6059	5803	5547	SW	SW	63021	35	0.0225
Kmu_gr 135		62O/08	2983_14	141_32,33	29º14.02'	83º22.07'	0.34	1140	6059	5788	5517	SE	SE	63021	27	0.0092
Kmu_gr 136		62O/07	2983_10	141_35	29º15.10'	83º28.58'	0.07	315	5547	5471	5395	S	S	75021	13	0.0009
Kmu_gr 137		62O/07	2983_10	141_35	29º15.64'	83º30.02'	0.42	1140	5974	5776	5578	W	W	63021	30	0.0125
Kmu_gr 138		62O/07	2983_10	141_35	29º15.35'	83º30.81'	0.10	630	5944	5822	5700	W	W	75021	15	0.0015
Kmu_gr 139		62O/12	2983_15	141_35	29º14.42'	83º31.33'	0.16	315	5822	5715	5608	W	W	67021	19	0.0031
Kmu_gr 140		62O/12	2983_15	141_35	29º12.92'	83º31.02'	0.09	500	5730	5608	5486	N	N	75021	15	0.0013
Kmu_gr 141		62O/12	2983_15	140_36	29º12.45'	83º30.45'	0.88	950	5822	5639	5456	N	N	63321	40	0.0351
Kmu_gr 142		62O/12	2983_15	140_36	29º12.37'	83º29.99'	0.28	950	5822	5639	5456	N	N	63021	25	0.0070
Kmu_gr 143		62O/08	2983_14	140_34,35	29º12.02'	83º29.55'	0.58	1260	5770	5567	5364	NW	NW	63021	34	0.0196
Kmu_gr 144		62O/08	2983_14	140_34,35	29º12.89'	83º27.99'	0.70	1140	5761	5578	5395	NW	NW	62021	36	0.0255
Kmu_gr 145		62O/08	2983_14	140_34,35	29º12.90'	83º27.34'	0.12	630	5822	5669	5517	NE	NE	63021	18	0.0023
Kmu_gr 146		62O/08	2983_14	140_34,35	29º13.28'	83º27.39'	0.17	630	5700	5608	5517	NE	NE	75021	20	0.0034
Kmu_gr 147		62O/08	2983_14	140_34,35	29º13.08'	83º26.95'	0.71	1520	5822	5593	5364	N	N	63021	37	0.0261
Kmu_gr 148		62O/08	2983_14	140_34,35	29º13.01'	83º26.57'	0.12	440	5791	5669	5547	NE	NE	75021	17	0.0020
Kmu_gr 149		62O/08	2983_14	140_34,35	29º13.36'	83º26.27'	0.21	690	5855	5633	5410	NW	NW	64021	22	0.0046
Kmu_gr 150		62O/08	2983_14	140_34,35	29º12.42'	83º26.53'	0.23	570	5669	5547	5425	N	N	67021	23	0.0053
Kmu_gr 151		62O/08	2983_14	140_34,35	29º11.66'	83º26.71'	1.00	1450	5730	5517	5304	NW	NW	63021	42	0.0419
Kmu_gr 152		62O/08	2983_14	140_34,35	29º11.70'	83º25.50'	0.06	315	5608	5502	5395	N	N	75021	12	0.0007
Kmu_gr 153		62O/08	2983_14	140_34,35	29º11.70'	83º25.15'	0.18	630	5700	5547	5395	NW	NW	63021	20	0.0037
Kmu_gr 154		62O/08	2983_14	140_34,35	29º11.54'	83º24.81'	0.05	315	5770	5689	5608	NW	NW	75021	10	0.0005
Kmu_gr 155		62O/08	2983_14	140_34,35	29º11.40'	83º24.63'	0.13	500	5639	5532	5425	NW	NW	63021	18	0.0023
Kmu_gr 156		62O/08	2983_14	138_32	29º 6.57'	83º19.02'	0.20	690	5578	5456	5334	NE	NE	63021	22	0.0043
Kmu_gr 157		62O/08	2983_14	138_32	29º 6.82'	83º18.42'	0.53	1140	5822	5547	5273	NW	NW	63011	33	0.0173
Kmu_gr 158		62O/03	2983_14	144_23	29º25.81'	83º 1.55'	0.29	1260	5121	5014	4907	E	E	63022	25	0.0074
Kmu_gr 159		62O/03	2983_14	144_23	29º26.61'	83º 0.69'	0.31	1520	5273	5090	4907	NE	NE	63022	26	0.0081

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 160		62K/15	2982_12	145_12	29º27.32'	82º59.62'	0.49	1390	5761	5410	5060	NE	NE	63021	32	0.0155
Kmu_gr 161		62K/15	2982_12	145_12	29º27.43'	82º59.06'	0.23	760	5486	5334	5182	E	E	63021	23	0.0053
Kmu_gr 162		62K/15	2982_12	145_12	29º27.80'	82º59.28'	0.32	950	5852	5471	5090	NE	NE	63021	26	0.0085
Kmu_gr 163		62K/15	2982_12	145_12	29º28.26'	82º58.86'	0.30	930	4877	4816	4755	NE	NE	63021	26	0.0077
Kmu_gr 164		62K/15	2982_12	145_12	29º28.02'	82º58.56'	0.53	1580	5547	5243	4938	NW	NW	63021	33	0.0173
Kmu_gr 165		62K/15	2982_12	145_13	29º29.51'	82º55.25'	0.10	315	5601	5544	5486	NE	NE	75021	15	0.0015
Kmu_gr 166		62K/15	2982_12	142_33	29º20.08'	82º56.04'	0.40	1070	5486	5334	5182	SE	SE	63021	29	0.0116
Kmu_gr 167		62K/15	2982_12	142_33	29º21.09'	82º56.22'	0.09	315	5563	5509	5456	NE	NE	37021	15	0.0013
Kmu_gr 168		62K/15	2982_12	142_33	29º21.48'	82º56.51'	0.18	630	4999	4892	4785	NE	NE	64021	20	0.0037
Kmu_gr 169		62K/15	2982_12	142_33	29º20.76'	82º55.88'	0.65	440	5563	5494	5425	N	N	60021	35	0.0230
Kmu_gr 170		62K/15	2982_12	142_33	29º20.15'	82º55.65'	0.85	950	5486	5319	5151	SE	SE	62021	39	0.0335
Kmu_gr 171		62K/15	2982_12	142_35	29º21.23'	82º52.26'	0.19	950	5395	5304	5212	NE	NE	77021	21	0.0040
Kmu_gr 172		62K/15	2982_12	142_35	29º20.62'	82º51.59'	1.38	690	5395	5337	5279	N	N	60021	47	0.0653
Kmu_gr 173		62K/15	2982_12	142_35	29º20.77'	82º50.26'	0.10	570	5273	5182	5090	NE	NE	75021	15	0.0015
Kmu_gr 174		62K/15	2982_12	142_36	29º20.56'	82º49.53'	0.59	1360	5962	5389	4816	N	N	67021	34	0.0201
Kmu_gr 175		62K/15	2982_12	142_36	29º20.83'	82º48.44'	0.23	630	5822	5456	5090	NE	NE	64021	23	0.0053
Kmu_gr 176		62K/15	2982_12	142_36	29º21.62'	82º48.56'	6.39	5375	6157	5563	4968	SE	SE	52011	82	0.5208
Kmu_gr 177		62K/15	2982_12	142_36	29º23.41'	82º48.38'	0.10	440	5928	5707	5486	Open	Open	37021	15	0.0015
Kmu_gr 178		62K/15	2982_12	142_37,38	29º23.66'	82º47.68'	2.57	4750	6126	5331	4535	NE	NE	53011	59	0.1524
Kmu_gr 179		62K/15	2982_12	142_37,38	29º23.34'	82º46.04'	1.41	2720	6096	5532	4968	NE	NE	52011	48	0.0633
Kmu_gr 180		62K/15	2982_12	142_37,38	29º24.17'	82º45.43'	1.63	2530	6248	5791	5334	N	N	52011	50	0.0820
Kmu_gr 181		62K/11	2982_12	142_38	29º24.65'	82º44.97'	0.20	760	5517	5349	5182	NW	NW	63021	22	0.0043
Kmu_gr 182		62K/11	2982_11	144_16	29º24.70'	82º43.28'	2.42	3160	5791	5410	5029	SE	SE	62021	58	0.1405
Kmu_gr 183		62K/11	2982_11	144_16	29º25.28'	82º44.62'	0.30	1260	4724	4542	4359	NE	NE	63011	26	0.0077
Kmu_gr 184		62K/11	2982_11	144_16	29º25.37'	82º43.10'	1.38	3475	6096	5486	4877	E	E	63021	47	0.0653
Kmu_gr 185		62K/11	2982_11	144_16	29º26.00'	82º43.26'	0.83	1900	5822	5349	4877	E	E	62021	40	0.0357
Kmu_gr 186		62K/11	2982_11	144_16	29º26.56'	82º43.45'	0.49	950	5791	5563	5334	E	E	63021	32	0.0133
Kmu_gr 187		62K/11	2982_11	145_18	29º26.95'	82º43.83'	0.39	630	5639	5486	5334	E	E	63021	29	0.0112
Kmu_gr 188		62K/11	2982_11	145_18	29º27.02'	82º44.51'	0.22	760	5273	5136	4999	SE	SE	75022	22	0.0049
Kmu_gr 189		62K/11	2982_11	145_18	29º27.53'	82º44.26'	0.33	630	6096	5745	5395	E	E	60021	27	0.0089
Kmu_gr 190		62K/11	2982_11	144_17	29º27.82'	82º45.10'	0.34	630	5121	5075	5029	NE	NE	63021	27	0.0092
Kmu_gr 191		62K/11	2982_11	145_18	29º27.90'	82º44.40'	0.23	820	5486	5319	5151	E	E	60021	23	0.0053
Kmu_gr 192		62K/11	2982_11	145_18	29º28.17'	82º44.70'	0.08	570	5578	5532	5486	NE	NE	75021	14	0.0011
Kmu_gr 193		62K/11	2982_11	145_18	29º28.21'	82º44.24'	0.09	315	5486	5425	5364	NE	NE	77021	15	0.0018
Kmu_gr 194		62K/11	2982_11	145_18	29º28.79'	82º43.83'	0.45	880	5651	5386	5121	E	E	60021	31	0.0137
Kmu_gr 195		62K/11	2982_11	145_18	29º29.38'	82º43.50'	0.31	630	4968	4846	4724	NW	NW	64021	26	0.0081
Kmu_gr 196		62K/11	2982_11	145_18	29º28.76'	82º43.25'	0.68	950	5651	5416	5182	W	W	67021	36	0.0245
Kmu_gr 197		62K/11	2982_11	145_18	29º28.11'	82º43.74'	1.68	820	5182	5060	4938	W	W	60021	51	0.0854
Kmu_gr 198		62K/11	2982_11	144_16	29º27.06'	82º42.78'	1.37	2215	5669	5304	4938	W	W	63021	47	0.0646
Kmu_gr 199		62K/11	2982_11	144_16	29º26.32'	82º42.60'	0.97	2090	5852	5441	5029	NW	NW	63021	41	0.0402
Kmu_gr 200		62K/11	2982_11	144_16	29º26.10'	82º42.16'	1.37	2530	5852	5380	4907	W	W	63321	47	0.0646
Kmu_gr 201		62K/11	2982_11	144_16	29º26.00'	82º41.30'	0.42	820	5243	5105	4968	NW	NW	60021	30	0.0125
Kmu_gr 202		62K/11	2982_11	144_16	29º25.53'	82º41.27'	0.06	315	5791	5715	5639	NW	NW	75022	12	0.0007

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 203		62K/11	2982_11	144_16	29º25.57'	82º41.10'	0.16	950	5334	5182	5029	NW	NW	75022	19	0.0031
Kmu_gr 204		62K/11	2982_11	144_16	29º25.50'	82º40.98'	0.04	440	5425	5182	4938	NW	NW	75022	9	0.0004
Kmu_gr 205		62K/11	2982_11	144_14	29º25.66'	82º40.29'	7.72	6330	5639	5151	4663	NW	NW	52011	87	0.6710
Kmu_gr 206		62K/11	2982_11	144_14	29º24.59'	82º39.83'	0.24	630	5334	5151	4968	NW	NW	77051	23	0.0056
Kmu_gr 207		62K/11	2982_11	144_14	29º24.24'	82º37.76'	0.49	950	6309	5852	5395	E	E	60021	32	0.0155
Kmu_gr 208		62K/11	2982_11	144_14	29º24.41'	82º38.23'	0.48	1580	6157	5669	5182	SE	SE	63021	31	0.0151
Kmu_gr 209		62K/11	2982_11	144_14	29º25.06'	82º38.20'	1.82	2530	6087	5558	5029	E	E	62321	52	0.0953
Kmu_gr 210		62K/11	2982_11	144_14	29º25.64'	82º38.48'	1.13	1900	5761	5517	5273	SE	SE	62321	44	0.0496
Kmu_gr 211		62K/11	2982_11	144_14	29º26.08'	82º38.70'	0.31	950	5791	5532	5273	SE	SE	63021	26	0.0081
Kmu_gr 212		62K/11	2982_11	144_14	29º26.56'	82º39.03'	2.14	1900	6184	5561	4938	E	E	60321	56	0.1188
Kmu_gr 213		62K/11	2982_11	145_20	29º28.54'	82º39.38'	0.95	630	5489	5183	4877	E	E	60321	41	0.0390
Kmu_gr 214		62K/11	2982_11	145_20	29º29.54'	82º39.46'	0.10	190	5465	5400	5334	E	E	37021	15	0.0015
Kmu_gr 215		62K/11	2982_11	145_20	29º29.52'	82º39.37'	0.09	190	5465	5400	5334	W	W	37021	15	0.0013
Kmu_gr 216		62K/11	2982_11	145_20	29º28.91'	82º39.09'	0.68	950	5489	5122	4755	NW	NW	63021	36	0.0245
Kmu_gr 217		62K/11	2982_11	145_20	29º28.61'	82º38.77'	0.25	500	5489	5229	4968	NW	NW	77021	24	0.0059
Kmu_gr 218		62K/11	2982_11	145_20	29º28.04'	82º38.82'	1.78	2530	5489	5107	4724	SW	SW	63021	52	0.0925
Kmu_gr 219		62K/11	2982_11	144_14	29º27.24'	82º38.73'	0.39	1200	5883	5456	5029	NW	NW	63021	29	0.0112
Kmu_gr 220		62K/11	2982_11	144_14	29º26.08'	82º38.29'	0.06	440	5700	5669	5639	NW	NW	77021	12	0.0007
Kmu_gr 221		62K/11	2982_11	144_14	29º26.21'	82º37.06'	5.49	5700	5944	5227	4511	N	NW	52011	77	0.4248
Kmu_gr 222		62K/11	2982_11	144_14	29º26.53'	82º36.54'	0.08	570	5364	5258	5151	SE	SE	75022	14	0.0011
Kmu_gr 223		62K/11	2982_11	144_14	29º26.89'	82º36.58'	0.16	500	5395	5288	5182	E	E	75022	19	0.0031
Kmu_gr 224		62K/11	2982_11	145_21	29º27.26'	82º36.02'	2.29	3160	6102	5444	4785	NE	NE	62011	57	0.1476
Kmu_gr 225		62K/11	2982_11	145_21	29º27.93'	82º35.62'	0.89	1260	5358	5255	5151	SE	SE	63021	40	0.0357
Kmu_gr 226		62K/11	2982_11	145_21	29º28.22'	82º35.95'	0.59	1015	5358	5118	4877	SE	SE	60021	34	0.0201
Kmu_gr 227		62K/11	2982_11	145_21	29º28.86'	82º36.10'	0.08	630	5090	4953	4816	SE	SE	75021	14	0.0011
Kmu_gr 228		62K/11	2982_11	145_21	29º28.98'	82º35.76'	0.08	250	5517	5395	5273	E	E	77021	14	0.0011
Kmu_gr 229		62K/11	2982_11	145_21	29º29.59'	82º35.93'	0.17	500	5486	5517	5547	SE	SE	77021	20	0.0034
Kmu_gr 230		62K/11	2982_11	145_21	29º29.63'	82º36.37'	0.24	950	5029	4892	4755	SE	SE	75021	23	0.0056
Kmu_gr 231		62K/10	2982_07	145_21	29º30.12'	82º36.37'	1.35	2530	5151	4938	4724	NE	NE	62021	47	0.0633
Kmu_gr 232		62K/10	2982_07	145_21	29º30.89'	82º35.64'	0.30	950	4968	4831	4694	SW	SW	63021	26	0.0077
Kmu_gr 233		62K/11	2982_11	145_21	29º29.68'	82º35.60'	0.20	630	5334	5319	5304	S	S	75022	22	0.0043
Kmu_gr 234		62K/11	2982_11	145_21	29º28.77'	82º35.25'	1.53	2530	5358	4904	4450	NW	NW	62321	49	0.0752
Kmu_gr 235		62K/11	2982_11	145_23	29º28.06'	82º33.90'	4.48	2845	5925	5172	4420	NE	NE	62021	72	0.3231
Kmu_gr 236		62K/11	2982_11	145_23	29º29.32'	82º33.74'	0.13	500	5029	4862	4694	NE	NE	75022	18	0.0023
Kmu_gr 237		62K/11	2982_11	145_23	29º28.82'	82º33.17'	0.14	630	5029	5014	4999	NW	NW	75022	18	0.0025
Kmu_gr 238		62K/11	2982_11	145_23	29º27.96'	82º32.70'	0.89	2215	5925	5325	4724	NW	NW	63021	40	0.0357
Kmu_gr 239		62K/11	2982_11	145_23	29º27.62'	82º32.78'	0.06	315	5578	5410	5243	N	N	77021	12	0.0007
Kmu_gr 240		62K/11	2982_11	145_23	29º27.21'	82º32.94'	1.28	1260	5925	5706	5486	S	S	62021	46	0.0589
Kmu_gr 241		62K/11	2982_11	145_23	29º26.58'	82º33.21'	0.21	950	5456	5258	5060	SW	SW	75022	22	0.0046
Kmu_gr 242		62K/11	2982_11	145_23	29º25.72'	82º34.21'	11.15	5375	6450	5374	4298	W	W	52011	98	1.0969
Kmu_gr 243		62K/11	2982_11	144_10	29º25.49'	82º31.47'	1.18	1900	5505	5023	4542	NE	NE	60021	45	0.0526
Kmu_gr 244		62K/11	2982_11	144_10	29º25.93'	82º31.16'	0.23	950	4877	4694	4511	NE	NE	75021	23	0.0053
Kmu_gr 245		62K/11	2982_11	144_10	29º26.42'	82º30.80'	0.13	950	4816	4648	4481	NE	NE	75021	18	0.0023

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kmu_gr 246		62K/07	2982_10	144_9	29º28.46'	82º28.37'	0.37	315	5182	5105	5029	NW	NW	37021	28	0.0104
Kmu_gr 247		62K/07	2982_10	144_9	29º28.07'	82º27.03'	0.08	500	5227	5128	5029	NE	NE	75022	14	0.0011
Kmu_gr 248		62K/07	2982_10	144_9	29º28.45'	82º26.76'	0.23	440	5608	5532	5456	SE	SE	37011	23	0.0053
Kmu_gr 249		62K/06	2982_06	144_9	29º30.61'	82º27.17'	0.90	1710	5685	5372	5060	NE	NE	63321	40	0.0419
Kmu_gr 250		62K/06	2982_06	144_9	29º30.57'	82º26.01'	0.59	630	5060	4968	4877	NE	NE	60021	34	0.0155
Kmu_gr 251		62K/06	2982_06	144_9	29º30.37'	82º25.92'	0.10	250	5060	4999	4938	S	S	63021	15	0.0015
Kmu_gr 252		62K/07	2982_10	144_9	29º27.45'	82º26.66'	0.84	1260	5517	5197	4877	NW	NW	60021	39	0.0329
Kmu_gr 253		62K/07	2982_10	144_9	29º26.89'	82º26.29'	1.04	1580	5517	5197	4877	NW	NW	60021	43	0.0442
Kmu_gr 254		62K/07	2982_10	144_9	29º27.19'	82º24.97'	0.72	1260	5505	5084	4663	NE	NE	67021	37	0.0266

Glacier Inventory of Bheri Basin

Total Number : 452 Total Area : 583.40 (km^2) Ice Reserve : 47.77 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kbh_gr 1		62K/8	2982_14	121_1	29º 0.39'	82º24.25'	1.12	1260	5403	5052	4700	NE	NE	60021	44	0.0490
Kbh_gr 2		62K/12	2982_15	140_10	29º11.13'	82º35.55'	0.23	1260	5639	5105	4572	SW	SW	75021	23	0.0053
Kbh_gr 3		62K/12	2982_15	140_10	29º11.37'	82º36.04'	0.28	990	5639	5456	5273	NE	NE	77021	25	0.0070
Kbh_gr 4		62K/12	2982_15	140_10	29º11.57'	82º35.93'	0.11	760	5639	5509	5380	NE	NE	77021	16	0.0018
Kbh_gr 5		62K/12	2982_15	140_10	29º11.91'	82º35.49'	2.49	3100	5767	5238	4709	NE	NE	62021	59	0.1460
Kbh_gr 6		62K/12	2982_15	140_10	29º12.54'	82º33.61'	4.07	2215	5692	5292	4892	NE	NE	60021	70	0.2839
Kbh_gr 7		62K/12	2982_15	141_10	29º13.36'	82º33.25'	0.95	1900	6042	5593	5144	NE	NE	63021	41	0.0390
Kbh_gr 8		62K/12	2982_15	141_10	29º14.47'	82º34.56'	0.04	190	5456	5425	5395	SE	SE	75021	9	0.0004
Kbh_gr 9		62K/12	2982_15	141_10	29º13.90'	82º32.82'	2.10	1900	6042	5459	4877	NE	NE	60021	55	0.1158
Kbh_gr 10		62K/12	2982_15	141_10	29º15.00'	82º32.50'	0.54	1260	5334	5197	5060	SE	SE	63021	33	0.0178
Kbh_gr 11		62K/11	2982_11	141_10	29º16.29'	82º33.55'	1.70	1580	6005	5532	5060	SE	SE	60021	51	0.0868
Kbh_gr 12		62K/11	2982_11	141_10	29º17.13'	82º35.56'	8.97	3800	6386	5342	4298	SW	SW	52311	91	0.8202
Kbh_gr 13		62K/11	2982_11	141_11	29º16.14'	82º36.60'	0.07	190	5547	5517	5486	W	W	37021	13	0.0009
Kbh_gr 14		62K/11	2982_11	141_11	29º15.63'	82º36.69'	0.12	881	5456	5227	4999	SW	SW	75021	17	0.0020
Kbh_gr 15		62K/11	2982_11	141_11	29º15.35'	82º37.51'	0.15	630	4968	4862	4755	NE	NE	75021	19	0.0028
Kbh_gr 16		62K/11	2982_11	141_11	29º15.58'	82º37.26'	0.21	630	5029	4926	4822	NE	NE	75021	22	0.0046
Kbh_gr 17		62K/11	2982_11	141_11	29º16.81'	82º37.09'	1.95	990	5425	5151	4877	SE	SE	60021	54	0.1047
Kbh_gr 18		62K/11	2982_11	141_11	29º17.65'	82º38.67'	0.30	630	4968	4785	4602	NE	NE	64021	26	0.0077
Kbh_gr 19		62K/11	2982_11	142_43	29º18.00'	82º37.41'	2.88	1900	6089	5392	4694	NE	NE	60321	62	0.1779
Kbh_gr 20		62K/11	2982_11	142_43	29º18.91'	82º37.19'	2.02	2520	5304	4846	4389	NE	NE	60321	54	0.1099
Kbh_gr 21		62K/11	2982_11	142_43	29º18.83'	82º36.08'	4.19	3800	6248	5319	4389	NE	NE	62021	70	0.2952
Kbh_gr 22		62K/11	2982_11	142_43	29º19.56'	82º35.89'	0.47	990	5608	5304	4999	E	E	77021	31	0.0146
Kbh_gr 23		62K/11	2982_11	142_43	29º20.08'	82º35.67'	0.69	1260	5334	5044	4755	E	E	63021	36	0.0250
Kbh_gr 24		62K/11	2982_11	142_43	29º20.47'	82º34.86'	2.08	1580	5834	5294	4755	NE	NE	60321	55	0.1143
Kbh_gr 25		62K/11	2982_11	142_43	29º21.56'	82º35.14'	0.10	630	5304	5136	4968	SE	SE	75022	15	0.0015
Kbh_gr 26		62K/11	2982_11	142_43	29º22.42'	82º34.86'	25.65	8870	6627	5645	4663	SW	SE	51011	130	3.3221
Kbh_gr 27		62K/11	2982_11	142_43	29º22.26'	82º37.00'	7.55	6330	6883	5701	4519	SW	SW	52021	86	0.6513
Kbh_gr 28		62K/11	2982_11	142_43	29º21.32'	82º36.51'	0.18	1070	5334	5044	4755	SW	SW	75022	20	0.0037
Kbh_gr 29		62K/11	2982_11	142_43	29º21.49'	82º37.05'	0.35	1070	6309	5974	5639	SW	SW	77021	28	0.0096
Kbh_gr 30		62K/11	2982_11	142_43	29º21.08'	82º36.66'	0.14	820	5182	4983	4785	SW	SW	75022	18	0.0025

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 31		62K/11	2982_11	142_43	29º20.72'	82º36.93'	0.11	690	5258	5067	4877	SW	SW	75022	16	0.0018
Kbh_gr 32		62K/11	2982_11	142_43	29º20.77'	82º37.29'	2.36	3160	6431	5581	4731	S	S	60321	58	0.1358
Kbh_gr 33		62K/11	2982_11	142_43	29º21.20'	82º38.80'	11.71	4430	6883	5636	4389	SW	SW	62321	100	1.1710
Kbh_gr 34		62K/11	2982_11	143_13	29º20.15'	82º39.93'	3.75	3800	6251	5473	4694	SW	SW	62021	68	0.2542
Kbh_gr 35		62K/11	2982_11	143_13	29º19.39'	82º40.19'	1.37	1900	5712	5203	4694	SW	SW	62321	47	0.0646
Kbh_gr 36		62K/11	2982_11	143_13	29º18.63'	82º40.31'	0.62	1260	5133	4708	4282	S	S	77021	35	0.0216
Kbh_gr 37		62K/11	2982_11	143_13	29º19.50'	82º40.62'	0.27	630	5364	5060	4755	NE	NE	77021	25	0.0066
Kbh_gr 38		62K/11	2982_11	143_13	29º19.98'	82º40.57'	1.20	1580	5712	5066	4420	NE	NE	62321	45	0.0539
Kbh_gr 39		62K/11	2982_11	143_13	29º20.45'	82º40.79'	0.43	880	5791	5410	5029	E	E	77021	30	0.0129
Kbh_gr 40		62K/11	2982_11	143_13	29º21.22'	82º40.44'	0.94	1260	6251	5671	5090	E	E	60321	41	0.0385
Kbh_gr 41		62K/11	2982_11	143_14	29º21.73'	82º40.51'	0.36	500	5852	5364	4877	E	E	77021	28	0.0100
Kbh_gr 42		62K/11	2982_11	143_14	29º22.52'	82º41.65'	36.38	13930	6556	5381	4206	S	S	51011	145	5.2782
Kbh_gr 43		62K/11	2982_11	143_14	29º23.17'	82º39.71'	1.18	1900	6614	5624	4633	SE	SE	60051	45	0.0526
Kbh_gr 44		62K/11	2982_11	143_14	29º23.68'	82º40.13'	1.54	2560	6035	5319	4602	S	S	63051	49	0.0758
Kbh_gr 45		62K/11	2982_11	143_14	29º24.34'	82º41.63'	7.03	4435	6075	5445	4816	S	S	62051	84	0.5919
Kbh_gr 46		62K/11	2982_11	143_15	29º24.22'	82º43.04'	1.30	2530	6096	5867	5639	S	S	60021	46	0.0601
Kbh_gr 47		62K/11	2982_11	143_15	29º24.01'	82º44.42'	0.22	440	6099	5701	5304	S	S	37021	22	0.0049
Kbh_gr 48		62K/11	2982_11	143_15	29º23.63'	82º44.28'	0.09	500	5182	5090	4999	SW	SW	75022	15	0.0013
Kbh_gr 49		62K/11	2982_11	143_15	29º23.52'	82º44.74'	0.15	630	5639	5410	5182	SW	SW	77021	19	0.0028
Kbh_gr 50		62K/15	2982_12	143_15	29º23.45'	82º45.17'	0.19	500	6248	5944	5639	SW	SW	37021	21	0.0040
Kbh_gr 51		62K/11	2982_11	142_39	29º19.67'	82º42.94'	3.80	3800	6483	5253	4023	NW	NW	62021	68	0.2588
Kbh_gr 52		62K/11	2982_11	142_39	29º19.08'	82º42.27'	0.37	1580	5212	4740	4267	NW	NW	75022	28	0.0104
Kbh_gr 53		62K/11	2982_11	141_15	29º18.32'	82º43.21'	7.24	4430	6483	5665	4846	SW	SW	63021	85	0.6157
Kbh_gr 54		62K/11	2982_11	141_15	29º17.49'	82º43.51'	0.55	630	6279	6035	5791	SW	SW	37022	33	0.0182
Kbh_gr 55		62K/11	2982_11	141_15	29º17.33'	82º43.92'	0.96	990	6294	6012	5730	SE	SE	37022	41	0.0396
Kbh_gr 56		62K/11	2982_11	141_15	29º17.88'	82º44.29'	2.46	1900	6294	5357	4420	SE	SE	63321	58	0.1436
Kbh_gr 57		62K/11	2982_11	141_15	29º18.52'	82º45.97'	10.66	6330	6483	5680	4877	SE	SW	51012	97	1.0330
Kbh_gr 58		62K/15	2982_12	142_38	29º19.73'	82º45.59'	0.39	630	5334	5227	5121	S	S	64022	29	0.0112
Kbh_gr 59		62K/15	2982_12	142_38	29º17.52'	82º46.92'	4.30	3475	5608	5144	4679	SW	SW	62521	71	0.3057
Kbh_gr 60		62K/15	2982_12	141_15	29º15.84'	82º46.04'	1.66	2520	6102	5428	4755	SW	SW	62021	51	0.0840
Kbh_gr 61		62K/15	2982_12	141_15	29º15.38'	82º45.11'	0.44	2215	4907	4656	4404	E	E	63021	30	0.0133
Kbh_gr 62		62K/15	2982_12	141_15	29º15.06'	82º46.81'	1.08	630	5974	5700	5425	SW	SW	77021	43	0.0466
Kbh_gr 63		62K/15	2982_12	141_15	29º14.57'	82º46.19'	3.13	2580	5304	5014	4724	SW	SW	62021	64	0.1991
Kbh_gr 64		62K/12	2982_15	141_15	29º14.04'	82º44.87'	3.82	3160	6411	5568	4724	NW	NW	60321	68	0.2606
Kbh_gr 65		62K/12	2982_15	141_15	29º13.65'	82º43.77'	1.73	2215	6411	5583	4755	NW	NW	67021	51	0.0889
Kbh_gr 66		62K/12	2982_15	141_15	29º13.65'	82º42.25'	0.39	990	5639	5502	5364	SE	SE	64321	29	0.0112
Kbh_gr 67		62K/12	2982_15	141_15	29º12.79'	82º43.61'	1.03	880	6066	5532	4999	W	W	60021	42	0.0436
Kbh_gr 68		62K/12	2982_15	141_15	29º12.47'	82º44.15'	0.51	1580	5791	5425	5060	S	S	63021	32	0.0164
Kbh_gr 69		62K/12	2982_15	141_15	29º12.85'	82º44.88'	1.65	1900	6411	5751	5090	S	S	60021	51	0.0834
Kbh_gr 70		62K/16	2982_16	139_20	29º 8.84'	82º45.50'	2.64	2580	5962	5442	4923	NW	NW	60321	60	0.1581
Kbh_gr 71		62K/12	2982_15	139_19,20	29º 8.27'	82º43.91'	3.57	1260	5883	5380	4877	N	N	60021	67	0.2379
Kbh_gr 72		62K/12	2982_15	139_19,20	29º 8.22'	82º42.45'	1.06	1260	5887	5329	4770	N	N	60021	43	0.0454
Kbh_gr 73		62K/12	2982_15	139_19,20	29º 6.93'	82º42.11'	0.12	630	5273	5090	4907	NW	NW	75022	17	0.0020

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 74		62K/12	2982_15	139_19,20	29º 7.46'	82º42.96'	0.55	630	5887	5687	5486	S	S	77021	33	0.0182
Kbh_gr 75		62K/12	2982_15	139_19,20	29º 7.52'	82º43.64'	0.48	1140	5883	5608	5334	SW	SW	77021	31	0.0151
Kbh_gr 76		62K/12	2982_15	139_19,20	29º 7.16'	82º44.12'	1.98	3475	5883	5121	4359	S	S	60021	54	0.1069
Kbh_gr 77		62K/12	2982_15	139_19,20	29º 6.91'	82º45.00'	1.48	1260	5791	5502	5212	SE	SE	77021	49	0.0718
Kbh_gr 78		62K/16	2982_16	139_19	29º 6.70'	82º46.17'	0.74	630	5639	5486	5334	SW	SW	37021	37	0.0276
Kbh_gr 79		62K/16	2982_16	139_19	29º 6.25'	82º46.59'	0.46	440	5633	5586	5538	SE	SE	37021	31	0.0142
Kbh_gr 80		62K/16	2982_16	139_19	29º 6.39'	82º47.54'	0.26	250	5633	5529	5425	Open	Open	37021	24	0.0063
Kbh_gr 81		62K/16	2982_16	139_19	29º 7.26'	82º45.49'	5.71	6330	5962	5343	4724	SE	SE	63021	78	0.4478
Kbh_gr 82		62K/16	2982_16	139_19	29º 7.88'	82º46.52'	1.41	1580	5425	5197	4968	E	E	62021	48	0.0672
Kbh_gr 83		62K/16	2982_16	139_19	29º 8.24'	82º45.82'	0.12	990	5944	5639	5334	Open	Open	75021	17	0.0020
Kbh_gr 84		62K/16	2982_16	139_19	29º 8.57'	82º46.40'	0.91	1710	5639	5349	5060	E	E	60321	40	0.0368
Kbh_gr 85		62K/16	2982_16	139_19	29º 9.03'	82º46.31'	0.67	1710	5486	5258	5029	NE	NE	63021	36	0.0240
Kbh_gr 86		62K/16	2982_16	141_16	29º13.36'	82º45.44'	1.09	1770	6096	5593	5090	SE	SE	63021	43	0.0472
Kbh_gr 87		62K/16	2982_16	141_16	29º13.74'	82º46.08'	1.29	1900	6035	5532	5029	SW	SW	63021	46	0.0595
Kbh_gr 88		62K/16	2982_16	141_16	29º13.88'	82º46.61'	0.45	990	6035	5593	5151	SW	SW	77021	31	0.0137
Kbh_gr 89		62K/16	2982_16	141_16	29º13.94'	82º47.25'	0.90	1710	6443	5645	4846	SW	SW	77021	40	0.0362
Kbh_gr 90		62K/16	2982_16	141_16	29º13.73'	82º47.90'	0.62	990	6401	5944	5486	SW	SW	77321	35	0.0216
Kbh_gr 91		62K/16	2982_16	141_16	29º13.96'	82º48.50'	0.40	1260	5944	5608	5273	E	E	75022	29	0.0116
Kbh_gr 92		62K/16	2982_16	141_16	29º14.69'	82º47.53'	1.72	2215	6443	5508	4572	NE	NE	60021	51	0.0882
Kbh_gr 93		62K/15	2982_12	141_16	29º15.87'	82º47.77'	3.19	2845	5486	4983	4481	SE	SE	61021	64	0.2043
Kbh_gr 94		62K/15	2982_12	141_16	29º16.57'	82º47.12'	0.19	630	5486	5243	4999	SE	SE	75021	21	0.0040
Kbh_gr 95		62K/15	2982_12	141_16	29º15.71'	82º49.26'	0.87	1900	5456	4999	4542	SW	SW	63021	40	0.0346
Kbh_gr 96		62K/15	2982_12	191_17,18	29º15.35'	82º49.47'	0.07	440	5090	4953	4816	SW	SW	75022	13	0.0009
Kbh_gr 97		62K/15	2982_12	191_17,18	29º15.45'	82º50.27'	0.74	1260	5486	5121	4755	SW	SW	62021	37	0.0276
Kbh_gr 98		62K/15	2982_12	191_17,18	29º15.22'	82º51.30'	0.74	1900	6215	5470	4724	SW	SW	63021	37	0.0276
Kbh_gr 99		62K/15	2982_12	191_17,18	29º14.42'	82º52.17'	3.00	1260	6215	5851	5486	SW	SW	67021	63	0.1880
Kbh_gr 100		62K/16	2982_16	191_17,18	29º14.81'	82º51.41'	0.24	760	5486	5182	4877	SW	SW	77021	23	0.0056
Kbh_gr 101		62K/16	2982_16	141_18	29º14.11'	82º51.77'	0.35	630	5334	5151	4968	W	W	77021	28	0.0096
Kbh_gr 102		62K/16	2982_16	141_18	29º13.16'	82º52.36'	0.79	1900	6096	5471	4846	SW	SW	77021	38	0.0302
Kbh_gr 103		62K/16	2982_16	141_18	29º12.89'	82º52.85'	3.22	2520	6096	5441	4785	SW	SW	62021	64	0.2069
Kbh_gr 104		62K/16	2982_16	140_18	29º12.30'	82º53.20'	0.58	1580	6237	5480	4724	SW	SW	77021	34	0.0196
Kbh_gr 105		62K/16	2982_16	140_18	29º12.13'	82º53.81'	1.04	1900	6180	5467	4755	SW	SW	63021	43	0.0442
Kbh_gr 106		62K/16	2982_16	140_18	29º11.64'	82º53.99'	0.29	990	6180	5620	5060	SW	SW	63021	25	0.0074
Kbh_gr 107		62K/16	2982_16	140_18	29º11.81'	82º54.17'	0.15	990	6180	5604	5029	SE	SE	37021	19	0.0028
Kbh_gr 108		62K/16	2982_16	140_18	29º12.42'	82º54.22'	0.36	315	6237	6075	5913	NE	NE	37021	28	0.0100
Kbh_gr 109		62K/16	2982_16	140_18	29º13.05'	82º53.81'	0.21	630	5639	5410	5182	NE	NE	75022	22	0.0046
Kbh_gr 110		62K/15	2982_12	140_18	29º15.21'	82º52.60'	1.22	1580	5852	5227	4602	NE	NE	60321	45	0.0551
Kbh_gr 111		62K/15	2982_12	141_19	29º15.96'	82º53.05'	0.11	630	4877	4694	4511	E	E	75022	16	0.0018
Kbh_gr 112		62K/15	2982_12	141_19	29º16.53'	82º53.10'	0.15	880	4694	4465	4237	N	N	75022	19	0.0028
Kbh_gr 113		62K/15	2982_12	141_19	29º16.41'	82º52.58'	0.61	1390	4816	4389	3962	N	N	63022	35	0.0211
Kbh_gr 114		62K/15	2982_12	141_19	29º15.66'	82º52.11'	0.54	820	6215	5851	5486	N	N	77021	33	0.0178
Kbh_gr 115		62K/15	2982_12	141_17,18	29º16.28'	82º50.61'	0.31	990	5151	4923	4694	NE	NE	75022	26	0.0081
Kbh_gr 116		62K/15	2982_12	141_17,18	29º16.41'	82º50.00'	0.45	1580	5669	5166	4663	NE	NE	75021	31	0.0137

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 117		62K/15	2982_12	141_17,18	29º17.01'	82º49.27'	2.23	1260	5761	5121	4481	NE	NE	67021	56	0.1257
Kbh_gr 118		62K/15	2982_12	141_17,18	29º17.28'	82º48.06'	0.83	990	6139	5645	5151	NE	NE	77021	39	0.0324
Kbh_gr 119		62K/15	2982_12	141_17,18	29º17.95'	82º48.51'	1.83	1260	5182	4877	4572	NE	NE	60021	52	0.0960
Kbh_gr 120		62K/15	2982_12	141_17,18	29º18.55'	82º47.91'	0.27	990	5425	5105	4785	NE	NE	75021	25	0.0066
Kbh_gr 121		62K/15	2982_12	142_36,37	29º19.00'	82º47.57'	0.09	500	5456	5243	5029	E	E	75021	15	0.0013
Kbh_gr 122		62K/15	2982_12	142_36,37	29º19.19'	82º47.52'	0.22	630	5547	5288	5029	NE	NE	77021	22	0.0049
Kbh_gr 123		62K/15	2982_12	142_36,37	29º20.00'	82º46.87'	4.62	1900	6227	5476	4724	SE	SE	60051	73	0.3368
Kbh_gr 124		62K/15	2982_12	142_36,37	29º21.29'	82º46.99'	6.88	5060	6556	5633	4709	SE	SE	62021	84	0.5750
Kbh_gr 125		62K/15	2982_12	142_36,37	29º20.48'	82º48.20'	0.09	630	5304	5151	4999	SW	SW	75022	15	0.0013
Kbh_gr 126		62K/15	2982_12	142_36,37	29º20.29'	82º48.57'	0.18	820	5364	5197	5029	SW	SW	75022	20	0.0037
Kbh_gr 127		62K/15	2982_12	142_36,37	29º19.38'	82º48.62'	1.19	2520	5608	5243	4877	SW	SW	62021	45	0.0532
Kbh_gr 128		62K/15	2982_12	142_36,37	29º19.11'	82º49.07'	0.23	1070	5334	5182	5029	SW	SW	75022	23	0.0053
Kbh_gr 129		62K/15	2982_12	142_36,37	29º19.85'	82º50.13'	3.66	3160	5962	5496	5029	SW	SW	62021	67	0.2460
Kbh_gr 130		62K/15	2982_12	142_36,37	29º19.56'	82º50.82'	0.58	1580	5913	5685	5456	SW	SW	63021	34	0.0196
Kbh_gr 131		62K/15	2982_12	142_35	29º18.51'	82º50.63'	1.49	3475	5517	5136	4755	W	SW	63021	49	0.0725
Kbh_gr 132		62K/15	2982_12	142_35	29º19.84'	82º51.64'	3.28	2315	5803	5355	4907	SE	SE	60321	65	0.2121
Kbh_gr 133		62K/15	2982_12	142_35	29º20.11'	82º53.07'	0.23	440	5029	4907	4785	NE	NE	75022	23	0.0053
Kbh_gr 134		62K/15	2982_12	142_35	29º20.47'	82º52.33'	1.49	1260	5279	5185	5090	SE	SE	60021	49	0.0725
Kbh_gr 135		62K/15	2982_12	142_35	29º20.97'	82º52.60'	0.86	1770	5279	5124	4968	SE	SE	63021	40	0.0340
Kbh_gr 136		62K/15	2982_12	141_20	29º18.14'	82º54.40'	1.03	1580	5304	4938	4572	NW	NW	60321	42	0.0436
Kbh_gr 137		62K/15	2982_12	141_20	29º17.83'	82º54.30'	0.04	380	4999	4923	4846	SW	SW	75022	9	0.0004
Kbh_gr 138		62K/15	2982_12	141_20	29º17.58'	82º54.70'	0.29	760	5182	4953	4724	SW	SW	75022	25	0.0074
Kbh_gr 139		62K/15	2982_12	141_21	29º16.91'	82º57.32'	0.08	440	5486	5425	5364	NW	NW	37021	14	0.0011
Kbh_gr 140		62K/15	2982_12	141_21	29º16.72'	82º56.94'	0.23	760	5212	5121	5029	NW	NW	75022	23	0.0053
Kbh_gr 141		62K/15	2982_12	141_22	29º15.85'	82º58.03'	0.12	630	5151	5060	4968	NE	NE	75022	17	0.0020
Kbh_gr 142		62K/15	2982_12	141_22	29º16.59'	82º58.30'	0.40	2215	5060	4953	4846	NE	NE	75022	29	0.0116
Kbh_gr 143		62K/15	2982_12	141_22	29º16.86'	82º57.99'	0.08	630	5060	5014	4968	NE	NE	75022	14	0.0011
Kbh_gr 144		62K/15	2982_12	141_22	29º16.88'	82º57.46'	0.05	250	5486	5410	5334	NE	NE	37021	10	0.0005
Kbh_gr 145		62K/15	2982_12	141_22	29º17.20'	82º57.88'	0.12	630	5243	5151	5060	NE	NE	75022	17	0.0020
Kbh_gr 146		62K/15	2982_12	141_22	29º17.61'	82º58.30'	0.23	990	5151	5075	4999	SW	SW	75022	23	0.0053
Kbh_gr 147		62K/15	2982_12	141_22	29º17.49'	82º58.62'	0.07	440	5151	5090	5029	SW	SW	75022	13	0.0009
Kbh_gr 148		62K/15	2982_12	141_22	29º17.36'	82º58.82'	0.06	315	5182	5121	5060	SW	SW	75022	12	0.0007
Kbh_gr 149		62K/15	2982_12	141_22	29º17.20'	82º59.07'	0.07	315	5182	5136	5090	SW	SW	75022	13	0.0009
Kbh_gr 150		62K/15	2982_12	141_22	29º16.86'	82º59.67'	0.05	500	5179	5073	4968	NE	NE	75021	10	0.0005
Kbh_gr 151		62K/15	2982_12	141_22	29º17.12'	82º59.57'	0.07	500	5151	5090	5029	NE	NE	75021	13	0.0009
Kbh_gr 152		62O/3	2983_09	141_23	29º15.04'	83º 2.95'	0.11	570	5639	5547	5456	NW	NW	37021	16	0.0018
Kbh_gr 153		62O/4	2983_13	139_12	29º 8.09'	83º 4.71'	0.05	380	5669	5532	5395	N	N	75021	10	0.0005
Kbh_gr 154		62O/4	2983_13	139_12	29º 7.75'	83º 3.89'	1.85	2215	5974	5502	5029	N	N	62021	53	0.0974
Kbh_gr 155		62O/4	2983_13	140_22	29º10.62'	83º 1.45'	0.11	630	5639	5441	5243	N	N	75021	16	0.0018
Kbh_gr 156		62O/4	2983_13	140_22	29º10.39'	82º59.09'	0.42	315	5623	5555	5486	N	N	37021	30	0.0125
Kbh_gr 157		62O/4	2983_13	140_22	29º10.30'	83º 0.89'	0.14	630	5304	5212	5121	W	W	75022	18	0.0025
Kbh_gr 158		62O/4	2983_13	139_13	29º 7.42'	83º 2.91'	0.74	1900	5517	5304	5090	W	W	63021	37	0.0276
Kbh_gr 159		62O/4	2983_13	139_13	29º 6.72'	83º 2.87'	1.38	1900	5944	5624	5304	SW	SW	62021	47	0.0653

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 160		62O/4	2983_13	139_13	29º 6.28'	83º 0.71'	1.14	1390	5621	5340	5060	E	E	60321	44	0.0502
Kbh_gr 161		62O/4	2983_13	139_13	29º 6.88'	83º 0.71'	0.10	315	5425	5349	5273	NE	NE	75022	15	0.0015
Kbh_gr 162		62K/16	2982_16	139_13	29º 6.43'	83º 0.09'	1.05	1260	5578	5288	4999	NE	NE	60021	43	0.0448
Kbh_gr 163		62K/16	2982_16	139_14	29º 6.18'	82º58.90'	2.34	1260	5852	5532	5212	NE	NE	60021	57	0.1342
Kbh_gr 164		62K/16	2982_16	139_14	29º 6.29'	82º58.33'	0.09	270	5669	5593	5516	SW	SW	75022	15	0.0013
Kbh_gr 165		62K/16	2982_16	139_14	29º 6.02'	82º58.28'	0.08	425	5425	5303	5182	SW	SW	75022	14	0.0011
Kbh_gr 166		62K/16	2982_16	139_14	29º 5.89'	82º58.47'	0.03	217	5303	5257	5212	SW	SW	75022	7	0.0002
Kbh_gr 167		62K/16	2982_16	139_14	29º 5.66'	82º58.72'	0.30	980	5871	5572	5273	SW	SW	37321	26	0.0077
Kbh_gr 168		62K/16	2982_16	139_14	29º 5.27'	82º58.78'	0.12	440	5334	5258	5182	SW	SW	75022	17	0.0020
Kbh_gr 169		62K/16	2982_16	139_13	29º 5.65'	82º59.77'	2.31	2520	5871	5465	5060	SE	SE	60021	57	0.1319
Kbh_gr 170		62O/4	2983_13	139_13	29º 5.49'	83º 1.59'	0.15	630	5425	5288	5151	NW	NW	75021	19	0.0028
Kbh_gr 171		62O/4	2983_13	137_39	29º 2.95'	83º 1.07'	0.14	440	5965	5726	5486	NW	NW	37021	18	0.0025
Kbh_gr 172		62O/4	2983_13	137_39	29º 1.29'	83º 1.82'	0.15	570	5395	5319	5243	SE	SE	63021	19	0.0028
Kbh_gr 173		62P/1	2883_01	137_39	28º59.02'	83º 0.83'	0.06	315	5090	5044	4999	N	N	75022	12	0.0007
Kbh_gr 174		62O/4	2983_13	137_39	29º 1.60'	83º 1.82'	0.26	990	5550	5305	5060	NE	NE	77021	24	0.0063
Kbh_gr 175		62O/4	2983_13	137_39	29º 3.15'	83º 1.65'	1.44	1710	5965	5604	5243	E	E	60321	48	0.0692
Kbh_gr 176		62O/4	2983_13	138_38	29º 4.01'	83º 1.97'	0.90	1260	5608	5425	5243	NE	NE	60321	40	0.0362
Kbh_gr 177		62O/4	2983_13	138_38	29º 6.15'	83º 3.28'	1.01	1580	5700	5471	5243	SE	SE	63321	42	0.0425
Kbh_gr 178		62O/4	2983_13	138_38	29º 6.57'	83º 3.68'	0.27	1140	5944	5685	5425	SE	SE	63021	25	0.0066
Kbh_gr 179		62O/4	2983_13	138_38	29º 7.08'	83º 3.97'	0.78	1900	5913	5624	5334	SE	SE	63321	38	0.0297
Kbh_gr 180		62O/4	2983_13	138_38	29º 7.00'	83º 4.76'	0.30	1260	5700	5486	5273	SW	SW	63021	26	0.0077
Kbh_gr 181		62O/4	2983_13	139_12	29º 6.73'	83º 5.10'	0.49	1140	5700	5593	5486	NE	NE	64321	32	0.0155
Kbh_gr 182		62O/4	2983_13	139_12	29º 7.75'	83º 4.64'	0.06	440	5730	5593	5456	NE	NE	75021	12	0.0007
Kbh_gr 183		62O/8	2983_14	137_33	29º 3.00'	83º16.57'	0.10	570	5608	5456	5304	N	N	77021	15	0.0015
Kbh_gr 184		62O/8	2983_14	137_33	29º 2.32'	83º16.15'	0.18	880	5547	5410	5273	NW	NW	75021	20	0.0037
Kbh_gr 185		62O/8	2983_14	137_33	29º 1.13'	83º16.02'	0.09	630	5608	5486	5364	NW	NW	75021	15	0.0013
Kbh_gr 186		62O/8	2983_14	137_33	29º 0.82'	83º15.58'	0.49	630	5608	5456	5304	NW	NW	77021	32	0.0155
Kbh_gr 187		62O/4	2983_13	137_33	29º 0.93'	83º14.70'	0.22	440	5547	5456	5364	N	N	77021	22	0.0049
Kbh_gr 188		62O/4	2983_13	137_33	29º 1.30'	83º14.43'	0.12	630	5706	5505	5304	NW	NW	77021	17	0.0020
Kbh_gr 189		62O/4	2983_13	137_33	29º 0.69'	83º14.16'	0.21	570	5639	5456	5273	N	N	77021	22	0.0046
Kbh_gr 190		62O/4	2983_13	137_33	29º 0.35'	83º13.34'	0.11	630	5639	5532	5425	E	E	77021	16	0.0018
Kbh_gr 191		62O/4	2983_13	137_33	29º 0.54'	83º12.74'	0.10	630	5578	5410	5243	N	N	75021	15	0.0015
Kbh_gr 192		62O/4	2983_13	137_33	29º 0.70'	83º12.07'	0.17	630	5669	5502	5334	NW	NW	77021	20	0.0034
Kbh_gr 193		62O/4	2983_13	137_33	29º 0.95'	83º10.52'	0.04	250	5608	5578	5547	SE	SE	75021	9	0.0004
Kbh_gr 194		62O/4	2983_13	137_33	29º 0.19'	83º12.30'	0.03	250	5547	5502	5456	NW	NW	75021	7	0.0002
Kbh_gr 195		62O/4	2983_13	137_33	29º 0.37'	83º12.46'	0.29	1260	5547	5425	5304	SE	SE	63021	25	0.0074
Kbh_gr 196		62P/1	2883_01	137_34	28º59.73'	83º11.33'	0.31	990	5761	5471	5182	N	N	63021	26	0.0081
Kbh_gr 197		62P/1	2883_01	137_34	28º59.14'	83º10.96'	1.32	1400	6142	5555	4968	NW	NW	60321	47	0.0614
Kbh_gr 198		62P/1	2883_01	137_34	28º59.02'	83º10.28'	1.05	2215	6142	5525	4907	NW	NW	63021	43	0.0448
Kbh_gr 199		62P/1	2883_01	137_34	28º58.80'	83º 9.08'	1.60	2215	5931	5404	4877	NW	NW	62021	50	0.0799
Kbh_gr 200		62P/1	2883_01	137_34	28º58.65'	83º 8.52'	0.62	1400	5931	5541	5151	NW	NW	63321	35	0.0216
Kbh_gr 201		62P/1	2883_01	136_24	28º58.81'	83º10.16'	0.10	315	5700	5578	5456	S	S	37021	15	0.0015
Kbh_gr 202		62P/1	2883_01	136_24	28º58.56'	83º10.50'	0.10	630	5517	5364	5212	S	S	75021	15	0.0015

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 203		62P/1	2883_01	136_24	28º58.42'	83º11.48'	2.53	3150	6142	5616	5090	S	S	62321	59	0.1492
Kbh_gr 204		62P/1	2883_01	136_24	28º58.01'	83º11.94'	0.04	315	5578	5486	5395	SW	SW	75021	9	0.0004
Kbh_gr 205		62P/1	2883_01	136_24	28º57.63'	83º11.83'	0.03	250	5578	5486	5395	NW	NW	75021	7	0.0002
Kbh_gr 206		62P/1	2883_01	136_24	28º58.30'	83º12.54'	0.62	1575	5608	5425	5243	SE	SE	63021	35	0.0216
Kbh_gr 207		62P/1	2883_01	136_24	28º59.44'	83º11.68'	1.36	1900	6035	5593	5151	NE	NE	63021	47	0.0640
Kbh_gr 208		62O/4	2983_13	137_34	29º 0.30'	83º13.03'	0.19	630	5639	5517	5395	SW	SW	63021	21	0.0040
Kbh_gr 209		62O/4	2983_13	137_34	29º 0.38'	83º14.09'	0.08	440	5486	5441	5395	SW	SW	64021	14	0.0011
Kbh_gr 210		62P/5	2883_02	137_32	28º59.44'	83º16.93'	0.30	1140	5639	5486	5334	SW	SW	63021	26	0.0077
Kbh_gr 211		62P/5	2883_02	137_32	28º58.53'	83º17.08'	0.64	630	5828	5566	5304	N	N	60321	35	0.0225
Kbh_gr 212		62P/5	2883_02	137_32	28º57.76'	83º16.90'	0.31	630	5669	5502	5334	N	N	62021	26	0.0081
Kbh_gr 213		62P/5	2883_02	137_32	28º57.06'	83º16.43'	0.24	570	5773	5538	5304	N	N	64021	23	0.0056
Kbh_gr 214		62P/5	2883_02	137_32	28º59.13'	83º17.78'	1.66	2490	5761	5532	5304	SE	S	53021	51	0.0840
Kbh_gr 215		62P/5	2883_02	136_19	28º57.41'	83º18.35'	0.10	250	5852	5730	5608	N	N	37021	15	0.0015
Kbh_gr 216		62P/5	2883_02	136_19	28º56.87'	83º18.46'	0.35	990	5883	5715	5547	NW	NW	63021	28	0.0096
Kbh_gr 217		62P/5	2883_02	136_19	28º56.34'	83º18.31'	0.79	1580	5864	5614	5364	W	W	60321	38	0.0302
Kbh_gr 218		62P/5	2883_02	136_19	28º55.10'	83º16.92'	0.20	630	5395	5258	5121	E	E	63021	22	0.0043
Kbh_gr 219		62P/5	2883_02	136_19	28º55.95'	83º18.21'	0.06	250	5486	5441	5395	SW	SW	75022	12	0.0007
Kbh_gr 220		62P/5	2883_02	136_19	28º56.30'	83º18.69'	0.13	315	5864	5767	5669	SW	SW	37021	18	0.0023
Kbh_gr 221		62P/5	2883_02	136_19	28º56.10'	83º19.16'	0.14	440	5669	5578	5486	W	W	37021	18	0.0025
Kbh_gr 222		62P/5	2883_02	136_19	28º55.52'	83º19.24'	0.19	760	5700	5563	5425	SW	SW	63021	21	0.0040
Kbh_gr 223		62P/5	2883_02	136_19	28º55.72'	83º19.51'	0.17	440	5700	5563	5425	E	E	77021	20	0.0034
Kbh_gr 224		62P/5	2883_02	136_19	28º56.52'	83º19.24'	0.65	1260	5864	5538	5212	SE	SE	62021	35	0.0230
Kbh_gr 225		62P/5	2883_02	136_19	28º57.33'	83º18.43'	0.06	250	5700	5639	5578	NE	NE	37021	12	0.0007
Kbh_gr 226		62P/5	2883_02	137_32	28º59.43'	83º18.08'	0.03	190	5578	5532	5486	SE	SE	75022	7	0.0002
Kbh_gr 227		62P/5	2883_02	137_32	28º59.62'	83º17.93'	0.14	315	5822	5745	5669	SE	SE	37021	18	0.0025
Kbh_gr 228		62P/5	2883_02	137_32	28º59.81'	83º17.58'	0.28	820	5578	5471	5364	NE	NE	63021	25	0.0070
Kbh_gr 229		62P/5	2883_02	137_32	28º59.91'	83º17.22'	0.18	990	5730	5578	5425	NE	NE	63021	20	0.0037
Kbh_gr 230		62O/8	2883_14	137_32	29º 1.02'	83º18.40'	0.40	1140	5578	5425	5273	NW	NW	63021	29	0.0116
Kbh_gr 231		62O/8	2883_14	137_32	29º 0.84'	83º17.84'	0.23	630	5563	5448	5334	NW	NW	63021	23	0.0053
Kbh_gr 232		62O/8	2883_14	137_32	29º 0.94'	83º16.41'	0.52	1260	5721	5497	5273	NE	NE	63021	32	0.0169
Kbh_gr 233		62O/8	2883_14	138_32	29º 5.51'	83º19.40'	0.06	250	5791	5685	5578	N	N	37021	12	0.0007
Kbh_gr 234		62O/8	2883_14	140_33	29º11.41'	83º25.19'	0.24	880	5730	5593	5456	SW	SW	63021	23	0.0056
Kbh_gr 235		62O/8	2883_14	140_33	29º11.42'	83º25.99'	0.17	630	5764	5625	5486	W	W	37021	20	0.0034
Kbh_gr 236		62O/8	2883_14	140_33	29º11.07'	83º25.93'	0.17	630	5700	5563	5425	NW	NW	63021	20	0.0034
Kbh_gr 237		62O/8	2883_14	140_34	29º12.73'	83º27.00'	0.25	315	5822	5715	5608	S	S	37021	24	0.0059
Kbh_gr 238		62O/8	2883_14	140_34	29º12.02'	83º28.52'	0.10	440	5700	5563	5425	NW	NW	37021	15	0.0015
Kbh_gr 239		62O/12	2883_15	140_35	29º11.85'	83º30.02'	0.13	630	5700	5639	5578	E	E	77021	18	0.0023
Kbh_gr 240		62O/12	2883_15	140_35	29º12.96'	83º31.42'	0.16	440	5852	5761	5669	S	S	77021	19	0.0031
Kbh_gr 241		62O/12	2883_15	140_36	29º11.85'	83º32.40'	0.13	440	5669	5578	5486	NW	NW	77021	18	0.0023
Kbh_gr 242		62O/12	2883_15	140_36	29º12.00'	83º34.28'	0.11	500	5761	5654	5547	NW	NW	77021	16	0.0018
Kbh_gr 243		62O/12	2883_15	139_52	29º 8.91'	83º40.55'	0.14	630	5974	5837	5700	NW	NW	37021	18	0.0025
Kbh_gr 244		62O/12	2883_15	139_52	29º 7.66'	83º40.69'	0.28	990	5974	5806	5639	NW	NW	63021	25	0.0070
Kbh_gr 245		62O/12	2883_15	139_52	29º 7.62'	83º39.92'	0.62	820	5974	5791	5608	N	N	60021	35	0.0216

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 246		62O/12	2883_15	139_52	29º 7.53'	83º39.36'	0.84	1260	6026	5802	5578	N	N	60021	39	0.0329
Kbh_gr 247		62O/12	2883_15	139_52	29º 7.71'	83º38.81'	0.14	440	5974	5852	5730	NE	NE	77021	18	0.0025
Kbh_gr 248		62O/12	2883_15	139_52	29º 6.50'	83º37.99'	0.17	440	5913	5837	5761	N	N	77021	20	0.0034
Kbh_gr 249		62O/12	2883_15	139_52	29º 7.47'	83º37.40'	0.19	630	5919	5764	5608	N	N	77021	21	0.0040
Kbh_gr 250		62O/12	2883_15	139_52	29º 6.33'	83º37.60'	0.08	315	5791	5685	5578	N	N	75022	14	0.0011
Kbh_gr 251		62O/12	2883_15	139_52	29º 6.46'	83º36.22'	0.21	500	5791	5654	5517	N	N	77021	22	0.0046
Kbh_gr 252		62O/12	2883_15	138_24	29º 5.44'	83º35.06'	0.14	570	5816	5697	5578	N	N	75021	18	0.0025
Kbh_gr 253		62O/12	2883_15	138_24	29º 4.78'	83º37.69'	0.87	1770	5730	5563	5395	NW	NW	63021	40	0.0346
Kbh_gr 254		62O/12	2883_15	138_24	29º 3.94'	83º37.18'	3.00	2400	6136	5765	5395	NW	NW	62021	63	0.1880
Kbh_gr 255		62O/12	2883_15	138_24	29º 3.66'	83º36.51'	0.10	440	5675	5611	5547	N	N	75021	15	0.0015
Kbh_gr 256		62O/12	2883_15	138_24	29º 3.74'	83º35.99'	0.49	1320	5892	5689	5486	NE	NE	63321	32	0.0155
Kbh_gr 257		62O/12	2883_15	138_24	29º 3.82'	83º35.55'	0.26	630	5761	5631	5502	N	N	77021	24	0.0063
Kbh_gr 258		62O/12	2883_15	138_24	29º 3.92'	83º35.03'	0.50	1260	5822	5593	5364	N	N	63021	32	0.0160
Kbh_gr 259		62O/12	2883_15	138_24	29º 3.64'	83º34.46'	0.47	630	5822	5593	5364	NW	NW	77021	31	0.0146
Kbh_gr 260		62O/12	2883_15	138_24	29º 3.45'	83º34.06'	0.01	190	5700	5654	5608	NE	NE	75021	2	0.0000
Kbh_gr 261		62O/12	2883_15	138_25	29º 3.73'	83º33.52'	0.41	1070	5947	5656	5364	NW	NW	63021	29	0.0121
Kbh_gr 262		62O/12	2883_15	138_25	29º 3.88'	83º32.84'	0.20	630	5730	5608	5486	NW	NW	77021	22	0.0043
Kbh_gr 263		62O/12	2883_15	137_24	29º 3.01'	83º36.88'	0.56	1580	5913	5730	5547	W	W	63021	33	0.0187
Kbh_gr 264		62O/12	2883_15	137_24	29º 2.35'	83º36.47'	2.59	1900	6096	5745	5395	NW	NW	63321	59	0.1540
Kbh_gr 265		62O/12	2883_15	137_24	29º 1.50'	83º35.60'	1.32	1900	5883	5608	5334	NW	NW	62021	47	0.0614
Kbh_gr 266		62O/12	2883_15	137_24	29º 1.64'	83º35.08'	0.38	990	5910	5729	5547	N	N	63021	28	0.0108
Kbh_gr 267		62O/12	2883_15	137_24	29º 2.05'	83º34.44'	0.54	1580	5883	5639	5395	NW	NW	63021	33	0.0178
Kbh_gr 268		62O/12	2883_15	137_24	29º 1.35'	83º34.81'	0.41	990	5910	5698	5486	SW	SW	63021	29	0.0121
Kbh_gr 269		62O/12	2883_15	137_24	29º 1.17'	83º35.45'	0.22	440	5913	5791	5669	SW	SW	77021	22	0.0049
Kbh_gr 270		62O/12	2883_15	137_24	29º 1.21'	83º36.63'	1.25	1580	5944	5715	5486	SW	SW	62021	46	0.0570
Kbh_gr 271		62O/12	2883_15	137_24	29º 0.64'	83º36.70'	0.43	990	5956	5721	5486	W	W	60321	30	0.0129
Kbh_gr 272		62O/12	2883_15	137_24	29º 0.28'	83º36.89'	0.63	990	5956	5767	5578	SW	SW	63321	35	0.0221
Kbh_gr 273		62P/9	2883_03	137_23	28º59.05'	83º36.56'	0.38	630	5761	5624	5486	N	N	63021	28	0.0108
Kbh_gr 274		62P/9	2883_03	137_23	28º59.02'	83º35.53'	0.15	570	5861	5750	5639	NE	NE	75021	19	0.0028
Kbh_gr 275		62P/9	2883_03	137_23	28º59.20'	83º35.20'	0.11	440	5822	5654	5486	NW	NW	75021	16	0.0018
Kbh_gr 276		62P/9	2883_03	137_23	28º59.58'	83º34.22'	0.50	1580	5944	5662	5380	NE	NE	63021	32	0.0160
Kbh_gr 277		62P/9	2883_03	137_25	28º59.83'	83º33.60'	0.59	990	5849	5592	5334	N	N	62021	34	0.0201
Kbh_gr 278		62O/12	2883_15	137_25	29º 0.10'	83º33.19'	0.20	630	5578	5502	5425	N	N	63021	22	0.0043
Kbh_gr 279		62O/12	2883_15	137_25	29º 0.35'	83º32.91'	0.12	500	5700	5593	5486	N	N	75021	17	0.0020
Kbh_gr 280		62O/12	2883_15	137_25	29º 1.44'	83º32.02'	0.79	1390	5791	5608	5425	N	N	63021	38	0.0302
Kbh_gr 281		62O/12	2883_15	137_25	29º 0.30'	83º30.63'	0.14	690	5700	5517	5334	N	N	75021	18	0.0025
Kbh_gr 282		62O/12	2883_15	137_25	29º 0.33'	83º30.29'	0.28	1070	5791	5563	5334	N	N	75021	25	0.0070
Kbh_gr 283		62O/8	2983_14	137_26	29º 0.57'	83º29.78'	0.23	440	5822	5639	5456	N	N	77021	23	0.0053
Kbh_gr 284		62O/12	2883_15	137_25	29º 0.18'	83º32.50'	0.36	1260	5764	5671	5578	W	W	63021	28	0.0100
Kbh_gr 285		62P/9	2883_03	137_25	28º59.85'	83º32.79'	0.11	315	5883	5745	5608	W	W	37021	16	0.0018
Kbh_gr 286		62P/9	2883_03	137_25	28º59.25'	83º32.78'	0.21	440	5977	5747	5517	W	W	77321	22	0.0046
Kbh_gr 287		62P/9	2883_03	137_25	28º57.63'	83º32.19'	0.16	500	5864	5675	5486	NW	NW	77321	19	0.0031
Kbh_gr 288		62P/9	2883_03	137_25	28º57.76'	83º34.10'	0.05	250	5791	5715	5639	W	W	75021	10	0.0005

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 289		62P/9	2883_03	137_25	28º56.80'	83º34.12'	0.41	990	6026	5726	5425	NW	NW	63321	29	0.0121
Kbh_gr 290		62P/9	2883_03	137_25	28º54.59'	83º31.96'	0.16	440	5974	5822	5669	N	N	77021	19	0.0031
Kbh_gr 291		62P/9	2883_03	135_30	28º54.19'	83º31.62'	0.12	630	6120	5895	5669	N	N	77021	17	0.0020
Kbh_gr 292		62P/9	2883_03	135_30	28º53.90'	83º31.20'	0.10	570	5913	5776	5639	NW	NW	37021	15	0.0015
Kbh_gr 293		62P/9	2883_03	135_30	28º53.47'	83º30.80'	0.46	990	6133	5840	5547	N	N	75021	31	0.0142
Kbh_gr 294		62P/9	2883_03	135_30	28º53.37'	83º30.36'	0.52	1260	6133	5855	5578	NW	NW	63021	32	0.0169
Kbh_gr 295		62P/5	2883_02	135_31	28º52.98'	83º29.98'	0.90	1210	6133	5779	5425	NW	NW	63021	40	0.0362
Kbh_gr 296		62P/5	2883_02	135_31	28º52.81'	83º29.29'	0.86	1390	5852	5639	5425	NW	NW	64321	40	0.0340
Kbh_gr 297		62P/5	2883_02	135_31	28º53.41'	83º28.65'	0.37	990	5761	5639	5517	SE	SE	75021	28	0.0104
Kbh_gr 298		62P/5	2883_02	135_31	28º55.36'	83º29.43'	0.88	1900	5944	5669	5395	NE	NE	63321	40	0.0351
Kbh_gr 299		62P/5	2883_02	135_31	28º55.36'	83º28.99'	0.16	630	5944	5654	5364	N	N	77021	19	0.0031
Kbh_gr 300		62P/5	2883_02	135_31	28º55.04'	83º28.83'	0.21	990	5944	5639	5334	W	W	77321	22	0.0046
Kbh_gr 301		62P/5	2883_02	135_31	28º54.20'	83º28.24'	1.31	1900	5947	5671	5395	W	W	63021	46	0.0608
Kbh_gr 302		62P/5	2883_02	135_31	28º54.01'	83º27.57'	0.20	950	5608	5502	5395	E	E	77021	22	0.0043
Kbh_gr 303		62P/5	2883_02	135_31	28º54.28'	83º27.41'	0.26	630	5517	5425	5334	NE	NE	63021	24	0.0063
Kbh_gr 304		62P/5	2883_02	135_31	28º54.77'	83º27.28'	0.25	630	5639	5517	5395	NE	NE	77021	24	0.0059
Kbh_gr 305		62P/5	2883_02	136_31	28º55.59'	83º26.37'	0.76	1900	5791	5593	5395	E	E	63021	38	0.0286
Kbh_gr 306		62P/5	2883_02	136_31	28º56.11'	83º26.90'	0.33	880	5852	5685	5517	E	E	63021	27	0.0089
Kbh_gr 307		62P/5	2883_02	136_31	28º57.28'	83º27.77'	0.43	1140	5761	5593	5425	NE	NE	62021	30	0.0129
Kbh_gr 308		62P/5	2883_02	136_31	28º57.48'	83º27.02'	1.03	1260	5761	5547	5334	NE	NE	60021	42	0.0436
Kbh_gr 309		62P/5	2883_02	136_31	28º58.27'	83º26.55'	0.12	440	5639	5578	5517	N	N	75021	17	0.0020
Kbh_gr 310		62P/5	2883_02	136_31	28º58.02'	83º26.18'	0.55	1070	5883	5578	5273	NW	NW	63021	33	0.0182
Kbh_gr 311		62P/5	2883_02	136_30	28º58.91'	83º24.14'	0.31	950	5700	5532	5364	N	N	60321	26	0.0081
Kbh_gr 312		62O/8	2983_14	137_27	29º 2.13'	83º26.11'	0.17	440	5776	5601	5425	NW	NW	37021	20	0.0034
Kbh_gr 313		62O/8	2983_14	137_27	29º 1.37'	83º26.77'	0.24	630	5639	5532	5425	NE	NE	63021	23	0.0056
Kbh_gr 314		62O/8	2983_14	137_27	29º 2.54'	83º27.22'	0.09	315	5669	5563	5456	N	N	75021	15	0.0013
Kbh_gr 315		62O/8	2983_14	138_28	29º 3.64'	83º25.59'	0.12	440	5791	5593	5395	N	N	77021	17	0.0020
Kbh_gr 316		62O/8	2983_14	138_28	29º 3.50'	83º25.35'	0.17	630	5791	5563	5334	NW	NW	77021	20	0.0034
Kbh_gr 317		62O/8	2983_14	138_28	29º 4.15'	83º24.49'	0.10	315	5721	5573	5425	N	N	77021	15	0.0015
Kbh_gr 318		62P/5	2883_02	136_20	28º59.40'	83º23.73'	0.12	315	5608	5517	5425	N	N	77021	17	0.0020
Kbh_gr 319		62P/5	2883_02	136_20	28º58.98'	83º23.47'	0.75	1260	5883	5547	5212	W	W	63321	37	0.0281
Kbh_gr 320		62P/5	2883_02	136_20	28º58.63'	83º23.23'	0.27	500	5883	5624	5364	W	W	77021	25	0.0066
Kbh_gr 321		62P/5	2883_02	136_20	28º58.71'	83º23.64'	0.10	440	5883	5715	5547	S	S	77021	15	0.0015
Kbh_gr 322		62P/5	2883_02	136_31	28º57.68'	83º26.20'	0.17	315	5883	5715	5547	W	W	77021	20	0.0034
Kbh_gr 323		62P/5	2883_02	136_31	28º56.50'	83º26.61'	1.04	1580	5944	5563	5182	NW	NW	63021	43	0.0442
Kbh_gr 324		62P/5	2883_02	136_31	28º56.25'	83º26.04'	0.62	1260	6091	5697	5304	NW	NW	67321	35	0.0216
Kbh_gr 325		62P/5	2883_02	136_31	28º56.45'	83º25.52'	0.11	440	5517	5395	5273	NW	NW	75021	16	0.0018
Kbh_gr 326		62P/5	2883_02	136_31	28º56.12'	83º25.65'	0.41	1140	5730	5441	5151	W	W	63021	29	0.0121
Kbh_gr 327		62P/5	2883_02	136_31	28º55.90'	83º26.02'	0.37	1260	6091	5713	5334	SW	SW	63021	28	0.0104
Kbh_gr 328		62P/5	2883_02	136_31	28º55.51'	83º26.07'	0.09	315	5791	5624	5456	W	W	77021	15	0.0013
Kbh_gr 329		62P/5	2883_02	135_32	28º53.99'	83º27.04'	0.11	315	5669	5547	5425	NW	NW	77021	16	0.0018
Kbh_gr 330		62P/5	2883_02	135_32	28º53.88'	83º26.75'	0.16	500	5761	5593	5425	NW	NW	77021	19	0.0031
Kbh_gr 331		62P/5	2883_02	135_32	28º53.61'	83º26.50'	0.16	690	5608	5471	5334	W	W	63021	19	0.0031

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 332		62P/5	2883_02	135_32	28º52.91'	83º27.99'	0.93	760	5761	5547	5334	W	W	60321	41	0.0379
Kbh_gr 333		62P/5	2883_02	135_32	28º52.27'	83º26.81'	0.42	440	5639	5502	5364	N	N	60021	30	0.0125
Kbh_gr 334		62P/5	2883_02	134_31	28º52.17'	83º26.12'	0.95	1900	5944	5532	5121	NW	NW	63021	41	0.0390
Kbh_gr 335		62P/5	2883_02	134_31	28º51.86'	83º25.51'	0.23	950	5730	5456	5182	NE	NE	63021	23	0.0053
Kbh_gr 336		62P/5	2883_02	134_31	28º51.44'	83º25.13'	0.44	950	5730	5532	5334	SW	SW	63021	30	0.0133
Kbh_gr 337		62P/5	2883_02	134_31	28º51.29'	83º25.82'	1.91	2215	5822	5425	5029	SW	SW	60021	53	0.1018
Kbh_gr 338		62P/5	2883_02	134_31	28º52.19'	83º30.09'	1.04	1580	6197	5887	5578	W	W	60021	43	0.0442
Kbh_gr 339		62P/5	2883_02	134_31	28º51.23'	83º29.73'	3.31	2720	6197	5750	5304	W	W	60321	65	0.2147
Kbh_gr 340		62P/5	2883_02	134_31	28º50.92'	83º28.44'	0.62	1260	6328	5770	5212	W	W	60021	35	0.0216
Kbh_gr 341		62P/5	2883_02	134_31	28º50.61'	83º28.15'	0.34	950	6005	5730	5456	W	W	63021	27	0.0092
Kbh_gr 342		62P/5	2883_02	134_31	28º50.28'	83º28.02'	0.25	820	5913	5639	5364	W	W	63021	24	0.0059
Kbh_gr 343		62P/5	2883_02	134_31	28º50.50'	83º28.61'	0.80	1580	6328	5907	5486	SW	SW	63321	38	0.0308
Kbh_gr 344		62P/5	2883_02	134_31	28º49.44'	83º28.26'	2.35	2215	5944	5585	5227	W	W	63321	57	0.1350
Kbh_gr 345		62P/5	2883_02	134_31	28º48.94'	83º28.58'	0.87	1900	6087	5680	5273	SW	SW	63321	40	0.0346
Kbh_gr 346		62P/5	2883_02	134_31	28º48.28'	83º28.01'	0.03	250	5700	5654	5608	SW	SW	75022	7	0.0002
Kbh_gr 347		62P/5	2883_02	134_31	28º48.35'	83º28.41'	0.11	250	5978	5839	5700	SW	SW	77021	16	0.0018
Kbh_gr 348		62P/5	2883_02	167_30	28º47.54'	83º28.03'	6.34	6020	6401	5593	4785	NW	NW	52021	81	0.5153
Kbh_gr 349		62P/5	2883_02	167_30	28º48.06'	83º26.02'	0.51	1260	5608	5304	4999	NW	NW	62021	32	0.0164
Kbh_gr 350		62P/5	2883_02	167_30	28º47.21'	83º26.19'	0.16	820	5547	5471	5395	SW	SW	75022	19	0.0031
Kbh_gr 351		62P/5	2883_02	167_31	28º47.12'	83º24.74'	7.93	8870	6639	5361	4084	W	N	52011	88	0.6956
Kbh_gr 352		62P/5	2883_02	167_31	28º48.33'	83º23.28'	0.85	630	5304	5121	4938	N	N	64022	39	0.0335
Kbh_gr 353		62P/5	2883_02	167_33	28º48.91'	83º21.25'	1.75	1260	5486	5075	4663	NE	NE	60021	52	0.0903
Kbh_gr 354		62P/5	2883_02	167_33	28º49.26'	83º20.56'	1.93	1260	5486	5075	4663	N	N	60021	53	0.1032
Kbh_gr 355		62P/5	2883_02	167_33	28º49.02'	83º20.08'	0.14	315	5456	5380	5304	SW	SW	77021	18	0.0025
Kbh_gr 356		62P/5	2883_02	167_33	28º47.98'	83º22.33'	0.15	820	5608	5517	5425	S	S	75021	19	0.0028
Kbh_gr 357		62P/5	2883_02	167_33	28º45.45'	83º21.25'	22.58	6330	7715	6083	4450	N	N	60321	124	2.8052
Kbh_gr 358		62P/5	2883_02	167_35	28º44.58'	83º17.16'	23.03	6330	7661	5982	4304	W	N	52311	125	2.8796
Kbh_gr 359		62P/5	2883_02	167_35	28º44.93'	83º14.73'	4.01	4430	7371	6170	4968	NE	NE	63021	69	0.2783
Kbh_gr 360		62P/1	2883_01	167_35	28º45.92'	83º15.46'	0.80	1140	5944	5654	5364	E	E	77021	38	0.0308
Kbh_gr 361		62P/5	2883_02	167_35	28º45.59'	83º15.32'	0.05	250	5822	5745	5669	E	E	63321	10	0.0005
Kbh_gr 362		62P/5	2883_02	167_35	28º45.88'	83º14.46'	0.11	315	6919	6812	6706	E	E	75021	16	0.0018
Kbh_gr 363		62P/1	2883_01	167_35	28º46.42'	83º14.83'	0.31	500	6998	6532	6066	NE	NE	77021	26	0.0081
Kbh_gr 364		62P/1	2883_01	167_35	28º47.40'	83º14.44'	0.10	500	6748	6544	6340	NE	NE	77021	15	0.0015
Kbh_gr 365		62P/5	2883_02	167_35	28º46.08'	83º15.98'	0.03	315	5486	5334	5182	NE	NE	75021	7	0.0002
Kbh_gr 366		62P/5	2883_02	167_35	28º46.19'	83º16.24'	0.09	190	5657	5617	5578	E	E	75021	15	0.0013
Kbh_gr 367		62P/5	2883_02	167_35	28º46.28'	83º15.78'	0.32	880	5547	5349	5151	NE	NE	63321	26	0.0085
Kbh_gr 368		62P/5	2883_02	167_35	28º46.82'	83º15.41'	0.87	630	5639	5425	5212	E	E	60321	40	0.0346
Kbh_gr 369		62P/5	2883_02	167_35	28º47.44'	83º15.34'	0.28	690	5852	5654	5456	SE	SE	63021	25	0.0070
Kbh_gr 370		62P/5	2883_02	167_35	28º47.82'	83º15.93'	0.23	760	5425	5258	5090	SE	SE	63021	23	0.0053
Kbh_gr 371		62P/1	2883_01	167_35	28º47.98'	83º15.15'	0.72	440	5669	5441	5212	NE	NE	60321	37	0.0266
Kbh_gr 372		62P/1	2883_01	134_24	28º49.02'	83º14.10'	1.86	1900	6075	5720	5364	E	E	60321	53	0.0982
Kbh_gr 373		62P/1	2883_01	134_24	28º49.37'	83º15.03'	0.25	315	5669	5593	5517	NE	NE	77321	24	0.0059
Kbh_gr 374		62P/1	2883_01	134_24	28º49.75'	83º14.77'	0.26	990	5304	5105	4907	NE	NE	63021	24	0.0063

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 375		62P/1	2883_01	134_24	28º48.72'	83º13.53'	0.81	1580	6075	5674	5273	NW	NW	63021	39	0.0313
Kbh_gr 376		62P/1	2883_01	134_24	28º48.30'	83º13.64'	0.90	1580	6075	5735	5395	W	W	63021	40	0.0362
Kbh_gr 377		62P/1	2883_01	167_36	28º47.77'	83º13.87'	0.95	1580	6748	5980	5212	W	W	63021	41	0.0390
Kbh_gr 378		62P/1	2883_01	167_36	28º47.32'	83º14.00'	1.04	1580	6748	5995	5243	W	W	63021	43	0.0442
Kbh_gr 379		62P/1	2883_01	167_36	28º46.79'	83º13.98'	1.66	2215	6998	6105	5212	W	W	63021	51	0.0840
Kbh_gr 380		62P/1	2883_01	167_36	28º46.21'	83º13.71'	0.62	1390	6248	5776	5304	NW	NW	63021	35	0.0216
Kbh_gr 381		62P/1	2883_01	167_36	28º45.24'	83º12.12'	20.32	7600	7371	6139	4907	NE	N	52321	120	2.4386
Kbh_gr 382		62P/1	2883_01	167_36	28º46.16'	83º11.92'	0.11	570	5852	5700	5547	E	E	75022	16	0.0018
Kbh_gr 383		62P/1	2883_01	167_36	28º46.74'	83º11.99'	0.27	1260	6172	5860	5547	NE	NE	77021	25	0.0066
Kbh_gr 384		62P/1	2883_01	167_36	28º46.85'	83º11.91'	0.19	1260	6172	5966	5761	N	N	77021	21	0.0040
Kbh_gr 385		62P/1	2883_01	134_24	28º46.64'	83º11.18'	4.14	4750	6584	5928	5273	NE	NE	52021	70	0.2905
Kbh_gr 386		62P/1	2883_01	134_24	28º46.90'	83º10.31'	0.42	1260	6126	5814	5502	E	E	63021	30	0.0125
Kbh_gr 387		62P/1	2883_01	134_24	28º47.46'	83º10.45'	0.65	1900	6157	5776	5395	SE	SE	63021	35	0.0230
Kbh_gr 388		62P/1	2883_01	134_24	28º47.77'	83º10.40'	0.53	1260	6294	5845	5395	E	E	63021	33	0.0173
Kbh_gr 389		62P/1	2883_01	134_24	28º48.17'	83º10.80'	0.09	630	5700	5563	5425	NE	NE	75022	15	0.0013
Kbh_gr 390		62P/1	2883_01	134_24	28º48.41'	83º10.61'	0.54	1580	5639	5349	5060	NE	NE	63321	33	0.0178
Kbh_gr 391		62P/1	2883_01	134_24	28º48.39'	83º10.02'	0.74	2215	6294	5707	5121	NE	NE	63021	37	0.0276
Kbh_gr 392		62P/1	2883_01	134_24	28º49.11'	83º10.05'	0.24	990	5608	5425	5243	NE	NE	75021	23	0.0056
Kbh_gr 393		62P/1	2883_01	134_24	28º49.85'	83º 9.86'	0.43	990	5730	5547	5364	S	S	63021	30	0.0129
Kbh_gr 394		62P/1	2883_01	134_24	28º50.02'	83º10.54'	0.33	1260	5608	5456	5304	NE	NE	37021	27	0.0089
Kbh_gr 395		62P/1	2883_01	134_24	28º49.99'	83º 9.45'	0.11	500	5639	5486	5334	NW	NW	77021	16	0.0018
Kbh_gr 396		62P/1	2883_01	134_24	28º47.88'	83º10.00'	0.22	440	6294	6043	5791	W	W	77321	22	0.0049
Kbh_gr 397		62P/1	2883_01	134_22	28º45.95'	83º 8.19'	13.10	10130	7246	5985	4724	NE	N	52021	104	1.3599
Kbh_gr 398		62P/1	2883_01	134_22	28º46.22'	83º 7.09'	0.54	1260	5913	5685	5456	E	E	75022	33	0.0178
Kbh_gr 399		62P/1	2883_01	134_22	28º46.62'	83º 7.49'	0.63	1260	6066	5776	5486	E	E	75021	35	0.0221
Kbh_gr 400		62P/1	2883_01	134_22	28º47.01'	83º 7.68'	0.09	500	6087	5863	5639	S	S	75021	15	0.0013
Kbh_gr 401		62P/1	2883_01	167_40	28º47.11'	83º 7.97'	0.11	315	5578	5471	5364	E	E	75022	16	0.0018
Kbh_gr 402		62P/1	2883_01	167_40	28º47.29'	83º 8.39'	0.15	570	5761	5654	5547	SE	SE	75022	19	0.0028
Kbh_gr 403		62P/1	2883_01	167_40	28º47.36'	83º 7.74'	0.14	315	6066	5883	5700	NE	NE	37021	18	0.0025
Kbh_gr 404		62P/1	2883_01	167_40	28º47.01'	83º 6.32'	7.25	5700	6536	5676	4816	NE	NE	52021	85	0.6169
Kbh_gr 405		62P/1	2883_01	167_40	28º47.15'	83º 6.89'	0.13	500	5364	5243	5121	N	N	75022	18	0.0023
Kbh_gr 406		62P/1	2883_01	134_20	28º47.46'	83º 5.34'	1.15	2215	5915	5579	5243	E	E	63021	44	0.0508
Kbh_gr 407		62P/1	2883_01	134_20	28º48.00'	83º 5.67'	1.53	2215	5761	5502	5243	E	E	62021	49	0.0752
Kbh_gr 408		62P/1	2883_01	134_20	28º48.91'	83º 5.57'	1.43	2215	5791	5502	5212	NE	NE	63321	48	0.0685
Kbh_gr 409		62P/1	2883_01	134_20	28º49.89'	83º 5.24'	2.20	1900	5547	5410	5273	NE	NE	62021	56	0.1234
Kbh_gr 410		62P/1	2883_01	134_20	28º50.17'	83º 4.70'	0.05	380	5585	5536	5486	SE	SE	37021	10	0.0005
Kbh_gr 411		62P/1	2883_01	134_20	28º50.35'	83º 4.45'	0.22	570	5304	5144	4983	N	N	64021	22	0.0049
Kbh_gr 412		62P/1	2883_01	134_20	28º48.53'	83º 5.03'	2.06	3160	5761	5425	5090	NW	NW	63321	55	0.1128
Kbh_gr 413		62P/1	2883_01	134_20	28º47.27'	83º 4.09'	2.89	1900	5852	5410	4968	N	N	60321	62	0.1787
Kbh_gr 414		62P/1	2883_01	134_19	28º47.82'	83º 1.14'	0.46	440	5639	5425	5212	NE	NE	37021	31	0.0142
Kbh_gr 415		62P/1	2883_01	134_19	28º48.10'	83º 0.48'	0.24	500	5639	5456	5273	NW	NW	37021	23	0.0056
Kbh_gr 416		62L/13	2882_04	134_19	28º48.13'	82º59.96'	0.28	380	5578	5456	5334	N	N	37021	25	0.0070
Kbh_gr 417		62P/1	2883_01	134_19	28º47.82'	83º 0.05'	0.55	990	5547	5441	5334	SW	SW	60321	33	0.0182

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kbh_gr 418		62P/1	2883_01	134_19	28º47.67'	83º 0.80'	0.45	1260	5639	5349	5060	S	S	60021	31	0.0137
Kbh_gr 419		62P/1	2883_01	134_19	28º47.48'	83º 1.88'	0.16	990	5334	5227	5121	E	E	75021	19	0.0031
Kbh_gr 420		62P/1	2883_01	134_19	28º47.50'	83º 2.59'	0.19	570	5304	5212	5121	S	S	75021	21	0.0040
Kbh_gr 421		62P/1	2883_01	137_41	28º46.43'	83º 3.12'	4.61	2340	5852	5380	4907	W	W	60321	73	0.3358
Kbh_gr 422		62P/1	2883_01	137_41	28º45.86'	83º 1.88'	0.47	990	5273	5136	4999	NE	NE	60321	31	0.0146
Kbh_gr 423		62P/1	2883_01	137_41	28º45.57'	83º 1.46'	0.13	760	5182	5075	4968	N	N	75021	18	0.0023
Kbh_gr 424		62P/1	2883_01	137_41	28º45.33'	83º 2.54'	0.25	880	5151	5075	4999	NW	NW	75021	24	0.0059
Kbh_gr 425		62P/1	2883_01	167_40	28º46.51'	83º 4.08'	0.43	990	5852	5502	5151	S	S	63021	30	0.0129
Kbh_gr 426		62P/1	2883_01	167_40	28º46.01'	83º 4.79'	1.56	3800	5608	5090	4572	S	S	52012	49	0.0772
Kbh_gr 427		62P/1	2883_01	167_40	28º45.50'	83º 5.50'	0.13	370	5273	5166	5060	SW	SW	75022	18	0.0023
Kbh_gr 428		62P/1	2883_01	167_40	28º45.53'	83º 5.85'	0.14	440	5608	5456	5304	SW	SW	75022	18	0.0025
Kbh_gr 429		62P/2	2883_05	167_39	28º44.43'	83º 6.08'	0.82	990	5517	5212	4907	W	W	60021	39	0.0318
Kbh_gr 430		62P/2	2883_05	167_39	28º43.97'	83º 6.22'	0.04	190	5608	5532	5456	S	S	75021	9	0.0004
Kbh_gr 431		62P/2	2883_05	167_39	28º44.23'	83º 6.74'	0.28	1140	5974	5532	5090	S	S	77321	25	0.0070
Kbh_gr 432		62P/2	2883_05	167_39	28º44.52'	83º 6.93'	0.06	315	6706	6492	6279	S	S	77321	12	0.0007
Kbh_gr 433		62P/2	2883_05	167_39	28º43.79'	83º 6.77'	0.10	500	5243	5166	5090	S	S	63021	15	0.0015
Kbh_gr 434		62P/2	2883_05	167_39	28º43.26'	83º 6.90'	0.25	440	5395	5304	5212	SE	SE	62321	24	0.0059
Kbh_gr 435		62P/2	2883_05	167_39	28º43.97'	83º 7.82'	1.73	1580	5700	5410	5121	SW	SW	77021	51	0.0889
Kbh_gr 436		62P/2	2883_05	167_39	28º44.63'	83º 7.46'	0.57	440	6706	6294	5883	SE	SE	77321	34	0.0192
Kbh_gr 437		62P/2	2883_05	167_38	28º43.52'	83º 8.40'	0.44	1260	6096	5608	5121	SW	SW	77021	30	0.0133
Kbh_gr 438		62P/2	2883_05	167_38	28º43.19'	83º 8.74'	0.08	630	5669	5517	5364	S	S	77321	14	0.0011
Kbh_gr 439		62P/2	2883_05	167_38	28º42.78'	83º 8.82'	0.14	440	5730	5471	5212	SW	SW	77321	18	0.0025
Kbh_gr 440		62P/2	2883_05	167_38	28º42.05'	83º 9.10'	0.03	315	5489	5320	5151	SW	SW	77021	7	0.0002
Kbh_gr 441		62P/2	2883_05	167_38	28º41.85'	83º 8.88'	0.22	630	5121	5044	4968	NW	NW	63021	22	0.0049
Kbh_gr 442		62P/2	2883_05	167_38	28º42.22'	83º 9.47'	1.09	1260	5489	5244	4999	E	E	63321	43	0.0472
Kbh_gr 443		62P/2	2883_05	167_37	28º43.95'	83º10.47'	14.56	4430	7246	6016	4785	SE	SE	60321	108	1.5654
Kbh_gr 444		62P/2	2883_05	167_37	28º42.46'	83º14.25'	39.82	3800	7268	6003	4738	S	S	60021	149	5.9484
Kbh_gr 445		62P/2	2883_05	166_6	28º40.64'	83º12.16'	3.86	3160	6529	5657	4785	N	N	60021	68	0.2643
Kbh_gr 446		62P/2	2883_05	166_6	28º41.14'	83º11.22'	0.10	630	4846	4724	4602	W	W	77021	15	0.0015
Kbh_gr 447		62L/14	2882_08	164_19	28º34.04'	82º58.93'	0.25	500	4481	4282	4084	W	W	77021	24	0.0059
Kbh_gr 448		62L/9	2882_03	134_8	28º49.79'	82º37.95'	0.81	630	4968	4907	4846	SE	SE	67021	39	0.0313
Kbh_gr 449		62L/9	2882_03	134_8	28º50.26'	82º37.55'	0.41	315	5858	5733	5608	Open	Open	37021	29	0.0121
Kbh_gr 450		62L/9	2882_03	134_8	28º49.40'	82º36.91'	0.36	990	5841	5572	5304	S	S	77021	28	0.0100
Kbh_gr 451		62L/9	2882_03	134_8	28º48.91'	82º36.74'	0.04	315	5212	5121	5029	S	S	75022	9	0.0004
Kbh_gr 452		62L/9	2882_03	134_8	28º48.74'	82º36.62'	0.01	190	5060	5014	4968	S	S	75022	2	0.0001

Glacier Inventory of Tila Basin

Total Number : 58 Total Area : 54.69 (km^2) Ice Reserve : 3.75 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kti_gr 1		62K/7	2982_10	144_8	29º27.79'	82º27.79'	0.07	440	5182	5090	4999	NW	NW	75022	13	0.0009
Kti_gr 2		62K/7	2982_10	144_8	29º27.54'	82º27.54'	0.12	630	5425	5166	4907	W	W	75021	17	0.0020
Kti_gr 3		62K/7	2982_10	144_8	29º27.43'	82º27.43'	0.06	250	4907	4831	4755	W	W	60022	12	0.0007
Kti_gr 4		62K/7	2982_10	144_8	29º27.15'	82º27.15'	0.72	1140	4724	4602	4481	NW	NW	60022	37	0.0266
Kti_gr 5		62K/7	2982_10	144_8	29º26.92'	82º26.92'	0.46	630	5464	5170	4877	N	N	37021	31	0.0142
Kti_gr 6		62K/7	2982_10	144_8	29º26.97'	82º26.97'	0.26	350	5182	5090	4999	NW	NW	67022	24	0.0063
Kti_gr 7		62K/7	2982_10	144_8	29º26.75'	82º26.75'	0.07	250	5060	4968	4877	NW	NW	75022	13	0.0009
Kti_gr 8		62K/7	2982_10	144_8	29º26.56'	82º26.56'	0.06	380	5182	5105	5029	SW	SW	75022	12	0.0007
Kti_gr 9		62K/7	2982_10	144_8	29º26.33'	82º26.33'	0.73	1520	5464	5186	4907	SW	SW	63021	37	0.0271
Kti_gr 10		62K/7	2982_10	144_9	29º26.55'	82º26.55'	0.03	150	4938	4892	4846	S	S	75022	7	0.0002
Kti_gr 11		62K/7	2982_10	144_10	29º26.36'	82º26.36'	0.14	440	5151	5075	4999	SW	SW	64022	18	0.0025
Kti_gr 12		62K/7	2982_10	144_10	29º26.03'	82º26.03'	0.03	250	5029	4953	4877	SW	SW	75022	7	0.0002
Kti_gr 13		62K/7	2982_10	144_10	29º26.44'	82º26.44'	1.11	760	5545	5257	4968	E	E	60021	44	0.0484
Kti_gr 14		62K/7	2982_10	144_10	29º27.70'	82º27.70'	1.56	630	5456	5197	4938	SE	SE	60021	49	0.0772
Kti_gr 15		62K/7	2982_10	144_10	29º28.48'	82º28.48'	0.13	250	5557	5445	5334	SE	SE	37021	18	0.0023
Kti_gr 16		62K/7	2982_10	143_8	29º25.30'	82º25.30'	1.51	1450	5328	5194	5060	NW	NW	63321	49	0.0738
Kti_gr 17		62K/7	2982_10	143_8	29º24.84'	82º24.84'	0.13	250	5328	5179	5029	SW	SW	60021	18	0.0023
Kti_gr 18		62K/7	2982_10	143_8	29º24.81'	82º24.81'	0.16	630	5304	5166	5029	S	S	60021	19	0.0031
Kti_gr 19		62K/11	2982_11	143_8	29º24.05'	82º24.05'	0.16	440	4816	4679	4542	SE	SE	67021	19	0.0031
Kti_gr 20		62K/11	2982_11	143_8	29º24.50'	82º24.50'	0.54	990	5060	4846	4633	S	S	67021	33	0.0178
Kti_gr 21		62K/11	2982_11	143_9	29º24.80'	82º24.80'	0.72	820	5090	4892	4694	SW	SW	67021	37	0.0266
Kti_gr 22		62K/11	2982_11	143_9	29º24.13'	82º24.13'	8.36	2025	6627	5676	4724	SW	SW	60021	89	0.7465
Kti_gr 23		62K/11	2982_11	143_9	29º22.23'	82º22.23'	0.07	500	5395	5227	5060	SW	SW	75021	13	0.0009
Kti_gr 24		62K/11	2982_11	143_9	29º22.54'	82º22.54'	1.26	1450	4877	4572	4267	NW	NW	63021	46	0.0576
Kti_gr 25		62K/11	2982_11	143_9	29º22.36'	82º22.36'	0.60	1450	4877	4526	4176	NW	NW	63021	34	0.0206
Kti_gr 26		62K/11	2982_11	143_9	29º21.99'	82º21.99'	0.04	380	4846	4755	4663	SW	SW	75022	9	0.0004
Kti_gr 27		62K/11	2982_11	143_9	29º21.97'	82º21.97'	0.30	630	5151	4938	4724	SW	SW	67021	26	0.0077
Kti_gr 28		62K/11	2982_11	143_9	29º21.66'	82º21.66'	0.06	250	4602	4511	4420	SW	SW	75022	12	0.0007
Kti_gr 29		62K/11	2982_11	142_44	29º21.72'	82º21.72'	4.86	1580	5973	5227	4481	SW	SW	60021	74	0.3605
Kti_gr 30		62K/11	2982_11	142_44	29º19.91'	82º19.91'	1.15	1260	5792	5289	4785	SW	SW	60021	44	0.0508

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kti_gr 31		62K/11	2982_11	142_45	29º18.56'	82º18.56'	14.21	8870	6386	5205	4023	NW	NW	52011	107	1.5155
Kti_gr 32		62K/11	2982_11	142_45	29º19.52'	82º19.52'	0.13	530	4572	4488	4404	NW	NW	75022	18	0.0023
Kti_gr 33		62K/11	2982_11	142_45	29º18.31'	82º18.31'	2.79	2530	6111	5387	4663	NE	NE	60021	61	0.1704
Kti_gr 34		62K/11	2982_11	142_45	29º19.72'	82º19.72'	0.55	1260	4816	4618	4420	NE	NE	63022	33	0.0182
Kti_gr 35		62K/11	2982_11	142_46	29º19.54'	82º19.54'	1.17	1260	4968	4770	4572	NE	NE	62021	44	0.0520
Kti_gr 36		62K/11	2982_11	142_46	29º20.13'	82º20.13'	0.52	1140	4755	4656	4557	NE	NE	63021	32	0.0169
Kti_gr 37		62K/11	2982_11	142_46	29º20.48'	82º20.48'	0.40	1140	4755	4633	4511	NE	NE	63021	29	0.0116
Kti_gr 38		62K/11	2982_11	142_46	29º19.71'	82º19.71'	0.18	820	4816	4663	4511	W	W	75021	20	0.0037
Kti_gr 39		62K/11	2982_11	142_46	29º19.28'	82º19.28'	0.21	570	4846	4747	4648	NW	NW	64021	22	0.0046
Kti_gr 40		62K/11	2982_11	142_46	29º18.29'	82º18.29'	0.37	500	5334	5044	4755	SW	SW	37021	28	0.0104
Kti_gr 41		62K/11	2982_11	142_46	29º18.14'	82º18.14'	0.42	990	4877	4724	4572	NW	NW	63022	30	0.0125
Kti_gr 42		62K/11	2982_11	141_8	29º17.35'	82º17.35'	0.06	315	6096	5974	5852	SW	SW	67021	12	0.0007
Kti_gr 43		62K/11	2982_11	141_8	29º17.10'	82º17.10'	0.17	250	5486	5334	5182	SW	SW	75022	20	0.0034
Kti_gr 44		62K/11	2982_11	141_8	29º17.00'	82º17.00'	0.25	630	6386	6012	5639	SW	SW	37321	24	0.0059
Kti_gr 45		62K/11	2982_11	141_8	29º16.17'	82º16.17'	0.52	1140	4633	4542	4450	SW	SW	53022	32	0.0169
Kti_gr 46		62K/11	2982_11	141_8	29º15.31'	82º15.31'	0.25	760	5488	5243	4999	NW	NW	37021	24	0.0059
Kti_gr 47		62K/11	2982_11	141_8	29º15.16'	82º15.16'	0.06	760	5334	5166	4999	NW	NW	37021	12	0.0007
Kti_gr 48		62K/12	2982_15	141_8	29º14.65'	82º14.65'	2.71	1900	5456	5090	4724	SW	SW	60021	60	0.1638
Kti_gr 49		62K/12	2982_15	140_9	29º13.39'	82º13.39'	1.43	1580	5944	5403	4862	SW	SW	62021	48	0.0685
Kti_gr 50		62K/12	2982_15	140_9	29º12.66'	82º12.66'	0.25	1015	5700	5288	4877	SW	SW	75021	24	0.0059
Kti_gr 51		62K/12	2982_15	140_9	29º12.37'	82º12.37'	0.35	760	5486	5250	5014	SW	SW	62021	28	0.0096
Kti_gr 52		62K/12	2982_15	140_9	29º12.15'	82º12.15'	0.21	630	5547	5258	4968	SW	SW	75021	22	0.0046
Kti_gr 53		62K/12	2982_15	140_9	29º11.91'	82º11.91'	0.55	1390	5425	5105	4785	SW	SW	63021	33	0.0182
Kti_gr 54		62K/12	2982_15	140_9	29º11.93'	82º11.93'	0.08	315	5806	5677	5547	SW	SW	75021	14	0.0011
Kti_gr 55		62K/12	2982_15	140_9	29º11.71'	82º11.71'	0.21	1140	5791	5395	4999	SW	SW	75021	22	0.0046
Kti_gr 56		62K/12	2982_15	140_9	29º11.50'	82º11.50'	0.25	1070	5791	5410	5029	SW	SW	75021	24	0.0059
Kti_gr 57		62K/12	2982_15	140_9	29º11.37'	82º11.37'	0.78	1260	5639	5334	5029	SW	SW	63021	38	0.0297
Kti_gr 58		62K/12	2982_15	140_9	29º11.19'	82º11.19'	0.19	760	5639	5410	5182	SW	SW	70021	21	0.0040

Glacier Inventory of Humla Basin

Total Number :424 Total Area : 534.53 (km^2) Ice Reserve : 36.006 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Khu_gr 1		62G/9	2981_03	151_5	29º54.64'	81º44.33'	0.23	570	4968	4881	4793	NW	NW	63021	23	0.0053
Khu_gr 2		62G/9	2981_03	151_5	29º54.95'	81º43.84'	0.15	760	5014	4858	4702	NW	NW	75021	19	0.0028
Khu_gr 3		62G/9	2981_03	151_5	29º54.89'	81º43.12'	0.05	222	4846	4782	4717	NE	NE	75021	10	0.0005
Khu_gr 4		62G/9	2981_03	152_2	29º57.02'	81º41.49'	0.10	348	5273	5151	5029	NE	NE	67021	15	0.0015
Khu_gr 5		62G/9	2981_03	152_2	29º57.07'	81º41.27'	0.07	348	5456	5250	5044	N	N	67021	13	0.0009
Khu_gr 6		62G/9	2981_03	152_2	29º59.44'	81º40.33'	0.23	634	5547	5288	5029	NW	NW	67021	23	0.0053
Khu_gr 7		62G/9	2981_03	152_2	29º59.22'	81º40.25'	0.23	570	5547	5448	5349	NW	NW	67021	23	0.0053
Khu_gr 8		62G/9	2981_03	152_1	29º56.48'	81º34.49'	0.51	1457	4892	4736	4580	W	W	63021	32	0.0164
Khu_gr 9		62G/9	2981_03	170_19	29º56.13'	81º31.70'	2.82	2408	5791	5410	5029	N	N	60021	61	0.1729
Khu_gr 10		62G/9	2981_03	170_19	29º55.91'	81º31.00'	0.19	190	6234	6089	5944	N	N	67021	21	0.0040
Khu_gr 11		62G/9	2981_03	168_7	29º57.13'	81º30.89'	0.42	950	5486	5265	5044	NE	NE	63021	30	0.0125
Khu_gr 12		62G/9	2981_03	168_7	29º56.51'	81º30.03'	1.14	2304	5471	5197	4923	SW	SW	63021	44	0.0502
Khu_gr 13		62G/9	2981_03	168_7	29º56.08'	81º30.34'	0.09	412	6234	6074	5913	W	W	67021	15	0.0013
Khu_gr 14		62G/9	2981_03	168_7	29º54.77'	81º28.96'	20.50	8850	7031	5649	4267	N	N	51012	120	2.4674
Khu_gr 15		62G/5	2981_02	169_8	29º54.94'	81º28.07'	0.33	700	5959	5768	5578	E	E	75021	27	0.0089
Khu_gr 16		62G/5	2981_02	153_12	30º 0.12'	81º30.52'	0.53	1394	5517	5243	4968	S	S	63021	33	0.0173
Khu_gr 17		62F/12	3081_15	153_12	30º 0.04'	81º31.02'	0.25	760	5395	5212	5029	SE	SE	63021	24	0.0059
Khu_gr 18		62F/12	3081_15	153_12	30º 0.10'	81º32.66'	0.35	824	5395	5273	5151	SE	SE	60021	28	0.0096
Khu_gr 19		62F/12	3081_15	153_12	30º 0.71'	81º32.35'	0.45	1077	5243	5029	4816	NE	NE	75021	31	0.0137
Khu_gr 20		62F/12	3081_15	153_12	30º 0.94'	81º31.59'	0.63	950	5151	5006	4862	NE	NE	75021	35	0.0221
Khu_gr 21		62F/12	3081_15	153_12	30º 1.27'	81º31.10'	0.08	380	5029	4953	4877	NE	NE	75021	14	0.0011
Khu_gr 22		62F/12	3081_15	153_12	30º 0.91'	81º30.19'	1.53	2788	5700	*	*	NW	NW	63021	49	0.0752
Khu_gr 23		62F/12	3081_15	153_12	30º 0.30'	81º29.89'	0.46	1457	5502	*	*	NW	NW	63021	31	0.0142
Khu_gr 24		62F/8	3081_14	153_11	30º 0.05'	81º28.09'	0.62	450	5581	*	*	N	N	60021	35	0.0216
Khu_gr 25		62F/8	3081_14	153_11	30º 0.70'	81º27.13'	1.35	2091	*	*	*	NE	NE	62021	47	0.0633
Khu_gr 26		62F/8	3081_14	153_11	30º 1.08'	81º26.12'	0.44	1964	*	*	*	NE	NE	63021	30	0.0133
Khu_gr 27		62F/8	3081_14	153_11	30º 2.85'	81º26.15'	0.12	824	*	*	*	SE	SE	75021	17	0.0020
Khu_gr 28		62F/8	3081_14	153_7	30º 2.92'	81º25.79'	0.11	190	*	*	*	SE	SE	75021	16	0.0018
Khu_gr 29		62F/8	3081_14	153_7	30º 1.91'	81º20.80'	1.08	3168	*	*	*	NE	NE	63021	43	0.0466
Khu_gr 30		62F/8	3081_14	153_7	30º 1.95'	81º19.45'	1.01	2281	*	*	*	NE	NE	63021	42	0.0425

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 31		62F/8	3081_14	153_7	30º 2.95'	81º20.30'	1.05	3168	*	*	*	NE	NE	63021	43	0.0448
Khu_gr 32		62F/8	3081_14	171_13	30º 2.53'	81º17.67'	0.45	1077	*	*	*	NE	NE	63021	31	0.0137
Khu_gr 33		62F/8	3081_14	171_13	30º 3.09'	81º16.71'	0.96	2408	*	*	*	NE	NE	63021	41	0.0396
Khu_gr 34		62F/8	3081_14	172_10	30º 5.47'	81º18.23'	0.51	1711	*	*	*	E	E	63021	32	0.0164
Khu_gr 35		62F/8	3081_14	172_10	30º 5.70'	81º17.86'	0.18	950	*	*	*	SE	SE	63021	20	0.0037
Khu_gr 36		62F/8	3081_14	172_10	30º 6.22'	81º18.41'	0.48	1204	*	*	*	N	N	63021	31	0.0151
Khu_gr 37		62F/8	3081_14	155_29	30º 8.04'	81º20.39'	2.70	2091	*	*	*	SE	SE	62021	60	0.1630
Khu_gr 38		62F/7	3081_10	213_12	30º14.92'	81º24.42'	2.80	2344	6424	5802	5182	SW	SW	60021	61	0.1712
Khu_gr 39		62F/7	3081_10	213_12	30º15.77'	81º25.25'	0.60	1267	5578	5288	4999	SW	SW	62021	34	0.0206
Khu_gr 40		62F/7	3081_10	213_12	30º15.01'	81º25.65'	0.04	253	4656	*	*	S	S	75021	9	0.0004
Khu_gr 41		62F/7	3081_10	157_26	30º15.83'	81º28.28'	3.78	3358	5852	5532	5212	NE	NE	62021	68	0.2569
Khu_gr 42		62F/7	3081_10	157_26	30º16.80'	81º28.16'	0.45	824	5822	5639	5456	NE	NE	75021	31	0.0137
Khu_gr 43		62F/7	3081_10	157_26	30º16.71'	81º26.52'	9.02	5005	5944	5467	4991	NE	NE	62021	92	0.8264
Khu_gr 44		62F/7	3081_10	157_25	30º17.57'	81º25.02'	1.33	3358	6218	5806	5395	E	E	63021	47	0.0620
Khu_gr 45		62F/7	3081_10	157_25	30º17.86'	81º24.82'	0.20	507	5913	5836	5761	NE	NE	75021	22	0.0043
Khu_gr 46		62F/7	3081_10	157_25	30º18.05'	81º25.24'	0.12	634	6401	6172	5944	SW SW	SW	75021	17	0.0020
Khu_gr 47		62F/7	3081_10	157_25	30º18.34'	81º25.52'	0.04	317	6248	6096	5944	E	E	75021	9	0.0004
Khu_gr 48		62F/7	3081_10	158_24	30º19.61'	81º24.14'	0.51	1140	6005	5860	5715	E	E	63021	32	0.0164
Khu_gr 49		62F/7	3081_10	158_24	30º20.62'	81º24.45'	0.24	507	6005	5890	5776	NE	NE	63021	23	0.0056
Khu_gr 50		62F/7	3081_10	158_24	30º19.33'	81º26.73'	2.26	2218	5974	5723	5471	SE	SE	62021	57	0.1280
Khu_gr 51		62F/7	3081_10	213_14	30º19.97'	81º26.24'	0.26	444	6035	5944	5852	S	S	67021	24	0.0063
Khu_gr 52		62F/7	3081_10	213_14	30º19.45'	81º28.51'	0.34	760	5456	5384	5311	E	E	63021	27	0.0092
Khu_gr 53		62F/7	3081_10	213_14	30º19.68'	81º27.92'	0.29	950	5593	5502	5410	NE	NE	63021	25	0.0074
Khu_gr 54		62F/7	3081_10	213_14	30º20.16'	81º27.37'	0.28	1077	5593	5601	5608	S	S	63021	25	0.0070
Khu_gr 55		62F/7	3081_10	213_14	30º20.62'	81º27.13'	1.12	1584	5974	5723	5471	SE	SE	63021	44	0.0490
Khu_gr 56		62F/7	3081_10	213_14	30º20.51'	81º26.25'	3.39	2344	6035	5768	5502	NE	NE	62021	65	0.2218
Khu_gr 57		62F/7	3081_10	158_24	30º21.41'	81º24.62'	0.41	760	6005	5867	5730	NE	NE	67021	29	0.0121
Khu_gr 58		62F/7	3081_10	158_24	30º21.80'	81º24.23'	0.28	887	5974	5867	5761	E	E	63021	25	0.0070
Khu_gr 59		62F/7	3081_10	158_24	30º22.10'	81º24.17'	0.24	760	5944	5848	5753	E	E	63021	23	0.0056
Khu_gr 60		62F/15	3081_12	158_24	30º22.28'	81º50.34'	0.20	570	6279	6187	6096	E	E	63021	22	0.0043
Khu_gr 61		62F/15	3081_12	159_14	30º22.03'	81º51.21'	0.30	634	6096	5913	5730	W	W	67021	26	0.0077
Khu_gr 62		62F/15	3081_12	159_14	30º22.19'	81º51.54'	1.31	1394	6096	5909	5723	SE	SE	62021	46	0.0608
Khu_gr 63		62F/15	3081_12	159_14	30º21.97'	81º52.41'	0.44	1140	6005	5898	5791	NW	NW	63021	30	0.0133
Khu_gr 64		62F/15	3081_12	158_14	30º20.03'	81º51.70'	2.56	2154	6066	5799	5532	N	N	62021	59	0.1516
Khu_gr 65		62F/15	3081_12	158_14	30º20.41'	81º50.79'	0.39	1140	5883	5730	5578	N	N	63021	29	0.0112
Khu_gr 66		62F/15	3081_12	158_14	30º20.36'	81º49.83'	0.31	760	6096	5928	5761	NE	NE	63021	26	0.0081
Khu_gr 67		62F/15	3081_12	158_14	30º20.37'	81º49.59'	0.35	697	6096	5936	5776	NW	NW	67021	28	0.0096
Khu_gr 68		62F/15	3081_12	158_14	30º20.44'	81º48.80'	0.09	444	5921	5852	5784	N	N	75021	15	0.0013
Khu_gr 69		62F/15	3081_12	158_14	30º19.45'	81º49.44'	0.53	697	6096	5837	5578	N	N	60021	33	0.0173
Khu_gr 70		62F/15	3081_12	158_14	30º19.23'	81º49.00'	0.23	760	6096	5913	5730	NW	NW	63021	23	0.0053
Khu_gr 71		62F/15	3081_12	158_14	30º19.14'	81º49.37'	0.06	253	6142	6104	6066	SW	SW	77021	12	0.0007
Khu_gr 72		62F/15	3081_12	158_14	30º19.25'	81º49.70'	0.42	1140	6142	5959	5776	NE	NE	63021	30	0.0125
Khu_gr 73		62F/15	3081_12	158_14	30º20.03'	81º50.47'	0.67	1331	6066	5890	5715	W	W	63021	36	0.0240

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 74		62F/15	3081_12	158_14	30º19.65'	81º51.21'	0.07	127	6142	6058	5974	SW	SW	77021	13	0.0009
Khu_gr 75		62F/15	3081_12	158_14	30º19.39'	81º51.40'	0.06	253	6081	6012	5944	SW	SW	77021	12	0.0007
Khu_gr 76		62F/15	3081_12	158_14	30º19.23'	81º50.98'	0.25	824	5471	5372	5273	NW	NW	63021	24	0.0059
Khu_gr 77		62F/15	3081_12	158_14	30º19.24'	81º51.62'	0.10	444	6050	5944	5837	SE	SE	77021	15	0.0015
Khu_gr 78		62F/15	3081_12	158_13	30º19.72'	81º53.02'	0.32	444	6172	5966	5761	SW	SW	67021	26	0.0085
Khu_gr 79		62F/15	3081_12	158_13	30º18.76'	81º52.86'	0.71	1014	5974	5791	5608	NW	NW	67021	37	0.0261
Khu_gr 80		62F/15	3081_12	158_13	30º17.90'	81º51.93'	1.90	2154	5761	5654	5547	N	N	62021	53	0.1011
Khu_gr 81		62F/15	3081_12	157_15	30º17.08'	81º50.91'	2.99	2851	6035	5723	5410	N	N	62021	63	0.1871
Khu_gr 82		62F/15	3081_12	157_15	30º17.33'	81º50.26'	0.10	444	5700	5616	5532	NW	NW	75021	15	0.0015
Khu_gr 83		62F/15	3081_12	157_15	30º17.36'	81º49.48'	0.11	1331	5822	5601	5380	NW	NW	63021	16	0.0018
Khu_gr 84		62F/15	3081_12	157_15	30º17.17'	81º48.76'	0.49	634	5578	5471	5364	N	N	75021	32	0.0155
Khu_gr 85		62F/15	3081_12	157_15	30º17.27'	81º48.06'	0.10	444	5852	5776	5700	S	S	75021	15	0.0015
Khu_gr 86		62F/15	3081_12	157_14	30º16.27'	81º51.42'	0.15	190	6126	6005	5883	S	S	77021	19	0.0028
Khu_gr 87		62F/15	3081_12	157_14	30º16.64'	81º51.82'	1.34	2344	6126	5784	5441	SE	SE	63021	47	0.0627
Khu_gr 88		62F/15	3081_12	157_14	30º16.59'	81º53.08'	0.25	1077	5822	5692	5563	NW	NW	75021	24	0.0059
Khu_gr 89		62F/15	3081_12	157_14	30º16.30'	81º53.00'	0.13	634	5791	5685	5578	NW	NW	75021	18	0.0023
Khu_gr 90		62F/15	3081_12	157_14	30º15.65'	81º53.03'	0.12	634	5822	5704	5585	NW	NW	75021	17	0.0020
Khu_gr 91		62F/16	3081_16	157_13	30º14.90'	81º52.99'	0.44	824	5624	5532	5441	NW	NW	63021	30	0.0133
Khu_gr 92		62F/16	3081_16	157_13	30º12.63'	81º52.78'	0.08	253	5889	5947	6005	W	W	77021	14	0.0011
Khu_gr 93		62F/16	3081_16	156_19	30º11.13'	81º51.47'	15.24	9060	5974	5444	4915	NW	NW	52012	109	1.6635
Khu_gr 94		62F/16	3081_16	156_19	30º10.84'	81º49.79'	3.49	4245	5913	5429	4945	N	N	53052	66	0.2307
Khu_gr 95		62F/16	3081_16	156_19	30º10.35'	81º48.72'	9.09	5512	6108	5519	4930	NE	NE	52012	92	0.8349
Khu_gr 96		62F/16	3081_16	156_18	30º10.71'	81º47.44'	2.11	2408	5845	5582	5319	NE	NE	62021	55	0.1166
Khu_gr 97		62F/16	3081_16	156_18	30º11.24'	81º47.12'	0.87	1140	5624	5544	5464	E	E	63021	40	0.0346
Khu_gr 98		62F/16	3081_16	156_18	30º11.90'	81º46.97'	0.18	634	6115	5938	5761	S	S	77021	20	0.0037
Khu_gr 99		62F/16	3081_16	156_18	30º12.14'	81º47.49'	0.19	760	6200	6018	5837	SE	SE	77021	21	0.0040
Khu_gr 100		62F/16	3081_16	156_18	30º12.29'	81º48.19'	0.24	634	6050	5738	5425	SE	SE	77021	23	0.0056
Khu_gr 101		62F/16	3081_16	156_18	30º12.56'	81º47.74'	0.89	1584	6050	5700	5349	NE	NE	63021	40	0.0357
Khu_gr 102		62F/16	3081_16	156_18	30º12.48'	81º46.60'	1.88	2661	6115	5785	5456	NW	NW	63021	53	0.0996
Khu_gr 103		62F/16	3081_16	156_18	30º12.33'	81º45.57'	1.31	1964	5883	5650	5418	N	N	63021	46	0.0608
Khu_gr 104		62F/16	3081_16	156_18	30º11.89'	81º46.73'	0.33	760	6115	5862	5608	SW	SW	77021	27	0.0089
Khu_gr 105		62F/12	3081_15	156_18	30º10.95'	81º45.94'	3.25	2344	5916	5518	5121	NW	NW	60021	64	0.2095
Khu_gr 106		62F/12	3081_15	156_17	30º 9.48'	81º39.81'	0.48	824	4968	4816	4663	NE	NE	63021	31	0.0151
Khu_gr 107		62F/12	3081_15	156_17	30º 9.52'	81º39.45'	0.46	950	4999	4831	4663	NE	NE	63021	31	0.0142
Khu_gr 108		62F/12	3081_15	156_17	30º10.45'	81º38.78'	1.12	1204	5486	5296	5105	SE	SE	63021	44	0.0490
Khu_gr 109		62F/12	3081_15	156_17	30º10.87'	81º39.41'	0.66	824	5466	5293	5121	SE	SE	60021	36	0.0235
Khu_gr 110		62F/12	3081_15	156_17	30º12.32'	81º40.87'	0.52	1584	5182	4923	4663	NE	NE	63021	32	0.0169
Khu_gr 111		62F/12	3081_15	156_17	30º11.06'	81º38.17'	8.05	4752	5898	5311	4724	NE	NE	62321	88	0.7097
Khu_gr 112		62F/12	3081_15	156_16	30º12.23'	81º37.84'	0.59	1331	6037	5685	5334	NE	NE	62021	34	0.0201
Khu_gr 113		62F/12	3081_15	156_16	30º12.69'	81º36.59'	1.68	2218	5441	5189	4938	NW	NW	62021	51	0.0854
Khu_gr 114		62F/12	3081_15	156_16	30º12.18'	81º35.60'	3.68	2344	5791	5425	5060	NW	NW	60021	67	0.2478
Khu_gr 115		62F/12	3081_15	156_14	30º12.28'	81º33.73'	2.38	1457	5593	5235	4877	N	N	61021	58	0.1373
Khu_gr 116		62F/12	3081_15	156_14	30º12.36'	81º32.57'	0.53	1394	5273	5029	4785	N	N	62021	33	0.0173

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 117		62F/12	3081_15	156_14	30º12.35'	81º32.12'	0.17	887	4785	4694	4602	NE	NE	63021	20	0.0034
Khu_gr 118		62F/12	3081_15	156_14	30º11.30'	81º31.92'	0.40	1711	5182	4831	4481	SW	SW	63021	29	0.0116
Khu_gr 119		62F/12	3081_15	156_14	30º11.35'	81º32.61'	0.27	1140	5273	5105	4938	S	S	75021	25	0.0066
Khu_gr 120		62F/12	3081_15	156_14	30º11.21'	81º32.96'	0.48	1647	5608	5212	4816	S	S	63021	31	0.0151
Khu_gr 121		62F/12	3081_15	156_14	30º11.19'	81º33.28'	0.41	1584	5730	5273	4816	SW	SW	62021	29	0.0121
Khu_gr 122		62F/12	3081_15	156_14	30º11.21'	81º33.69'	0.46	1394	5532	5220	4907	SW	SW	63021	31	0.0142
Khu_gr 123		62F/12	3081_15	156_14	30º11.18'	81º34.04'	0.17	887	5456	5227	4999	SW	SW	63021	20	0.0034
Khu_gr 124		62F/12	3081_15	156_14	30º11.24'	81º34.86'	2.37	2028	5761	5288	4816	S	S	62021	58	0.1365
Khu_gr 125		62F/12	3081_15	156_16	30º11.12'	81º35.96'	3.16	2598	5898	5372	4846	SW	SW	62021	64	0.2017
Khu_gr 126		62F/12	3081_15	156_16	30º10.14'	81º36.03'	5.03	2471	5898	5296	4694	NW	NW	52012	75	0.3776
Khu_gr 127		62F/12	3081_15	156_16	30º 9.82'	81º34.88'	0.57	1140	5090	4930	4770	N	N	63021	34	0.0192
Khu_gr 128		62F/12	3081_15	155_25	30º 9.06'	81º33.38'	0.38	1584	5151	4862	4572	W	W	63021	28	0.0108
Khu_gr 129		62F/12	3081_15	155_25	30º 9.09'	81º34.38'	0.71	1521	5304	5060	4816	SW	SW	63021	37	0.0261
Khu_gr 130		62F/12	3081_15	155_25	30º 8.95'	81º35.20'	0.96	1457	5471	5235	4999	SW	SW	63021	41	0.0396
Khu_gr 131		62F/12	3081_15	155_25	30º 8.92'	81º35.76'	1.17	1394	5364	5166	4968	SE	SE	63021	44	0.0520
Khu_gr 132		62F/12	3081_15	155_25	30º 8.13'	81º35.72'	0.28	1140	5029	4873	4717	SW	SW	63021	25	0.0070
Khu_gr 133		62F/12	3081_15	155_25	30º 7.82'	81º35.73'	0.57	1964	5029	4816	4602	W	W	53052	34	0.0192
Khu_gr 134		62F/12	3081_15	155_24	30º 9.41'	81º36.68'	4.07	2028	5578	5220	4862	SE	SE	60021	70	0.2839
Khu_gr 135		62F/12	3081_15	155_24	30º 9.73'	81º38.44'	1.26	2091	5486	5258	5029	SE	SE	53021	46	0.0576
Khu_gr 136		62F/12	3081_15	155_24	30º 9.42'	81º39.04'	0.06	190	5666	5424	5182	SW	SW	77021	12	0.0007
Khu_gr 137		62F/12	3081_15	155_24	30º 8.94'	81º39.14'	0.92	1204	5357	5003	4648	SW	SW	62021	41	0.0373
Khu_gr 138		62F/12	3081_15	155_24	30º 8.90'	81º39.76'	0.17	697	5357	5254	5151	SE	SE	63021	20	0.0034
Khu_gr 139		62F/16	3081_16	155_19	30º10.48'	81º45.66'	0.11	444	5840	5633	5425	SW	SW	77021	16	0.0018
Khu_gr 140		62F/16	3081_16	155_19	30º10.19'	81º46.17'	0.79	1774	5608	5395	5182	SW	SW	63021	38	0.0302
Khu_gr 141		62F/16	3081_16	155_19	30º 9.46'	81º46.88'	2.96	2218	5745	5448	5151	SW	SW	60021	62	0.1846
Khu_gr 142		62F/16	3081_16	155_19	30º 8.81'	81º47.34'	0.14	634	5639	5517	5395	SW	SW	75021	18	0.0025
Khu_gr 143		62F/16	3081_16	155_19	30º 8.68'	81º47.93'	2.00	2281	5608	5380	5151	SW	SW	63021	54	0.1084
Khu_gr 144		62F/16	3081_16	154_21	30º 7.81'	81º47.90'	1.97	1394	5578	5334	5090	NW	NW	60021	54	0.1062
Khu_gr 145		62F/16	3081_16	154_21	30º 7.32'	81º47.26'	0.08	380	5395	5304	5212	N	N	75021	14	0.0011
Khu_gr 146		62F/16	3081_16	154_21	30º 6.56'	81º47.15'	3.26	3041	5456	5075	4694	NW	NW	62021	65	0.2104
Khu_gr 147		62F/16	3081_16	154_21	30º 5.93'	81º47.66'	0.38	507	5243	5151	5060	S	S	75021	28	0.0108
Khu_gr 148		62F/16	3081_16	154_22	30º 4.94'	81º49.56'	0.66	1140	4999	4862	4724	NE	NE	63021	36	0.0235
Khu_gr 149		62F/16	3081_16	154_22	30º 5.79'	81º50.36'	0.21	570	4877	4793	4709	NE	NE	75021	22	0.0046
Khu_gr 150		62F/16	3081_16	154_22	30º 5.61'	81º49.70'	0.52	1014	4999	4862	4724	N	N	63021	32	0.0169
Khu_gr 151		62F/16	3081_16	154_22	30º 6.01'	81º48.12'	0.41	697	5182	5105	5029	NE	NE	63021	29	0.0121
Khu_gr 152		62F/16	3081_16	154_22	30º 7.11'	81º48.27'	0.33	507	5517	5387	5258	SE	SE	67021	27	0.0089
Khu_gr 153		62F/16	3081_16	154_22	30º 7.18'	81º48.72'	0.48	824	5380	5220	5060	S	S	63021	31	0.0151
Khu_gr 154		62F/16	3081_16	154_22	30º 6.81'	81º49.45'	0.15	634	5121	5029	4938	S	S	75021	19	0.0028
Khu_gr 155		62F/16	3081_16	155_18	30º 8.05'	81º49.70'	12.38	5005	5669	5182	4694	SE	SE	62021	102	1.2612
Khu_gr 156		62F/16	3081_16	155_18	30º 7.80'	81º52.03'	10.00	4625	5791	5212	4633	SW	SW	52021	95	0.9485
Khu_gr 157		62F/16	3081_16	155_17	30º 6.40'	81º53.32'	8.44	3928	5517	5189	4862	W	W	51012	90	0.7561
Khu_gr 158		62F/16	3081_16	155_17	30º 7.21'	81º54.03'	0.20	507	5517	5395	5273	SW	SW	77021	22	0.0043
Khu_gr 159		62F/16	3081_16	154_26	30º 4.27'	81º54.69'	4.75	5892	5547	4862	4176	W	W	51012	74	0.3496

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 160		62F/16	3081_16	154_26	30º 3.70'	81º54.16'	0.47	760	4938	4709	4481	NW	NW	75021	31	0.0146
Khu_gr 161		62F/16	3081_16	154_26	30º 3.74'	81º53.42'	2.50	2661	5450	4843	4237	NW	NW	62021	59	0.1468
Khu_gr 162		62F/16	3081_16	153_22	30º 2.32'	81º53.70'	0.77	1204	5380	5075	4770	S	S	62021	38	0.0292
Khu_gr 163		62F/16	3081_16	153_22	30º 2.39'	81º54.36'	1.54	1774	5450	5087	4724	S	S	62021	49	0.0758
Khu_gr 164		62F/16	3081_16	153_22	30º 1.42'	81º55.36'	0.11	570	4755	4694	4633	NE	NE	75021	16	0.0018
Khu_gr 165		62F/16	3081_16	153_22	30º 2.63'	81º55.30'	0.85	1457	5060	4884	4709	SE	SE	52021	39	0.0335
Khu_gr 166		62F/16	3081_16	153_23	30º 1.30'	81º57.47'	0.20	824	5364	5288	5212	SE	SE	75021	22	0.0043
Khu_gr 167		62F/16	3081_16	153_23	30º 2.29'	81º57.22'	0.96	2788	5456	4724	3993	N	N	63021	41	0.0396
Khu_gr 168		62F/16	3081_16	153_23	30º 3.49'	81º55.88'	0.74	1584	4923	4747	4572	E	E	63021	37	0.0276
Khu_gr 169		62F/16	3081_16	154_28	30º 4.78'	81º59.76'	0.27	634	5029	4907	4785	E	E	64021	25	0.0066
Khu_gr 170		62F/16	3081_16	154_28	30º 5.50'	81º59.73'	0.23	760	5304	5090	4877	SE	SE	63021	23	0.0053
Khu_gr 171		62F/16	3081_16	154_28	30º 5.30'	81º59.04'	1.28	1774	5304	4968	4633	NW	NW	63021	46	0.0589
Khu_gr 172		62F/16	3081_16	154_28	30º 4.97'	81º57.66'	0.10	570	4785	4694	4602	N	N	75021	15	0.0015
Khu_gr 173		62F/16	3081_16	154_28	30º 4.49'	81º57.75'	0.16	507	5608	5395	5182	N	N	77021	19	0.0031
Khu_gr 174		62F/16	3081_16	154_28	30º 4.48'	81º57.47'	0.14	507	5608	5395	5182	NW	NW	77021	18	0.0025
Khu_gr 175		62F/16	3081_16	154_28	30º 4.91'	81º57.17'	0.23	444	4907	4801	4694	NE	NE	64021	23	0.0053
Khu_gr 176		62F/16	3081_16	154_28	30º 5.18'	81º56.55'	0.43	1394	4938	4782	4625	NE	NE	63021	30	0.0129
Khu_gr 177		62F/16	3081_16	154_28	30º 5.59'	81º56.14'	0.17	444	5243	5136	5029	SE	SE	75021	20	0.0034
Khu_gr 178		62F/16	3081_16	154_28	30º 5.79'	81º56.34'	0.17	444	5334	5250	5166	SE	SE	75021	20	0.0034
Khu_gr 179		62F/16	3081_16	154_28	30º 6.56'	81º56.03'	3.15	2534	6247	5471	4694	NE	NE	67021	64	0.2008
Khu_gr 180		62F/16	3081_16	155_14	30º 9.20'	81º55.72'	10.71	4689	5791	5151	4511	SE	SE	51012	97	1.0395
Khu_gr 181		62F/16	3081_16	155_14	30º10.02'	81º55.05'	0.14	444	5639	5441	5243	NE	NE	75021	18	0.0025
Khu_gr 182		62F/16	3081_16	155_13	30º 8.41'	81º58.51'	1.02	1140	5182	4999	4816	NE	NE	63021	42	0.0431
Khu_gr 183		62F/16	3081_16	155_14	30º 9.93'	81º56.64'	0.83	1521	5608	5532	5456	SE	SE	63021	39	0.0324
Khu_gr 184		62F/16	3081_16	155_14	30º10.46'	81º56.15'	0.14	444	5334	5136	4938	SE	SE	75021	18	0.0025
Khu_gr 185		62F/16	3081_16	156_24	30º11.39'	81º59.20'	0.36	887	5090	4968	4846	NE	NE	63021	28	0.0100
Khu_gr 186		62F/16	3081_16	156_24	30º10.97'	81º58.15'	0.26	887	5243	5044	4846	NW	NW	75021	24	0.0063
Khu_gr 187		62F/16	3081_16	156_24	30º11.22'	81º57.44'	0.35	697	4907	4801	4694	N	N	53012	28	0.0096
Khu_gr 188		62F/16	3081_16	156_23	30º11.27'	81º55.66'	2.39	4689	5883	5319	4755	E	E	52021	58	0.1381
Khu_gr 189		62F/16	3081_16	156_23	30º11.87'	81º54.63'	3.95	5196	5761	5422	5083	E	E	52021	69	0.2727
Khu_gr 190		62F/16	3081_16	156_23	30º12.86'	81º53.79'	3.16	3865	5889	5436	4983	SE	SE	62021	64	0.2017
Khu_gr 191		62F/16	3081_16	157_10,11	30º14.55'	81º53.70'	0.74	1711	5822	5631	5441	NE	NE	63021	37	0.0276
Khu_gr 192		62F/16	3081_16	157_10,11	30º14.30'	81º57.26'	0.29	824	4999	4892	4785	NE	NE	75021	25	0.0074
Khu_gr 193		62F/16	3081_16	157_10,11	30º14.76'	81º56.34'	2.68	2471	5547	5075	4602	NE	NE	63021	60	0.1613
Khu_gr 194		62F/15	3081_12	157_10,11	30º15.19'	81º55.33'	0.33	824	5471	5326	5182	NE	NE	63021	27	0.0089
Khu_gr 195		62F/15	3081_12	157_10,11	30º15.02'	81º54.49'	0.45	1014	5639	5517	5395	NE	NE	63021	31	0.0137
Khu_gr 196		62F/15	3081_12	157_10,11	30º15.54'	81º53.83'	1.92	1964	5791	5654	5517	NE	NE	60021	53	0.1025
Khu_gr 197		62F/15	3081_12	157_10,11	30º16.29'	81º53.55'	0.14	444	6096	5898	5700	NE	NE	75021	18	0.0025
Khu_gr 198		62F/15	3081_12	158_11	30º17.58'	81º53.35'	1.32	2724	5944	5719	5494	SE	SE	62021	47	0.0614
Khu_gr 199		62F/15	3081_12	158_11	30º17.98'	81º54.01'	0.08	507	5913	5822	5730	SW	SW	75021	14	0.0011
Khu_gr 200		62F/15	3081_12	158_11	30º17.68'	81º54.18'	0.08	253	5791	5715	5639	S	S	75021	14	0.0011
Khu_gr 201		62F/15	3081_12	158_11	30º17.82'	81º54.66'	0.27	824	5471	5368	5265	E	E	64021	25	0.0066
Khu_gr 202		62F/15	3081_12	158_11	30º18.41'	81º54.25'	0.49	1331	5639	5483	5326	E	E	63021	32	0.0155

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 203		62F/15	3081_12	158_11	30º18.83'	81º53.45'	1.10	2281	5974	5700	5425	E	E	63021	43	0.0478
Khu_gr 204		62F/15	3081_12	158_11	30º19.46'	81º53.99'	0.05	317	5700	5650	5601	SE	SE	75021	10	0.0005
Khu_gr 205		62F/15	3081_12	158_11	30º19.43'	81º55.29'	0.35	760	5944	5730	5517	SW	SW	77021	28	0.0096
Khu_gr 206		62F/15	3081_12	158_11	30º19.48'	81º55.61'	0.06	253	5944	5806	5669	NE	NE	77021	12	0.0007
Khu_gr 207		62F/15	3081_12	158_11	30º19.82'	81º54.13'	1.27	2724	5944	5593	5243	E	E	63021	46	0.0582
Khu_gr 208		62F/15	3081_12	158_11	30º20.12'	81º54.09'	0.14	380	5639	5486	5334	NE	NE	74021	18	0.0025
Khu_gr 209		62F/15	3081_12	158_11	30º20.04'	81º53.71'	0.70	1901	5944	5532	5121	NE	NE	63021	36	0.0255
Khu_gr 210		62F/15	3081_12	158_11	30º20.28'	81º53.19'	1.67	2281	6096	5715	5334	NE	NE	63021	51	0.0847
Khu_gr 211		62F/15	3081_12	158_11	30º21.58'	81º52.74'	0.57	1077	6035	5867	5700	S	S	67021	34	0.0192
Khu_gr 212		62F/15	3081_12	158_11	30º21.49'	81º53.35'	0.28	760	6035	5883	5730	S	S	67021	25	0.0070
Khu_gr 213		62F/15	3081_12	158_11	30º21.19'	81º54.10'	0.27	507	5913	5822	5730	S	S	67021	25	0.0066
Khu_gr 214		62F/15	3081_12	158_11	30º21.10'	81º54.54'	0.05	317	5669	5635	5601	S	S	75021	10	0.0005
Khu_gr 215		62F/15	3081_12	158_11	30º21.03'	81º54.99'	0.02	190	5913	5852	5791	SE	SE	77021	5	0.0001
Khu_gr 216		62F/15	3081_12	158_10	30º21.10'	81º56.99'	0.20	697	5791	5700	5608	SW	SW	77021	22	0.0043
Khu_gr 217		62F/15	3081_12	158_10	30º20.81'	81º57.36'	1.28	2028	5852	5578	5304	SW	SW	63021	46	0.0589
Khu_gr 218		62F/15	3081_12	158_10	30º19.89'	81º58.45'	0.10	507	5913	5730	5547	NW	NW	75021	15	0.0015
Khu_gr 219		62F/15	3081_12	158_10	30º19.40'	81º59.04'	0.60	1267	5913	5605	5296	NW	NW	63021	34	0.0206
Khu_gr 220		62F/15	3081_12	158_10	30º19.01'	81º59.65'	0.74	1394	5913	5681	5448	SW	SW	63021	37	0.0276
Khu_gr 221		62J/3	3082_09	158_9	30º18.64'	82º 0.20'	0.10	507	5639	5574	5509	NW	NW	75021	15	0.0015
Khu_gr 222		62J/3	3082_09	158_9	30º19.12'	82º 0.54'	2.32	2281	6035	5525	5014	S	S	63021	57	0.1326
Khu_gr 223		62J/3	3082_09	158_9	30º19.24'	82º 1.92'	0.03	253	5669	5608	5547	SW	SW	75021	7	0.0002
Khu_gr 224		62J/3	3082_09	158_8	30º19.70'	82º 2.59'	6.38	7096	6218	5601	4983	SE	SE	52021	81	0.5197
Khu_gr 225		62J/3	3082_09	158_8	30º20.21'	82º 3.97'	0.95	1457	5761	5513	5265	SE	SE	62021	41	0.0390
Khu_gr 226		62J/3	3082_09	158_7	30º20.70'	82º 4.87'	0.54	1077	5822	5624	5425	NE	NE	63021	33	0.0178
Khu_gr 227		62J/3	3082_09	158_7	30º21.08'	82º 4.55'	1.10	2028	6096	5791	5486	NE	NE	63021	43	0.0478
Khu_gr 228		62J/3	3082_09	157_6	30º18.18'	82º 7.04'	1.24	1584	6157	5791	5425	NE	NE	63021	45	0.0563
Khu_gr 229		62J/3	3082_09	157_6	30º16.91'	82º 6.70'	0.42	1140	5944	5692	5441	NW	NW	63021	30	0.0125
Khu_gr 230		62J/3	3082_09	157_6	30º15.59'	82º 6.68'	0.81	1457	5669	5498	5326	NW	NW	63021	39	0.0313
Khu_gr 231		62J/4	3082_13	156_26, 27	30º12.05'	82º 6.59'	10.48	3802	*	*	*	NW	NW	51022	96	1.0098
Khu_gr 232		62J/4	3082_13	156_26, 27	30º10.91'	82º 3.30'	0.35	1014	*	*	*	W	W	63021	28	0.0096
Khu_gr 233		62J/4	3082_13	214_9	30º 9.07'	82º 7.29'	11.12	8934	*	*	*	W	W	52012	98	1.0929
Khu_gr 234		62J/4	3082_13	155_7	30º10.52'	82º 9.89'	3.69	4942	*	*	*	S	S	63051	67	0.2487
Khu_gr 235		62J/4	3082_13	155_9	30º 7.52'	82º 6.99'	0.29	2408	*	*	*	SW	SW	63021	25	0.0074
Khu_gr 236		62J/4	3082_13	155_9	30º 7.08'	82º 7.50'	0.44	1711	*	*	*	SW	SW	63021	30	0.0133
Khu_gr 237		62J/4	3082_13	155_9	30º 7.07'	82º 8.25'	0.39	2154	*	*	*	S	S	63021	29	0.0112
Khu_gr 238		62J/4	3082_13	155_9	30º 7.19'	82º 8.54'	0.55	2344	*	*	*	S	S	63021	33	0.0182
Khu_gr 239		62J/4	3082_13	155_9	30º 7.07'	82º 9.49'	0.46	1521	*	*	*	SW	SW	63021	31	0.0142
Khu_gr 240		62J/4	3082_13	155_6,8	30º 6.13'	82º 8.04'	7.06	8680	*	*	*	NW	NW	52012	84	0.5953
Khu_gr 241		62J/4	3082_13	154_30	30º 6.59'	82º 5.75'	0.24	1204	*	*	*	NE	NE	63021	23	0.0056
Khu_gr 242		62J/4	3082_13	154_30	30º 5.28'	82º 5.44'	1.96	3358	*	*	*	W	W	53021	54	0.1054
Khu_gr 243		62J/4	3082_13	154_30	30º 4.56'	82º 5.32'	0.21	760	*	*	*	SW	SW	63021	22	0.0046
Khu_gr 244		62J/4	3082_13	154_30	30º 4.35'	82º 5.87'	1.01	1901	*	*	*	SW	SW	63021	42	0.0425
Khu_gr 245		62J/4	3082_13	154_29	30º 3.33'	82º 5.44'	1.62	3548	*	*	*	NW	NW	53012	50	0.0813

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 246		62J/4	3082_13	154_29	30º 4.19'	82º 3.78'	1.20	2851	*	*	*	NW	NW	63021	45	0.0539
Khu_gr 247		62J/4	3082_13	154_29	30º 4.72'	82º 3.14'	0.29	1204	*	*	*	NW	NW	63021	25	0.0074
Khu_gr 248		62J/4	3082_13	154_29	30º 2.71'	82º 4.09'	1.54	4879	*	*	*	NW	NW	63021	49	0.0758
Khu_gr 249		62J/4	3082_13	153_26	30º 1.45'	82º 5.44'	4.56	4308	*	*	*	NW	NW	62021	73	0.3309
Khu_gr 250		62J/4	3082_13	153_26	30º 1.62'	82º 3.04'	3.79	5196	*	*	*	NW	NW	51012	68	0.2579
Khu_gr 251		62J/4	3082_13	153_26	30º 1.86'	82º 2.37'	0.35	1647	*	*	*	NW	NW	63021	28	0.0096
Khu_gr 252		62J/4	3082_13	153_26	30º 1.67'	82º 2.06'	0.26	1140	*	*	*	NW	NW	63021	24	0.0063
Khu_gr 253		62K/1	2982_01	153_25	29º59.91'	82º 2.21'	0.18	317	5243	*	*	NW	NW	77021	20	0.0037
Khu_gr 254		62K/1	2982_01	153_25	29º59.96'	82º 2.86'	0.06	760	*	*	4846	SW	SW	75021	12	0.0007
Khu_gr 255		62K/1	2982_01	153_25	29º59.94'	82º 3.17'	0.61	2218	*	*	4755	SW	SW	63021	35	0.0211
Khu_gr 256		62K/1	2982_01	153_25	29º59.53'	82º 3.92'	1.77	2344	5608	5227	4846	W	W	62021	52	0.0917
Khu_gr 257		62K/1	2982_01	153_25	29º58.49'	82º 3.68'	3.69	2661	5761	5227	4694	W	W	60021	67	0.2487
Khu_gr 258		62K/1	2982_01	153_25	29º57.96'	82º 3.22'	0.79	1140	5710	5103	4496	NW	NW	63021	38	0.0302
Khu_gr 259		62K/1	2982_01	152_9	29º57.33'	82º 1.40'	0.22	127	5629	5405	5182	N	N	37021	22	0.0049
Khu_gr 260		62K/1	2982_01	152_9	29º57.22'	82º 1.28'	0.33	127	5629	5405	5182	S	S	37021	27	0.0089
Khu_gr 261		62K/1	2982_01	152_10	29º57.19'	82º 2.80'	0.09	190	5710	5431	5151	SE	SE	77021	15	0.0013
Khu_gr 262		62K/1	2982_01	152_10	29º57.28'	82º 3.06'	0.69	950	5710	5377	5044	E	E	63021	36	0.0250
Khu_gr 263		62K/1	2982_01	152_10	29º57.82'	82º 3.61'	0.10	317	5194	5119	5044	E	E	77021	15	0.0015
Khu_gr 264		62K/1	2982_01	152_10	29º57.81'	82º 5.13'	1.04	1901	5121	4915	4709	SE	SE	63021	43	0.0442
Khu_gr 265		62K/1	2982_01	152_10	29º58.87'	82º 5.64'	2.12	2091	5761	5281	4801	E	E	60021	55	0.1173
Khu_gr 266		62K/1	2982_01	152_10	29º59.51'	82º 5.43'	1.96	3231	5761	5121	4481	NE	NE	63021	54	0.1054
Khu_gr 267		62K/1	2982_01	152_10	29º59.76'	82º 4.65'	2.09	1901	5456	5250	5044	E	E	60021	55	0.1151
Khu_gr 268		62J/4	3082_13	153_28	30º 1.17'	82º 8.41'	0.07	507	*	*	*	NE	NE	75021	13	0.0009
Khu_gr 269		62J/4	3082_13	153_28	30º 2.92'	82º 6.99'	3.50	3231	*	*	*	SE	SE	62021	66	0.2316
Khu_gr 270		62J/4	3082_13	154_31	30º 4.08'	82º 6.82'	1.52	3105	*	*	*	SE	SE	60021	49	0.0745
Khu_gr 271		62J/4	3082_13	154_31	30º 5.09'	82º 7.66'	1.12	1521	*	*	*	S	S	61021	44	0.0490
Khu_gr 272		62J/4	3082_13	154_31	30º 4.85'	82º 8.27'	0.81	1901	*	*	*	SW	SW	63021	39	0.0313
Khu_gr 273		62J/4	3082_13	154_31	30º 3.71'	82º 8.10'	4.55	4182	*	*	*	SW	SW	52021	73	0.3299
Khu_gr 274		62K/1	2982_01	153_30	30º 0.08'	82º13.60'	2.55	4055	5517	*	*	N	N	53021	59	0.1508
Khu_gr 275		62K/1	2982_01	153_30	29º58.58'	82º12.77'	0.43	887	4968	4869	4770	W	W	64021	30	0.0129
Khu_gr 276		62K/1	2982_01	153_30	29º58.67'	82º11.51'	8.96	6083	5700	4983	4267	N	N	52021	91	0.8190
Khu_gr 277		62K/1	2982_01	152_14	29º58.29'	82º10.33'	0.32	697	5334	5250	5166	NW	NW	63021	26	0.0085
Khu_gr 278		62K/1	2982_01	152_14	29º57.50'	82º 9.54'	2.53	2978	5822	5296	4770	SW	SW	62021	59	0.1492
Khu_gr 279		62K/1	2982_01	152_14	29º56.45'	82º 9.39'	7.52	1711	5669	5128	4587	SW	SW	60021	86	0.6478
Khu_gr 280		62K/1	2982_01	151_16	29º55.93'	82º 7.17'	1.78	1774	5182	4930	4679	NW	NW	63021	52	0.0925
Khu_gr 281		62K/1	2982_01	150_19	29º53.63'	82º 5.13'	0.44	634	4816	4671	4526	E	E	67021	30	0.0133
Khu_gr 282		62K/1	2982_01	150_19	29º54.35'	82º 4.85'	1.31	1711	5090	4869	4648	E	E	60021	46	0.0608
Khu_gr 283		62K/1	2982_01	151_16	29º55.64'	82º 8.97'	0.40	1014	5212	5029	4846	W	W	63021	29	0.0116
Khu_gr 284		62K/1	2982_01	151_16	29º54.48'	82º 9.51'	2.49	3802	5395	4816	4237	NW	NW	63021	59	0.1460
Khu_gr 285		62K/1	2982_01	151_16	29º53.32'	82º10.42'	0.88	950	5044	4816	4587	E	E	67021	40	0.0351
Khu_gr 286		62K/1	2982_01	151_16	29º54.22'	82º10.96'	0.05	317	4679	4587	4496	NE	NE	75021	10	0.0005
Khu_gr 287		62K/1	2982_01	151_16	29º54.65'	82º10.26'	1.00	824	5166	4991	4816	NE	NE	67021	42	0.0419
Khu_gr 288		62K/1	2982_01	151_16	29º55.52'	82º 9.61'	1.56	1394	5294	5017	4740	NE	NE	63021	49	0.0772

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 289		62K/1	2982_01	152_13,14	29º56.27'	82º10.16'	0.20	634	5182	5121	5060	SE	SE	63021	22	0.0043
Khu_gr 290		62K/1	2982_01	152_13,14	29º56.63'	82º11.13'	0.50	760	5182	5113	5044	S	S	62021	32	0.0160
Khu_gr 291		62K/1	2982_01	152_13,14	29º56.40'	82º12.26'	1.73	2281	5243	4900	4557	SE	SE	63021	51	0.0889
Khu_gr 292		62K/1	2982_01	152_13,14	29º55.43'	82º13.07'	0.25	824	5014	4793	4572	NW	NW	63021	24	0.0059
Khu_gr 293		62K/1	2982_01	151_17	29º54.41'	82º13.19'	2.25	2724	5493	5246	4999	NW	NW	62021	57	0.1272
Khu_gr 294		62K/1	2982_01	151_17	29º53.70'	82º14.48'	1.10	1457	5493	5040	4587	E	E	60021	43	0.0478
Khu_gr 295		62K/1	2982_01	151_17	29º54.23'	82º14.02'	0.57	1331	5493	5044	4595	NE	NE	67021	34	0.0192
Khu_gr 296		62K/1	2982_01	153_30	29º57.66'	82º12.74'	0.47	634	5304	5121	4938	SE	SE	67021	31	0.0146
Khu_gr 297		62K/1	2982_01	153_30	29º58.17'	82º13.00'	1.10	1711	5182	4862	4542	E	E	63021	43	0.0478
Khu_gr 298		62K/1	2982_01	153_30	29º58.71'	82º13.87'	0.45	824	5486	5273	5060	SE	SE	63021	31	0.0137
Khu_gr 299		62K/1	2982_01	153_30	29º58.03'	82º14.58'	0.28	697	5273	5090	4907	NW	NW	67021	25	0.0070
Khu_gr 300		62K/1	2982_01	153_30	29º57.58'	82º14.86'	0.43	1394	5243	5006	4770	SE	SE	63021	30	0.0129
Khu_gr 301		62K/5	2982_02	152_15	29º56.20'	82º15.91'	0.13	634	4907	4850	4793	E	E	75021	18	0.0023
Khu_gr 302		62K/5	2982_02	153_30	29º57.86'	82º15.05'	0.19	1014	5273	5022	4770	E	E	63021	21	0.0040
Khu_gr 303		62K/1	2982_01	153_30	29º59.11'	82º14.37'	1.08	1647	4816	4732	4648	E	E	63021	43	0.0466
Khu_gr 304		62K/1	2982_01	153_30	29º59.63'	82º14.62'	0.47	1077	5136	4900	4663	E	E	63021	31	0.0146
Khu_gr 305		62J/4	3082_13	154_33	30º 3.80'	82º11.92'	5.68	6653	*	*	*	SE	SE	52012	78	0.4446
Khu_gr 306		62J/8	3082_13	154_33	30º 2.45'	82º15.77'	7.06	5512	6035	5296	4557	SE	SE	53021	84	0.5953
Khu_gr 307		62J/8	3082_14	154_34	30º 3.82'	82º15.69'	0.25	317	5852	5791	5730	S	S	77021	24	0.0059
Khu_gr 308		62J/8	3082_14	154_34	30º 2.59'	82º16.93'	0.47	1647	5800	5369	4938	SW	SW	63021	31	0.0146
Khu_gr 309		62J/8	3082_14	154_34	30º 2.21'	82º17.60'	1.01	1394	5547	5288	5029	SW	SW	63021	42	0.0425
Khu_gr 310		62J/8	3082_14	153_31	30º 1.15'	82º17.39'	1.29	2661	5334	4983	4633	NW	NW	63021	46	0.0595
Khu_gr 311		62K/5	2982_02	152_16	29º59.06'	82º18.61'	0.18	695	5182	5102	5022	NW	NW	63021	20	0.0037
Khu_gr 312		62K/5	2982_02	152_16	29º58.75'	82º18.06'	1.01	1240	5090	4968	4846	NW	NW	63021	42	0.0425
Khu_gr 313		62K/5	2982_02	152_16	29º58.00'	82º18.68'	0.23	680	5090	5044	4999	SW	SW	63021	23	0.0053
Khu_gr 314		62K/5	2982_02	152_16	29º56.64'	82º18.42'	0.28	720	5121	5014	4907	NW	NW	63021	25	0.0070
Khu_gr 315		62K/5	2982_02	152_16	29º56.49'	82º18.70'	0.46	1175	5212	5071	4930	SW	SW	60021	31	0.0142
Khu_gr 316		62J/8	3082_14	153_32	30º 0.40'	82º19.49'	0.16	650	5364	5319	5273	NW	NW	77021	19	0.0031
Khu_gr 317		62K/5	2982_02	152_17	29º58.63'	82º20.42'	0.27	840	5090	4915	4740	SW	SW	63021	25	0.0066
Khu_gr 318		62K/5	2982_02	152_17	29º58.26'	82º20.61'	0.42	995	5090	4923	4755	W	W	63021	30	0.0125
Khu_gr 319		62K/5	2982_02	152_17	29º57.70'	82º20.59'	0.35	1225	5029	4862	4694	W	W	63021	28	0.0096
Khu_gr 320		62K/5	2982_02	152_17	29º57.22'	82º20.72'	0.52	1315	5151	4968	4785	SW	SW	63021	32	0.0169
Khu_gr 321		62K/5	2982_02	152_17	29º56.78'	82º21.09'	0.58	1430	5364	5090	4816	SW	SW	63021	34	0.0196
Khu_gr 322		62J/8	3082_14	153_32	30º 0.72'	82º19.50'	0.18	697	5243	5090	4938	NE	NE	75021	20	0.0037
Khu_gr 323		62J/8	3082_14	153_32	30º 0.96'	82º19.24'	0.17	507	5273	5151	5029	E	E	64021	20	0.0034
Khu_gr 324		62J/8	3082_14	153_32	30º 1.08'	82º18.70'	0.23	697	5273	5136	4999	NW	NW	75021	23	0.0053
Khu_gr 325		62J/8	3082_14	153_32	30º 2.11'	82º18.00'	0.12	317	5547	5486	5425	E	E	67021	17	0.0020
Khu_gr 326		62J/8	3082_14	153_32	30º 2.58'	82º19.42'	0.76	1014	5608	5326	5044	S	S	63021	38	0.0286
Khu_gr 327		62J/8	3082_14	153_34,35	30º 0.39'	82º22.55'	0.75	1711	5837	5395	4953	SE	SE	63021	37	0.0281
Khu_gr 328		62J/8	3082_14	153_34,35	30º 1.02'	82º23.06'	1.10	2091	5486	5296	5105	SE	SE	63021	43	0.0478
Khu_gr 329		62J/8	3082_14	153_34,35	30º 1.20'	82º23.76'	2.12	2978	5700	5304	4907	SW	SE	63021	55	0.1173
Khu_gr 330		62J/8	3082_14	153_34,35	30º 0.44'	82º24.84'	0.53	760	5974	5654	5334	W	W	67021	33	0.0173
Khu_gr 331		62K/5	2982_02	153_34,35	29º57.46'	82º24.24'	0.23	824	5547	5399	5250	SW	SW	63021	23	0.0053

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 332		62K/5	2982_02	153_34,35	29º58.41'	82º24.16'	0.25	697	5273	5189	5105	SE	SE	63021	24	0.0059
Khu_gr 333		62K/5	2982_02	153_34,35	29º59.18'	82º24.01'	0.18	444	5243	5121	4999	NE	NE	63021	20	0.0037
Khu_gr 334		62K/5	2982_02	153_34,35	29º59.83'	82º24.96'	1.53	1140	5761	5342	4923	W	W	63021	49	0.0752
Khu_gr 335		62K/5	2982_02	153_34,35	29º59.34'	82º26.03'	0.28	634	5846	5681	5517	SW	SW	67021	25	0.0070
Khu_gr 336		62K/5	2982_02	153_34,35	29º59.06'	82º26.54'	0.38	1647	5928	5700	5471	SW	SW	63021	28	0.0108
Khu_gr 337		62K/5	2982_02	152_21	29º57.97'	82º27.40'	0.29	760	5608	5410	5212	NW	NW	63021	25	0.0074
Khu_gr 338		62K/5	2982_02	152_21	29º58.14'	82º28.00'	1.26	2978	5730	5349	4968	SE	SE	63021	46	0.0576
Khu_gr 339		62K/5	2982_02	152_21	29º56.75'	82º29.89'	0.08	444	5745	5585	5425	W	W	77021	14	0.0011
Khu_gr 340		62K/5	2982_02	151_23	29º54.07'	82º27.27'	0.10	570	5090	5014	4938	NW	NW	75021	15	0.0015
Khu_gr 341		62K/5	2982_02	151_23	29º54.50'	82º26.42'	0.63	1267	5029	4877	4724	NW	NW	63021	35	0.0221
Khu_gr 342		62K/5	2982_02	151_23	29º53.63'	82º26.69'	0.36	1204	5547	5399	5250	SW	SW	63021	28	0.0100
Khu_gr 343		62K/5	2982_02	151_23	29º53.01'	82º27.41'	0.12	507	5700	5525	5349	W	W	63021	17	0.0020
Khu_gr 344		62K/5	2982_02	151_23	29º51.95'	82º27.30'	0.74	1014	5349	5227	5105	W	W	63021	37	0.0276
Khu_gr 345		62K/5	2982_02	151_21	29º54.58'	82º24.34'	0.49	1077	4816	4602	4389	N	N	63021	32	0.0155
Khu_gr 346		62K/5	2982_02	151_21	29º53.96'	82º23.63'	1.99	2344	5346	4921	4496	N	N	62021	54	0.1076
Khu_gr 347		62K/5	2982_02	151_21	29º54.07'	82º22.42'	0.98	2851	5121	4671	4221	NW	NW	63021	42	0.0407
Khu_gr 348		62K/5	2982_02	151_21	29º53.01'	82º24.23'	0.45	1457	5718	5412	5105	NW	NW	63021	31	0.0137
Khu_gr 349		62K/5	2982_02	151_21	29º52.39'	82º23.70'	1.47	1711	5456	5243	5029	NW	NW	63021	48	0.0712
Khu_gr 350		62K/5	2982_02	151_21	29º52.33'	82º22.58'	0.66	4815	5243	4945	4648	NW	NW	60021	36	0.0235
Khu_gr 351		62K/5	2982_02	151_21	29º52.22'	82º21.80'	0.66	1077	5258	4999	4740	NE	NE	60021	36	0.0235
Khu_gr 352		62K/5	2982_02	151_20	29º52.77'	82º20.69'	1.82	2471	5364	4953	4542	NW	NW	62021	52	0.0953
Khu_gr 353		62K/5	2982_02	151_20	29º52.56'	82º19.66'	1.00	1711	5182	4843	4503	NW	NW	63021	42	0.0419
Khu_gr 354		62K/5	2982_02	151_20	29º52.99'	82º18.81'	0.21	2598	5014	4862	4709	NW	NW	63021	22	0.0046
Khu_gr 355		62K/5	2982_02	151_20	29º51.83'	82º20.03'	1.39	2218	5456	5166	4877	SW	SW	63021	47	0.0659
Khu_gr 356		62K/5	2982_02	151_20	29º51.47'	82º20.69'	3.45	3548	5456	5022	4587	SW	SW	52021	66	0.2271
Khu_gr 357		62K/5	2982_02	150_14	29º50.14'	82º19.57'	0.62	1014	5401	5124	4846	NW	NW	67021	35	0.0216
Khu_gr 358		62K/5	2982_02	150_14	29º50.15'	82º18.43'	0.27	760	4755	4572	4389	N	N	67021	25	0.0066
Khu_gr 359		62K/5	2982_02	150_14	29º50.34'	82º18.17'	0.13	697	4755	4481	4206	N	N	75021	18	0.0023
Khu_gr 360		62K/5	2982_02	149_45	29º48.55'	82º16.79'	0.35	887	5029	4877	4724	NW	NW	63021	28	0.0096
Khu_gr 361		62K/5	2982_02	149_45	29º48.10'	82º15.03'	1.30	1647	5334	4968	4602	NW	NW	63021	46	0.0601
Khu_gr 362		62K/5	2982_02	149_44	29º48.00'	82º14.33'	0.75	1204	4968	4808	4648	N	N	63021	37	0.0281
Khu_gr 363		62K/5	2982_02	149_44	29º48.18'	82º13.84'	0.43	887	4846	4686	4526	N	N	63021	30	0.0129
Khu_gr 364		62K/5	2982_02	149_43	29º46.91'	82º10.76'	0.71	1457	4724	4382	4039	NE	NE	63021	37	0.0261
Khu_gr 365		62K/5	2982_02	149_43	29º48.25'	82º10.64'	0.42	1140	4374	4161	3947	N	N	63021	30	0.0125
Khu_gr 366		62K/5	2982_02	149_45	29º47.65'	82º15.33'	0.17	317	5212	5136	5060	S	S	74021	20	0.0034
Khu_gr 367		62K/5	2982_02	149_45	29º47.66'	82º15.84'	0.37	570	5151	5010	4869	SE	SE	63021	28	0.0104
Khu_gr 368		62K/5	2982_02	149_45	29º47.88'	82º15.59'	0.21	887	5334	5128	4923	E	E	63021	22	0.0046
Khu_gr 369		62K/5	2982_02	149_45	29º48.12'	82º15.69'	0.24	760	5243	5083	4923	E	E	63021	23	0.0056
Khu_gr 370		62K/5	2982_02	149_45	29º48.32'	82º15.94'	0.08	507	5304	5166	5029	NE	NE	75021	14	0.0011
Khu_gr 371		62K/5	2982_02	149_45	29º48.81'	82º18.04'	0.52	1077	5761	5441	5121	S	S	67021	32	0.0169
Khu_gr 372		62K/5	2982_02	150_16	29º49.86'	82º19.79'	0.28	697	5401	5185	4968	E	E	60021	25	0.0070
Khu_gr 373		62K/5	2982_02	150_16	29º50.47'	82º20.50'	0.18	634	5441	5212	4983	SW	SW	63021	20	0.0037
Khu_gr 374		62K/5	2982_02	150_15	29º51.67'	82º22.26'	1.21	1711	5593	5330	5067	SE	SE	60021	45	0.0545

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 375		62K/5	2982_02	150_15	29º51.75'	82º23.04'	0.54	697	5441	5296	5151	SW	SW	63021	33	0.0178
Khu_gr 376		62K/5	2982_02	150_15	29º51.11'	82º25.33'	1.33	2408	5212	5075	4938	SW	SW	63021	47	0.0620
Khu_gr 377		62K/5	2982_02	150_15	29º49.27'	82º25.76'	1.38	2028	5517	5212	4907	NW	NW	62021	47	0.0653
Khu_gr 378		62K/5	2982_02	150_15	29º49.02'	82º24.83'	1.84	2534	5456	5174	4892	NW	NW	63021	53	0.0967
Khu_gr 379		62K/5	2982_02	150_15	29º49.62'	82º24.14'	0.41	950	5395	5212	5029	SE	SE	63021	29	0.0121
Khu_gr 380		62K/5	2982_02	150_15	29º49.19'	82º23.17'	0.15	950	5547	5281	5014	SW	SW	75021	19	0.0028
Khu_gr 381		62K/5	2982_02	150_15	29º49.04'	82º24.11'	1.11	3295	5944	5471	4999	SE	SE	63021	44	0.0484
Khu_gr 382		62K/5	2982_02	149_47,48	29º47.81'	82º23.75'	1.08	1901	5425	5182	4938	SW	SW	62021	43	0.0466
Khu_gr 383		62K/5	2982_02	149_47,48	29º47.24'	82º23.87'	0.73	1394	5547	5334	5121	SW	SW	63021	37	0.0271
Khu_gr 384		62K/5	2982_02	149_47,48	29º46.87'	82º24.36'	0.51	1140	5517	5357	5197	SW	SW	63021	32	0.0164
Khu_gr 385		62K/5	2982_02	149_47,48	29º46.22'	82º23.78'	2.45	1964	5550	5214	4877	NW	NW	62021	58	0.1428
Khu_gr 386		62K/5	2982_02	149_47,48	29º46.35'	82º23.12'	0.46	1394	5550	5198	4846	N	N	63021	31	0.0142
Khu_gr 387		62K/5	2982_02	149_47,48	29º46.59'	82º22.67'	0.69	1837	5243	4915	4587	NE	NE	63021	36	0.0250
Khu_gr 388		62K/5	2982_02	149_47,48	29º46.90'	82º22.09'	0.15	507	5243	5090	4938	NE	NE	75021	19	0.0028
Khu_gr 389		62K/5	2982_02	149_47,48	29º47.16'	82º21.85'	0.18	507	5273	5117	4961	NE	NE	75021	20	0.0037
Khu_gr 390		62K/5	2982_02	149_47,48	29º47.73'	82º21.42'	1.21	2408	5517	5121	4724	NE	NE	63021	45	0.0545
Khu_gr 391		62K/5	2982_02	149_47,48	29º47.87'	82º20.97'	0.13	570	5182	5029	4877	N	N	75021	18	0.0023
Khu_gr 392		62K/5	2982_02	149_47,48	29º47.50'	82º20.70'	0.19	507	5730	5433	5136	NW	NW	75021	21	0.0040
Khu_gr 393		62K/5	2982_02	149_47,48	29º47.16'	82º20.74'	0.08	507	5319	5159	4999	SW	SW	75021	14	0.0011
Khu_gr 394		62K/5	2982_02	149_47,48	29º47.22'	82º21.02'	0.17	507	5669	5456	5243	SW	SW	67021	20	0.0034
Khu_gr 395		62K/5	2982_02	149_47,48	29º46.84'	82º21.27'	0.79	1204	5532	5243	4953	SW	SW	60021	38	0.0302
Khu_gr 396		62K/5	2982_02	149_47,48	29º46.13'	82º20.60'	5.18	3865	5675	5093	4511	NW	NW	52021	76	0.3928
Khu_gr 397		62K/5	2982_02	149_47,48	29º45.28'	82º21.39'	0.18	634	5822	5502	5182	SW	SW	67021	20	0.0037
Khu_gr 398		62K/6	2982_06	149_47,48	29º43.55'	82º22.83'	20.28	507	5456	5243	5029	SW	SW	63021	120	2.4323
Khu_gr 399		62K/6	2982_06	148_19	29º44.96'	82º21.58'	0.10	1700	5334	5105	4877	S	S	63021	15	0.0015
Khu_gr 400		62K/6	2982_06	148_19	29º44.70'	82º22.70'	0.43	5558	5913	5159	4404	W	NW	51012	30	0.0129
Khu_gr 401		62K/6	2982_06	148_19	29º42.79'	82º21.81'	2.71	1774	5319	5022	4724	NE	NE	60021	60	0.1638
Khu_gr 402		62K/6	2982_06	148_20	29º43.32'	82º20.81'	2.57	1837	5311	4964	4618	N	N	60021	59	0.1524
Khu_gr 403		62K/6	2982_06	148_20	29º43.08'	82º19.93'	0.34	697	5090	4900	4709	NW	NW	60021	27	0.0092
Khu_gr 404		62K/6	2982_06	148_22	29º43.10'	82º19.09'	0.81	887	5166	4938	4709	NE	NE	60021	39	0.0313
Khu_gr 405		62K/6	2982_06	148_22	29º43.61'	82º18.94'	0.06	253	5029	4945	4862	NE	NE	75021	12	0.0007
Khu_gr 406		62K/6	2982_06	148_22	29º43.29'	82º18.59'	0.06	507	4862	5014	5166	W	W	75021	12	0.0007
Khu_gr 407		62K/6	2982_06	148_22	29º42.04'	82º17.51'	3.00	444	5227	4968	4709	NW	NW	60021	63	0.1880
Khu_gr 408		62K/6	2982_06	148_22	29º42.55'	82º16.74'	0.96	1140	5406	5149	4892	E	E	60021	41	0.0396
Khu_gr 409		62K/6	2982_06	148_22	29º42.98'	82º17.02'	0.65	634	5243	5014	4785	NE	NE	60021	35	0.0230
Khu_gr 410		62K/6	2982_06	148_22	29º43.56'	82º17.11'	0.58	1140	5060	4747	4435	NE	NE	60021	34	0.0196
Khu_gr 411		62K/6	2982_06	148_22	29º44.70'	82º17.12'	0.48	824	5304	5159	5014	NE	NE	37021	31	0.0151
Khu_gr 412		62K/2	2982_05	149_45	29º44.26'	82º16.32'	1.91	1964	5401	4903	4404	NW	NW	63021	53	0.1018
Khu_gr 413		62K/2	2982_05	149_45	29º43.40'	82º16.41'	1.46	1394	5401	5078	4755	NW	NW	60021	48	0.0705
Khu_gr 414		62K/2	2982_05	149_45	29º42.73'	82º15.80'	2.72	1647	5708	5056	4404	NW	NW	60021	61	0.1646
Khu_gr 415		62K/2	2982_05	149_44	29º42.78'	82º13.86'	0.36	1140	5349	5113	4877	E	E	63021	28	0.0100
Khu_gr 416		62K/5	2982_05	149_44	29º43.03'	82º14.16'	0.21	1014	5364	5174	4983	SE	SE	63021	22	0.0046
Khu_gr 417		62K/2	2982_05	149_44	29º43.24'	82º14.08'	0.44	697	5453	5157	4862	E	E	60021	30	0.0133

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Khu_gr 418		62K/2	2982_05	149_44	29º43.69'	82º14.39'	0.24	444	5425	5220	5014	NE	NE	67021	23	0.0056
Khu_gr 419		62K/2	2982_05	149_44	29º43.99'	82º14.35'	0.39	1077	5273	5014	4755	NE	NE	63021	29	0.0112
Khu_gr 420		62K/2	2982_05	149_44	29º44.01'	82º13.93'	1.54	1901	5453	5073	4694	N	N	63021	49	0.0758
Khu_gr 421		62K/2	2982_05	149_44	29º43.02'	82º13.54'	0.76	815	5453	5157	4862	NW	NW	60021	38	0.0286
Khu_gr 422		62K/2	2982_05	148_23	29º42.62'	82º13.37'	0.23	697	5227	5044	4862	NW	NW	63021	23	0.0053
Khu_gr 423		62K/2	2982_05	148_23	29º41.10'	82º13.91'	0.13	507	5212	5128	5044	W	W	77021	18	0.0023
Khu_gr 424		62K/2	2982_05	148_23	29º40.75'	82º13.73'	0.86	1140	5243	5079	4915	SW	SW	60021	40	0.0340

Glacier Inventory of Kawari Basin

Total Number : 39   Total Area : 53.33 (km^2)   Ice Reserve : 3.29 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kka_gr 1		62G/10	2981_07	147_44	29º40.59'	81º32.57'	0.36	824	5136	5021	4907	E	E	63021	28	0.0100
Kka_gr 2		62G/10	2981_07	147_44	29º41.18'	81º32.55'	0.63	1647	5425	5121	4816	SE	SE	63021	35	0.0221
Kka_gr 3		62G/10	2981_07	147_44	29º41.97'	81º31.70'	3.97	2218	5379	4960	4542	E	E	61021	69	0.2745
Kka_gr 4		62G/10	2981_07	148_39	29º43.09'	81º31.58'	0.59	1394	5349	5014	4679	N	N	63021	34	0.0201
Kka_gr 5		62G/10	2981_07	148_39	29º43.88'	81º31.04'	0.62	1236	5319	5163	5006	N	N	63021	35	0.0216
Kka_gr 6		62G/10	2981_07	148_39	29º44.54'	81º30.88'	0.17	380	5304	5250	5197	SE	SE	75021	20	0.0034
Kka_gr 7		62G/10	2981_07	148_39	29º44.79'	81º31.76'	1.89	2978	5560	5233	4907	SE	SE	63021	53	0.1003
Kka_gr 8		62G/10	2981_07	148_39	29º44.80'	81º33.11'	1.11	1521	5389	5224	5060	SW	SW	63021	44	0.0484
Kka_gr 9		62G/10	2981_07	148_39	29º44.49'	81º33.32'	0.15	570	5291	5176	5060	SW	SW	63021	19	0.0028
Kka_gr 10		62G/10	2981_07	148_39	29º44.35'	81º33.59'	0.16	444	5291	5168	5044	S	S	63021	19	0.0031
Kka_gr 11		62G/10	2981_07	149_29	29º45.30'	81º35.68'	3.25	3992	*	*	*	N	N	62021	64	0.2095
Kka_gr 12		62G/10	2981_07	149_29	29º45.20'	81º35.19'	0.30	1204	*	*	*	N	N	63021	26	0.0077
Kka_gr 13		62G/10	2981_07	149_29	29º44.44'	81º34.68'	0.60	1267	*	*	*	NE	NE	63021	34	0.0206
Kka_gr 14		62G/10	2981_07	149_29	29º45.32'	81º34.58'	2.52	2598	*	*	*	NE	NE	60021	59	0.1484
Kka_gr 15		62G/10	2981_07	149_29	29º46.26'	81º34.03'	1.48	2661	5760	*	*	NE	NE	60021	49	0.0718
Kka_gr 16		62G/10	2981_07	149_29	29º46.80'	81º33.97'	0.69	1521	5878	*	*	N	N	63021	36	0.0250
Kka_gr 17		62G/09	2981_03	150_5	29º47.03'	81º33.63'	1.09	1837	5788	*	*	NE	NE	63021	43	0.0472
Kka_gr 18		62G/09	2981_03	150_5	29º47.59'	81º33.46'	1.77	1711	5788	5393	4999	NE	NE	63021	52	0.0917
Kka_gr 19		62G/09	2981_03	150_5	29º48.59'	81º33.94'	2.27	3992	5759	5303	4846	NE	NE	60021	57	0.1288
Kka_gr 20		62G/09	2981_03	150_5	29º49.06'	81º34.34'	0.66	1394	5760	5288	4816	E	E	60021	36	0.0235
Kka_gr 21		62G/09	2981_03	150_5	29º49.48'	81º34.10'	1.11	1077	5760	5250	4740	NE	NE	60021	44	0.0484
Kka_gr 22		62G/09	2981_03	150_5	29º50.87'	81º34.31'	2.34	1140	5578	5174	4770	SE	SE	60021	57	0.1342
Kka_gr 23		62G/09	2981_03	150_32	29º50.95'	81º35.58'	0.72	760	5364	5197	5029	SW	SW	60021	37	0.0266
Kka_gr 24		62G/09	2981_03	150_32	29º51.03'	81º36.47'	0.31	760	5212	5144	5075	S	S	60021	26	0.0081
Kka_gr 25		62G/09	2981_03	150_32	29º51.47'	81º36.22'	2.18	1647	5449	4896	4343	NE	NE	60021	56	0.1219
Kka_gr 26		62G/09	2981_03	150_32	29º51.47'	81º34.96'	1.74	1077	5243	5075	4907	N	N	60021	52	0.0896
Kka_gr 27		62G/09	2981_03	150_32	29º51.77'	81º33.93'	3.27	2028	5578	5159	4740	N	N	60021	65	0.2112
Kka_gr 28		62G/09	2981_03	152_21	29º54.16'	81º33.10'	10.54	8364	6922	5214	3505	E	E	52012	97	1.0175
Kka_gr 29		62G/09	2981_03	152_21	29º54.27'	81º31.43'	0.03	317	6248	6111	5974	SE	SE	75021	7	0.0002
Kka_gr 30		62G/09	2981_03	152_21	29º54.96'	81º32.13'	3.45	2724	5730	4999	4267	SE	SE	60021	66	0.2271

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kka_gr 31		62G/09	2981_03	152_21	29º55.37'	81º33.57'	0.21	824	4785	4572	4359	S	S	63021	22	0.0046
Kka_gr 32		62G/09	2981_03	152_21	29º55.69'	81º34.00'	0.17	824	4862	4709	4557	S	S	63021	20	0.0034
Kka_gr 33		62G/09	2981_03	152_3	29º56.36'	81º41.39'	1.31	2028	5630	5177	4724	NW	NW	60021	46	0.0608
Kka_gr 34		62G/09	2981_03	152_3	29º55.98'	81º41.72'	0.11	760	5608	5593	5578	SW	SW	60021	16	0.0018
Kka_gr 35		62G/09	2981_03	152_3	29º55.81'	81º42.09'	0.10	190	5654	5570	5486	SE	SE	60021	15	0.0015
Kka_gr 36		62G/09	2981_03	152_3	29º55.29'	81º42.35'	0.98	1647	5630	5269	4907	W	W	60021	42	0.0407
Kka_gr 37		62G/09	2981_03	152_3	29º54.73'	81º42.66'	0.06	444	5044	4953	4862	W	W	75021	12	0.0007
Kka_gr 38		62G/09	2981_03	152_3	29º54.57'	81º42.77'	0.10	507	5075	4983	4892	W	W	75021	15	0.0015
Kka_gr 39		62G/09	2981_03	152_3	29º54.59'	81º43.54'	0.36	1140	5136	5022	4907	W	W	75021	28	0.0100

Glacier Inventory of West Seti Basin

Total Number : 134 Total Area : 294.13 (km^2) Ice Reserve : 24.48 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Kse_gr 1		62/G1	2981_01	149_15	29º48.69'	81º 4.74'	5.29	5005	6161	5229	4298	SW	SW	53021	76	0.4041
Kse_gr 2		62/G1	2981_01	149_15	29º48.25'	81º 5.81'	2.75	2915	6096	5395	4694	S	S	63021	61	0.1671
Kse_gr 3		62/G1	2981_01	149_19	29º48.32'	81º11.77'	0.56	1331	5373	4988	4602	SE	SE	63021	33	0.0187
Kse_gr 4		62/G1	2981_01	149_19	29º48.92'	81º11.88'	0.65	1711	5580	5152	4724	SE	SE	63021	35	0.0230
Kse_gr 5		62/G1	2981_01	149_19	29º49.74'	81º12.21'	2.32	2154	5136	4755	4374	NE	NE	67021	57	0.1326
Kse_gr 6		62/G1	2981_01	149_19	29º48.31'	81º10.87'	0.90	1267	5100	4893	4685	NW	NW	63021	40	0.0362
Kse_gr 7		62/G1	2981_01	149_18	29º49.29'	81º 8.98'	0.13	570	5715	5540	5364	E	E	67021	18	0.0023
Kse_gr 8		62/G1	2981_01	149_18	29º49.45'	81º 9.37'	0.08	507	5029	4877	4724	NE	NE	75021	14	0.0011
Kse_gr 9		62/G1	2981_01	149_18	29º49.95'	81º 9.21'	1.64	3738	5715	4900	4084	SE	SE	53021	50	0.0827
Kse_gr 10		62/G1	2981_01	149_18	29º50.84'	81º 8.95'	1.50	1077	5304	5037	4770	N	N	60021	49	0.0732
Kse_gr 11		62/G1	2981_01	149_18	29º50.40'	81º 8.39'	0.40	950	4968	4740	4511	NW	NW	63021	29	0.0116
Kse_gr 12		62/G1	2981_01	149_18	29º49.53'	81º 8.25'	0.12	570	6059	5818	5578	NW	NW	75021	17	0.0020
Kse_gr 13		62/G1	2981_01	150_16	29º49.75'	81º 6.49'	10.21	3992	6096	5212	4328	NW	NW	62021	96	0.9752
Kse_gr 14		62/G1	2981_01	150_16	29º50.92'	81º 6.97'	0.06	507	4740	4580	4420	SE	SE	75021	12	0.0007
Kse_gr 15		62/G1	2981_01	150_16	29º50.86'	81º 6.61'	0.15	824	5319	5083	4846	E	E	75021	19	0.0028
Kse_gr 16		62/G1	2981_01	150_16	29º51.48'	81º 6.41'	3.19	3231	6553	5578	4602	NE	NE	60021	64	0.2043
Kse_gr 17		62/G1	2981_01	150_16	29º52.33'	81º 6.92'	2.16	2408	5645	5055	4465	NE	NE	60021	56	0.1204
Kse_gr 18		62/G1	2981_01	150_16	29º53.17'	81º 6.75'	0.48	1204	5151	5060	4968	NE	NE	63021	31	0.0151
Kse_gr 19		62/G1	2981_01	150_16	29º52.55'	81º 6.33'	0.43	760	5563	5067	4572	NW	NW	67021	30	0.0129
Kse_gr 20	Kap Chuli	62/G1	2981_01	150_16	29º52.01'	81º 4.53'	18.77	6780	6467	5382	4298	NE	NE	51021	117	2.1946
Kse_gr 21		62/G1	2981_01	151_18	29º53.05'	81º 3.73'	2.18	3358	6849	5741	4633	SE	SE	60021	56	0.1219
Kse_gr 22		62/G1	2981_01	151_18	29º53.80'	81º 4.36'	1.73	2344	5852	5288	4724	NE	NE	63021	51	0.0889
Kse_gr 23		62/G1	2981_01	151_18	29º54.82'	81º 2.88'	25.39	6463	6849	5596	4343	NE	NE	51021	129	3.2775
Kse_gr 24		62/G1	2981_01	152_8	29º56.60'	81º 4.14'	0.35	1711	5098	4896	4694	NE	NE	75021	28	0.0096
Kse_gr 25		62/G1	2981_01	152_8	29º57.32'	81º 3.22'	1.72	2724	6163	5582	5002	SE	SE	63021	51	0.0882
Kse_gr 26		62/G1	2981_01	152_8	29º57.78'	81º 3.81'	0.34	824	5334	5189	5044	SE	SE	74021	27	0.0092
Kse_gr 27		62/G1	2981_01	152_8	30º 0.09'	81º 4.75'	23.68	8997	6808	5652	4496	S	S	51012	126	2.9880
Kse_gr 28		62/F4	3081_13	171_8	30º 0.93'	81º 3.49'	1.14	2724	6043	5460	4877	SE	SE	63021	44	0.0502
Kse_gr 29		62/F4	3081_13	171_8	30º 1.40'	81º 4.18'	1.46	2471	5578	5182	4785	SE	SE	63021	48	0.0705
Kse_gr 30		62/F4	3081_13	215_6	30º 2.92'	81º 5.14'	0.38	1077	6172	5959	5745	E	E	63021	28	0.0108

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kse_gr 31		62/F4	3081_13	215_6	30º 2.56'	81º 5.65'	0.26	824	5791	5464	5136	SW	SW	75021	24	0.0063
Kse_gr 32		62/F4	3081_13	215_6	30º 2.13'	81º 6.54'	1.12	1204	6712	6251	5791	S	S	67021	44	0.0490
Kse_gr 33		62/G1	2981_01	215_6	29º59.83'	81º 7.16'	1.55	2724	6575	5674	4773	SW	SW	62021	49	0.0765
Kse_gr 34		62/G1	2981_01	170_10	29º59.42'	81º 7.37'	0.82	1964	6395	5788	5182	SW	SW	63021	39	0.0318
Kse_gr 35		62/G1	2981_01	170_10	29º59.05'	81º 7.52'	0.81	1394	6157	5666	5176	SW	SW	62021	39	0.0313
Kse_gr 36		62/G1	2981_01	170_10	29º58.08'	81º 6.95'	4.06	2471	6632	5800	4968	NW	NW	60021	70	0.2830
Kse_gr 37		62/G1	2981_01	170_10	29º56.95'	81º 7.13'	0.27	1077	6632	6059	5486	W	W	67021	25	0.0066
Kse_gr 38		62/G1	2981_01	170_10	29º56.83'	81º 8.39'	4.05	2661	6632	5648	4663	E	E	60021	70	0.2820
Kse_gr 39		62/G1	2981_01	170_10	29º57.76'	81º 8.45'	3.08	3041	6654	5689	4724	SE	SE	63021	63	0.1948
Kse_gr 40		62/G1	2981_01	171_11	29º58.61'	81º 9.13'	13.88	2915	6066	5182	4298	SE	SE	60021	106	1.4688
Kse_gr 41		62/F4	3081_13	171_12	30º 0.78'	81º11.78'	1.65	2788	6059	5506	4953	SE	SE	63021	51	0.0834
Kse_gr 42		62/G1	2981_01	153_5	29º59.09'	81º13.84'	0.46	982	5011	4849	4688	NE	NE	75021	31	0.0142
Kse_gr 43		62/G1	2981_01	153_5	29º59.48'	81º13.64'	0.13	697	5121	5020	4919	E	E	75021	18	0.0023
Kse_gr 44		62/G1	2981_01	153_5	30º 0.11'	81º13.55'	2.07	2218	5456	5090	4724	SE	SE	62021	55	0.1136
Kse_gr 45		62/F4	3081_14	153_5	30º 0.44'	81º15.09'	0.35	1077	5535	5020	4930	SE	SE	63021	28	0.0096
Kse_gr 46		62/G5	2981_02	170_12	29º58.82'	81º15.61'	0.77	2154	4490	4245	4001	SE	SE	63021	38	0.0292
Kse_gr 47		62/G5	2981_02	170_12	29º57.66'	81º16.43'	1.09	1331	5630	5433	5236	NW	NW	63021	43	0.0472
Kse_gr 48		62/G1	2981_01	170_12	29º56.02'	81º14.55'	2.45	1521	6016	5218	4420	N	N	60021	58	0.1428
Kse_gr 49		62/G1	2981_01	170_12	29º54.82'	81º12.88'	0.55	1267	6016	5522	5029	SW	SW	63021	33	0.0182
Kse_gr 50		62/G1	2981_01	170_12	29º54.33'	81º12.97'	0.80	887	5741	5324	4907	W	W	67021	38	0.0308
Kse_gr 51		62/G1	2981_01	170_12	29º53.49'	81º12.94'	0.49	1140	5425	5238	5051	SE	SE	63021	32	0.0155
Kse_gr 52		62/G1	2981_01	170_12	29º54.89'	81º14.29'	6.25	2661	5741	5111	4481	SE	SE	60021	81	0.5055
Kse_gr 53		62/G5	2981_02	213_1,151_13	29º54.63'	81º16.42'	0.21	550	5288	5037	4785	N	N	67021	22	0.0046
Kse_gr 54		62/G5	2981_02	213_1,151_13	29º55.01'	81º16.29'	0.30	1120	4907	4633	4359	NE	NE	63021	26	0.0077
Kse_gr 55		62/G5	2981_02	213_1,151_13	29º55.80'	81º15.54'	0.21	610	5243	5075	4907	NE	NE	67021	22	0.0046
Kse_gr 56		62/G5	2981_02	152_15	29º57.11'	81º19.20'	1.36	2950	4679	4503	4328	NE	NE	63021	47	0.0640
Kse_gr 57		62/G5	2981_02	152_15	29º57.66'	81º17.81'	0.75	1750	4654	4487	4319	NE	NE	63021	37	0.0281
Kse_gr 58		62/G5	2981_02	152_14	29º58.13'	81º17.27'	1.29	2000	5191	4836	4481	SE	SE	62021	46	0.0595
Kse_gr 59		62/G5	2981_02	152_14	29º58.87'	81º17.19'	0.78	980	5191	5034	4877	SE	SE	60021	38	0.0297
Kse_gr 60		62/G5	2981_02	152_14	29º59.28'	81º17.82'	0.37	400	5121	4983	4846	E	E	60021	28	0.0104
Kse_gr 61		62/G5	2981_02	152_14	29º59.53'	81º17.58'	0.69	1000	5136	4968	4801	NE	NE	60021	36	0.0250
Kse_gr 62		62/G5	2981_02	152_14	29º59.21'	81º17.06'	0.35	950	5136	5010	4884	W	W	60021	28	0.0096
Kse_gr 63		62/G5	2981_02	152_14	29º59.16'	81º16.58'	0.60	1120	5273	4968	4663	NE	NE	63021	34	0.0206
Kse_gr 64		62/F8	3081_14	171_12,13	30º 0.57'	81º15.73'	0.48	887	*	*	*	SE	SE	60021	31	0.0151
Kse_gr 65		62/F8	3081_14	171_12,13	30º 1.62'	81º16.07'	5.03	4055	*	*	*	SE	SE	62021	75	0.3776
Kse_gr 66		62/F8	3081_14	171_12,13	30º 2.41'	81º16.31'	0.53	1457	*	*	*	SW	SW	63021	33	0.0173
Kse_gr 67		62/F8	3081_14	171_12,13	30º 2.14'	81º16.65'	0.17	1774	*	*	*	SW	SW	63021	20	0.0034
Kse_gr 68		62/F8	3081_14	171_12,13	30º 1.78'	81º17.11'	0.31	1457	*	*	*	SW	SW	63021	26	0.0081
Kse_gr 69		62/F8	3081_14	171_12,13	30º 1.81'	81º17.60'	0.55	1584	*	*	*	W	W	63021	33	0.0182
Kse_gr 70		62/F8	3081_14	171_12,13	30º 1.15'	81º18.73'	2.84	1457	*	*	*	SW	SW	60021	61	0.1745
Kse_gr 71		62/F8	3081_14	171_12,13	30º 1.31'	81º19.97'	0.55	507	*	*	*	SW	SW	67021	33	0.0182
Kse_gr 72		62/F8	3081_14	171_12,13	30º 0.54'	81º20.23'	1.69	1521	*	*	*	S	S	60021	51	0.0861
Kse_gr 73		62/G5	2981_02	153_8	29º59.17'	81º22.07'	0.45	1100	4633	4458	4282	NE	NE	63021	31	0.0137

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kse_gr 74		62/G5	2981_02	153_8	29º59.54'	81º21.64'	0.82	1400	5462	4872	4282	NE	NE	60021	39	0.0318
Kse_gr 75		62/G5	2981_02	153_8	29º59.85'	81º20.97'	0.18	550	4663	4557	4450	N	N	74021	20	0.0037
Kse_gr 76		62/G5	2981_02	153_10	29º59.42'	81º27.25'	1.77	3050	5364	5166	4968	W	W	53021	52	0.0917
Kse_gr 77		62/G5	2981_02	153_10	29º58.47'	81º27.84'	0.43	900	5281	5204	5128	S	S	74021	30	0.0129
Kse_gr 78		62/G5	2981_02	152_18	29º56.47'	81º27.00'	0.55	1600	5243	5022	4801	W	W	63021	33	0.0182
Kse_gr 79		62/G5	2981_02	152_18	29º55.54'	81º26.03'	9.97	5500	5761	5105	4450	NW	NW	52021	95	0.9447
Kse_gr 80		62/G5	2981_02	152_18	29º56.05'	81º22.85'	2.27	3400	5557	4912	4267	NW	NW	62021	57	0.1288
Kse_gr 81		62/G5	2981_02	152_18	29º53.51'	81º25.02'	1.13	1700	6447	5677	4907	NW	NW	60021	44	0.0496
Kse_gr 82		62/G5	2981_02	152_18	29º52.09'	81º25.23'	0.97	850	5639	5357	5075	W	W	60021	41	0.0402
Kse_gr 83		62/G5	2981_02	152_18	29º51.69'	81º25.05'	0.35	1200	5654	5319	4983	NW	NW	63021	28	0.0096
Kse_gr 84		62/G5	2981_02	168_9	29º51.47'	81º24.11'	2.96	3050	5825	5153	4481	NW	NW	52021	62	0.1846
Kse_gr 85		62/G5	2981_02	168_9	29º52.42'	81º22.43'	4.43	2770	6526	5496	4465	N	N	60021	72	0.3183
Kse_gr 86		62/G5	2981_02	168_11	29º53.52'	81º21.50'	0.14	500	5060	4915	4770	NW	NW	75021	18	0.0025
Kse_gr 87		62/G5	2981_02	168_11	29º53.39'	81º21.01'	2.00	2200	5182	4709	4237	N	N	63021	54	0.1084
Kse_gr 88		62/G5	2981_02	168_11	29º52.59'	81º20.82'	0.07	400	5639	5608	5578	NE	NE	37021	13	0.0009
Kse_gr 89		62/G5	2981_02	168_11	29º51.99'	81º20.16'	1.46	2560	5364	4892	4420	W	W	53021	48	0.0705
Kse_gr 90		62/G5	2981_02	168_11	29º52.51'	81º20.72'	0.09	275	5639	5532	5425	SW	SW	37021	15	0.0013
Kse_gr 91		62/G5	2981_02	168_11	29º52.02'	81º21.55'	0.32	1300	6462	6035	5608	NW	NW	63021	26	0.0085
Kse_gr 92		62/G5	2981_02	168_11	29º51.62'	81º22.02'	0.36	725	6443	5889	5334	SW	SW	60021	28	0.0100
Kse_gr 93		62/G5	2981_02	168_11	29º51.26'	81º21.81'	0.06	450	5669	5441	5212	SW	SW	75021	12	0.0007
Kse_gr 94		62/G5	2981_02	168_11	29º50.36'	81º22.39'	5.42	2400	6443	5599	4755	W	W	60021	77	0.4175
Kse_gr 95		62/G5	2981_02	168_11	29º49.24'	81º22.29'	1.42	1400	5791	5395	4999	W	W	60021	48	0.0679
Kse_gr 96		62/G5	2981_02	168_11	29º48.58'	81º20.39'	1.69	3150	5334	5037	4740	NW	NW	63021	51	0.0861
Kse_gr 97		62/G5	2981_02	168_11	29º47.71'	81º20.29'	0.49	950	5197	4968	4740	S	S	60021	32	0.0155
Kse_gr 98		62/G5	2981_02	168_11	29º47.63'	81º20.93'	0.21	650	5334	5166	4999	S	S	75021	22	0.0046
Kse_gr 99		62/G5	2981_02	168_11	29º48.62'	81º22.60'	0.51	850	5212	4945	4679	SW	SW	60021	32	0.0164
Kse_gr 100		62/G5	2981_02	168_11	29º48.49'	81º23.21'	0.45	850	5395	5151	4907	W	W	60021	31	0.0137
Kse_gr 101		62/G5	2981_02	168_9	29º49.34'	81º23.09'	0.97	1620	5395	4907	4420	NE	NE	60021	41	0.0402
Kse_gr 102		62/G5	2981_02	168_9	29º50.59'	81º23.79'	2.02	1620	5364	4877	4389	SE	SE	60021	54	0.1099
Kse_gr 103		62/G5	2981_02	168_9	29º50.84'	81º24.84'	0.33	1000	5761	5425	5090	S	S	63021	27	0.0089
Kse_gr 104		62/G5	2981_02	168_9	29º50.84'	81º25.15'	0.25	1000	5761	5380	4999	S	S	63021	24	0.0059
Kse_gr 105		62/G5	2981_02	168_9	29º51.42'	81º25.81'	0.56	975	5456	5204	4953	SE	SE	60021	33	0.0187
Kse_gr 106		62/G5	2981_02	168_9	29º51.62'	81º26.33'	0.73	1800	5486	5029	4572	SE	SE	63021	37	0.0271
Kse_gr 107		62/G5	2981_02	169_9	29º52.18'	81º27.64'	12.41	7650	7025	5204	3719	SW	SW	52021	102	1.2652
Kse_gr 108		62/G5	2981_02	168_7	29º50.49'	81º28.66'	0.20	600	5462	5284	5105	NW	NW	67021	22	0.0043
Kse_gr 109		62/G5	2981_02	168_7	29º49.94'	81º28.13'	1.13	1650	4880	4642	4404	NW	NW	67021	44	0.0496
Kse_gr 110		62/G5	2981_02	168_7	29º48.64'	81º28.07'	0.38	1020	5151	4724	4298	SE	SE	63021	28	0.0108
Kse_gr 111		62/G5	2981_02	168_7	29º49.44'	81º28.70'	0.39	1050	4880	4680	4481	SE	SE	63021	29	0.0112
Kse_gr 112		62/G5	2981_02	168_7	29º50.85'	81º29.19'	0.32	800	5456	5220	4983	SE	SE	67021	26	0.0085
Kse_gr 113		62/G5	2981_02	168_7	29º51.13'	81º29.43'	0.15	400	5273	5136	4999	SE	SE	75021	19	0.0028
Kse_gr 114		62/G5	2981_02	168_7	29º52.31'	81º30.75'	13.22	5829	6922	5220	3962	SE	SE	51021	104	1.3765
Kse_gr 115		62/G9	2981_03	168_6	29º50.74'	81º33.13'	5.26	2218	5578	5109	4641	NW	NW	60021	76	0.4010
Kse_gr 116		62/G9	2981_03	168_6	29º48.57'	81º33.36'	0.27	634	5760	5395	5029	NW	NW	67021	25	0.0066

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Kse_gr 117		62/G9	2981_03	149_28	29º47.86'	81º32.33'	3.17	1552	5759	5368	4976	W	W	60021	64	0.2026
Kse_gr 118		62/G9	2981_03	149_28	29º46.26'	81º31.83'	14.18	5512	5881	5104	4328	NW	NW	62021	107	1.5112
Kse_gr 119		62/G5	2981_02	149_27	29º46.52'	81º29.87'	2.48	2140	5587	5118	4648	NW	NW	60021	59	0.1452
Kse_gr 120		62/G5	2981_02	149_27	29º46.06'	81º29.19'	0.15	450	4938	4846	4755	NW	NW	74021	19	0.0028
Kse_gr 121		62/G5	2981_02	149_27	29º45.57'	81º30.18'	3.41	3510	5395	4755	4115	NW	NW	60021	66	0.2236
Kse_gr 122		62/G10	2981_07	149_27	29º44.69'	81º30.40'	0.81	1265	5745	5357	4968	W	W	60021	39	0.0313
Kse_gr 123		62/G10	2981_07	148_40	29º43.73'	81º30.48'	0.69	1331	5212	4983	4755	W	W	63021	36	0.0250
Kse_gr 124		62/G10	2981_07	148_40	29º43.28'	81º30.59'	0.99	1267	5364	5105	4846	W	W	60021	42	0.0413
Kse_gr 125		62/G10	2981_07	148_40	29º42.62'	81º30.68'	2.67	2091	5212	4983	4755	NW	NW	60021	60	0.1605
Kse_gr 126		62/G10	2981_07	147_45	29º41.65'	81º30.81'	1.09	1077	5542	5408	5273	NW	NW	60021	43	0.0472
kse_gr 127		62/G10	2981_07	147_45	29º40.80'	81º30.36'	2.34	1267	5243	4945	4648	NW	NW	60021	57	0.1342
kse_gr 128		62/G6	2981_06	147_45	29º39.77'	81º28.86'	0.17	507	5486	5441	5395	NW	NW	37021	20	0.0034
kse_gr 129		62/G6	2981_06	147_45	29º39.61'	81º28.90'	0.28	824	5486	5296	5105	SW	SW	37021	25	0.0070
kse_gr 130		62/G6	2981_06	147_45	29º39.99'	81º29.79'	0.65	317	5486	5265	5044	SE	SE	67021	35	0.0230
kse_gr 131		62/G10	2981_07	147_45	29º40.07'	81º30.39'	1.41	1616	5307	4955	4602	SE	SE	63021	48	0.0672
kse_gr 132		62/G10	2981_07	147_45	29º40.70'	81º31.51'	3.31	2344	5425	4983	4542	S	S	61021	65	0.2147
kse_gr 133		62/G10	2981_07	147_45	29º40.23'	81º32.29'	0.29	1267	5121	4923	4724	NW	NW	63021	25	0.0074
kse_gr 134		62/G10	2981_07	147_45	29º39.93'	81º32.58'	0.33	1204	5212	4938	4663	NW	NW	63021	27	0.0089

Glacier Inventory of Mahakali Basin

Total Number : 87 Total Area : 143.33 (km^2) Ice Reserve : 10.06 (km^3)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Glacier Number	Glacier Name	Map Code 60's	Map Code 90's	Aerial Photo Number	Latitude	Longitude	Area (Km^2)	Mean Length (m)	Elevation Heighest (m)	Elevation Mean (m)	Elevation Tongue (m)	Orientation Accumulation	Orientation Ablation	Classification	Thickness (m)	Reserve of Ice (Km^3)
Mkali_gr 1		62B/16	3080_16	205_5	30°10.39'	80°55.74'	0.72	1521	*	*	*	NW	NW	63021	37	0.0266
Mkali_gr 2		62B/16	3080_16	205_5	30°11.05'	80°56.64'	1.44	2534	*	*	*	NE	NE	63021	48	0.0692
Mkali_gr 3		62B/16	3080_16	205_5	30°11.46'	80°58.03'	0.65	1457	*	*	*	N	N	63021	35	0.0230
Mkali_gr 4		62B/16	3080_16	205_5	30°10.69'	80°58.73'	0.98	2154	*	*	*	NW	NW	63021	42	0.0407
Mkali_gr 5		62B/16	3080_16	215_14	30°12.57'	81° 1.92'	0.54	570	*	*	*	NW	NW	63021	33	0.0178
Mkali_gr 6		62B/16	3080_16	215_14	30°12.76'	81° 2.89'	0.94	887	*	*	*	W	W	67021	41	0.0407
Mkali_gr 7		62F/4	3081_13	215_14	30°11.92'	81° 2.60'	0.59	950	*	*	*	W	W	63021	34	0.0225
Mkali_gr 8		62F/4	3081_13	215_14	30°11.33'	81° 2.33'	1.51	1774	*	*	*	NW	NW	63021	49	0.0758
Mkali_gr 9		62F/4	3081_13	215_12	30°10.85'	81° 3.08'	0.40	1267	5090	4968	4846	SW	SW	63021	29	0.0116
Mkali_gr 10		62F/4	3081_13	215_12	30°10.70'	81° 3.71'	0.05	190	5608	5502	5395	NW	NW	77021	10	0.0005
Mkali_gr 11		62F/4	3081_13	215_12	30°10.44'	81° 3.72'	0.11	760	6005	5745	5486	NW	NW	77021	16	0.0020
Mkali_gr 12		62F/4	3081_13	215_12	30°10.25'	81° 2.69'	0.30	1077	4968	4884	4801	SW	SW	63021	26	0.0077
Mkali_gr 13		62F/4	3081_13	215_12	30° 9.81'	81° 3.06'	0.58	1647	5090	4866	4642	SW	SW	63021	34	0.0196
Mkali_gr 14		62F/4	3081_13	215_12	30°10.09'	81° 3.67'	0.50	1140	6005	5593	5182	SW	SW	63021	32	0.0155
Mkali_gr 15		62F/4	3081_13	215_10	30° 9.22'	81° 3.64'	1.52	2915	5974	5297	4621	SW	SW	63021	49	0.0745
Mkali_gr 16		62F/4	3081_13	215_10	30° 9.53'	81° 4.57'	0.72	1014	6035	5761	5486	NW	NW	63021	37	0.0266
Mkali_gr 17		62F/4	3081_13	215_10	30° 8.89'	81° 4.50'	0.44	1331	5669	5281	4892	SW	SW	63021	30	0.0133
Mkali_gr 18		62F/4	3081_13	215_10	30° 8.79'	81° 4.92'	0.26	1077	5791	5410	5029	SW	SW	63021	24	0.0063
Mkali_gr 19		62F/4	3081_13	215_10	30° 8.19'	81° 5.50'	2.51	1901	5791	5166	4542	SW	SW	60021	59	0.1476
Mkali_gr 20		62F/4	3081_13	215_11	30° 7.79'	81° 4.28'	5.72	5259	6370	5325	4279	NW	NW	52012	78	0.4488
Mkali_gr 21		62F/4	3081_13	215_11	30° 6.30'	81° 4.29'	2.50	2915	5974	5372	4770	NW	NW	62021	59	0.1468
Mkali_gr 22		62F/4	3081_13	215_11	30° 5.48'	81° 4.33'	0.19	824	5456	5136	4816	S	S	63021	21	0.0040
Mkali_gr 23		62F/4	3081_13	154_5	30° 4.67'	81° 6.26'	4.60	4562	6224	5520	4816	W	W	51012	73	0.3348
Mkali_gr 24		62F/4	3081_13	154_5	30° 4.87'	81° 7.59'	0.05	190	6447	6332	6218	W	W	77021	10	0.0005
Mkali_gr 25		62F/4	3081_13	171_7,8	30° 3.65'	81° 4.71'	12.07	5576	6620	5389	4157	NW	NW	52012	101	1.2192
Mkali_gr 26		62F/4	3081_13	171_7,8	30° 3.41'	81° 3.81'	0.37	1204	4846	4642	4438	NE	NE	75021	28	0.0104
Mkali_gr 27		62F/4	3081_13	171_7,8	30° 3.70'	81° 3.56'	0.35	1204	4785	4599	4414	NE	NE	75021	28	0.0096
Mkali_gr 28		62F/4	3081_13	171_7,8	30° 3.85'	81° 3.27'	0.19	824	4731	4601	4471	NE	NE	75021	21	0.0040
Mkali_gr 29		62B/16	3080_16	171_7,8	30° 4.09'	81° 2.84'	0.29	950	4831	4641	4450	NE	NE	75021	25	0.0074
Mkali_gr 30		62B/16	3080_16	171_7,8	30° 4.15'	81° 2.29'	0.38	1394	4974	4682	4389	NE	NE	75021	28	0.0108

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Mkali_gr 31		62B/16	3080_16	171_7,8	30° 2.00'	81° 3.61'	4.47	6589	6410	5377	4343	NW	NW	53021	72	0.3221
Mkali_gr 32		62B/16	3080_16	171_7,8	30° 1.56'	81° 1.98'	8.48	9821	6618	5351	4084	NW	NW	53021	90	0.7609
Mkali_gr 33		62C/13	2980_04	171_6	30° 1.42'	80°59.63'	10.18	6083	*	*	*	NW	NW	53021	95	0.9714
Mkali_gr 34		62C/13	2980_04	171_6	30° 2.10'	80°58.24'	3.27	4942	*	*	*	NW	NW	53021	65	0.2112
Mkali_gr 35		62C/13	2980_04	171_5	30° 2.54'	80°56.43'	4.07	4752	*	*	*	NE	NE	53021	70	0.2839
Mkali_gr 36		62C/13	2980_04	171_5	30° 2.35'	80°54.10'	9.63	3295	*	*	*	N	N	52021	94	0.9019
Mkali_gr 37		62C/13	2980_04	171_5	30° 3.10'	80°53.07'	0.58	2154	*	*	*	NE	NE	63021	34	0.0196
Mkali_gr 38		62C/13	2980_04	170_4	29°58.91'	80°52.29'	0.66	1457	5319	4878	4438	NW	NW	67021	36	0.0235
Mkali_gr 39		62C/13	2980_04	170_4	29°58.63'	80°52.65'	0.49	887	6157	5745	5334	SW	SW	67021	32	0.0155
Mkali_gr 40		62C/13	2980_04	170_4	29°57.90'	80°53.07'	0.09	380	6169	6056	5944	SW	SW	77021	15	0.0013
Mkali_gr 41		62C/13	2980_04	170_4	29°57.44'	80°52.17'	1.58	2154	5136	4580	4023	NW	NW	63021	50	0.0786
Mkali_gr 42		62C/13	2980_04	170_4	29°57.14'	80°51.53'	2.27	3105	5945	5045	4145	NW	NW	63021	57	0.1288
Mkali_gr 43		62C/13	2980_04	170_3	29°56.45'	80°50.22'	0.85	1140	4907	4612	4316	N	N	63021	39	0.0335
Mkali_gr 44		62C/13	2980_04	170_3	29°57.45'	80°49.51'	1.42	3421	4877	4393	3909	NE	NE	53021	48	0.0679
Mkali_gr 45		62C/13	2980_04	170_3	29°58.42'	80°50.02'	0.19	760	4206	4107	4008	N	N	75021	21	0.0040
Mkali_gr 46		62C/13	2980_04	170_3	29°58.31'	80°49.06'	1.12	2154	5075	4613	4151	NW	NW	62021	44	0.0490
Mkali_gr 47		62C/13	2980_04	170_3	29°57.32'	80°48.47'	1.13	2851	5151	4610	4069	NW	NW	63021	44	0.0496
Mkali_gr 48		62C/13	2980_04	170_3	29°57.59'	80°47.90'	0.64	1584	4572	4282	3993	NW	NW	62021	35	0.0225
Mkali_gr 49		62C/13	2980_04	170_3	29°56.41'	80°48.58'	0.12	444	4481	4374	4267	SW	SW	74021	17	0.0020
Mkali_gr 50		62C/13	2980_04	170_3	29°55.73'	80°50.09'	0.68	1457	5029	4721	4414	W	W	63021	36	0.0245
Mkali_gr 51		62C/13	2980_04	170_4	29°55.65'	80°51.15'	2.45	3041	5945	5190	4435	SW	SW	53021	58	0.1428
Mkali_gr 52		62C/13	2980_04	170_4	29°55.58'	80°52.12'	0.20	570	5745	5479	5212	SW	SW	75021	22	0.0043
Mkali_gr 53		62C/13	2980_04	170_4	29°55.82'	80°53.55'	4.01	2281	5121	4831	4542	NE	NE	60021	69	0.2783
Mkali_gr 54		62C/13	2980_04	170_4	29°56.37'	80°52.52'	0.15	317	5945	5731	5517	SE	SE	37021	19	0.0028
Mkali_gr 55		62C/13	2980_04	170_5	29°56.79'	80°53.49'	1.95	1901	5608	5151	4694	SE	SE	60021	54	0.1047
Mkali_gr 56		62C/13	2980_04	170_5	29°57.49'	80°53.79'	2.69	2344	6005	5334	4663	SE	SE	60021	60	0.1622
Mkali_gr 57		62C/13	2980_04	170_5	29°58.70'	80°53.06'	0.30	824	6370	5986	5602	NE	NE	77021	26	0.0077
Mkali_gr 58		62C/13	2980_04	170_5	29°58.22'	80°55.60'	2.64	4245	4877	4438	3999	SE	SE	52012	60	0.1581
Mkali_gr 59		62C/13	2980_04	170_5	29°59.63'	80°54.42'	1.51	887	*	*	4764	SE	SE	60021	49	0.0738
Mkali_gr 60		62C/13	2980_04	170_5	29°59.63'	80°55.40'	0.27	1014	*	*	4938	SW	SW	75021	25	0.0066
Mkali_gr 61		62C/13	2980_04	170_6	29°59.64'	80°56.02'	0.35	697	*	*	5425	SW	SW	67021	28	0.0096
Mkali_gr 62		62C/13	2980_04	170_6	29°58.82'	80°56.78'	0.46	1584	5700	5174	4648	SW	SW	63021	31	0.0142
Mkali_gr 63		62C/13	2980_04	170_6	29°59.60'	80°56.85'	0.33	634	*	*	5928	S	S	67021	27	0.0096
Mkali_gr 64		62C/13	2980_04	170_6	29°59.65'	80°57.54'	0.21	507	*	*	5944	SE	SE	60021	22	0.0046
Mkali_gr 65		62C/13	2980_04	170_7	29°58.78'	80°57.99'	0.11	950	4535	4365	4194	SW	SW	75021	16	0.0018
Mkali_gr 66		62C/13	2980_04	170_7	29°59.51'	80°58.66'	2.12	2598	*	*	4209	SW	SW	53511	55	0.1173
Mkali_gr 67		62C/13	2980_04	170_7	29°59.12'	80°59.32'	0.05	444	4572	4513	4453	SW	SW	75021	10	0.0005
Mkali_gr 68		62C/13	2980_04	170_7	29°58.69'	80°59.70'	2.94	5196	6370	5261	4151	SW	SW	52012	62	0.1829
Mkali_gr 69		62C/13	2980_04	170_7	29°58.25'	81° 0.72'	1.45	2724	6158	5284	4410	NW	NW	67021	48	0.0698
Mkali_gr 70		62C/13	2980_04	169_20	29°57.03'	80°59.91'	11.30	5956	5913	4999	4084	NW	NW	52012	99	1.1166
Mkali_gr 71		62C/13	2980_04	169_20	29°55.86'	81° 0.09'	0.53	1394	5075	4793	4511	N	N	63021	33	0.0173
Mkali_gr 72		62C/13	2980_04	169_20	29°55.68'	80°59.71'	0.17	1014	5523	5154	4785	N	N	75021	20	0.0034
Mkali_gr 73		62G/1	2981_01	169_20	29°55.66'	80°59.39'	0.03	317	5051	4971	4892	NW	NW	75021	7	0.0002

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Mkali_gr 74		62G/1	2981_01	169_20	29°55.17'	80°59.72'	0.11	697	5425	5186	4947	SW	SW	77021	16	0.0018
Mkali_gr 75		62G/1	2981_01	169_20	29°54.91'	81° 0.36'	0.09	380	5185	5031	4877	SW	SW	74021	15	0.0013
Mkali_gr 76		62G/1	2981_01	169_20	29°54.88'	81° 0.85'	0.49	760	5386	5116	4846	SW	SW	74021	32	0.0155
Mkali_gr 77		62G/1	2981_01	169_21	29°54.56'	81° 1.55'	0.67	1204	5621	5163	4706	SW	SW	67021	36	0.0240
Mkali_gr 78		62G/1	2981_01	169_21	29°53.89'	81° 2.28'	0.47	1140	5218	4842	4465	SW	SW	67021	31	0.0146
Mkali_gr 79		62G/1	2981_01	169_21	29°53.19'	81° 2.86'	0.98	697	6361	5924	5486	SW	SW	67021	42	0.0407
Mkali_gr 80		62C/13	2981_04	169_21	29°52.45'	81° 2.68'	0.47	1457	5700	5037	4374	SW	SW	67021	31	0.0146
Mkali_gr 81		62C/13	2981_04	168_22	29°52.27'	81° 3.32'	0.48	760	6828	6248	5669	W	W	60021	31	0.0129
Mkali_gr 82		62G/1	2981_01	168_22	29°51.48'	81° 3.08'	0.05	253	5639	5578	5517	W	W	75021	10	0.0005
Mkali_gr 83		62G/1	2981_01	168_22	29°51.51'	81° 2.04'	5.68	5259	6467	5176	3886	NW	NW	52012	78	0.4446
Mkali_gr 84		62C/13	2981_04	169_19	29°51.51'	81° 0.18'	0.78	1331	5136	4945	4755	NE	NE	60021	38	0.0297
Mkali_gr 85		62C/13	2981_04	169_19	29°51.50'	80°58.69'	0.66	887	4685	4375	4066	SW	SW	60021	36	0.0235
Mkali_gr 86		62G/1	2981_01	169_19	29°49.64'	81° 3.19'	2.40	1901	6467	5466	4465	SW	SW	60021	58	0.1389
Mkali_gr 87		62G/1	2981_01	169_19	29°47.50'	81° 5.01'	0.31	887	4694	4549	4404	NW	NW	63021	26	0.0081

Annex 2
Database of Glacial Lake Inventory

Glacial Lake Inventory of Tamor Basin

Total Number : 356 Total Area : 7.32 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Ktr_gl 1	Bhute Pokhari	72M/7	2787_10	45_38,39	27°26.17'	87°27.84'	4657	110			3249	SE	Cs	E
Ktr_gl 2		72M/6	2787_06	47_69,70	27°30.22'	87°28.42'	1757	60			4237	SE	Cs	E
Ktr_gl 3		72M/6	2787_06	47_69,70	27°31.21'	87°29.52'	1428	125			4221	NE	Cs	E
Ktr_gl 4		72M/6	2787_06	47_69,70	27°31.27'	87°29.31'	1604	90			4260	NE	Cs	E
Ktr_gl 5	Panch Pokhari	72M/6	2787_06	47_69,70	27°31.74'	87°28.92'	6481	135			4298	NE	Cs	V
Ktr_gl 6	Panch Pokhari	72M/6	2787_06	47_69,70	27°31.61'	87°28.81'	57248	370			4298	NE	Cs	V
Ktr_gl 7	Panch Pokhari	72M/6	2787_06	47_69,70	27°31.57'	87°29.03'	13247	140			4313	NE	Cs	E
Ktr_gl 8	Panch Pokhari	72M/6	2787_06	47_69,70	27°31.35'	87°28.76'	6371	115			4374	NE	Cs	E
Ktr_gl 9	Kalo Pokhari	72M/6	2787_06	47_69,70	27°33.80'	87°29.43'	39960	320			4190	SE	Cs	C
Ktr_gl 10		72M/10	2787_07	48_9,10	27°35.32'	87°30.96'	3757	90			4176	S	Ds	V
Ktr_gl 11		72M/10	2787_07	48_9,10	27°35.17'	87°30.59'	27614	270			4313	NE	Ds	V
Ktr_gl 12		72M/10	2787_07	48_9,10	27°35.64'	87°31.14'	17860	240			4313	SW	Ds	V
Ktr_gl 13	Panch Pokhari	72M/10	2787_07	48_9,10	27°35.24'	87°31.55'	6283	85			4496	NW	Ds	E
Ktr_gl 14		72M/10	2787_07	48_9,10	27°34.43'	87°32.30'	4921	100			4084	SE	Ds	E
Ktr_gl 15		72M/10	2787_07	48_9,10	27°34.58'	87°32.18'	6700	95			4176	SE	Cs	E
Ktr_gl 16		72M/10	2787_07	48_9,10	27°34.88'	87°32.05'	29832	275			4221	E	Ds	C
Ktr_gl 17		72M/10	2787_07	48_9,10	27°35.42'	87°32.05'	8150	140			4389	SE	Ds	V
Ktr_gl 18		72M/10	2787_07	48_9,10	27°35.63'	87°32.48'	4350	110			4298	E	Ds	E
Ktr_gl 19		72M/10	2787_07	48_9,10	27°35.73'	87°32.37'	1735	60			4404	E	Cs	E
Ktr_gl 20		72M/10	2787_07	48_9,10	27°36.19'	87°32.23'	14147	175			4389	SE	Ds	V
Ktr_gl 21	Panch Pokhari	72M/10	2787_07	48_9,10	27°37.06'	87°32.84'	62323	390			4481	SW	Ds	C
Ktr_gl 22		72M/10	2787_07	48_8,9	27°36.76'	87°33.20'	24121	260			4557	SW	Ds	C
Ktr_gl 23		72M/10	2787_07	48_8,9	27°35.98'	87°33.19'	34665	370			4176	S	Ds	V
Ktr_gl 24		72M/10	2787_07	48_8,9	27°35.38'	87°34.04'	9007	150			4161	NE	Ds	V
Ktr_gl 25		72M/10	2787_07	48_8,9	27°35.66'	87°33.82'	22034	280			4252	SE	Ds	V
Ktr_gl 26	Saju Pokhari	72M/10	2787_07	48_8,9	27°36.98'	87°33.86'	8216	135			4374	SE	Ds	C
Ktr_gl 27		72M/10	2787_07	48_8,9	27°37.75'	87°32.72'	18870	190			4701	SE	Ds	V
Ktr_gl 28		72M/10	2787_07	48_8,9	27°37.90'	87°32.56'	14916	185			4770	SE	Ds	C
Ktr_gl 29	Cheudo Pokhari	72M/10	2787_07	48_8,9	27°38.66'	87°34.51'	85762	435			3851	SE	Ds	V
Ktr_gl 30		72M/10	2787_07	48_8,9	27°38.38'	87°33.31'	7755	100			4206	E	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 31		72M/10	2787_07	48_8,9	27°38.87'	87°33.69'	11665	180			4633	NE	Ds	V
Ktr_gl 32		72M/10	2787_07	68_4,5	27°40.38'	87°33.49'	38795	290			4618	SE	Ds	E
Ktr_gl 33		72M/10	2787_07	68_4,5	27°41.63'	87°33.63'	2988	80			4785	SE	Cs	E
Ktr_gl 34		72M/10	2787_07	68_4,5	27°38.77'	87°35.47'	5316	130			4069	S	Ds	V
Ktr_gl 35		72M/10	2787_07	68_4,5	27°39.95'	87°35.29'	12214	190			4557	SE	Ds	V
Ktr_gl 36		72M/10	2787_07	68_4,5	27°40.20'	87°36.16'	3603	85			4923	SE	Cs	E
Ktr_gl 37		72M/10	2787_07	68_4,5	27°37.83'	87°35.78'	16476	160			3917	SE	Ds	V
Ktr_gl 38		72M/10	2787_07	68_4,5	27°37.80'	87°36.85'	4064	95			4435	SW	Ds	E
Ktr_gl 39		72M/10	2787_07	68_4,5	27°37.77'	87°37.05'	20869	245			4435	SW	Ds	V
Ktr_gl 40		72M/10	2787_07	68_4,5	27°37.93'	87°36.98'	62564	350			4435	SW	Ds	V
Ktr_gl 41		72M/10	2787_07	68_4,5	27°38.30'	87°36.88'	3317	95			4618	SE	Ds	V
Ktr_gl 42		72M/10	2787_07	68_4,5	27°38.42'	87°36.85'	6173	105			4618	N	Ds	E
Ktr_gl 43		72M/10	2787_07	68_4,5	27°38.34'	87°37.07'	3097	80			4557	E	Ds	V
Ktr_gl 44		72M/10	2787_07	68_4,5	27°38.48'	87°37.02'	10127	160			4587	SE	Ds	V
Ktr_gl 45		72M/10	2787_07	68_4,5	27°38.41'	87°37.23'	39454	445			4557	SW	Ds	V
Ktr_gl 46		72M/10	2787_07	68_4,5	27°37.48'	87°36.58'	2175	60			4130	SW	Ds	E
Ktr_gl 47		72M/10	2787_07	68_4,5	27°37.15'	87°36.55'	2087	60			4161	S	Cs	E
Ktr_gl 48	Saune Pokhari	72M/10	2787_07	68_4,5	27°36.21'	87°36.11'	67024	470			3399	S	Ds	E
Ktr_gl 49	Tin Pokhari	72M/10	2787_07	68_4,5	27°38.33'	87°38.17'	174249	530			4313	SE	Ds	V
Ktr_gl 50	Tin Pokhari	72M/10	2787_07	68_4,5	27°38.15'	87°37.57'	53777	280			4435	N	Ds	V
Ktr_gl 51	Tin Pokhari	72M/10	2787_07	68_4,5	27°38.73'	87°37.56'	75789	475			4435	SE	Ds	V
Ktr_gl 52		72M/10	2787_07	68_4,5	27°38.74'	87°37.33'	19705	235			4442	E	Ds	V
Ktr_gl 53		72M/10	2787_07	68_4,5	27°38.89'	87°36.85'	7271	125			4587	E	Ds	V
Ktr_gl 54		72M/10	2787_07	68_4,5	27°38.99'	87°36.86'	7359	100			4587	NE	Cs	E
Ktr_gl 55		72M/10	2787_07	68_4,5	27°39.21'	87°36.78'	9688	145			4595	SE	Ds	E
Ktr_gl 56		72M/10	2787_07	68_4,5	27°39.56'	87°37.00'	30382	295			4557	SE	Ds	V
Ktr_gl 57		72M/10	2787_07	68_4,5	27°39.31'	87°37.48'	10149	110			4526	S	Ds	V
Ktr_gl 58		72M/10	2787_07	68_4,5	27°38.72'	87°38.71'	2394	70			4374	NE	Ds	V
Ktr_gl 59		72M/10	2787_07	68_4,5	27°38.80'	87°38.74'	3097	75			4343	NE	Ds	V
Ktr_gl 60		72M/10	2787_07	68_4,5	27°39.20'	87°38.43'	2373	75			4953	SE	Cs	V
Ktr_gl 61		72M/10	2787_07	68_4,5	27°39.49'	87°38.74'	8436	150			4938	NE	Cs	E
Ktr_gl 62		72M/10	2787_07	68_4,5	27°39.52'	87°38.55'	6107	110	30	Ktr_gr 1	4983	N	Cs	E
Ktr_gl 63		72M/10	2787_07	68_4,5	27°39.76'	87°38.50'	3119	80	425	Ktr_gr 1	4923	NE	Cs	E
Ktr_gl 64		72M/10	2787_07	68_4,5	27°40.03'	87°38.10'	8084	70	647	Ktr_gr 2	4770	NE	Ds	V
Ktr_gl 65		72M/10	2787_07	68_4,5	27°40.29'	87°37.93'	14675	145	260	Ktr_gr 3	4862	SE	Ds	V
Ktr_gl 66		72M/10	2787_07	68_4,5	27°40.46'	87°38.15'	50526	360			4968	SE	Ds	V
Ktr_gl 67		72M/10	2787_07	68_4,5	27°40.30'	87°38.39'	20760	200			4923	SW	Cs	E
Ktr_gl 68		72M/10	2787_07	68_6,7	27°39.57'	87°39.61'	6898	145			4481	S	Ds	E
Ktr_gl 69		72M/10	2787_07	68_6,7	27°39.85'	87°40.18'	8699	130			4587	NE	Ds	C
Ktr_gl 70		72M/10	2787_07	68_6,7	27°39.81'	87°40.04'	29327	300			4595	NE	Ds	C
Ktr_gl 71		72M/10	2787_07	68_6,7	27°40.27'	87°39.80'	7996	150			4648	N	Cs	V
Ktr_gl 72		72M/10	2787_07	68_6,7	27°42.12'	87°39.55'	34270	290			4770	E	Ds	V
Ktr_gl 73		72M/10	2787_07	68_6,7	27°42.15'	87°39.28'	13356	170			4822	E	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 74		72M/10	2787_07	68_6,7	27°43.79'	87°39.41'	6964	125			4953	SW	Ds	V
Ktr_gl 75		72M/10	2787_07	68_6,7	27°41.01'	87°41.44'	11972	145			4564	SW	Ds	V
Ktr_gl 76		72M/10	2787_07	68_6,7	27°41.20'	87°41.56'	4921	120			4587	SW	Ds	V
Ktr_gl 77		72M/10	2787_07	68_6,7	27°41.41'	87°41.67'	31831	260			4618	SW	Ds	E
Ktr_gl 78		72M/10	2787_07	68_6,7	27°41.61'	87°41.73'	12346	145			4663	S	Ds	E
Ktr_gl 79		72M/10	2787_07	68_6,7	27°41.65'	87°41.87'	5316	150			4694	SW	Ds	E
Ktr_gl 80		72M/10	2787_07	68_6,7	27°40.87'	87°41.86'	91298	500			4557	W	Ds	V
Ktr_gl 81		72M/10	2787_07	68_6,7	27°40.38'	87°41.81'	7052	135			4496	SW	Cs	E
Ktr_gl 82		72M/10	2787_07	68_6,7	27°40.01'	87°42.29'	71330	490			4557	SW	Ds	V
Ktr_gl 83		72M/10	2787_07	68_6,7	27°39.98'	87°42.59'	38883	370			4564	W	Ds	V
Ktr_gl 84		72M/10	2787_07	68_6,7	27°39.84'	87°43.04'	4481	100			4618	SW	Ds	V
Ktr_gl 85		72M/10	2787_07	68_6,7	27°39.73'	87°42.87'	53580	370			4618	NW	Ds	V
Ktr_gl 86		72M/10	2787_07	68_6,7	27°39.70'	87°42.25'	6459	125			4420	W	Ds	E
Ktr_gl 87		72M/10	2787_07	68_6,7	27°39.17'	87°42.07'	4459	90			4450	W	Ds	V
Ktr_gl 88	Kali Pokhari	72M/10	2787_07	68_6,7	27°39.07'	87°42.34'	112673	570			4465	W	Ds	V
Ktr_gl 89		72M/10	2787_07	68_6,7	27°39.41'	87°42.72'	3954	385			4618	S	Ds	V
Ktr_gl 90		72M/10	2787_07	68_6,7	27°39.36'	87°42.84'	6612	115			4618	SW	Ds	V
Ktr_gl 91		72M/10	2787_07	68_6,7	27°39.10'	87°42.71'	26076	380			4442	W	Ds	V
Ktr_gl 92		72M/10	2787_07	68_6,7	27°39.16'	87°43.56'	3559	100			4740	W	Ds	V
Ktr_gl 93	Lam Pokhari	72M/10	2787_07	68_6,7	27°37.74'	87°41.89'	96483	610			4138	NW	Ds	V
Ktr_gl 94		72M/10	2787_07	68_6,7	27°37.71'	87°42.51'	105094	430			4343	W	Ds	V
Ktr_gl 95		72M/10	2787_07	68_6,7	27°38.06'	87°43.07'	19156	240			4481	SW	Ds	V
Ktr_gl 96		72M/10	2787_07	68_6,7	27°38.27'	87°43.10'	9490	160			4557	S	Ds	V
Ktr_gl 97		72M/10	2787_07	68_6,7	27°38.52'	87°43.23'	4350	80			4686	SE	Ds	V
Ktr_gl 98		72M/10	2787_07	68_6,7	27°38.82'	87°43.38'	4899	110			4694	SW	Ds	V
Ktr_gl 99		72M/10	2787_07	68_6,7	27°37.35'	87°41.97'	3317	60			4313	N	Ds	V
Ktr_gl 100		72M/10	2787_07	68_6,7	27°36.83'	87°42.16'	35808	285			4168	SW	Ds	V
Ktr_gl 101		72M/10	2787_07	68_6,7	27°37.21'	87°42.79'	80358	385			4449	SW	Ds	C
Ktr_gl 102		72M/10	2787_07	68_6,7	27°36.56'	87°42.63'	36620	390			4267	S	Ds	V
Ktr_gl 103		72M/10	2787_07	68_6,7	27°37.20'	87°43.30'	5624	95			4633	SW	Ds	V
Ktr_gl 104		72M/10	2787_07	68_6,7	27°36.20'	87°43.12'	14389	170			4191	SW	Ds	V
Ktr_gl 105		72M/10	2787_07	68_6,7	27°36.32'	87°43.44'	14279	205			4282	SW	Ds	V
Ktr_gl 106		72M/14	2787_12	68_6,7	27°37.10'	87°45.50'	26054	220			4420	NE	Ds	E
Ktr_gl 107		72M/10	2787_07	68_6,7	27°37.52'	87°44.59'	27658	280			4359	N	Ds	V
Ktr_gl 108		72M/10	2787_07	68_6,7	27°37.17'	87°44.33'	94550	700			4450	NE	Ds	V
Ktr_gl 109		72M/10	2787_07	68_6,7	27°37.52'	87°43.92'	5228	115			4709	N	Cs	E
Ktr_gl 110		72M/10	2787_07	68_6,7	27°38.32'	87°44.14'	25153	220			4557	S	Ds	V
Ktr_gl 111		72M/10	2787_07	68_6,7	27°38.54'	87°43.89'	8677	185			4610	S	Ds	V
Ktr_gl 112		72M/10	2787_07	68_6,7	27°38.89'	87°44.38'	7513	120			4542	NE	Ds	V
Ktr_gl 113		72M/10	2787_07	68_6,7	27°38.96'	87°44.02'	9490	135			4694	SE	Ds	V
Ktr_gl 114		72M/10	2787_07	68_6,7	27°39.75'	87°44.15'	4108	100			4648	E	Ds	V
Ktr_gl 115		72M/10	2787_07	68_6,7	27°39.65'	87°43.97'	25922	230			4648	NE	Ds	V
Ktr_gl 116		72M/10	2787_07	68_6,7	27°39.60'	87°43.84'	2812	75			4679	NE	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 117		72M/10	2787_07	68_6,7	27°39.45'	87°43.74'	17816	275			4724	NE	Ds	V
Ktr_gl 118		72M/10	2787_07	68_6,7	27°39.70'	87°43.58'	14565	190			4801	SE	Ds	E
Ktr_gl 119		72M/10	2787_07	68_6,7	27°40.54'	87°44.22'	31348	295			4438	NE	Ds	V
Ktr_gl 120		72M/10	2787_07	68_6,7	27°40.35'	87°43.86'	35280	405			4679	NE	Ds	E
Ktr_gl 121		72M/10	2787_07	68_6,7	27°41.03'	87°43.44'	8370	120			4709	E	Cs	E
Ktr_gl 122		72M/10	2787_07	68_6,7	27°40.72'	87°42.93'	14718	210			4831	NE	Cs	E
Ktr_gl 123		72M/10	2787_07	68_6,7	27°42.51'	87°41.75'	25241	270			4679	NE	Ds	C
Ktr_gl 124		72M/10	2787_07	68_6,7	27°42.35'	87°41.67'	20452	190			4709	NE	Ds	C
Ktr_gl 125		72M/10	2787_07	50_20,21	27°43.72'	87°40.79'	27064	245			4862	NE	Ds	V
Ktr_gl 126		72M/10	2787_07	50_20,21	27°43.72'	87°40.59'	20013	195			4907	E	Ds	V
Ktr_gl 127		72M/10	2787_07	50_20,21	27°43.70'	87°40.35'	11445	145			4938	E	Ds	V
Ktr_gl 128		72M/10	2787_07	50_20,21	27°43.81'	87°40.66'	3581	80			4930	SE	Ds	V
Ktr_gl 129		72M/10	2787_07	50_20,21	27°43.76'	87°40.97'	5997	115			4831	SE	Ds	E
Ktr_gl 130		72M/10	2787_07	50_20,21	27°44.31'	87°40.51'	12390	210			4831	N	Ds	V
Ktr_gl 131		72M/10	2787_07	50_20,21	27°44.49'	87°39.78'	12522	175			5090	SE	Cs	E
Ktr_gl 132		72M/10	2787_07	50_20,21	27°44.15'	87°42.37'	5668	110			4785	W	Ds	E
Ktr_gl 133		72M/10	2787_07	50_20,21	27°43.77'	87°43.67'	6986	125			4587	NE	Cs	E
Ktr_gl 134		72M/10	2787_07	50_20,21	27°43.61'	87°43.16'	5931	110			4694	N	Cs	E
Ktr_gl 135	Kerisar Pokhari	72M/10	2787_07	50_20,21	27°44.24'	87°42.92'	57292	420			4724	NE	Ds	C
Ktr_gl 136		72M/9	2787_03	51_47,48	27°45.13'	87°42.00'	1494	55			4890	NE	Cs	E
Ktr_gl 137		72M/9	2787_03	51_47,48	27°45.19'	87°41.59'	7162	110	135	Ktr_gr 18	5010	NE	Cs	E
Ktr_gl 138		72M/9	2787_03	51_47,48	27°45.50'	87°41.46'	12302	170	220	KKtr_gr19	4950	NE	Cs	E
Ktr_gl 139		72M/9	2787_03	51_47,48	27°46.02'	87°41.81'	3515	95			5050	NE	Cs	E
Ktr_gl 140		72M/9	2787_03	51_47,48	27°46.16'	87°41.49'	5514	120			4950	NE	Cs	E
Ktr_gl 141		72M/9	2787_03	51_47,48	27°46.72'	87°41.08'	9995	125	250	Ktr_gr 21	4950	NE	Cs	E
Ktr_gl 142		72M/9	2787_03	51_47,48	27°48.14'	87°40.75'	15993	220	135	Ktr_gr 24	4950	SE	Cs	E
Ktr_gl 143		72M/9	2787_03	51_47,48	27°48.47'	87°40.89'	6590	115			5250	SE	Cs	E
Ktr_gl 144		72M/9	2787_03	51_47,48	27°48.46'	87°42.06'	8238	140	40	Ktr_gr 26	5180	S	Cs	E
Ktr_gl 145		72M/9	2787_03	51_47,48	27°49.17'	87°44.34'	7249	115	35	Ktr_gr 29	5090	SE	Cs	M
Ktr_gl 146		72M/13	2787_04	51_47,48	27°48.83'	87°45.09'	181147	830	0	Ktr_gr 30	4877	S	Ds	M
Ktr_gl 147		72M/13	2787_04	51_47,48	27°48.71'	87°45.31'	3713	75	280	Ktr_gr 31	4816	S	Cs	M
Ktr_gl 148		72M/13	2787_04	51_47,48	27°47.02'	87°46.65'	21660	240	215	Ktr_gr 35	4938	E	Ds	L
Ktr_gl 149		72M/13	2787_04	51_47,48	27°46.70'	87°47.87'	2790	60	300	Ktr_gr 37	4968	W	Ds	E
Ktr_gl 150		72M/13	2787_04	51_47,48	27°46.15'	87°47.99'	5009	90	290	Ktr_gr 38	4983	SW	Ds	V
Ktr_gl 151		72M/13	2787_04	51_47,48	27°46.02'	87°47.70'	8589	145	450	Ktr_gr 38	4816	NW	Ds	V
Ktr_gl 152		72M/13	2787_04	51_47,48	27°45.92'	87°47.62'	25373	235	355	Ktr_gr 39	4785	NW	Ds	V
Ktr_gl 153		72M/13	2787_04	51_47,48	27°45.87'	87°47.51'	9314	180	540	Ktr_gr 39	4816	NW	Cs	E
Ktr_gl 154	Sinjenma Pokhari	72M/13	2787_04	51_47,48	27°45.44'	87°46.81'	252345	835			4671	NW	Ds	V
Ktr_gl 155		72M/13	2787_04	51_47,48	27°45.49'	87°47.49'	4064	85	420	Ktr_gr 39	4846	W	Ds	V
Ktr_gl 156		72M/13	2787_04	51_47,48	27°45.28'	87°46.96'	6019	110			4679	NW	Ds	V
Ktr_gl 157		72M/13	2787_04	51_47,48	27°45.11'	87°46.54'	7381	120			4785	NE	Ds	E
Ktr_gl 158		72M/13	2787_04	51_47,48	27°45.66'	87°46.22'	3757	65			4572	NW	Ds	V
Ktr_gl 159		72M/13	2787_04	51_47,48	27°45.26'	87°46.15'	13005	155			4618	N	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 160		72M/13	2787_04	51_47,48	27°45.29'	87°45.59'	9270	155			4602	SW	Ds	V
Ktr_gl 161		72M/14	2787_08	51_48,49	27°44.13'	87°46.50'	22517	240			4663	S	Ds	V
Ktr_gl 162		72M/14	2787_08	51_48,49	27°44.32'	87°46.83'	184728	665	450	Ktr_gr 42	4688	SW	Ds	V
Ktr_gl 163	Samdo Pokhari	72M/14	2787_08	51_48,49	27°44.70'	87°47.07'	181015	735			4770	SW	Ds	V
Ktr_gl 164		72M/14	2787_08	51_48,49	27°44.87'	87°47.04'	2153	100	435	Ktr_gr 41	4877	NW	Ds	E
Ktr_gl 165		72M/14	2787_08	51_48,49	27°44.91'	87°47.38'	5778	130	90	Ktr_gr 40	4892	SW	Ds	E
Ktr_gl 166		72M/14	2787_08	51_48,49	27°42.82'	87°45.47'	27328	325			4369	SE	Ds	V
Ktr_gl 167		72M/14	2787_08	51_48,49	27°42.81'	87°47.80'	4218	95			4328	NE	Ds	V
Ktr_gl 168	Nura Pokhari	72M/14	2787_08	51_48,49	27°43.02'	87°47.55'	44946	395			4450	SE	Ds	E
Ktr_gl 169		72M/14	2787_08	51_48,49	27°44.40'	87°48.25'	42640	290			4450	SW	Ds	V
Ktr_gl 170		72M/14	2787_08	51_48,49	27°44.06'	87°48.83'	31238	275			4801	S	Ds	E
Ktr_gl 171		72M/14	2787_08	51_48,49	27°43.43'	87°49.39'	3032	50			4602	SE	Cs	E
Ktr_gl 172		72M/13	2787_04	51_48,49	27°45.39'	87°49.44'	12939	200			4709	SE	Cs	E
Ktr_gl 173		72M/13	2787_04	52_16,17	27°50.19'	87°47.91'	5250	90			4999	N	Cs	E
Ktr_gl 174		72M/13	2787_04	52_16,17	27°51.16'	87°47.57'	58413	425	475	Ktr_gr 67	5273	N	Ds	V
Ktr_gl 175		72M/13	2787_04	52_16,17	27°51.05'	87°48.63'	5031	110			5105	E	Ds	E
Ktr_gl 176		72M/13	2787_04	52_16,17	27°51.78'	87°48.54'	12653	135			5380	E	Cs	E
Ktr_gl 177		72M/13	2787_04	52_16,17	27°52.38'	87°48.34'	9226	140	445	Ktr_gr 71	4999	E	Cs	E
Ktr_gl 178		72M/13	2787_04	52_16,17	27°52.67'	87°48.54'	6986	115	335	Ktr_gr 72	5121	SE	Cs	E
Ktr_gl 179		72M/13	2787_04	53_55,56	27°54.62'	87°49.12'	63048	640	537	Ktr_gr 79	5121	S	Ds	V
Ktr_gl 180		72M/13	2787_04	53_55,56	27°54.62'	87°49.26'	41585	380	160	Ktr_gr 80	5151	S	Ds	V
Ktr_gl 181		72M/13	2787_04	53_55,56	27°56.28'	87°50.31'	20738	185	45	Ktr_gr 81	5334	SE	Ds	B
Ktr_gl 182		72M/13	2787_04	53_55,56	27°54.66'	87°51.13'	6107	110	490	Ktr_gr 82	5380	S	Ds	V
Ktr_gl 183		72M/13	2787_04	53_55,56	27°54.74'	87°51.12'	12500	140	355	Ktr_gr 82	5387	S	Ds	V
Ktr_gl 184		72M/13	2787_04	53_55,56	27°54.82'	87°51.15'	6437	135	230	Ktr_gr 82	5395	S	Ds	V
Ktr_gl 185		72M/13	2787_04	53_55,56	27°54.18'	87°51.18'	10918	160	165	Ktr_gr 83	5243	SW	Ds	B
Ktr_gl 186		72M/13	2787_04	53_55,56	27°54.06'	87°51.18'	5558	105	395	Ktr_gr 83	5197	SW	Ds	B
Ktr_gl 187		72M/13	2787_04	53_55,56	27°54.15'	87°50.39'	4481	85	0	Ktr_gr 81	5014	W	Cs	S
Ktr_gl 188		72M/13	2787_04	53_55,56	27°53.02'	87°49.96'	7667	120	1210	Ktr_gr 84	5105	SW	Ds	V
Ktr_gl 189		72M/13	2787_04	53_55,56	27°52.58'	87°51.55'	20979	205	475	Ktr_gr 85	5174	SE	Ds	V
Ktr_gl 190		72M/13	2787_04	53_55,56	27°53.17'	87°51.77'	5800	120	420	Ktr_gr 86	5425	SE	Ds	E
Ktr_gl 191	Nagama	72M/13	2787_04	52_12,13	27°52.10'	87°52.02'	18980	210	560	Ktr_gr 87	4907	SW	Ds	M
Ktr_gl 192	Nagama	72M/13	2787_04	52_12,13	27°51.71'	87°51.75'	149689	975	980	Ktr_gr 87	4884	SW	Ds	M
Ktr_gl 193		72M/13	2787_04	52_12,13	27°50.63'	87°52.68'	66497	335			5243	SE	Ds	C
Ktr_gl 194		72M/13	2787_04	52_12,13	27°51.53'	87°53.08'	10984	155			5212	SE	Ds	E
Ktr_gl 195		72M/13	2787_04	52_12,13	27°52.09'	87°54.10'	7162	95	550	Ktr_gr 95	4877	SW	Ds	M
Ktr_gl 196		72M/13	2787_04	52_12,13	27°54.10'	87°55.91'	6481	125			5410	SW	Cs	S
Ktr_gl 197		72M/13	2787_04	52_12,13	27°54.25'	87°55.76'	8985	110			5349	SW	Cs	S
Ktr_gl 198		72M/13	2787_04	52_12,13	27°54.32'	87°55.62'	12478	90			5349	SW	Cs	S
Ktr_gl 199		72M/13	2787_04	52_12,13	27°54.36'	87°55.84'	12653	110			5364	SW	Cs	S
Ktr_gl 200		72M/13	2787_04	52_12,13	27°51.47'	87°55.91'	37477	250	0	Ktr_gr 98	5121	SE	Cs	G
Ktr_gl 201		72M/13	2787_04	52_12,13	27°52.85'	87°56.38'	9029	70			5509	S	Cs	S
Ktr_gl 202		72M/13	2787_04	52_12,13	27°52.94'	87°56.40'	16322	80			5509	S	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 203		72M/13	2787_04	52_12,13	27°53.13'	87°56.58'	14147	80			5540	SW	Cs	S
Ktr_gl 204		72M/13	2787_04	52_12,13	27°53.22'	87°56.67'	28976	90			5555	SW	Cs	S
Ktr_gl 205		72M/13	2787_04	52_12,13	27°53.33'	87°56.77'	33809	100			5555	SW	Cs	S
Ktr_gl 206		72M/13	2787_04	52_12,13	27°50.34'	87°56.14'	10764	120	0	Ktr_gr 99	5570	W	Cs	S
Ktr_gl 207		72M/13	2787_04	52_12,13	27°50.32'	87°56.49'	3273	80	0	Ktr_gr 99	4770	W	Cs	S
Ktr_gl 208		72M/13	2787_04	52_12,13	27°50.62'	87°56.47'	4965	90	0	Ktr_gr 99	4808	S	Cs	S
Ktr_gl 209		72M/13	2787_04	52_12,13	27°50.68'	87°56.58'	6590	110	0	Ktr_gr 99	4816	S	Cs	S
Ktr_gl 210		72M/13	2787_04	52_12,13	27°50.49'	87°56.81'	6151	145	210	Ktr_gr 100	4877	SW	Cs	L
Ktr_gl 211		72M/13	2787_04	52_12,13	27°50.22'	87°56.84'	2922	85	0	Ktr_gr 99	4816	W	Cs	S
Ktr_gl 212		72M/13	2787_04	52_12,13	27°50.41'	87°57.88'	18343	240	225	Ktr_gr 102	4999	SW	Ds	V
Ktr_gl 213		72M/13	2787_04	52_12,13	27°50.51'	87°57.86'	4108	75	150	Ktr_gr 102	4490	SW	Ds	V
Ktr_gl 214		72M/13	2787_04	52_12,13	27°50.85'	87°58.35'	36642	370	290	Ktr_gr 102	5090	SW	Ds	C
Ktr_gl 215		72M/13	2787_04	52_12,13	27°49.85'	87°57.50'	8985	161	250	Ktr_gr 99	5029	NW	Ds	L
Ktr_gl 216		72M/13	2787_04	53_59	27°50.42'	87°58.97'	5228	70			5258	W	Cs	S
Ktr_gl 217		72M/13	2787_04	53_59	27°50.49'	87°59.00'	5316	70			5258	W	Cs	S
Ktr_gl 218		72M/13	2787_04	53_59	27°50.36'	87°59.04'	10083	70			5265	W	Cs	S
Ktr_gl 219		72M/13	2787_04	53_59	27°50.45'	87°59.13'	13950	70			5265	W	Cs	S
Ktr_gl 220		72M/13	2787_04	53_59	27°50.40'	87°59.30'	20232	70			5273	W	Cs	S
Ktr_gl 221		72M/13	2787_04	51_51,52	27°47.40'	87°52.83'	29085	315	1130	Ktr_gr 111	4176	NW	Ds	V
Ktr_gl 222		72M/13	2787_04	51_51,52	27°46.14'	87°52.91'	6195	105	0	Ktr_gr 115	4420	NW	Cs	S
Ktr_gl 223		72M/13	2787_04	51_51,52	27°46.01'	87°53.08'	9029	105	0	Ktr_gr 115	4458	NW	Cs	S
Ktr_gl 224		72M/13	2787_04	51_51,52	27°45.94'	87°53.36'	6239	115	0	Ktr_gr 115	4488	SW	Cs	S
Ktr_gl 225		72M/13	2787_04	52_11	27°45.98'	87°53.40'	4613	105	0	Ktr_gr 115	4488	NW	Cs	S
Ktr_gl 226		72M/13	2787_04	52_11	27°45.82'	87°53.45'	3757	110	0	Ktr_gr 115	4496	NW	Cs	S
Ktr_gl 227		72M/13	2787_04	52_11	27°45.88'	87°53.47'	3559	70	0	Ktr_gr 115	4496	NW	Cs	S
Ktr_gl 228		72M/13	2787_04	52_11	27°45.90'	87°53.69'	3515	110	0	Ktr_gr 115	4519	NW	Cs	S
Ktr_gl 229		72M/14	2787_08	50_15,16	27°44.38'	87°53.17'	19398	220	190	Ktr_gr 117	4679	NW	Ds	L
Ktr_gl 230		72M/14	2787_08	50_15,16	27°42.83'	87°52.93'	14455	150			4724	SE	Cs	E
Ktr_gl 231		72M/14	2787_08	50_15,16	27°43.39'	87°53.13'	3471	80			4778	SE	Cs	E
Ktr_gl 232		72M/14	2787_08	50_15,16	27°43.67'	87°52.78'	6810	135			4877	NE	Cs	E
Ktr_gl 233		72M/14	2787_08	50_15,16	27°42.73'	87°53.48'	1450	50			4641	S	Cs	M
Ktr_gl 234		72M/14	2787_08	50_15,16	27°42.84'	87°53.47'	2746	70			4663	S	Cs	M
Ktr_gl 235		72M/14	2787_08	50_15,16	27°42.93'	87°53.47'	2768	65			4679	S	Cs	M
Ktr_gl 236		72M/14	2787_08	50_15,16	27°42.21'	87°53.85'	5119	95	760	Ktr_gr 124	4633	W	Ds	S
Ktr_gl 237		72M/14	2787_08	50_15,16	27°41.62'	87°53.76'	36972	335	560	Ktr_gr 126	4602	W	Ds	V
Ktr_gl 238	Nag Pokhari	72M/14	2787_08	50_15,16	27°39.42'	87°52.04'	12741	185			4328	SE	Ds	V
Ktr_gl 239	Hans Pokhari	72M/14	2787_08	50_15,16	27°39.19'	87°53.51'	10281	155			4724	SE	Cs	E
Ktr_gl 240		72M/14	2787_08	50_15,16	27°40.23'	87°53.30'	4943	115			4679	E	Ds	E
Ktr_gl 241		72M/14	2787_08	50_15,16	27°40.25'	87°53.11'	3625	95			4694	E	Cs	E
Ktr_gl 242		72M/14	2787_08	50_15,16	27°40.40'	87°53.14'	4657	105			4877	SE	Cs	E
Ktr_gl 243		72M/14	2787_08	50_15,16	27°40.61'	87°53.16'	3339	75			4724	SE	Ds	E
Ktr_gl 244	Lumba Kolamba	72M/14	2787_08	50_15,16	27°40.73'	87°52.91'	17442	175			4740	SE	Ds	E
Ktr_gl 245		72M/14	2787_08	50_15,16	27°40.80'	87°53.01'	14477	175			4740	SE	Ds	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 246		72M/14	2787_08	50_15,16	27°40.84'	87°54.33'	4921	95	150	Ktr_gr 127	4923	S	Cs	E
Ktr_gl 247		72M/14	2787_08	50_15,16	27°40.90'	87°54.43'	10720	200	705	Ktr_gr 127	4846	SE	Ds	V
Ktr_gl 248		72M/14	2787_08	50_15,16	27°40.69'	87°54.64'	13422	235	190	Ktr_gr 127	4938	S	Ds	E
Ktr_gl 249		72M/14	2787_08	50_15,16	27°42.70'	87°56.65'	20386	220	980	Ktr_gr 132	4938	E	Ds	V
Ktr_gl 250		72M/14	2787_08	50_15,16	27°43.29'	87°55.89'	22275	135	0	Ktr_gr 135	5060	NE	Ds	M
Ktr_gl 251		72M/14	2787_08	50_15,16	27°43.52'	87°55.89'	26361	255	430	Ktr_gr 137	5151	S	Ds	E
Ktr_gl 252		72M/14	2787_08	50_15,16	27°44.12'	87°56.72'	15092	130	155	Ktr_gr 139	5044	S	Ds	M
Ktr_gl 253		72M/14	2787_08	50_15,16	27°44.21'	87°56.84'	10303	115	170	Ktr_gr 139	5136	SE	Ds	M
Ktr_gl 254	Nupchu Pokhari	72M/13	2787_04	51_51,52	27°47.40'	87°56.22'	140287	770	225	Ktr_gr 146	4877	SE	Ds	C
Ktr_gl 255		72M/13	2787_04	51_51,52	27°46.85'	87°56.87'	44002	395	425	Ktr_gr 148	4846	SW	Ds	E
Ktr_gl 256		72M/13	2787_04	51_51,52	27°45.87'	87°58.09'	30469	315	280	Ktr_gr 151	5121	SW	Cs	E
Ktr_gl 257		72M/13	2787_04	51_51,52	27°46.05'	87°58.24'	6437	80	290	Ktr_gr 151	5197	SW	Cs	E
Ktr_gl 258		72M/13	2787_04	51_51,52	27°47.01'	87°58.91'	4679	75	1260	Ktr_gr 154	5136	SE	Cs	B
Ktr_gl 259		72M/13	2787_04	51_51,52	27°47.21'	87°58.80'	3691	75	840	Ktr_gr 154	5136	SE	Cs	B
Ktr_gl 260		72A/1	2788_01	52_9,10	27°51.78'	88° 1.74'	22473	305	850	Ktr_gr 175	5395	SW	Ds	V
Ktr_gl 261		72A/1	2788_01	52_9,10	27°52.51'	88° 1.31'	15531	180	107	Ktr_gr 174	5639	SE	Cs	E
Ktr_gl 262		72A/1	2788_01	52_9,10	27°51.53'	88° 3.42'	58676	335	275	Ktr_gr 177	5502	SE	Cs	B
Ktr_gl 263		72A/1	2788_01	52_9,10	27°49.14'	88° 2.49'	30425	125	0	Ktr_gr 171	5014	S	Ds	M
Ktr_gl 264		72A/1	2788_01	52_9,10	27°49.91'	88° 4.27'	8524	120	338	Ktr_gr 182	5593	SE	Ds	E
Ktr_gl 265		72A/1	2788_01	52_9,10	27°50.02'	88° 4.24'	26647	215	100	Ktr_gr 182	5601	SE	Ds	E
Ktr_gl 266		72A/1	2788_01	52_9,10	27°50.07'	88° 4.88'	153094	575	20	Ktr_gr 183	5593	SE	Ds	M
Ktr_gl 267		72A/1	2788_01	51_56,57	27°46.41'	88° 1.24'	7645	150	0	Ktr_gr 193	4633	W	Cs	S
Ktr_gl 268		72A/1	2788_01	51_56,57	27°46.22'	88° 1.30'	15158	190	0	Ktr_gr 193	4633	W	Cs	S
Ktr_gl 269		72A/1	2788_01	51_56,57	27°46.26'	88° 1.44'	13686	190	0	Ktr_gr 193	4633	W	Cs	S
Ktr_gl 270		72A/1	2788_01	51_56,57	27°46.63'	88° 1.53'	21880	474	0	Ktr_gr 193	4671	SW	Ds	S
Ktr_gl 271		72A/1	2788_01	51_56,57	27°47.28'	88° 4.17'	8150	130	0	Ktr_gr 193	4846	W	Cs	S
Ktr_gl 272		72A/1	2788_01	51_56,57	27°47.21'	88° 4.33'	3207	70	0	Ktr_gr 193	4862	W	Cs	S
Ktr_gl 273		72A/1	2788_01	51_56,57	27°47.25'	88° 4.47'	4833	90	0	Ktr_gr 193	4869	W	Cs	S
Ktr_gl 274		72A/1	2788_01	51_56,57	27°47.25'	88° 4.68'	15224	90	0	Ktr_gr 193	4869	W	Cs	S
Ktr_gl 275		72A/1	2788_01	51_56,57	27°47.11'	88° 4.79'	16805	90	0	Ktr_gr 193	4877	W	Cs	S
Ktr_gl 276		72A/1	2788_01	51_56,57	27°47.00'	88° 5.21'	5031	115	0	Ktr_gr 193	4915	W	Cs	S
Ktr_gl 277		72A/1	2788_01	51_56,57	27°47.07'	88° 5.31'	2570	80	0	Ktr_gr 193	4923	W	Cs	S
Ktr_gl 278		72A/1	2788_01	51_56,57	27°47.17'	88° 5.44'	7952	120	0	Ktr_gr 193	4938	W	Cs	S
Ktr_gl 279		72A/1	2788_01	51_56,57	27°46.97'	88° 5.99'	24714	90			4900	W	Cs	S
Ktr_gl 280		72A/1	2788_01	51_56,57	27°47.09'	88° 6.12'	5690	60			4907	W	Cs	S
Ktr_gl 281		72A/1	2788_01	51_56,57	27°46.93'	88° 6.14'	26537	60			4907	W	Cs	S
Ktr_gl 282		72A/1	2788_01	51_56,57	27°46.74'	88° 6.48'	21177	90			4968	W	Cs	S
Ktr_gl 283		72A/1	2788_01	51_56,57	27°46.53'	88° 7.74'	4459	135	0	Ktr_gr 193	5105	W	Cs	S
Ktr_gl 284		72A/1	2788_01	51_56,57	27°46.70'	88° 7.89'	6502	90			5105	S	Cs	S
Ktr_gl 285		72A/1	2788_01	51_57,58	27°47.61'	88° 6.51'	2680	90			5281	S	Cs	S
Ktr_gl 286		72A/1	2788_01	51_57,58	27°47.66'	88° 6.57'	9732	125			5288	S	Cs	S
Ktr_gl 287		72A/1	2788_01	51_57,58	27°47.75'	88° 6.66'	6744	90			5304	S	Cs	S
Ktr_gl 288		72A/1	2788_01	51_57,58	27°48.05'	88° 8.63'	12456	120			5288	S	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 289		72A/1	2788_01	51_57,58	27°48.30'	88° 8.46'	6942	140			5304	S	Cs	S
Ktr_gl 290		72A/1	2788_01	51_57,58	27°48.33'	88° 8.59'	10567	110			5304	S	Cs	S
Ktr_gl 291		72A/1	2788_01	51_56,57	27°45.73'	88° 2.04'	57731	320	0	Ktr_gr 193	4816	NW	Cs	S
Ktr_gl 292		72A/1	2788_01	51_56,57	27°45.57'	88° 2.27'	7667	110	0	Ktr_gr 193	4823	NW	Cs	S
Ktr_gl 293		72M/14	2787_08	50_14,15	27°43.47'	87°58.45'	14894	165	0	Ktr_gr 214	4100	NW	Cs	M
Ktr_gl 294		72M/14	2787_08	50_14,15	27°43.41'	87°58.54'	5646	100	0	Ktr_gr 214	4107	W	Cs	S
Ktr_gl 295		72M/14	2787_08	50_14,15	27°42.87'	87°59.23'	8194	115	0	Ktr_gr 214	4282	NW	Cs	S
Ktr_gl 296		72M/14	2787_08	50_14,15	27°40.93'	87°58.33'	12456	168	0	Ktr_gr 222	4602	NW	Ds	M
Ktr_gl 297	Dudh Pokhari	72M/14	2787_08	68_12,13	27°38.79'	87°59.10'	24296	266	760	Ktr_gr 227	4607	S	Ds	V
Ktr_gl 298	Dudh Pokhari	72M/14	2787_08	67_8,9	27°38.22'	87°59.27'	28668	290			4542	W	Ds	L
Ktr_gl 299		72M/14	2787_08	67_9,10	27°36.59'	87°57.81'	9754	160			4840	NW	Ds	V
Ktr_gl 300		72M/14	2787_08	67_9,10	27°36.14'	87°56.89'	17948	240			4465	NW	Ds	V
Ktr_gl 301		72M/14	2787_08	67_9,10	27°35.95'	87°57.39'	5228	115			4801	NW	Ds	E
Ktr_gl 302		72M/14	2787_08	67_9,10	27°35.98'	87°57.43'	901	60			4801	NW	Ds	E
Ktr_gl 303		72M/14	2787_08	67_9,10	27°35.93'	87°57.70'	4262	90			4831	NW	Ds	V
Ktr_gl 304		72M/14	2787_08	67_9,10	27°35.51'	87°57.25'	10017	180			4740	W	Ds	E
Ktr_gl 305		72M/14	2787_08	67_9,10	27°36.10'	87°56.24'	10237	90			4511	SW	Cs	C
Ktr_gl 306		72M/14	2787_08	67_9,10	27°35.43'	87°56.60'	13774	60			4473	SW	Cs	C
Ktr_gl 307		72M/14	2787_08	67_9,10	27°34.21'	87°56.10'	3691	75			4488	SE	Ds	E
Ktr_gl 308	Chhudung Pokhari	72M/14	2787_08	67_9,10	27°34.18'	87°57.25'	11467	81			4359	NW	Ds	V
Ktr_gl 309		72M/14	2787_08	67_9,10	27°34.32'	87°58.10'	1340	175			4481	SW	Ds	E
Ktr_gl 310		72M/14	2787_08	67_9,10	27°34.68'	87°57.86'	2175	65			4813	SE	Ds	E
Ktr_gl 311		72M/14	2787_08	67_9,10	27°34.66'	87°58.00'	2087	70			4785	SE	Ds	E
Ktr_gl 312		72M/14	2787_08	67_9,10	27°34.80'	87°58.27'	5975	135			4721	SE	Ds	E
Ktr_gl 313		72M/14	2787_08	67_9,10	27°35.67'	87°58.21'	7689	140	150	Ktr_gr 237	5090	SE	Ds	V
Ktr_gl 314		72M/14	2787_08	67_9,10	27°35.60'	87°58.48'	24604	265	425	Ktr_gr 237	4999	S	Ds	V
Ktr_gl 315		72M/14	2787_08	67_9,10	27°35.45'	87°58.49'	10764	160	670	Ktr_gr 237	4983	S	Ds	V
Ktr_gl 316		72M/14	2787_08	67_9,10	27°35.39'	87°58.78'	24560	230	405	Ktr_gr 238	5019	S	Ds	C
Ktr_gl 317		72M/14	2787_08	67_9,10	27°35.78'	87°59.73'	5272	115	660	Ktr_gr 238	4935	NW	Ds	E
Ktr_gl 318		72A/2	2788_05	67_6,7	27°35.07'	88° 1.70'	10720	135	0	Ktr_gr 248	4427	NW	Cs	S
Ktr_gl 319		72A/2	2788_05	67_6,7	27°35.20'	88° 1.67'	7843	95	0	Ktr_gr 248	4427	W	Cs	S
Ktr_gl 320		72A/2	2788_05	67_6,7	27°35.16'	88° 2.24'	28295	255	0	Ktr_gr 248	4447	W	Cs	S
Ktr_gl 321		72A/2	2788_05	67_6,7	27°35.22'	88° 2.59'	4086	110	0	Ktr_gr 248	4465	NW	Cs	S
Ktr_gl 322		72A/2	2788_05	67_6,7	27°36.29'	88° 2.82'	6173	105	455	Ktr_gr 247	4892	SE	Cs	V
Ktr_gl 323		72A/2	2788_05	67_6,7	27°36.31'	88° 4.03'	21836	180			4625	S	Cs	S
Ktr_gl 324		72A/2	2788_05	67_6,7	27°36.44'	88° 4.08'	25065	180			4633	S	Cs	S
Ktr_gl 325		72A/2	2788_05	67_6,7	27°36.60'	88° 4.13'	31941	130			4633	S	Cs	S
Ktr_gl 326		72A/2	2788_05	67_6,7	27°36.74'	88° 4.00'	43716	130			4633	S	Cs	S
Ktr_gl 327		72A/2	2788_05	67_6,7	27°36.60'	88° 4.37'	28778	130			4633	S	Cs	S
Ktr_gl 328		72A/2	2788_05	67_6,7	27°38.83'	88° 4.57'	45671	215	0	Ktr_gr 248	4874	S	Cs	S
Ktr_gl 329		72A/2	2788_05	67_6,7	27°39.03'	88° 4.53'	6195	70			4877	S	Cs	S
Ktr_gl 330		72A/2	2788_05	67_6,7	27°39.10'	88° 4.55'	8480	70			4877	S	Cs	S
Ktr_gl 331		72A/2	2788_05	67_6,7	27°39.01'	88° 4.80'	9358	120			4877	S	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ktr_gl 332		72A/2	2788_05	67_6,7	27°33.67'	88° 2.27'	33633	300	0	Ktr_gr 255	5075	NW	Cs	S
Ktr_gl 333		72A/2	2788_05	67_6,7	27°32.80'	88° 0.46'	98767	505	2030	Ktr_gr 256	4602	SE	Ds	E
Ktr_gl 334		72A/2	2788_05	67_6,7	27°32.54'	88° 1.20'	3515	80			4808	SE	Cs	E
Ktr_gl 335		72A/2	2788_05	67_6,7	27°32.15'	88° 1.47'	12719	240			4648	S	Cs	E
Ktr_gl 336		72A/2	2788_05	67_6,7	27°32.47'	88° 2.91'	26142	255	135	Ktr_gr 258	5029	SW	Ds	V
Ktr_gl 337		72A/2	2788_05	67_6,7	27°33.14'	88° 2.95'	6019	90	0	Ktr_gr 258	5182	SE	Cs	S
Ktr_gl 338		72A/2	2788_05	67_6,7	27°31.82'	88° 3.43'	5184	70	125	Ktr_gr 260	5105	S	Ds	E
Ktr_gl 339		72M/14	2787_08	47_56,57	27°32.20'	87°58.84'	5009	87			4663	NW	Ds	V
Ktr_gl 340		72M/14	2787_08	47_56,57	27°32.20'	87°58.38'	17816	230			4542	W	Ds	V
Ktr_gl 341		72M/14	2787_08	47_56,57	27°30.57'	87°57.67'	3383	95			4221	SE	Ds	V
Ktr_gl 342		72M/14	2787_08	47_56,57	27°30.62'	87°57.59'	6612	110			4237	SE	Ds	V
Ktr_gl 343		72M/14	2787_08	47_56,57	27°30.81'	87°57.67'	9864	145			4298	SE	Ds	E
Ktr_gl 344		72M/14	2787_08	47_56,57	27°31.70'	87°58.43'	6085	110			4785	S	Ds	E
Ktr_gl 345		72M/14	2787_08	47_56,57	27°31.78'	87°59.36'	5624	105			4648	S	Cs	E
Ktr_gl 346		72M/14	2787_08	47_56,57	27°30.60'	87°59.47'	12412	160			4054	S	Ds	V
Ktr_gl 347		72M/14	2787_08	47_56,57	27°30.79'	87°59.51'	8655	125			4176	SW	Ds	E
Ktr_gl 348		72M/14	2787_08	47_56,57	27°31.36'	87°59.71'	14433	220			4435	S	Ds	V
Ktr_gl 349	Charre	78A/3	2788_09	46_46,47	27°29.36'	88° 2.46'	35390	360			4373	S	Ds	C
Ktr_gl 350		78A/3	2788_09	46_46,47	27°29.52'	88° 2.54'	7315	135			4381	SW	Cs	E
Ktr_gl 351	Lam	78A/3	2788_09	45_54,55	27°28.44'	88° 2.26'	45078	385			4351	SW	Ds	E
Ktr_gl 352	Handi	78A/3	2788_09	45_54,55	27°26.15'	88° 3.12'	8985	100			4267	W	Ds	E
Ktr_gl 353		78A/3	2788_09	45_54,55	27°26.19'	88° 3.71'	98548	75			4191	SE	Cs	C
Ktr_gl 354	Inwa	78A/3	2788_09	45_54,55	27°25.12'	88° 1.88'	4284	535			4351	SW	Ds	E
Ktr_gl 355	Sukhe	78A/3	2788_09	45_54,55	27°25.60'	88° 4.35'	9117	145			4292	SW	Ds	E
Ktr_gl 356	Jumlya	78A/3	2788_09	45_54,55	27°25.52'	88° 4.25'	6415	90			4294	W	Ds	E

Glacial Lake Inventory of Arun Basin

Total Number : 109 Total Area : 2.53 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kar_gl 1	Kal Pokhari	72I/14	2786_08	48_23	27º38.21'	86º59.16'	69467	330			4724	S	Ds	C
Kar_gl 2		72M/2	2787_05	49_30	27º37.57'	87º 3.48'	3849	95			4282	N	Cs	C
Kar_gl 3		72M/2	2787_05	49_30	27º37.51'	87º 3.49'	10006	135			4290	N	Cs	C
Kar_gl 4		72M/2	2787_05	49_30	27º37.74'	87º 3.21'	16934	225			4176	NE	Ds	E
Kar_gl 5		72M/2	2787_05	49_30	27º38.73'	87º 3.23'	8082	150			4938	SE	Cs	E
Kar_gl 6		72M/2	2787_05	49_30	27º39.12'	87º 2.65'	6927	135			5060	SE	Cs	E
Kar_gl 7		72M/2	2787_05	49_30	27º38.90'	87º 2.41'	4233	90			4362	S	Ds	E
Kar_gl 8		72M/2	2787_05	49_30	27º39.71'	87º 2.40'	3656	85	370	Kar_gr 4	4938	NE	Cs	E
Kar_gl 9		72M/2	2787_05	49_30	27º41.32'	87º 3.32'	16357	225			3810	S	Cs	E
Kar_gl 10		72M/2	2787_05	50_38,39	27º43.40'	87º 3.40'	60230	370			4176	W	Ds	E
Kar_gl 11		72M/2	2787_05	50_38,39	27º43.12'	87º 3.73'	10968	150			4092	SW	Cs	E
Kar_gl 12		72M/2	2787_05	50_38,39	27º42.97'	87º 4.07'	23669	175			4008	SW	Cs	C
Kar_gl 13		72M/2	2787_05	49_30	27º42.03'	87º 4.16'	17511	190			3886	SW	Cs	E
Kar_gl 14		72M/2	2787_05	49_30	27º41.86'	87º 4.29'	51571	295			3780	SW	Ds	C
Kar_gl 15		72M/2	2787_05	49_30	27º42.07'	87º 5.39'	6158	120			4375	W	Cs	E
Kar_gl 16		72M/1	2787_01	51_31,32	27º45.20'	87º 3.44'	4426	105			4374	SE	Cs	S
Kar_gl 17		72M/1	2787_01	51_31,32	27º45.24'	87º 3.36'	6350	110			4389	SE	Cs	S
Kar_gl 18		72M/1	2787_01	51_31,32	27º45.28'	87º 3.28'	8852	160			4389	SE	Cs	S
Kar_gl 19		72M/1	2787_01	51_31,32	27º45.27'	87º 3.18'	5388	105			4404	SE	Cs	S
Kar_gl 20		72M/1	2787_01	51_31,32	27º45.32'	87º 3.11'	34637	325			4420	SE	Cs	S
Kar_gl 21		72M/1	2787_01	51_31,32	27º45.20'	87º 1.07'	7505	125			4938	E	Cs	S
Kar_gl 22		72M/2	2787_05	50_32,33	27º41.43'	87º12.51'	148941	630			4069	SW	Cs	C
Kar_gl 23		72M/2	2787_05	50_32,33	27º41.60'	87º12.44'	4811	35			4077	S	Cs	C
Kar_gl 24		72M/2	2787_05	50_32,33	27º42.44'	87º14.33'	7505	145			4107	N	Cs	E
Kar_gl 25		72M/1	2787_01	50_32,33	27º42.21'	87º13.92'	1539	90			4237	N	Cs	C
Kar_gl 26		72M/1	2787_01	51_31,32	27º49.44'	87º 4.06'	15587	190	640	Kar_gr 25	4907	NE	Ds	E
Kar_gl 27		72M/1	2787_01	51_31,32	27º49.63'	87º 4.10'	20205	245	410	Kar_gr 25	4862	E	Cs	E
Kar_gl 28		72M/1	2787_01	51_31,32	27º49.66'	87º 4.26'	23669	275	630	Kar_gr 25	4862	SW	Cs	E
Kar_gl 29		72M/1	2787_01	52_35,36	27º50.50'	87º 5.01'	119114	600	610	Kar_gr 31	4862	SW	Ds	V
Kar_gl 30		72M/1	2787_01	51_31,32	27º49.73'	87º 5.89'	117190	615	100	Kar_gr 40	5273	SW	Ds	M

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kar_gl 31		72M/1	2787_01	51_31,32	27º48.64'	87º 8.55'	14432	245	325	Kar_gr 45	4755	S	Ds	E
Kar_gl 32		72M/1	2787_01	51_31,32	27º48.33'	87º 9.01'	48685	380	295	Kar_gr 46	4968	SW	Cs	E
Kar_gl 33		72M/2	2787_05	50_32,33	27º44.70'	87º12.82'	6735	105			4206	S	Cs	E
Kar_gl 34		72M/1	2787_01	51_34,34	27º45.58'	87º14.46'	9044	150			4206	SE	Cs	C
Kar_gl 35	Lakmi Pokhar	72M/5	2787_02	52_29,30	27º50.52'	87º17.54'	75432	375			5360	E	Ds	C
Kar_gl 36	Banduke Pokh	72M/5	2787_02	52_29,30	27º50.28'	87º18.15'	37524	265			5100	S	Ds	E
Kar_gl 37		72M/5	2787_02	52_29,30	27º49.25'	87º18.89'	9429	90			4080	W	Ds	E
Kar_gl 38		72M/5	2787_02	52_29,30	27º49.23'	87º19.00'	15010	160			4080	W	Ds	E
Kar_gl 39		72M/5	2787_02	52_29,30	27º48.73'	87º18.63'	20205	235			3920	W	Cs	E
Kar_gl 40	Molung Pokha	72M/5	2787_02	52_29,30	27º48.85'	87º20.04'	43297	425			3940	SE	Ds	V
Kar_gl 41		72M/5	2787_02	52_29,30	27º49.07'	87º19.88'	6543	100			4000	S	Ds	C
Kar_gl 42		72M/5	2787_02	52_29,30	27º49.33'	87º19.69'	3656	75			4080	S	Cs	E
Kar_gl 43	Pholung Pokh	72M/5	2787_02	52_29,30	27º49.47'	87º19.95'	60230	385			4120	S	Ds	E
Kar_gl 44	Kipu Pokhari	72M/5	2787_02	52_29,30	27º49.33'	87º21.41'	35984	360			3950	NE	Ds	E
Kar_gl 45		72M/5	2787_02	52_29,30	27º49.43'	87º21.73'	45798	275			3910	E	Ds	E
Kar_gl 46		72M/9	2787_03	51_42,43	27º50.36'	87º31.56'	4233	90			4350	S	Cs	C
Kar_gl 47		72M/9	2787_03	51_42,43	27º48.89'	87º32.54'	2886	100			4500	NW	Cs	E
Kar_gl 48		72M/9	2787_03	51_42,43	27º48.57'	87º34.62'	10006	165			4810	W	Cs	E
Kar_gl 49		72M/9	2787_03	51_42,43	27º48.26'	87º34.51'	6543	125			4710	W	Cs	E
Kar_gl 50		72M/9	2787_03	51_42,43	27º46.79'	87º32.78'	4811	105			4590	SW	Cs	E
Kar_gl 51		72M/9	2787_03	51_42,43	27º47.51'	87º34.00'	4811	105	740	Kar_gr 61	4890	SW	Cs	E
Kar_gl 52		72M/9	2787_03	51_42,43	27º46.53'	87º34.64'	82167	400			4710	SW	Cs	E
Kar_gl 53		72M/9	2787_03	51_42,43	27º47.04'	87º35.02'	24439	220			4870	SW	Cs	E
Kar_gl 54		72M/9	2787_03	51_42,43	27º47.37'	87º35.19'	46568	360			4950	SW	Cs	E
Kar_gl 55		72M/9	2787_03	51_42,43	27º47.47'	87º35.01'	10199	175			5010	S	Cs	E
Kar_gl 56		72M/9	2787_03	51_44,45	27º47.60'	87º37.88'	2309	70	1640	Kar_gr 63	4940	SE	Cs	E
Kar_gl 57	Chhawa	72M/9	2787_03	51_44,45	27º47.75'	87º37.83'	84477	530	1080	Kar_gr 63	4940	SE	Cs	E
Kar_gl 58		72M/9	2787_03	51_44,45	27º48.72'	87º38.11'	11931	175			5080	E	Cs	E
Kar_gl 59		72M/9	2787_03	51_44,45	27º48.78'	87º37.92'	12508	175			5110	E	Cs	E
Kar_gl 60		72M/9	2787_03	51_44,45	27º49.29'	87º38.42'	770	60	1130	Kar_gr 64	5140	SE	Cs	E
Kar_gl 61		72M/9	2787_03	51_44,45	27º49.46'	87º38.61'	8852	180			5130	SE	Cs	E
Kar_gl 62		72M/9	2787_03	51_44,45	27º49.82'	87º39.51'	8082	60	135	Kar_gr 66	5220	SW	Cs	E
Kar_gl 63		72M/9	2787_03	51_44,45	27º49.17'	87º39.25'	2502	85	450	Kar_gr 67	5270	NW	Cs	E
Kar_gl 64		72M/9	2787_03	51_44,45	27º49.03'	87º39.44'	1347	60	95	Kar_gr 67	5200	W	Cs	E
Kar_gl 65		72M/9	2787_03	51_44,45	27º48.99'	87º39.24'	3271	70	430	Kar_gr 67	5215	W	Cs	E
Kar_gl 66		72M/9	2787_03	51_44,45	27º46.96'	87º39.72'	8274	155	405	Kar_gr 71	5040	NW	Cs	E
Kar_gl 67		72M/9	2787_03	51_44,45	27º46.80'	87º39.68'	41757	320	115	Kar_gr 72	5040	NW	Cs	C
Kar_gl 68		72M/9	2787_03	51_44,45	27º46.16'	87º39.47'	33290	300	110	Kar_gr 74	5040	NW	Cs	E
Kar_gl 69		72M/9	2787_03	51_44,45	27º45.79'	87º38.63'	5388	130	175	Kar_gr 78	5150	NW	Cs	E
Kar_gl 70		72M/9	2787_03	51_44,45	27º45.95'	87º38.15'	30211	250			5040	NW	Cs	E
Kar_gl 71		72M/9	2787_03	51_44,45	27º45.19'	87º38.84'	26555	235	250	Kar_gr 80	5100	SW	Cs	E
Kar_gl 72		72M/9	2787_03	51_44,45	27º45.23'	87º39.05'	9044	145	100	Kar_gr 80	5120	SW	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kar_gl 73		72M/9	2787_03	50_23,24	27º45.40'	87º38.96'	13855	145	0	Kar_gr 80	5200	S	Cs	E
Kar_gl 74		72M/10	2787_07	50_23,24	27º44.16'	87º38.51'	8467	145			4968	NW	Ds	V
Kar_gl 75		72M/10	2787_07	50_23,24	27º44.08'	87º38.42'	4811	225			4980	NW	Ds	E
Kar_gl 76		72M/10	2787_07	50_23,24	27º43.65'	87º38.28'	3079	90	265	Kar_gr 82	4935	N	Cs	E
Kar_gl 77		72M/10	2787_07	50_23,24	27º43.69'	87º38.14'	33098	290	15	Kar_gr 83	4910	N	Ds	E
Kar_gl 78		72M/10	2787_07	50_23,24	27º43.90'	87º37.64'	9429	125	435	Kar_gr 84	4932	NE	Ds	V
Kar_gl 79		72M/10	2787_07	50_23,24	27º43.80'	87º37.52'	25401	225	705	Kar_gr 84	4935	NE	Ds	V
Kar_gl 80		72M/10	2787_07	50_23,24	27º44.53'	87º36.43'	3464	105			4816	N	Ds	E
Kar_gl 81		72M/10	2787_07	50_24,25	27º43.66'	87º35.92'	35599	260	660	Kar_gr 87	4785	SW	Ds	E
Kar_gl 82		72M/10	2787_07	50_24,25	27º42.29'	87º35.94'	20782	220	455	Kar_gr 89	4764	W	Ds	E
Kar_gl 83		72M/10	2787_07	50_24,25	27º40.88'	87º35.07'	57921	315			4826	NE	Ds	E
Kar_gl 84		72M/10	2787_07	50_24,25	27º43.21'	87º33.47'	8082	140			4496	W	Ds	V
Kar_gl 85		72M/10	2787_07	50_24,25	27º43.07'	87º33.97'	35984	355			4755	NW	Ds	E
Kar_gl 86		72M/10	2787_07	50_24,25	27º42.17'	87º33.63'	6927	125			4740	W	Cs	E
Kar_gl 87		72M/10	2787_07	50_24,25	27º41.56'	87º33.50'	4811	95			4801	N	Ds	E
Kar_gl 88		72M/10	2787_07	50_24,25	27º41.96'	87º32.09'	4811	125			4389	NW	Ds	E
Kar_gl 89		72M/10	2787_07	8_2,3	27º41.25'	87º32.63'	21745	250			4542	W	Ds	V
Kar_gl 90		72M/10	2787_07	8_2,3	27º39.93'	87º31.27'	57729	370			4816	NE	Ds	C
Kar_gl 91		72M/10	2787_07	68_2,3	27º40.23'	87º31.33'	15779	235			4724	NE	Ds	E
Kar_gl 92		72M/10	2787_07	68_2,3	27º40.16'	87º31.25'	1732	75			4740	NE	Cs	C
Kar_gl 93		72M/10	2787_07	68_2,3	27º40.43'	87º31.13'	53688	465			4496	NE	Ds	E
Kar_gl 94		72M/10	2787_07	68_2,3	27º40.81'	87º31.20'	70237	225			4298	N	Ds	E
Kar_gl 95		72M/10	2787_07	68_2,3	27º39.54'	87º30.16'	4426	115			4298	SW	Ds	E
Kar_gl 96		72M/10	2787_07	68_2,3	27º39.92'	87º30.35'	2886	65			4542	S	Ds	E
Kar_gl 97		72M/10	2787_07	68_2,3	27º39.03'	87º31.23'	36177	345			4450	SW	Ds	E
Kar_gl 98		72M/10	2787_07	48_9,10	27º36.13'	87º31.46'	21360	260			4221	N	Ds	E
Kar_gl 99		72M/6	2787_06	48_9,10	27º35.20'	87º29.29'	28095	235			4298	N	Cs	E
Kar_gl 100		72M/6	2787_06	47_69,70	27º31.71'	87º27.92'	7697	125			3993	N	Cs	E
Kar_gl 101		72M/6	2787_06	47_69,70	27º31.54'	87º28.25'	15202	205			4206	NW	Cs	E
Kar_gl 102		72M/6	2787_06	47_69,70	27º31.30'	87º28.33'	35792	260			4252	NW	Cs	E
Kar_gl 103		72M/6	2787_06	47_69,70	27º31.06'	87º28.42'	6158	120			4313	NW	Cs	E
Kar_gl 104		72M/6	2787_06	47_69,70	27º30.93'	87º28.44'	5580	130			4343	NW	Cs	E
Kar_gl 105		72M/6	2787_06	47_69,70	27º31.16'	87º27.93'	1732	70			4282	NW	Cs	E
Kar_gl 106		72M/6	2787_06	47_69,70	27º31.00'	87º28.01'	43874	290			4313	NW	Cs	E
Kar_gl 107		72M/6	2787_06	47_69,70	27º31.04'	87º27.35'	17511	190			4313	NW	Cs	E
Kar_gl 108		72M/6	2787_06	47_69,70	27º30.23'	87º27.53'	42335	335			4161	SW	Cs	E
Kar_gl 109	Jaljala Pokhar	72M/6	2787_06	47_69,70	27º28.12'	87º27.91'	6158	125			4200	SE	Cs	E

Glacial Lake Inventory of Dudh Koshi Basin

Total Number : 473 Total Area : 13.075 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kdh_gl 1		72I/10	2786-07	68_16,17	27º38.84'	86º31.41'	8993	165			4313	SE	Cs	E
Kdh_gl 2		72I/10	2786-07	68_16,17	27º39.78'	86º32.47'	12999	205			4322	SE	Ds	E
Kdh_gl 3		72I/10	2786-07	68_16,17	27º39.92'	86º33.06'	32709	285			4313	SE	Cs	E
Kdh_gl 4		72I/10	2786-07	50_47,48	27º40.31'	86º32.59'	4934	130			4535	SE	Cs	E
Kdh_gl 5		72I/10	2786-07	50_47,48	27º40.34'	86º32.67'	2600	65			4532	E	Cs	E
Kdh_gl 6		72I/10	2786-07	50_47,48	27º40.61'	86º32.89'	34194	245			4465	S	Ds	E
Kdh_gl 7		72I/10	2786-07	50_47,48	27º40.77'	86º32.75'	18039	200			4496	SE	Ds	E
Kdh_gl 8		72I/10	2786-07	50_47,48	27º41.09'	86º32.77'	16580	195			4618	S	Cs	E
Kdh_gl 9		72I/10	2786-07	50_47,48	27º41.55'	86º33.18'	14484	220			4709	S	Ds	E
Kdh_gl 10		72I/10	2786-07	50_47,48	27º41.74'	86º33.22'	2838	150			4816	SE	Cs	E
Kdh_gl 11		72I/10	2786-07	50_47,48	27º40.55'	86º33.99'	4589	105			4548	SW	Cs	E
Kdh_gl 12		72I/10	2786-07	50_47,48	27º40.50'	86º34.04'	5120	120			4557	SW	Cs	E
Kdh_gl 13		72I/10	2786-07	50_47,48	27º41.13'	86º34.30'	19259	210			4715	E	Cs	E
Kdh_gl 14		72I/10	2786-07	50_47,48	27º42.08'	86º34.54'	31674	245			4740	SE	Cs	E
Kdh_gl 15		72I/10	2786-07	50_47,48	27º42.20'	86º33.73'	91123	475			4831	SE	Cs	E
Kdh_gl 16		72I/10	2786-07	50_47,48	27º41.83'	86º33.75'	7746	120			4895	E	Cs	E
Kdh_gl 17		72I/10	2786-07	50_47,48	27º42.32'	86º32.91'	11142	150			5185	SW	Cs	E
Kdh_gl 18		72I/10	2786-07	50_47,48	27º42.57'	86º33.93'	25467	235	220	Kdu_gr 1	4901	S	Cs	C
Kdh_gl 19		72I/10	2786-07	50_47,48	27º42.60'	86º35.50'	78177	440	1305	Kdu_gr 5	4816	SE	Cs	B
Kdh_gl 20		72I/10	2786-07	50_47,48	27º42.68'	86º36.07'	103007	540	870	Kdu_gr 5	4822	S	Cs	B
Kdh_gl 21		72I/10	2786-07	50_47,48	27º42.17'	86º36.46'	17614	225			4801	SE	Cs	E
Kdh_gl 22		72I/10	2786-07	50_47,48	27º42.00'	86º36.69'	3926	95			4730	SW	Cs	E
Kdh_gl 23		72I/10	2786-07	50_47,48	27º41.96'	86º36.63'	3873	85			4724	SW	Cs	E
Kdh_gl 24		72I/10	2786-07	50_47,48	27º41.44'	86º36.47'	12176	175			4770	NW	Cs	E
Kdh_gl 25		72I/10	2786-07	50_47,48	27º40.92'	86º36.15'	3900	155			4915	SW	Cs	E
Kdh_gl 26		72I/10	2786-07	50_47,48	27º40.41'	86º36.68'	55788	340			4383	SW	Cs	E
Kdh_gl 27		72I/9	2786-03	51_18,19	27º46.08'	86º37.66'	15890	170	860	Kdu_gr 17	4831	SE	Ds	E
Kdh_gl 28		72I/9	2786-03	51_18,19	27º46.51'	86º37.53'	104944	625	0	Kdu_gr 21	4846	SE	Ds	V
Kdh_gl 29		72I/9	2786-03	51_18,19	27º46.86'	86º36.98'	849	45	0	Kdu_gr 21	4881	E	Cs	S
Kdh_gl 30		72I/9	2786-03	51_18,19	27º46.91'	86º36.81'	2096	65	0	Kdu_gr 21	4907	E	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 31		72I/9	2786-03	51_18,19	27º46.73'	86º36.63'	3502	70	0	Kdu_gr 21	4919	SE	Cs	S
Kdh_gl 32		72I/9	2786-03	51_18,19	27º46.81'	86º36.51'	4112	85	0	Kdu_gr 21	4927	SE	Cs	S
Kdh_gl 33		72I/9	2786-03	51_18,19	27º46.88'	86º36.28'	5757	90	0	Kdu_gr 21	4944	E	Cs	S
Kdh_gl 34		72I/9	2786-03	51_18,19	27º46.63'	86º36.23'	5173	110	0	Kdu_gr 21	4953	SE	Cs	S
Kdh_gl 35		72I/9	2786-03	51_18,19	27º46.72'	86º36.11'	2096	80	0	Kdu_gr 21	4968	S	Cs	S
Kdh_gl 36		72I/9	2786-03	51_18,19	27º46.77'	86º36.09'	531	25	0	Kdu_gr 21	4968	S	Cs	S
Kdh_gl 37		72I/9	2786-03	51_18,19	27º46.88'	86º35.75'	7560	125	0	Kdu_gr 21	4944	E	Cs	S
Kdh_gl 38		72I/9	2786-03	51_18,19	27º46.83'	86º35.51'	11487	140	415	Kdu_gr 22	5075	NE	Cs	E
Kdh_gl 39		72I/9	2786-03	51_18,19	27º47.35'	86º37.37'	406644	940	530	Kdu_gr 24	5145	SW	Ds	E
Kdh_gl 40		72I/9	2786-03	51_18,19	27º47.71'	86º37.18'	18914	190	270	Kdu_gr 24	5191	SE	Cs	E
Kdh_gl 41		72I/9	2786-03	51_18,19	27º47.70'	86º37.59'	26289	300	785	Kdu_gr 25	5160	SW	Ds	E
Kdh_gl 42		72I/9	2786-03	51_18,19	27º46.96'	86º37.82'	33345	305	440	Kdu_gr 26	4993	SW	Ds	E
Kdh_gl 43		72I/9	2786-03	51_18,19	27º47.13'	86º38.04'	13662	215	70	Kdu_gr 26	5087	SE	Ds	M
Kdh_gl 44		72I/9	2786-03	51_18,19	27º47.00'	86º38.34'	20957	245	55	Kdu_gr 27	5264	SW	Cs	M
Kdh_gl 45		72I/9	2786-03	51_18,19	27º46.64'	86º41.07'	5650	135			4523	SE	Cs	E
Kdh_gl 46		72I/9	2786-03	51_18,19	27º47.00'	86º41.89'	8595	140			4046	E	Ds	V
Kdh_gl 47		72I/9	2786-03	51_18,19	27º49.13'	86º35.51'	12866	130	0	Kdu_gr 32	4532	SE	Cs	S
Kdh_gl 48		72I/9	2786-03	51_18,19	27º49.39'	86º34.83'	955	45	0	Kdu_gr 33	4670	E	Cs	S
Kdh_gl 49		72I/9	2786-03	51_18,19	27º49.36'	86º34.78'	1963	60	0	Kdu_gr 33	4670	E	Cs	S
Kdh_gl 50		72I/9	2786-03	51_18,19	27º49.41'	86º34.40'	32231	395	1035	Kdu_gr 34	4770	NE	Cs	V
Kdh_gl 51		72I/9	2786-03	51_18,19	27º49.57'	86º34.30'	46662	315	755	Kdu_gr 34	4785	SE	Cs	M
Kdh_gl 52		72I/9	2786-03	51_18,19	27º49.63'	86º34.62'	2096	70	0	Kdu_gr 35	4747	S	Cs	S
Kdh_gl 53		72I/9	2786-03	51_18,19	27º50.35'	86º37.98'	11460	180			4450	NE	Ds	E
Kdh_gl 54		72I/9	2786-03	53_20,21	27º51.28'	86º37.83'	7587	135			4374	E	Ds	E
Kdh_gl 55	Dig-Tsho	72I/9	2786-03	53_20,21	27º52.41'	86º35.61'	143250	605	55	Kdu_gr 40	4365	SE	Cs	M
Kdh_gl 56		72I/9	2786-03	53_20,21	27º52.75'	86º34.42'	7560	150	235	Kdu_gr 41	4926	SE	Ds	E
Kdh_gl 57		72I/9	2786-03	53_20,21	27º52.93'	86º34.58'	33292	260	530	Kdu_gr 41	4874	SE	Ds	E
Kdh_gl 58	Phangagang-(	72I/9	2786-03	53_20,21	27º52.77'	86º35.19'	60536	320	1395	Kdu_gr 41	4474	SE	Ds	V
Kdh_gl 59		72I/9	2786-03	53_20,21	27º54.02'	86º34.74'	27748	225	245	Kdu_gr 44	5154	S	Cs	E
Kdh_gl 60		72I/9	2786-03	53_20,21	27º54.13'	86º35.10'	4934	105	1135	Kdu_gr 45	5209	E	Cs	C
Kdh_gl 61		72I/9	2786-03	53_21,22	27º54.28'	86º35.09'	24830	260	825	Kdu_gr 45	5218	SE	Ds	E
Kdh_gl 62		72I/9	2786-03	53_21,22	27º54.36'	86º35.46'	1141	50	535	Kdu_gr 46	5221	S	Cs	E
Kdh_gl 63		72I/9	2786-03	53_21,22	27º54.37'	86º35.40'	3157	85	465	Kdu_gr 46	5224	S	Cs	E
Kdh_gl 64		72I/9	2786-03	53_21,22	27º54.45'	86º35.29'	3502	80	40	Kdu_gr 46	5230	SE	Cs	E
Kdh_gl 65		72I/9	2786-03	53_21,22	27º52.74'	86º36.67'	5836	110	290	Kdu_gr 46	4749	SW	Cs	E
Kdh_gl 66		72I/9	2786-03	53_21,22	27º54.51'	86º35.74'	16686	220			5151	S	Ds	E
Kdh_gl 67		72I/9	2786-03	53_21,22	27º54.06'	86º36.43'	2573	70			5188	S	Cs	E
Kdh_gl 68		72I/9	2786-03	53_21,22	27º56.98'	86º34.84'	2573	75	0	Kdu_gr 48	4828	SE	Cs	S
Kdh_gl 69		72I/9	2786-03	53_21,22	27º57.10'	86º34.45'	3316	75	0	Kdu_gr 48	4889	SE	Cs	S
Kdh_gl 70		72I/9	2786-03	53_21,22	27º56.67'	86º33.43'	28438	220	55	Kdu_gr 49	5136	SE	Ds	M
Kdh_gl 71		72I/9	2786-03	53_21,22	27º56.61'	86º33.23'	4404	90	0	Kdu_gr 49	5166	NE	Cs	S
Kdh_gl 72		72I/9	2786-03	53_21,22	27º56.70'	86º33.15'	2494	75	0	Kdu_gr 49	5185	E	Cs	S
Kdh_gl 73		72I/9	2786-03	53_21,22	27º57.05'	86º33.45'	10744	155	0	Kdu_gr 48	4962	E	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 74		72I/9	2786-03	55_6,7	27º58.26'	86º33.59'	24114	235			5087	E	Cs	E
Kdh_gl 75		72I/9	2786-03	55_6,7	27º58.69'	86º33.11'	63534	720	780	Kdu_gr 51	5105	SE	Ds	E
Kdh_gl 76		72I/9	2786-03	55_6,7	27º58.59'	86º33.00'	4032	80	440	Kdu_gr 50	5130	E	Cs	E
Kdh_gl 77		72I/9	2786-03	55_6,7	27º58.52'	86º32.77'	12654	125	50	Kdu_gr 50	5151	E	Ds	M
Kdh_gl 78		72I/9	2786-03	55_6,7	27º58.86'	86º32.85'	10505	120	705	Kdu_gr 51	5172	E	Ds	E
Kdh_gl 79		72I/9	2786-03	55_6,7	27º58.77'	86º32.54'	16766	185	160	Kdu_gr 51	5258	NE	Ds	E
Kdh_gl 80		72I/9	2786-03	53_21,22	27º57.52'	86º34.29'	48387	330	0	Kdu_gr 52	4892	S	Cs	S
Kdh_gl 81		72I/9	2786-03	53_21,22	27º57.64'	86º34.17'	1937	80	0	Kdu_gr 52	4910	SE	Cs	S
Kdh_gl 82		72I/9	2786-03	55_6,7	27º57.92'	86º34.20'	12256	210	0	Kdu_gr 52	4944	S	Cs	S
Kdh_gl 83		72I/9	2786-03	55_6,7	27º58.07'	86º34.18'	13317	175	0	Kdu_gr 52	4971	SE	Cs	S
Kdh_gl 84		72I/9	2786-03	55_6,7	27º58.23'	86º34.09'	6499	160	0	Kdu_gr 52	5005	E	Cs	S
Kdh_gl 85		72I/9	2786-03	55_6,7	27º58.40'	86º34.04'	7693	105	0	Kdu_gr 52	5029	E	Cs	S
Kdh_gl 86		72I/9	2786-03	55_6,7	27º58.64'	86º33.62'	6605	130	0	Kdu_gr 52	5063	SE	Cs	S
Kdh_gl 87		72I/9	2786-03	55_6,7	27º58.77'	86º33.71'	12123	190	0	Kdu_gr 52	5075	S	Cs	S
Kdh_gl 88		72I/9	2786-03	55_6,7	27º58.76'	86º33.49'	9364	160	0	Kdu_gr 52	5081	S	Cs	S
Kdh_gl 89		72I/9	2786-03	55_6,7	27º59.11'	86º33.44'	3396	90	0	Kdu_gr 52	5116	E	Cs	S
Kdh_gl 90		72I/9	2786-03	55_6,7	27º59.28'	86º33.19'	13397	180	0	Kdu_gr 52	5136	SW	Cs	S
Kdh_gl 91		72I/9	2786-03	55_6,7	27º59.20'	86º32.94'	9152	150	0	Kdu_gr 52	5136	SE	Cs	S
Kdh_gl 92		72I/9	2786-03	55_6,7	27º59.40'	86º33.17'	7587	115	0	Kdu_gr 52	5142	SE	Cs	S
Kdh_gl 93		72I/9	2786-03	55_6,7	27º59.66'	86º32.03'	5093	90	0	Kdu_gr 52	5166	SE	Cs	S
Kdh_gl 94		72I/9	2786-03	55_6,7	27º59.76'	86º33.09'	4006	95	0	Kdu_gr 52	5179	S	Cs	S
Kdh_gl 95		72I/9	2786-03	55_6,7	27º59.01'	86º34.26'	5650	110			5267	SE	Ds	E
Kdh_gl 96		72I/9	2786-03	55_6,7	27º58.17'	86º35.49'	19763	245			5197	S	Ds	E
Kdh_gl 97		72I/9	2786-03	55_6,7	27º58.48'	86º35.64'	11593	150			5258	SW	Ds	E
Kdh_gl 98		72I/9	2786-03	53_21,22	27º57.62'	86º36.01'	4457	110			5115	SE	Ds	E
Kdh_gl 99	Kirung Cho	72I/9	2786-03	55_6,7	27º59.39'	86º35.50'	35759	275			5380	E	Ds	E
Kdh_gl 100		72I/9	2786-03	55_6,7	28º 0.43'	86º34.12'	4165	95	0	Kdu_gr 54	4990	S	Cs	C
Kdh_gl 101		72I/9	2786-03	55_6,7	27º58.56'	86º36.77'	1061	50	0	Kdu_gr 54	4810	S	Cs	S
Kdh_gl 102		72I/9	2786-03	55_6,7	27º58.69'	86º36.55'	2626	60	0	Kdu_gr 54	4814	SE	Cs	S
Kdh_gl 103		72I/9	2786-03	55_6,7	27º58.81'	86º36.85'	3422	60	0	Kdu_gr 54	4822	S	Cs	S
Kdh_gl 104		72I/9	2786-03	55_6,7	27º59.27'	86º36.50'	4961	120	0	Kdu_gr 54	4872	SW	Cs	S
Kdh_gl 105		72I/9	2786-03	55_6,7	27º59.93'	86º36.30'	10876	125	0	Kdu_gr 54	4909	SE	Cs	S
Kdh_gl 106		71L/12	2886-15	55_6,7	28º 0.28'	86º35.88'	34698	290	0	Kdu_gr 54	4953	SE	Cs	S
Kdh_gl 107		71L/12	2886-15	55_6,7	28º 0.67'	86º35.40'	14723	145	0	Kdu_gr 54	5014	S	Cs	S
Kdh_gl 108		71L/12	2886-15	55_6,7	28º 1.10'	86º35.07'	19471	180	0	Kdu_gr 54	5051	SE	Cs	S
Kdh_gl 109		71L/12	2886-15	55_6,7	28º 1.13'	86º34.42'	12335	175	0	Kdu_gr 54	5079	NE	Cs	S
Kdh_gl 110		71L/12	2886-15	55_6,7	28º 1.09'	86º34.02'	3873	100	0	Kdu_gr 54	5099	SE	Cs	S
Kdh_gl 111		71L/12	2886-15	54_6,7	28º 1.36'	86º34.04'	7375	125	0	Kdu_gr 54	5136	SE	Cs	S
Kdh_gl 112		71L/12	2886-15	54_6,7	28º 1.54'	86º33.96'	21859	255	0	Kdu_gr 54	5142	SE	Cs	S
Kdh_gl 113		71L/12	2886-15	54_6,7	28º 1.48'	86º33.77'	8462	135	0	Kdu_gr 54	5166	S	Cs	S
Kdh_gl 114		71L/12	2886-15	54_6,7	28º 1.60'	86º33.48'	21302	185	0	Kdu_gr 54	5179	SE	Cs	S
Kdh_gl 115		71L/12	2886-15	54_6,7	28º 1.15'	86º32.95'	11062	180	0	Kdu_gr 54	5264	E	Cs	S
Kdh_gl 116		71L/12	2886-15	54_6,7	28º 1.26'	86º32.77'	15917	190	0	Kdu_gr 54	5267	E	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 117		71L/12	2886-15	54_6,7	28º 1.97'	86º35.24'	27430	135	0	Kdu_gr 54	4977	SW	Cs	S
Kdh_gl 118		71L/12	2886-15	54_6,7	28º 2.02'	86º35.53'	19445	200	0	Kdu_gr 54	4977	SW	Cs	S
Kdh_gl 119		71L/12	2886-15	54_6,7	28º 2.19'	86º35.35'	36847	300	0	Kdu_gr 54	5002	SW	Cs	S
Kdh_gl 120		71L/12	2886-15	54_6,7	28º 2.99'	86º35.74'	15147	150	0	Kdu_gr 54	5218	SW	Cs	S
Kdh_gl 121		71L/12	2886-15	54_6,7	28º 3.07'	86º35.84'	8144	125	0	Kdu_gr 54	5227	SW	Cs	S
Kdh_gl 122		71L/12	2886-15	54_6,7	28º 3.15'	86º35.97'	2547	55	0	Kdu_gr 54	5236	SE	Cs	S
Kdh_gl 123		71L/12	2886-15	54_6,7	28º 3.32'	86º36.04'	4642	95	0	Kdu_gr 54	5566	S	Cs	S
Kdh_gl 124		71L/12	2886-15	54_6,7	28º 3.67'	86º35.89'	10903	175	0	Kdu_gr 54	5270	SE	Cs	S
Kdh_gl 125		71L/12	2886-15	54_6,7	28º 3.73'	86º35.32'	45920	275	0	Kdu_gr 54	5291	SW	Cs	S
Kdh_gl 126		71L/12	2886-15	54_6,7	28º 2.12'	86º36.76'	19577	220	710	Kdu_gr 66	5325	SE	Ds	E
Kdh_gl 127	Homi Cho(1)	72I/9	2786-03	55_8,9	27º59.55'	86º37.39'	26369	325	0	Kdu_gr 67	4953	SW	Cs	S
Kdh_gl 128		72I/9	2786-03	55_8,9	27º59.68'	86º37.36'	10160	140	0	Kdu_gr 67	4956	S	Cs	S
Kdh_gl 129		71L/12	2886-15	54_8,9	28º 0.15'	86º37.57'	4377	65	0	Kdu_gr 67	4404	S	Cs	S
Kdh_gl 130		71L/12	2886-15	54_8,9	28º 0.26'	86º37.70'	2945	65	0	Kdu_gr 67	5020	SE	Cs	S
Kdh_gl 131	Homi Cho(2)	71L/12	2886-15	54_8,9	28º 0.38'	86º37.70'	40879	350	0	Kdu_gr 67	5026	SW	Cs	S
Kdh_gl 132		71L/12	2886-15	54_8,9	28º 0.48'	86º38.00'	3289	75	0	Kdu_gr 67	5044	SW	Cs	S
Kdh_gl 133		71L/12	2886-15	54_8,9	28º 0.62'	86º37.85'	5173	105	0	Kdu_gr 67	5063	SW	Cs	S
Kdh_gl 134		71L/12	2886-15	54_8,9	28º 1.25'	86º37.78'	5730	95	0	Kdu_gr 67	5139	S	Cs	S
Kdh_gl 135		71L/12	2886-15	54_8,9	28º 1.93'	86º37.64'	8011	130	0	Kdu_gr 67	5215	W	Cs	S
Kdh_gl 136		71L/12	2886-15	54_8,9	28º 2.02'	86º37.65'	1883	50	0	Kdu_gr 67	5224	S	Cs	S
Kdh_gl 137		71L/12	2886-15	54_8,9	28º 2.23'	86º37.80'	1990	50	0	Kdu_gr 67	5255	W	Cs	S
Kdh_gl 138		71L/12	2886-15	54_8,9	28º 2.34'	86º37.70'	3847	90	0	Kdu_gr 67	5270	SW	Cs	S
Kdh_gl 139		71L/12	2886-15	54_8,9	28º 2.40'	86º37.76'	3396	75	0	Kdu_gr 67	5285	SW	Cs	S
Kdh_gl 140		71L/12	2886-15	54_8,9	28º 2.45'	86º37.82'	2228	65	0	Kdu_gr 67	5300	SW	Cs	S
Kdh_gl 141		71L/12	2886-15	54_8,9	28º 2.53'	86º37.74'	8913	180	0	Kdu_gr 67	5310	SW	Cs	S
Kdh_gl 142		71L/12	2886-15	54_8,9	28º 2.63'	86º37.77'	5757	140	0	Kdu_gr 67	5331	S	Cs	S
Kdh_gl 143		71L/12	2886-15	54_8,9	28º 2.63'	86º37.85'	2759	75	0	Kdu_gr 67	5331	S	Cs	S
Kdh_gl 144		71L/12	2886-15	54_8,9	28º 2.68'	86º37.95'	37404	565	0	Kdu_gr 67	5331	SE	Cs	S
Kdh_gl 145		71L/12	2886-15	54_8,9	28º 3.03'	86º37.60'	6977	105	0	Kdu_gr 67	5371	SE	Cs	S
Kdh_gl 146		71L/12	2886-15	54_8,9	28º 0.42'	86º38.26'	200125	1370	1395	Kdu_gr 71	5057	SW	Cs	E
Kdh_gl 147		71L/12	2886-15	54_8,9	28º 0.91'	86º38.82'	76824	635	415	Kdu_gr 71	5115	SW	Ds	S
Kdh_gl 148		71L/12	2886-15	54_8,9	28º 0.38'	86º38.64'	42153	245	0	Kdu_gr 72	5179	NW	Ds	E
Kdh_gl 149		72I/9	2786-03	55_8,9	27º59.32'	86º38.01'	5226	95			5115	W	Cs	S
Kdh_gl 150		72I/9	2786-03	55_8,9	27º58.22'	86º38.28'	16394	180	0	Kdu_gr 75	5057	W	Cs	S
Kdh_gl 151		72I/9	2786-03	55_8,9	27º57.90'	86º37.88'	4775	125			5086	W	Ds	E
Kdh_gl 152		72I/9	2786-03	54_19,20	27º57.20'	86º37.36'	25520	225			4645	SW	Cs	E
Kdh_gl 153		72I/9	2786-03	54_19,20	27º57.28'	86º38.58'	6101	105			5230	SW	Ds	E
Kdh_gl 154		72I/9	2786-03	54_19,20	27º57.65'	86º38.50'	19286	175			5273	SE	Ds	E
Kdh_gl 155	Relama Cho	72I/9	2786-03	54_19,20	27º55.98'	86º39.04'	47830	340			4889	SE	Ds	V
Kdh_gl 156	Anladumba C	72I/9	2786-03	54_19,20	27º56.74'	86º39.25'	86029	390			5105	SW	Ds	E
Kdh_gl 157		72I/9	2786-03	54_19,20	27º55.77'	86º39.61'	6207	115	375	Kdu_gr 76	5023	SW	Ds	E
Kdh_gl 158	Tanjung Cho	72I/9	2786-03	54_19,20	27º56.43'	86º42.11'	169539	700			4700	SE	Ds	V
Kdh_gl 159	Dudhpokhari (	72I/9	2786-03	54_19,20	27º57.02'	86º41.58'	426938	975	1410	Kdu_gr 86	4734	SE	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 160		72I/9	2786-03	54_19,20	27º57.61'	86º39.95'	15439	215	285	Kdu_gr 87	5166	NW	Ds	E
Kdh_gl 161		72I/9	2786-03	54_19,20	27º57.82'	86º40.80'	4244	95			5148	SE	Ds	E
Kdh_gl 162	Thonak Cho	72I/9	2786-03	55_10,11	27º58.49'	86º40.99'	650699	1925			4834	SE	Ds	V
Kdh_gl 163		72I/9	2786-03	55_10,11	27º58.13'	86º39.53'	3714	115			5121	SW	Ds	E
Kdh_gl 164		72I/9	2786-03	55_10,11	27º59.44'	86º39.26'	21541	135	125	Kdu_gr 90	5246	S	Ds	E
Kdh_gl 165		72I/9	2786-03	55_10,11	27º59.71'	86º39.99'	21620	250	270	Kdu_gr91	5267	SE	Ds	E
Kdh_gl 166		72I/9	2786-03	55_10,11	27º58.98'	86º40.49'	6420	150			5144	SW	Ds	E
Kdh_gl 167		72I/9	2786-03	55_10,11	27º59.63'	86º41.24'	13158	155			4932	S	Ds	E
Kdh_gl 168	Ngojumba Ch	71L/12	2886-15	54_10,11	28º 0.31'	86º41.09'	143940	585			4950	SW	Ds	L
Kdh_gl 169		71L/12	2886-15	54_10,11	28º 0.49'	86º40.79'	32178	255	1565	Kdu_gr 94	4956	SE	Ds	L
Kdh_gl 170		71L/12	2886-15	54_10,11	28º 1.65'	86º41.26'	20586	170	1105	Kdu_gr 95	5145	SE	Ds	E
Kdh_gl 171		71L/12	2886-15	54_10,11	28º 1.43'	86º41.12'	99718	410			5145	NE	Cs	E
Kdh_gl 172		71L/12	2886-15	54_10,11	28º 1.74'	86º41.15'	18039	245	1555	Kdu_gr 96	5148	SE	Ds	E
Kdh_gl 173		71L/12	2886-15	54_10,11	28º 1.55'	86º41.00'	55363	585	545	Kdu_gr 95	5148	NE	Ds	E
Kdh_gl 174		71L/12	2886-15	54_10,11	28º 1.68'	86º40.37'	35123	340	85	Kdu_gr 95	5209	NE	Ds	C
Kdh_gl 175		71L/12	2886-15	54_10,11	28º 2.05'	86º40.43'	20586	210	270	Kdu_gr 96	5410	SE	Cs	E
Kdh_gl 176		71L/12	2886-15	54_10,11	28º 2.39'	86º40.55'	12786	140	245	Kdu_gr 97	5233	SE	Cs	M
Kdh_gl 177		72I/9	2786-03	54_17,18	27º56.14'	86º42.93'	4138	100	0	Kdu_gr 100	4712	S	Cs	S
Kdh_gl 178		72I/9	2786-03	54_17,18	27º56.29'	86º43.09'	15174	265	0	Kdu_gr 100	4712	SW	Cs	S
Kdh_gl 179		72I/9	2786-03	54_17,18	27º56.38'	86º42.82'	14988	220	0	Kdu_gr 100	4718	E	Cs	S
Kdh_gl 180		72I/9	2786-03	54_17,18	27º56.90'	86º42.31'	15864	165	0	Kdu_gr 100	4756	S	Cs	S
Kdh_gl 181		72I/9	2786-03	54_17,18	27º57.35'	86º42.43'	8675	95	0	Kdu_gr 100	4761	S	Cs	S
Kdh_gl 182		72I/9	2786-03	54_17,18	27º57.51'	86º42.20'	10876	145	0	Kdu_gr 100	4782	SE	Cs	S
Kdh_gl 183		72I/9	2786-03	54_17,18	27º57.70'	86º42.24'	5385	165	0	Kdu_gr 100	4795	SW	Cs	S
Kdh_gl 184		72I/9	2786-03	54_17,18	27º57.72'	86º42.04'	24750	235	0	Kdu_gr 100	4798	SE	Cs	S
Kdh_gl 185		72I/9	2786-03	54_17,18	27º57.93'	86º41.82'	4085	105	0	Kdu_gr 100	4807	SE	Cs	S
Kdh_gl 186		72I/9	2786-03	55_10,11	27º58.38'	86º41.92'	6871	105	0	Kdu_gr 100	4825	SE	Cs	S
Kdh_gl 187		72I/9	2786-03	55_10,11	27º58.67'	86º42.07'	4165	125	0	Kdu_gr 100	4849	SE	Cs	S
Kdh_gl 188		72I/9	2786-03	55_10,11	27º58.81'	86º42.09'	11911	135	0	Kdu_gr 100	4855	SW	Cs	S
Kdh_gl 189		72I/9	2786-03	55_10,11	27º59.03'	86º41.76'	7958	110	0	Kdu_gr 100	4872	SE	Cs	S
Kdh_gl 190		72I/9	2786-03	55_10,11	27º59.72'	86º42.09'	2998	65	0	Kdu_gr 100	4910	SW	Cs	S
Kdh_gl 191		72I/9	2786-03	55_10,11	27º59.74'	86º41.80'	2149	65	0	Kdu_gr 100	4919	SE	Cs	S
Kdh_gl 192		72I/9	2786-03	55_10,11	27º59.84'	86º41.83'	3767	85	0	Kdu_gr 100	4923	SW	Cs	S
Kdh_gl 193		72I/9	2786-03	55_10,11	27º59.88'	86º42.07'	3767	85	0	Kdu_gr 100	4923	SE	Cs	S
Kdh_gl 194		71L/12	2886-15	55_10,11	28º 0.25'	86º41.60'	3396	75	0	Kdu_gr 100	4935	SW	Cs	S
Kdh_gl 195		71L/12	2886-15	55_10,11	28º 0.39'	86º41.72'	4165	90	0	Kdu_gr 100	4944	SW	Cs	S
Kdh_gl 196		71L/12	2886-15	55_10,11	28º 0.45'	86º41.67'	3422	75	0	Kdu_gr 100	4953	SE	Cs	S
Kdh_gl 197		71L/12	2886-15	55_10,11	28º 0.56'	86º41.74'	3581	70	0	Kdu_gr 100	4953	SW	Cs	S
Kdh_gl 198		71L/12	2886-15	55_10,11	28º 0.62'	86º41.80'	3210	85	0	Kdu_gr 100	4953	SW	Cs	S
Kdh_gl 199		71L/12	2886-15	55_10,11	28º 0.70'	86º41.95'	2759	75	0	Kdu_gr 100	4962	SW	Cs	S
Kdh_gl 200		71L/12	2886-15	55_10,11	28º 0.88'	86º41.95'	8277	90	0	Kdu_gr 100	4974	E	Cs	S
Kdh_gl 201		71L/12	2886-15	55_10,11	28º 0.67'	86º42.39'	6765	95	0	Kdu_gr 100	4983	SW	Cs	S
Kdh_gl 202		71L/12	2886-15	55_10,11	28º 1.67'	86º41.91'	6340	105	0	Kdu_gr 100	5066	SE	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 203		71L/12	2886-15	55_10,11	28º 1.84'	86º41.94'	10505	190	0	Kdu_gr 100	5066	SE	Cs	S
Kdh_gl 204		71L/12	2886-15	55_10,11	28º 1.98'	86º41.71'	7746	140	0	Kdu_gr 100	5105	SE	Cs	S
Kdh_gl 205		71L/12	2886-15	55_10,11	28º 2.28'	86º41.62'	3687	65	0	Kdu_gr 100	5133	S	Cs	S
Kdh_gl 206	Kyajumba Ch	71L/12	2886-15	55_10,11	28º 2.22'	86º42.76'	160785	600	0	Kdu_gr 106	5364	SE	Cs	M
Kdh_gl 207		71L/12	2886-15	55_10,11	28º 2.61'	86º42.71'	10532	150	0	Kdu_gr 100	5294	SE	Cs	E
Kdh_gl 208		71L/12	2886-15	55_10,11	28º 1.13'	86º42.64'	3820	75	0	Kdu_gr 100	5023	S	Cs	S
Kdh_gl 209		71L/12	2886-15	55_10,11	28º 1.19'	86º42.70'	2573	60	0	Kdu_gr 100	5029	SW	Cs	S
Kdh_gl 210		71L/12	2886-15	55_10,11	28º 1.20'	86º42.78'	4297	70	0	Kdu_gr 100	5035	W	Cs	S
Kdh_gl 211		71L/12	2886-15	55_10,11	28º 1.25'	86º42.84'	2865	65	0	Kdu_gr 100	5035	SW	Cs	S
Kdh_gl 212		71L/12	2886-15	55_10,11	28º 1.61'	86º43.84'	8409	130	0	Kdu_gr 100	5105	W	Cs	S
Kdh_gl 213		71L/12	2886-15	55_10,11	28º 1.70'	86º43.81'	7428	110	0	Kdu_gr 100	5105	SW	Cs	S
Kdh_gl 214		71L/12	2886-15	55_10,11	28º 2.13'	86º43.76'	13609	175	0	Kdu_gr 100	5118	SW	Cs	S
Kdh_gl 215		71L/12	2886-15	55_10,11	28º 1.13'	86º44.15'	11991	205	0	Kdu_gr 100	5227	SW	Cs	S
Kdh_gl 216	Diwanare Ch	71L/12	2886-15	55_10,11	28º 0.97'	86º43.40'	197340	660	645	Kdu_gr 106	5066	SW	Cs	B
Kdh_gl 217		71L/12	2886-15	55_10,11	28º 0.87'	86º43.63'	12044	160	670	Kdu_gr 100	5084	NW	Ds	E
Kdh_gl 218		72I/9	2786-03	55_10,11	27º59.72'	86º43.26'	2308	55	0	Kdu_gr 100	5081	NW	Cs	S
Kdh_gl 219		72I/9	2786-03	55_10,11	27º59.63'	86º43.34'	3183	80	0	Kdu_gr 100	5096	SW	Cs	S
Kdh_gl 220		72I/9	2786-03	55_10,11	27º59.60'	86º43.57'	9762	225	0	Kdu_gr 100	5121	SW	Cs	S
Kdh_gl 221		72I/9	2786-03	55_10,11	27º59.60'	86º43.76'	5385	85	0	Kdu_gr 100	5136	S	Cs	S
Kdh_gl 222		72I/9	2786-03	55_10,11	27º59.54'	86º43.88'	15147	220	0	Kdu_gr 100	5154	S	Cs	S
Kdh_gl 223		72I/9	2786-03	55_10,11	27º59.55'	86º44.01'	3475	80	0	Kdu_gr 100	5188	SE	Cs	S
Kdh_gl 224		72I/9	2786-03	55_10,11	27º59.54'	86º44.10'	4165	65	0	Kdu_gr 100	5194	SW	Cs	S
Kdh_gl 225		72I/9	2786-03	55_10,11	27º59.55'	86º44.25'	5014	80	0	Kdu_gr 100	5194	SE	Cs	S
Kdh_gl 226		72I/9	2786-03	55_10,11	27º59.49'	86º44.58'	6393	105	0	Kdu_gr 100	5215	SE	Cs	S
Kdh_gl 227		72I/9	2786-03	55_10,11	27º58.63'	86º42.43'	36608	335	250	Kdu_gr 100	4715	SW	Cs	B
Kdh_gl 228		72I/9	2786-03	54_17,18	27º55.88'	86º44.47'	25042	230	0	Kdu_gr 100	4892	SW	Ds	V
Kdh_gl 229		72I/9	2786-03	54_17,18	27º55.97'	86º44.63'	17933	190			4892	S	Ds	E
Kdh_gl 230		72I/9	2786-03	54_17,18	27º57.62'	86º44.93'	6712	170			5111	SW	Ds	E
Kdh_gl 231		72I/9	2786-03	54_17,18	27º58.14'	86º44.75'	10425	150	115	Kdu_gr 100	5188	S	Ds	E
Kdh_gl 232		72I/9	2786-03	54_17,18	27º58.49'	86º44.36'	33160	295	180	Kdu_gr 112	5343	SE	Ds	E
Kdh_gl 233	Naktok Cho	72I/9	2786-03	54_17,18	27º55.95'	86º44.95'	84783	485	85	Kdu_gr 113	4947	SW	Ds	M
Kdh_gl 234		72I/9	2786-03	54_17,18	27º55.21'	86º44.86'	28279	260	250	Kdu_gr 114	4874	SW	Ds	E
Kdh_gl 235		72I/13	2786-04	53_26,27	27º52.78'	86º46.14'	7189	105	0	Kdu_gr 116	4877	SW	Ds	L
Kdh_gl 236		72I/13	2786-04	53_26,27	27º53.55'	86º46.20'	5810	100	0	Kdu_gr 116	5121	S	Cs	S
Kdh_gl 237		72I/13	2786-04	53_26,27	27º52.96'	86º47.11'	34964	210			5124	SE	Ds	E
Kdh_gl 238		72I/13	2786-04	53_26,27	27º53.09'	86º47.06'	6261	125			5212	SE	Ds	E
Kdh_gl 239		72I/13	2786-04	53_26,27	27º53.10'	86º47.69'	9126	135			5383	SW	Cs	E
Kdh_gl 240		72I/13	2786-04	53_26,27	27º53.41'	86º47.76'	30931	260	780	Kdu_gr 118	5450	SW	Ds	E
Kdh_gl 241		72I/13	2786-04	55_26,27	27º53.78'	86º47.98'	13980	165	215	Kdu_gr 119	5075	SE	Cs	E
Kdh_gl 242		72I/13	2786-04	55_26,27	27º53.88'	86º47.88'	424	25	55	Kdu_gr 119	5090	SE	Cs	E
Kdh_gl 243	Chola Cho	72I/13	2786-04	55_26,27	27º55.38'	86º47.38'	529069	1255	75	Kdu_gr 120	4499	SE	Ds	B
Kdh_gl 244		72I/13	2786-04	55_26,27	27º56.14'	86º46.30'	19843	300	1360	Kdu_gr 122	4670	SE	Ds	E
Kdh_gl 245		72I/13	2786-04	54_15,16	27º57.16'	86º46.30'	3847	100	850	Kdu_gr 124	5041	S	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 246		72I/13	2786-04	54_15,16	27º57.36'	86º46.53'	6367	115	1240	Kdu_gr 125	5075	SW	Ds	E
Kdh_gl 247		72I/13	2786-04	54_15,16	27º57.52'	86º46.47'	13105	245	1225	Kdu_gr 125	5105	SE	Ds	E
Kdh_gl 248		72I/13	2786-04	54_15,16	27º57.72'	86º46.23'	6101	85	385	Kdu_gr 125	5136	SE	Ds	E
Kdh_gl 249	Nire Cho	72I/13	2786-04	54_15,16	27º57.67'	86º46.62'	35361	250	140	Kdu_gr 128	5102	SE	Ds	E
Kdh_gl 250		72I/13	2786-04	54_15,16	27º57.42'	86º46.97'	39314	300			5096	SW	Cs	E
Kdh_gl 251		72I/13	2786-04	54_15,16	27º57.19'	86º46.85'	6552	115			5026	W	Cs	E
Kdh_gl 252		72I/13	2786-04	54_15,16	27º57.05'	86º46.81'	37298	245	810	Kdu_gr 129	4980	NW	Ds	E
Kdh_gl 253		72I/13	2786-04	54_15,16	27º56.97'	86º47.07'	45734	370	335	Kdu_gr 129	4993	NW	Ds	C
Kdh_gl 254		72I/13	2786-04	54_15,16	27º56.54'	86º47.65'	8303	135			5163	SE	Ds	E
Kdh_gl 255		72I/13	2786-04	54_15,16	27º57.46'	86º48.50'	10425	140	0	Kdu_gr 130	5047	SE	Cs	S
Kdh_gl 256	Chobulu Cho	72I/13	2786-04	54_15,16	27º57.73'	86º48.92'	18039	250	1160	Kdu_gr 131	5044	SE	Ds	V
Kdh_gl 257		72I/13	2786-04	54_15,16	27º57.87'	86º48.65'	8064	120	690	Kdu_gr 131	5206	SE	Ds	E
Kdh_gl 258		72I/13	2786-04	54_15,16	27º57.08'	86º49.56'	3502	70	0	Kdu_gr 133	4953	SW	Cs	S
Kdh_gl 259		72I/13	2786-04	54_15,16	27º57.50'	86º49.52'	7242	85	0	Kdu_gr 133	4983	SW	Cs	S
Kdh_gl 260		72I/13	2786-04	54_15,16	27º57.52'	86º49.64'	4430	105		Kdu_gr 133	4983	S	Cs	S
Kdh_gl 261		72I/13	2786-04	54_15,16	27º57.75'	86º49.84'	6154	110	0	Kdu_gr 133	5026	SE	Cs	S
Kdh_gl 262		72I/13	2786-04	54_15,16	27º57.86'	86º49.84'	6473	130	0	Kdu_gr 133	5026	SW	Cs	S
Kdh_gl 263		72I/13	2786-04	54_15,16	27º58.47'	86º50.03'	9577	100	0	Kdu_gr 133	5084	SE	Cs	S
Kdh_gl 264		72I/13	2786-04	54_15,16	27º58.65'	86º49.40'	6499	100	0	Kdu_gr 133	5172	SW	Cs	S
Kdh_gl 265		72I/13	2786-04	54_15,16	27º58.67'	86º49.22'	8728	155	0	Kdu_gr 133	5197	SW	Cs	S
Kdh_gl 266		72I/13	2786-04	54_15,16	27º58.50'	86º48.93'	4404	75	0	Kdu_gr 133	5197	SE	Cs	S
Kdh_gl 267		72I/13	2786-04	54_15,16	27º58.58'	86º48.22'	13450	150	0	Kdu_gr 133	5246	SW	Cs	S
Kdh_gl 268		72I/13	2786-04	54_15,16	27º59.39'	86º47.05'	4218	70	0	Kdu_gr 133	5569	SE	Cs	S
Kdh_gl 269		72I/13	2786-04	54_15,16	27º59.04'	86º48.12'	27881	270	0	Kdu_gr 133	5322	SE	Ds	E
Kdh_gl 270		72I/13	2786-04	54_15,16	27º58.81'	86º49.32'	4775	80	0	Kdu_gr 133	5206	SE	Cs	S
Kdh_gl 271		72I/13	2786-04	54_15,16	27º58.95'	86º49.09'	45071	370	0	Kdu_gr 133	5215	SE	Cs	S
Kdh_gl 272		72I/13	2786-04	54_15,16	27º59.02'	86º48.96'	25414	305	0	Kdu_gr 133	5223	E	Cs	S
Kdh_gl 273		72I/13	2786-04	54_15,16	27º59.14'	86º49.24'	15307	285	0	Kdu_gr 133	5223	SE	Cs	S
Kdh_gl 274		72I/13	2786-04	54_15,16	27º59.28'	86º48.95'	5279	85	0	Kdu_gr 133	5230	SW	Cs	S
Kdh_gl 275		72I/13	2786-04	54_15,16	27º59.35'	86º48.85'	5491	105	0	Kdu_gr 133	5236	SE	Cs	S
Kdh_gl 276		72I/13	2786-04	54_15,16	27º59.22'	86º48.45'	2228	65	0	Kdu_gr 133	5270	SE	Cs	S
Kdh_gl 277		72I/13	2786-04	54_15,16	27º59.48'	86º48.17'	7587	115	0	Kdu_gr 133	5349	SE	Cs	S
Kdh_gl 278		72I/13	2786-04	54_15,16	27º59.58'	86º48.52'	4510	95	0	Kdu_gr 133	5273	S	Cs	S
Kdh_gl 279		72I/13	2786-04	54_15,16	27º59.00'	86º49.57'	14962	255	1550	Kdu_gr 134	5182	SE	Ds	M
Kdh_gl 280		72I/13	2786-04	54_15,16	27º59.51'	86º49.42'	25812	235	520	Kdu_gr 134	5273	SW	Ds	E
Kdh_gl 281		72I/13	2786-04	54_15,16	27º59.71'	86º49.40'	15704	160	175	Kdu_gr 134	5337	SW	Ds	E
Kdh_gl 282		72I/13	2786-04	54_15,16	27º59.74'	86º49.58'	7269	120	245	Kdu_gr 134	5389	SW	Cs	E
Kdh_gl 283	Gorakashep C	72I/13	2786-04	54_15,16	27º58.93'	86º50.02'	81626	720	0	Kdu_gr 133	5145	SW	Cs	L
Kdh_gl 284		72I/13	2786-04	54_15,16	27º59.08'	86º50.49'	1777	35	0	Kdu_gr 133	5176	SW	Cs	S
Kdh_gl 285		72I/13	2786-04	54_15,16	27º59.13'	86º50.65'	2600	50	0	Kdu_gr 133	5176	W	Cs	S
Kdh_gl 286		72I/13	2786-04	54_15,16	27º59.61'	86º50.45'	6765	85	0	Kdu_gr 133	5288	SW	Cs	S
Kdh_gl 287		72I/13	2786-04	54_15,16	27º59.75'	86º50.33'	48811	375	0	Kdu_gr 133	5304	SE	Cs	S
Kdh_gl 288		72I/13	2786-04	54_15,16	27º59.84'	86º50.95'	4881	115	0	Kdu_gr 133	5261	SE	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 289		72I/13	2786-04	54_15,16	27º59.94'	86º51.02'	8913	125	0	Kdu_gr 133	5270	SW	Cs	S
Kdh_gl 290		71L/16	2786-16	54_15,16	28º 0.06'	86º51.17'	4430	85	0	Kdu_gr 133	5285	SW	Cs	S
Kdh_gl 291		71L/16	2786-16	55_15	28º 0.15'	86º51.26'	1061	35	0	Kdu_gr 133	5291	SW	Cs	S
Kdh_gl 292		71L/16	2786-16	55_15	28º 0.25'	86º51.34'	982	35	0	Kdu_gr 133	5296	SW	Cs	S
Kdh_gl 293		71L/16	2786-16	55_15	28º 0.30'	86º51.49'	2069	60	0	Kdu_gr 133	5300	SW	Cs	S
Kdh_gl 294		71L/16	2786-16	55_15	28º 0.47'	86º51.50'	5942	120	0	Kdu_gr 133	5319	SW	Cs	S
Kdh_gl 295		71L/16	2786-16	55_15	28º 0.48'	86º51.34'	3104	70	0	Kdu_gr 133	5319	SE	Cs	S
Kdh_gl 296		71L/16	2786-16	55_15	28º 0.02'	86º50.55'	9683	165	200	Kdu_gr 133	5389	SW	Ds	E
Kdh_gl 297		71L/16	2786-16	55_15	28º 0.23'	86º50.80'	6579	110	70	Kdu_gr 136	5410	SE	Ds	E
Kdh_gl 298		71L/16	2786-16	55_15	28º 0.42'	86º51.10'	38731	295	70	Kdu_gr 137	5328	SE	Cs	E
Kdh_gl 299		71L/16	2786-16	55_15	28º 0.44'	86º50.97'	5252	90	150	Kdu_gr 137	5334	SW	Cs	E
Kdh_gl 300	Paugungagay	72I/13	2786-04	54_13,14	27º57.60'	86º50.03'	16606	155	0	Kdu_gr 133	5044	SE	Cs	S
Kdh_gl 301		72I/13	2786-04	54_13,14	27º57.49'	86º50.14'	3528	75	0	Kdu_gr 133	5060	SE	Cs	S
Kdh_gl 302		72I/13	2786-04	54_13,14	27º57.24'	86º50.33'	6685	90	0	Kdu_gr 133	5108	SE	Cs	S
Kdh_gl 303		72I/13	2786-04	54_13,14	27º57.16'	86º50.39'	3396	60	0	Kdu_gr 133	5115	SE	Cs	S
Kdh_gl 304		72I/13	2786-04	54_13,14	27º56.64'	86º49.59'	33611	300	235	Kdu_gr 133	4907	SW	Ds	L
Kdh_gl 305		72I/13	2786-04	54_13,14	27º54.69'	86º49.85'	44699	305			4865	SW	Ds	E
Kdh_gl 306		72I/13	2786-04	54_13,14	27º55.22'	86º51.17'	59104	505			5096	S	Ds	C
Kdh_gl 307		72I/13	2786-04	54_13,14	27º55.57'	86º50.44'	2679	65			5465	SE	Ds	E
Kdh_gl 308		72I/13	2786-04	54_13,14	27º55.71'	86º50.42'	31966	260	0	Kdu_gr 148	5441	E	Ds	L
Kdh_gl 309		72I/13	2786-04	54_13,14	27º55.58'	86º51.19'	22628	180			5233	SW	Ds	C
Kdh_gl 310		72I/13	2786-04	54_13,14	27º55.92'	86º50.86'	25997	175	450	Kdu_gr 149	5456	SE	Cs	E
Kdh_gl 311		72I/13	2786-04	54_13,14	27º55.73'	86º51.65'	28040	280	850	Kdu_gr 150	5191	SE	Ds	E
Kdh_gl 312		72I/13	2786-04	54_13,14	27º56.26'	86º50.99'	14856	170	0	Kdu_gr 152	5349	SE	Ds	E
Kdh_gl 313		72I/13	2786-04	54_13,14	27º56.06'	86º52.07'	3661	70	0	Kdu_gr 152	5185	SE	Cs	S
Kdh_gl 314		72I/13	2786-04	54_13,14	27º56.08'	86º51.84'	4669	85	0	Kdu_gr 152	5197	SE	Cs	S
Kdh_gl 315		72I/13	2786-04	54_13,14	27º56.61'	86º52.13'	11619	150	0	Kdu_gr 152	5243	SW	Cs	S
Kdh_gl 316		72I/13	2786-04	54_13,14	27º56.70'	86º52.04'	4244	75	0	Kdu_gr 152	5297	SW	Cs	S
Kdh_gl 317		72I/13	2786-04	54_13,14	27º56.77'	86º51.68'	18941	160			5419	SE	Cs	E
Kdh_gl 318		72I/13	2786-04	54_13,14	27º56.87'	86º51.46'	10293	160	150	Kdu_gr 151	5450	SE	Cs	E
Kdh_gl 319		72I/13	2786-04	54_13,14	27º57.02'	86º51.50'	10585	110			5557	SW	Cs	E
Kdh_gl 320		72I/13	2786-04	54_13,14	27º57.85'	86º51.65'	21514	215	0	Kdu_gr 152	5636	SE	Cs	S
Kdh_gl 321		72I/13	2786-04	53_29,30	27º54.82'	86º52.41'	16500	215			4990	S	Ds	L
Kdh_gl 322		72I/13	2786-04	53_29,30	27º54.74'	86º52.93'	23026	270			4938	SW	Ds	L
Kdh_gl 323		72I/13	2786-04	53_29,30	27º54.70'	86º53.15'	2812	60	0	Kdu_gr 153	4977	SW	Cs	S
Kdh_gl 324		72I/13	2786-04	53_29,30	27º55.22'	86º53.47'	10744	190	0	Kdu_gr 153	5032	SE	Cs	S
Kdh_gl 325		72I/13	2786-04	53_29,30	27º55.46'	86º53.40'	8330	145	0	Kdu_gr 153	5052	SE	Cs	S
Kdh_gl 326		72I/13	2786-04	53_29,30	27º55.64'	86º53.49'	6844	130	0	Kdu_gr 153	5060	SE	Cs	S
Kdh_gl 327		72I/13	2786-04	53_29,30	27º56.15'	86º53.58'	6552	100	0	Kdu_gr 153	5145	SW	Cs	S
Kdh_gl 328		72I/13	2786-04	53_29,30	27º56.18'	86º53.43'	12203	280	0	Kdu_gr 153	5127	SW	Cs	S
Kdh_gl 329		72I/13	2786-04	53_29,30	27º54.49'	86º53.29'	2785	65			4923	SW	Cs	V
Kdh_gl 330		72I/13	2786-04	53_29,30	27º54.41'	86º53.54'	3183	65	0	Kdu_gr 156	4968	SW	Cs	S
Kdh_gl 331		72I/13	2786-04	53_29,30	27º54.34'	86º53.62'	2918	65	0	Kdu_gr 156	4962	SW	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 332		72I/13	2786-04	53_29,30	27º54.41'	86º53.80'	4085	110	0	Kdu_gr 156	4980	NW	Cs	S
Kdh_gl 333		72I/13	2786-04	53_29,30	27º54.48'	86º54.09'	9072	110	0	Kdu_gr 156	4999	S	Cs	S
Kdh_gl 334		72I/13	2786-04	53_29,30	27º54.55'	86º54.18'	4457	80	0	Kdu_gr 156	4996	SW	Cs	S
Kdh_gl 335		72I/13	2786-04	53_29,30	27º54.49'	86º54.30'	5942	110	0	Kdu_gr 156	4996	SE	Cs	S
Kdh_gl 336		72I/13	2786-04	53_29,30	27º54.44'	86º54.44'	3475	70	0	Kdu_gr 156	4996	SE	Cs	S
Kdh_gl 337		72I/13	2786-04	53_29,30	27º54.64'	86º54.54'	8887	155	0	Kdu_gr 156	5017	SW	Cs	S
Kdh_gl 338		72I/13	2786-04	53_29,30	27º54.77'	86º54.31'	16208	220	0	Kdu_gr 156	5026	SE	Cs	S
Kdh_gl 339		72I/13	2786-04	53_29,30	27º54.76'	86º54.52'	20426	230	0	Kdu_gr 156	5032	SW	Cs	S
Kdh_gl 340		72I/13	2786-04	53_29,30	27º54.96'	86º54.53'	9391	160	0	Kdu_gr 156	5044	SE	Cs	S
Kdh_gl 341		72I/13	2786-04	53_29,30	27º54.93'	86º54.73'	22681	270	0	Kdu_gr 156	5051	SE	Cs	S
Kdh_gl 342		72I/13	2786-04	53_29,30	27º55.17'	86º54.70'	6977	130	0	Kdu_gr 156	5060	SW	Cs	S
Kdh_gl 343		72I/13	2786-04	53_29,30	27º55.49'	86º54.99'	7905	95	0	Kdu_gr 156	5060	SE	Cs	S
Kdh_gl 344		72I/13	2786-04	53_29,30	27º55.31'	86º54.74'	3820	65	0	Kdu_gr 156	5078	SW	Cs	S
Kdh_gl 345		72I/13	2786-04	53_29,30	27º55.63'	86º55.25'	2945	70	0	Kdu_gr 156	5139	SW	Cs	S
Kdh_gl 346		72I/13	2786-04	53_29,30	27º55.89'	86º55.25'	2918	55	0	Kdu_gr 156	5166	SW	Cs	S
Kdh_gl 347		72I/13	2786-04	53_29,30	27º56.04'	86º55.29'	6367	130	0	Kdu_gr 156	5197	S	Cs	S
Kdh_gl 348		72I/13	2786-04	53_29,30	27º55.91'	86º55.71'	2467	45	0	Kdu_gr 156	5191	SW	Cs	S
Kdh_gl 349	Chokarma Ch	72I/13	2786-04	53_29,30	27º54.33'	86º54.80'	52790	460	0	Kdu_gr 160	4987	SW	Cs	L
Kdh_gl 350	Imja Cho	72I/13	2786-04	53_29,30	27º54.00'	86º55.40'	48811	410	0	Kdu_gr 160	5023	SW	Cs	S
Kdh_gl 351		72I/13	2786-04	53_29,30	27º53.92'	86º55.44'	21992	315	0	Kdu_gr 160	5032	SW	Cs	S
Kdh_gl 352		72I/13	2786-04	53_29,30	27º54.01'	86º55.63'	6950	145	0	Kdu_gr 160	5032	S	Cs	S
Kdh_gl 353		72I/13	2786-04	53_29,30	27º53.88'	86º55.69'	5836	105	0	Kdu_gr 160	5040	SE	Cs	S
Kdh_gl 354		72I/13	2786-04	53_29,30	27º53.93'	86º55.77'	2547	70	0	Kdu_gr 160	5040	SW	Cs	S
Kdh_gl 355		72I/13	2786-04	53_29,30	27º54.07'	86º56.22'	7640	120	0	Kdu_gr 160	5063	SE	Cs	S
Kdh_gl 356		72I/13	2786-04	53_29,30	27º53.99'	86º56.30'	4377	85	0	Kdu_gr 160	5060	SW	Cs	S
Kdh_gl 357		72I/13	2786-04	53_29,30	27º53.73'	86º56.37'	7587	110	0	Kdu_gr 160	5069	SW	Cs	S
Kdh_gl 358		72I/13	2786-04	53_29,30	27º53.71'	86º56.52'	5863	110	0	Kdu_gr 160	5072	SW	Cs	S
Kdh_gl 359		72I/13	2786-04	53_29,30	27º53.77'	86º56.60'	5040	75	0	Kdu_gr 160	5072	SW	Cs	S
Kdh_gl 360		72I/13	2786-04	53_29,30	27º54.31'	86º56.81'	8462	105	0	Kdu_gr 160	5115	SE	Cs	S
Kdh_gl 361		72I/13	2786-04	53_29,30	27º54.77'	86º56.86'	10770	175	0	Kdu_gr 160	5179	SE	Cs	S
Kdh_gl 362		72I/13	2786-04	53_29,30	27º55.00'	86º57.57'	7613	100	0	Kdu_gr 160	5212	SE	Cs	S
Kdh_gl 363		72I/13	2786-04	53_29,30	27º55.24'	86º57.69'	7799	85	0	Kdu_gr 160	5236	E	Cs	S
Kdh_gl 364		72I/13	2786-04	53_29,30	27º55.49'	86º57.37'	34168	185	0	Kdu_gr 160	5236	SE	Cs	S
Kdh_gl 365		72I/13	2786-04	53_29,30	27º54.47'	86º57.36'	15811	155	195	Kdu_gr 163	5227	SW	Cs	B
Kdh_gl 366		72I/13	2786-04	53_29,30	27º53.75'	86º57.31'	2494	70	0	Kdu_gr 160	5136	NW	Cs	S
Kdh_gl 367		72I/13	2786-04	53_29,30	27º53.46'	86º57.72'	10478	125	0	Kdu_gr 160	5182	NW	Cs	S
Kdh_gl 368		72I/13	2786-04	53_29,30	27º53.31'	86º56.25'	4244	80	0	Kdu_gr 160	5108	NW	Cs	S
Kdh_gl 369		72I/13	2786-04	53_29,30	27º53.18'	86º56.28'	5040	95	0	Kdu_gr 160	5130	NW	Cs	S
Kdh_gl 370		72I/13	2786-04	53_29,30	27º52.57'	86º56.17'	10107	155	0	Kdu_gr 160	5243	N	Cs	S
Kdh_gl 371		72I/13	2786-04	53_29,30	27º52.49'	86º55.86'	8144	155	0	Kdu_gr 160	5270	NE	Cs	S
Kdh_gl 372		72I/13	2786-04	53_29,30	27º53.31'	86º55.89'	4006	90			5182	NE	Cs	E
Kdh_gl 373	Ambulapcha (	72I/13	2786-04	53_29,30	27º53.62'	86º54.93'	127068	390			5023	NW	Cs	B
Kdh_gl 374		72I/13	2786-04	53_29,30	27º53.41'	86º53.38'	18304	205	0	Kdu_gr 167	4938	NW	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 375		72I/13	2786-04	53_29,30	27º53.24'	86º53.44'	12335	155	0	Kdu_gr 167	4953	NW	Cs	S
Kdh_gl 376		72I/13	2786-04	53_29,30	27º53.17'	86º53.27'	2016	55	0	Kdu_gr 167	5011	N	Cs	S
Kdh_gl 377		72I/13	2786-04	53_29,30	27º53.09'	86º53.32'	7295	130	0	Kdu_gr 167	5017	NW	Cs	S
Kdh_gl 378		72I/13	2786-04	53_29,30	27º53.59'	86º52.74'	3555	75	0	Kdu_gr 167	4840	NW	Cs	S
Kdh_gl 379		72I/13	2786-04	53_29,30	27º53.55'	86º52.92'	4748	85	0	Kdu_gr 167	4859	NW	Cs	S
Kdh_gl 380		72I/13	2786-04	53_29,30	27º53.32'	86º53.03'	3661	70	0	Kdu_gr 167	4904	NW	Cs	S
Kdh_gl 381		72I/13	2786-04	53_29,30	27º53.15'	86º53.00'	7322	115	0	Kdu_gr 167	4935	N	Cs	S
Kdh_gl 382		72I/13	2786-04	53_29,30	27º52.23'	86º52.91'	6101	70	0	Kdu_gr 167	5044	N	Cs	S
Kdh_gl 383		72I/13	2786-04	53_27,28	27º52.79'	86º51.32'	17429	210	0	Kdu_gr 169	4837	NW	Cs	S
Kdh_gl 384		72I/13	2786-04	53_27,28	27º53.14'	86º50.83'	14431	225	370	Kdu_gr 169	4679	NW	Ds	L
Kdh_gl 385		72I/13	2786-04	53_27,28	27º51.44'	86º49.22'	9311	120	1485	Kdu_gr 172	4465	NW	Cs	E
Kdh_gl 386		72I/13	2786-04	52_43,44	27º50.61'	86º51.63'	16739	255	0	Kdu_gr 174	5291	SE	Cs	S
Kdh_gl 387		72I/13	2786-04	52_43,44	27º50.86'	86º51.64'	4085	90	0	Kdu_gr 174	5358	SW	Cs	S
Kdh_gl 388		72I/13	2786-04	52_43,44	27º50.40'	86º52.08'	31860	430	0	Kdu_gr 174	5264	SW	Cs	S
Kdh_gl 389		72I/13	2786-04	52_43,44	27º49.47'	86º50.88'	16208	180	0	Kdu_gr 175	4901	NW	Cs	S
Kdh_gl 390		72I/13	2786-04	52_43,44	27º49.39'	86º51.17'	17482	180	0	Kdu_gr 175	4923	SW	Cs	S
Kdh_gl 391		72I/13	2786-04	52_43,44	27º49.50'	86º51.50'	17694	180	0	Kdu_gr 175	4971	SW	Cs	S
Kdh_gl 392		72I/13	2786-04	52_43,44	27º49.45'	86º51.99'	16925	150	0	Kdu_gr 175	5023	NW	Cs	S
Kdh_gl 393		72I/13	2786-04	52_43,44	27º49.15'	86º52.07'	16686	145	0	Kdu_gr 175	5044	NW	Cs	S
Kdh_gl 394		72I/13	2786-04	51_24,25	27º45.68'	86º47.82'	4351	85	0	Kdu_gr 186	4587	SE	Cs	S
Kdh_gl 395		72I/13	2786-04	51_24,25	27º46.03'	86º48.01'	5677	110	0	Kdu_gr 186	4657	SE	Cs	S
Kdh_gl 396		72I/13	2786-04	51_24,25	27º46.19'	86º48.07'	10929	130	0	Kdu_gr 186	4682	SW	Cs	S
Kdh_gl 397		72I/13	2786-04	51_24,25	27º46.80'	86º48.17'	13105	165	0	Kdu_gr 186	4849	SW	Cs	S
Kdh_gl 398		72I/13	2786-04	51_24,25	27º46.83'	86º48.07'	13131	170	0	Kdu_gr 186	4854	SW	Cs	S
Kdh_gl 399	Tam Pokhari	72I/14	2786-08	50_41,42	27º44.33'	86º50.76'	138846	515	45	Kdu_gr 202	4432	SW	Ds	M
Kdh_gl 400		72I/14	2786-08	50_41,42	27º44.32'	86º51.11'	83828	490	0	Kdu_gr 205	4481	SW	Ds	V
Kdh_gl 401		72I/13	2786-04	50_41,42	27º44.96'	86º52.40'	84305	660	0	Kdu_gr 205	4871	NW	Ds	S
Kdh_gl 402		72I/13	2786-04	51_25,26	27º45.42'	86º52.47'	6075	120	0	Kdu_gr 205	4910	NW	Ds	S
Kdh_gl 403		72I/13	2786-04	51_25,26	27º45.53'	86º52.68'	70352	510	0	Kdu_gr 205	4932	SW	Ds	S
Kdh_gl 404		72I/13	2786-04	51_25,26	27º45.66'	86º52.39'	6181	75	0	Kdu_gr 205	4932	S	Ds	S
Kdh_gl 405		72I/13	2786-04	51_25,26	27º46.16'	86º52.36'	8064	160	0	Kdu_gr 205	4965	SE	Ds	S
Kdh_gl 406		72I/13	2786-04	51_25,26	27º45.58'	86º51.97'	56265	365	35	Kdu_gr 203	5127	NE	Cs	L
Kdh_gl 407		72I/13	2786-04	51_25,26	27º45.91'	86º52.14'	25095	275			5051	SE	Cs	L
Kdh_gl 408		72I/13	2786-04	51_25,26	27º45.75'	86º51.71'	10982	165	385	Kdu_gr 204	5264	NE	Cs	E
Kdh_gl 409		72I/13	2786-04	51_25,26	27º46.81'	86º52.34'	7905	155	0	Kdu_gr 205	5029	S	Cs	S
Kdh_gl 410		72I/13	2786-04	51_25,26	27º46.74'	86º52.10'	4881	80	0	Kdu_gr 205	5023	SE	Cs	S
Kdh_gl 411		72I/13	2786-04	51_25,20	27º46.83'	86º51.91'	6579	100	0	Kdu_gr 205	5029	SE	Cs	S
Kdh_gl 412		72I/13	2786-04	51_25,20	27º46.82'	86º51.61'	7348	145	0	Kdu_gr 205	5075	E	Cs	S
Kdh_gl 413		72I/13	2786-04	51_25,20	27º46.82'	86º51.38'	4006	65	0	Kdu_gr 205	5105	NE	Cs	S
Kdh_gl 414		72I/13	2786-04	51_25,20	27º47.13'	86º50.62'	9974	145	0	Kdu_gr 205	5148	SE	Cs	S
Kdh_gl 415		72I/13	2786-04	51_25,20	27º47.17'	86º50.53'	8966	230	0	Kdu_gr 205	5148	SE	Cs	S
Kdh_gl 416		72I/13	2786-04	51_25,20	27º47.21'	86º50.64'	9948	135	0	Kdu_gr 205	5148	SE	Cs	S
Kdh_gl 417		72I/13	2786-04	51_25,20	27º47.95'	86º50.95'	4510	75	0	Kdu_gr 205	5480	SW	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 418		72I/13	2786-04	51_25,20	27º45.81'	86º52.77'	23769	345			5026	S	Cs	B
Kdh_gl 419		72I/13	2786-04	51_25,20	27º45.43'	86º53.45'	108233	505	0	Kdu_gr 216	5145	NW	Cs	M
Kdh_gl 420		72I/14	2786-08	50_41,42	27º44.22'	86º52.60'	11619	165	855	Kdu_gr 218	4724	SW	Ds	E
Kdh_gl 421		72I/14	2786-08	50_41,42	27º41.65'	86º51.67'	16845	185	450	Kdu_gr 225	5075	S	Ds	E
Kdh_gl 422	Dudh Pokhari	72I/14	2786-08	50_41,42	27º41.21'	86º51.68'	274297	1120	655	Kdu_gr 229	4761	SW	Ds	L
Kdh_gl 423		72I/14	2786-08	50_41,42	27º40.81'	86º51.35'	155161	625	705	Kdu_gr 231	4685	NW	Ds	E
Kdh_gl 424		72I/14	2786-08	48_24,25	27º41.02'	86º51.98'	5014	85			4871	NW	Ds	E
Kdh_gl 425		72I/14	2786-08	48_24,25	27º40.71'	86º51.78'	17402	280	405	Kdu_gr 230	4831	NW	Ds	C
Kdh_gl 426		72I/14	2786-08	48_24,25	27º40.59'	86º51.35'	11221	160	445	Kdu_gr 231	4746	N	Ds	E
Kdh_gl 427		72I/14	2786-08	48_24,25	27º39.92'	86º50.79'	11274	220			4871	NW	Cs	E
Kdh_gl 428	Mojang	72I/14	2786-08	48_24,25	27º38.83'	86º51.36'	105368	745	335	Kdu_gr 233	4349	SW	Ds	L
Kdh_gl 429		72I/14	2786-08	48_24,25	27º37.57'	86º51.90'	9391	145			4898	NW	Ds	E
Kdh_gl 430	Panch Pokhar	72I/14	2786-08	48_24,25	27º36.66'	86º50.94'	10850	155			4292	NW	Ds	E
Kdh_gl 431	Panch Pokhar	72I/14	2786-08	48_24,25	27º36.55'	86º50.84'	22416	215			4292	NW	Ds	E
Kdh_gl 432	Panch Pokhar	72I/14	2786-08	48_24,25	27º36.46'	86º51.10'	116563	570			4322	NW	Ds	E
Kdh_gl 433		72I/14	2786-08	50_40,41	27º41.60'	86º55.44'	8993	185	190	Kdu_gr 238	4990	S	Ds	E
Kdh_gl 434		72I/14	2786-08	50_40,41	27º42.61'	86º55.89'	4642	70	1895	Kdu_gr 239	4883	SE	Cs	E
Kdh_gl 435		72I/14	2786-08	50_40,41	27º43.15'	86º54.76'	120569	525	330	Kdu_gr 240	4883	N	Ds	C
Kdh_gl 436		72I/14	2786-08	50_40,41	27º43.26'	86º54.57'	12282	205	545	Kdu_gr 240	4953	NE	Ds	E
Kdh_gl 437		72I/14	2786-08	50_40,41	27º43.87'	86º54.41'	6738	100	695	Kdu_gr 241	5020	SE	Ds	E
Kdh_gl 438		72I/14	2786-08	50_40,41	27º44.38'	86º54.50'	8966	140	220	Kdu_gr 242	5145	SE	Ds	E
Kdh_gl 439		72I/14	2786-08	50_40,41	27º44.54'	86º55.92'	10319	145			5002	SE	Cs	E
Kdh_gl 440		72I/13	2786-04	51_27,28	27º45.33'	86º55.16'	3396	70			5532	SE	Cs	E
Kdh_gl 441		72I/13	2786-04	51_27,28	27º46.04'	86º55.77'	2706	60			5145	SE	Cs	E
Kdh_gl 442		72I/13	2786-04	51_27,28	27º47.70'	86º54.81'	133753	840	0	Kdu_gr 247	5267	SE	Cs	S
Kdh_gl 443		72I/13	2786-04	51_27,28	27º47.77'	86º56.73'	75392	510	0	Kdu_gr 249	5023	SW	Ds	V
Kdh_gl 444		72I/13	2786-04	51_27,28	27º48.23'	86º56.61'	112398	420	0	Kdu_gr 249	5057	SE	Ds	M
Kdh_gl 445		72I/13	2786-04	51_27,28	27º49.41'	86º55.59'	79955	535	0	Kdu_gr 249	5230	SE	Cs	S
Kdh_gl 446		72I/13	2786-04	52_39,40	27º49.82'	86º55.29'	207314	660	0	Kdu_gr 249	5352	SE	Cs	S
Kdh_gl 447		72I/13	2786-04	52_39,40	27º49.56'	86º54.90'	67407	405	0	Kdu_gr 249	5389	E	Cs	S
Kdh_gl 448		72I/13	2786-04	52_39,40	27º50.10'	86º55.58'	22761	295	0	Kdu_gr 250	5456	SW	Cs	M
Kdh_gl 449		72I/13	2786-04	52_39,40	27º50.17'	86º56.26'	198905	875	0	Kdu_gr 249	5182	SW	Cs	S
Kdh_gl 450		72I/13	2786-04	52_39,40	27º50.94'	86º55.97'	441660	1485			5380	SE	Cs	B
Kdh_gl 451		72I/13	2786-04	52_39,40	27º51.40'	86º55.20'	107782	530	25	Kdu_gr 252	5425	SE	Cs	M
Kdh_gl 452		72I/13	2786-04	52_39,40	27º51.58'	86º55.82'	37935	300	125	Kdu_gr 254	5441	SW	Cs	M
Kdh_gl 453		72I/13	2786-04	52_39,40	27º51.03'	86º56.22'	9868	155			5416	S	Ds	E
Kdh_gl 454		72I/13	2786-04	52_39,40	27º51.40'	86º56.41'	209834	665	115	Kdu_gr 255	5480	SW	Ds	M
Kdh_gl 455		72I/13	2786-04	52_39,40	27º50.39'	86º57.26'	88788	290	0	Kdu_gr 249	5441	NW	Cs	M
Kdh_gl 456		72I/13	2786-04	52_39,40	27º49.03'	86º57.49'	84146	435	70	Kdu_gr 258	5410	SS	Ds	E
Kdh_gl 457		72I/13	2786-04	52_39,40	27º49.19'	86º57.70'	27403	230	0	Kdu_gr 258	5419	SW	Cs	M
Kdh_gl 458		72I/13	2786-04	51_28,29	27º47.75'	86º57.82'	4748	90	0	Kdu_gr 260	5371	SW	Cs	S
Kdh_gl 459		72I/13	2786-04	51_28,29	27º47.92'	86º57.95'	78761	465	0	Kdu_gr 260	5380	SW	Cs	S
Kdh_gl 460		72I/13	2786-04	51_28,29	27º47.89'	86º58.25'	58043	370	0	Kdu_gr 260	5389	W	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kdh_gl 461		72I/13	2786-04	51_28,29	27º47.99'	86º58.67'	7481	90	0	Kdu_gr 260	5459	S	Cs	S
Kdh_gl 462		72I/13	2786-04	51_28,29	27º48.30'	86º58.65'	211877	640	0	Kdu_gr 260	5483	SW	Cs	B
Kdh_gl 463		72I/13	2786-04	51_28,29	27º48.02'	86º59.23'	6048	100	0	Kdu_gr 260	5572	SW	Cs	S
Kdh_gl 464		72I/13	2786-04	51_28,29	27º46.86'	86º57.22'	349397	1100	325	Kdu_gr 263	5206	SW	Ds	E
Kdh_gl 465		72I/13	2786-04	51_28,29	27º45.12'	86º56.99'	4351	90	0	Kdu_gr 264	4983	S	Cs	S
Kdh_gl 466		72I/13	2786-04	51_28,29	27º45.24'	86º57.33'	6446	125	0	Kdu_gr 264	4983	SE	Cs	S
Kdh_gl 467		72I/13	2786-04	51_28,29	27º45.23'	86º57.67'	7162	145	0	Kdu_gr 264	4996	SW	Cs	S
Kdh_gl 468		72I/13	2786-04	51_28,29	27º45.20'	86º57.96'	5703	140	0	Kdu_gr 264	5060	NW	Cs	S
Kdh_gl 469		72I/13	2786-04	51_28,29	27º45.24'	86º58.06'	4642	120	0	Kdu_gr 264	5069	SW	Cs	S
Kdh_gl 470		72I/14	2786-08	50_38,39	27º44.62'	86º57.38'	4112	100	325	Kdu_gr 265	5136	N	Cs	E
Kdh_gl 471		72I/14	2786-08	50_38,39	27º44.60'	86º57.61'	12707	150	155	Kdu_gr 265	5136	NW	Cs	E
Kdh_gl 472		72I/14	2786-08	50_38,39	27º42.68'	86º58.70'	6526	105	920	Kdu_gr 270	4660	W	Ds	E
Kdh_gl 473		72I/14	2786-08	48_23	27º34.51'	86º57.19'	9762	150			4170	NW	Cs	E

Glacial Lake Inventory of Likhu Basin

Total Number : 14   Total Area : 0.217 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Klik_gl 1	Bhale Pokhari	72I/6	2786_06	50_51,52	27º40.01'	86º23.09'	11858	100			4115	SE	Ds	E
Klik_gl 2		72I/6	2786_06	50_51,52	27º44.95'	86º25.35'	35149	310			4855	E	Ds	E
Klik_gl 3		72I/5	2786_02	51_14,15	27º48.32'	86º27.55'	5624	130	635	Klik_gr 8	4892	SE	Ds	C
Klik_gl 4		72I/5	2786_02	51_14,15	27º48.07'	86º28.35'	26316	235	250	Klik_gr 8	4950	E	Ds	E
Klik_gl 5		72I/5	2786_02	51_14,15	27º47.80'	86º28.91'	5226	85	485	Klik_gr 10	5002	SE	Ds	E
Klik_gl 6		72I/5	2786_02	51_14,15	27º45.21'	86º29.64'	27828	200			4718	NW	Cs	E
Klik_gl 7		72I/9	2786_03	51_18,19	27º44.71'	86º29.83'	16341	100			4633	SE	Cs	E
Klik_gl 8		72I/9	2786_03	51_18,19	27º45.76'	86º30.49'	690	35	0	Klik_gr 14	4685	SE	Cs	S
Klik_gl 9		72I/6	2786_06	50_51,52	27º45.89'	86º30.56'	690	30	0	Klik_gr 14	4459	S	Cs	S
Klik_gl 10		72I/10	2786_02	50_48,49	27º41.92'	86º31.72'	55974	245			4374	NW	Cs	C
Klik_gl 11		72I/10	2786_07	50_48,49	27º41.41'	86º32.11'	4032	105			4476	NW	Cs	E
Klik_gl 12		72I/10	2786_07	50_48,49	27º40.30'	86º32.22'	13397	180			4417	W	Ds	E
Klik_gl 13		72I/10	2786_07	50_48,49	27º40.00'	86º31.83'	10478	185			4316	NW	Cs	E
Klik_gl 14		72I/10	2786_02	50_48,49	27º39.22'	86º31.32'	3396	55			4197	NW	Cs	E

Glacial Lake Inventory of Tama Koshi Basin

Total Number : 57 Total Area : 1.258 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kta_gl 1		72I/1	2786_01	58_11,12	27º54.79'	86º 7.92'	5677	115			4493	SE	Ds	E
Kta_gl 2		72I/1	2786_01	58_11,12	27º54.59'	86º 9.35'	16898	180			4621	E	Ds	E
Kta_gl 3		72I/1	2786_01	58_11,12	27º55.83'	86º 8.02'	19524	250	185	Kta_gr 1	4968	E	Ds	E
Kta_gl 4		72I/4	2886_13	59_38,39	28º 2.13'	86º 9.49'	4324	75			4279	NE	Cs	E
Kta_gl 5		72I/4	2886_13	59_38,39	28º 1.79'	86º 6.07'	9285	120	740	Kta_gr 10	4740	E	Ds	E
Kta_gl 6		72I/4	2886_13	59_38,39	28º 3.04'	86º 8.28'	5677	110			4426	SW	Ds	E
Kta_gl 7		72I/4	2886_13	60_37,38	28º 5.02'	86º 6.28'	4218	65	0	Kta_gr 14	4962	E	Cs	S
Kta_gl 8		72I/4	2886_13	60_37,38	28º 6.86'	86º12.39'	22893	215	940	Kta_gr 18	4423	NW	Ds	E
Kta_gl 9		72I/4	2886_13	60_37,38	28º 5.70'	86º11.74'	48201	440	45	Kta_gr 20	4862	SW	Ds	B
Kta_gl 10		72I/4	2886_13	60_37,38	28º 5.74'	86º11.87'	12680	140	120	Kta_gr 20	4862	W	Cs	M
Kta_gl 11		72I/4	2886_13	60_37,38	28º 5.24'	86º11.91'	13529	150	15	Kta_gr 21	5023	SW	Cs	M
Kta_gl 12		72I/4	2886_13	60_37,38	28º 4.00'	86º12.09'	8754	130	415	Kta_gr 23	4996	NW	Cs	E
Kta_gl 13		72I/4	2886_13	60_37,38	28º 3.58'	86º12.43'	5385	110			5118	N	Cs	E
Kta_gl 14		72I/4	2886_13	60_37,38	28º 3.46'	86º12.46'	11964	90	175	Kta_gr 24	5136	W	Ds	E
Kta_gl 15	Omai Tsho	72I/5	2786_02	53_17,18	27º54.02'	86º28.05'	91653	575	340	Kta_gr 38	4801	SW	Ds	B
Kta_gl 16		72I/5	2786_02	53_17,18	27º54.85'	86º28.69'	7799	115	0	Kta_gr 38	5105	SW	Cs	S
Kta_gl 17		72I/5	2786_02	53_17,18	27º53.42'	86º28.09'	15943	260	150	Kta_gr 40	4670	SW	Cs	B
Kta_gl 18		72I/9	2786_03	53_18,19	27º56.66'	86º30.36'	4642	85	0	Kta_gr 40	5505	SW	Cs	S
Kta_gl 19		72I/9	2786_03	53_18,19	27º54.63'	86º30.04'	2759	65	0	Kta_gr 40	5029	SW	Cs	S
Kta_gl 20		72I/9	2786_03	53_18,19	27º55.18'	86º30.11'	3687	80	0	Kta_gr 40	5084	SW	Cs	S
Kta_gl 21		72I/9	2786_03	53_18,19	27º55.17'	86º30.20'	3979	95	0	Kta_gr 40	5087	SW	Cs	S
Kta_gl 22		72I/9	2786_03	53_18,19	27º55.01'	86º30.42'	13290	320	0	Kta_gr 40	5084	SW	Cs	S
Kta_gl 23		72I/9	2786_03	53_18,19	27º55.30'	86º30.35'	5093	95	0	Kta_gr 40	5118	W	Cs	S
Kta_gl 24		72I/9	2786_03	53_18,19	27º55.55'	86º30.29'	3396	70	0	Kta_gr 40	5154	W	Cs	S
Kta_gl 25		72I/9	2786_03	53_18,19	27º55.55'	86º30.47'	6765	90	0	Kta_gr 40	5148	SW	Cs	S
Kta_gl 26	Tsho Rolpa	72I/5	2786_02	53_17,18	27º52.03'	86º28.41'	231693	1070	0	Kta_gr 46	4557	NW	Cs	S
Kta_gl 27		72I/5	2786_02	53_17,18	27º51.79'	86º28.70'	10425	205	0	Kta_gr 46	4557	W	Cs	S
Kta_gl 28		72I/5	2786_02	53_17,18	27º51.72'	86º28.69'	5465	95	0	Kta_gr 46	4557	NW	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kta_gl 29		72I/5	2786_02	53_17,18	27º51.67'	86º28.76'	17747	130	0	Kta_gr 46	4557	NW	Cs	S
Kta_gl 30		72I/5	2786_02	53_17,18	27º51.57'	86º28.82'	10691	125	0	Kta_gr 46	4578	NW	Cs	S
Kta_gl 31		72I/5	2786_02	53_17,18	27º51.62'	86º28.89'	3714	65	0	Kta_gr 46	4578	NW	Cs	S
Kta_gl 32		72I/5	2786_02	53_17,18	27º51.35'	86º28.95'	6685	80	0	Kta_gr 46	4587	NW	Cs	S
Kta_gl 33		72I/9	2786_03	52_51,53	27º49.77'	86º31.26'	4457	90	0	Kta_gr 46	4926	W	Cs	S
Kta_gl 34		72I/9	2786_03	52_51,53	27º49.63'	86º31.77'	2494	45	0	Kta_gr 46	4953	W	Cs	S
Kta_gl 35		72I/9	2786_03	52_51,53	27º51.67'	86º32.42'	20639	310	0	Kta_gr 46	5496	W	Cs	S
Kta_gl 36		72I/5	2786_02	52_51,53	27º49.83'	86º29.71'	17986	200			5111	NE	Cs	E
Kta_gl 37		72I/5	2786_02	52_51,53	27º51.28'	86º26.02'	49501	560			4950	NE	Ds	V
Kta_gl 38		72I/5	2786_02	52_51,53	27º50.81'	86º25.76'	8595	80	160	Kta_gr 57	5072	NE	Ds	E
Kta_gl 39		72I/5	2786_02	52_51,53	27º51.23'	86º25.55'	2838	65	330	Kta_gr 58	5054	SE	Ds	E
Kta_gl 40		72I/5	2786_02	53_17,18	27º51.83'	86º24.20'	11036	155	70	Kta_gr 60	4904	N	Ds	E
Kta_gl 41		72I/5	2786_02	53_17,18	27º52.53'	86º22.51'	5120	105			4627	NE	Ds	E
Kta_gl 42		72I/5	2786_02	53_17,18	27º50.96'	86º21.51'	113618	455	805	Kta_gr 67	4563	W	Ds	C
Kta_gl 43		72I/5	2786_02	52_51,52	27º50.68'	86º24.76'	27615	295	745	Kta_gr 73	4901	SW	Ds	E
Kta_gl 44		72I/5	2786_02	51_12,13	27º49.42'	86º24.34'	13556	115	425	Kta_gr 74	4843	NW	Ds	E
Kta_gl 45		72I/5	2786_02	51_12,13	27º47.95'	86º23.86'	10903	130			4807	NE	Cs	E
Kta_gl 46		72I/5	2786_02	51_12,13	27º48.50'	86º23.35'	3236	105			4645	E	Cs	E
Kta_gl 47		72I/5	2786_02	51_12,13	27º48.76'	86º22.82'	7534	90			5035	NE	Cs	E
Kta_gl 48		72I/5	2786_02	51_12,13	27º47.43'	86º23.80'	74225	390			4618	NW	Ds	V
Kta_gl 49		72I/5	2786_02	51_12,13	27º47.19'	86º24.26'	14060	200			4752	NW	Ds	E
Kta_gl 50		72I/5	2786_02	51_12,13	27º46.99'	86º24.22'	8860	130			4846	W	Cs	E
Kta_gl 51		72I/5	2786_02	51_12,13	27º46.83'	86º23.54'	69078	530			4752	NE	Ds	E
Kta_gl 52		72I/5	2786_02	51_12,13	27º46.72'	86º23.17'	14219	160			4834	N	Ds	E
Kta_gl 53		72I/5	2786_02	51_12,13	27º46.01'	86º22.90'	7003	110			4755	E	Cs	E
Kta_gl 54	Kala Pokhari	72I/6	2786_02	50_52,53	27º43.68'	86º24.42'	39155	270			4450	SE	Cs	E
Kta_gl 55	Panch Pokhar	72I/6	2786_06	50_52,53	27º43.84'	86º25.43'	48493	420			4496	SW	Ds	E
Kta_gl 56	Jeta Pokhari	72I/6	2786_06	50_52,53	27º43.52'	86º25.26'	27138	270			4420	W	Cs	E
Kta_gl 57	Baula pokhari	72I/6	2786_02	50_52,53	27º40.22'	86º23.42'	25254	200			4054	NE	Cs	E

Glacial Lake Inventory of Sun Koshi Basin

Total Number : 35   Total Area : 0.412 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Ksun_gl 1		71H/12	2885_15	60_25,26	28º6.96'	85º43.96'	10692	105			4170	NE	Cs	E
Ksun_gl 2		71H/12	2885_15	61_32,33	28º7.91'	85º42.71'	10791	110	0	Ksun_gr 2	4636	E	Cs	S
Ksun_gl 3		71H/12	2885_15	61_32,33	28º8.26'	85º42.59'	21381	215	0	Ksun_gr 2	4718	SE	Cs	S
Ksun_gl 4		71H/12	2885_15	61_32,33	28º8.32'	85º44.30'	3315	65	0	Ksun_gr 3	4520	NW	Cs	S
Ksun_gl 5		71H/12	2885_15	61_32,33	28º8.43'	85º44.20'	1642	40	0	Ksun_gr 3	4548	NW	Cs	S
Ksun_gl 6		71H/12	2885_15	61_32,33	28º8.54'	85º44.23'	2718	50	0	Ksun_gr 3	4581	NW	Cs	S
Ksun_gl 7		71H/12	2885_15	61_32,33	28º8.63'	85º44.26'	4324	65	0	Ksun_gr 3	4596	NW	Cs	S
Ksun_gl 8		71H/12	2885_15	61_32,33	28º8.78'	85º44.30'	5127	80	0	Ksun_gr 3	4633	NW	Cs	S
Ksun_gl 9		71H/12	2885_15	61_32,33	28º8.75'	85º44.47'	6142	75	0	Ksun_gr 3	4633	NW	Cs	S
Ksun_gl 10		71H/16	2885_16	60_27	28º7.20'	85º46.31'	14356	105	535	Ksun_gr 6	4770	NE	Cs	E
Ksun_gl 11		71H/16	2885_16	61_31,32	28º6.90'	85º46.54'	8453	130			4587	SW	Cs	E
Ksun_gl 12		71H/16	2885_16	61_31,32	28º8.31'	85º49.82'	18919	130	60	Ksun_gr 14	4587	SE	Cs	M
Ksun_gl 13		71H/16	2885_16	60_28,29	28º4.98'	85º49.65'	10890	85			4039	SW	Ds	V
Ksun_gl 14		71H/16	2885_16	60_28,29	28º4.52'	85º50.17'	7809	120			4557	NW	Ds	V
Ksun_gl 15		71H/16	2885_16	60_28,29	28º4.79'	85º49.11'	27270	235			4225	NW	Ds	E
Ksun_gl 16		71H/16	2885_16	60_28,29	28º4.75'	85º48.27'	7006	170			4212	N	Ds	E
Ksun_gl 17		71H/16	2885_16	60_28,29	28º4.34'	85º48.29'	5328	45			4313	SW	Ds	E
Ksun_gl 18		71H/16	2885_16	60_28,29	28º3.76'	85º49.07'	11773	160			4511	NW	Ds	V
Ksun_gl 19	Syawaijyu Po	71H/16	2885_16	60_28,29	28º3.16'	85º49.67'	67480	360			4161	W	Ds	E
Ksun_gl 20		71H/16	2885_16	60_28,29	28º2.85'	85º50.60'	10040	130			4465	SW	Ds	E
Ksun_gl 21		71H/16	2885_16	60_28,29	28º2.91'	85º50.58'	2360	50			4471	SE	Cs	E
Ksun_gl 22		71H/16	2885_16	60_28,29	28º3.29'	85º50.37'	22344	315			4392	SE	Ds	C
Ksun_gl 23		71H/16	2885_16	60_28,29	28º3.76'	85º50.40'	23942	125			4618	SW	Ds	E
Ksun_gl 24		71H/16	2885_16	60_28,29	28º5.14'	85º52.24'	6607	120	0	Ksun_gr 19	4465	SW	Cs	S
Ksun_gl 25		71H/16	2885_16	59_30,31	28º2.04'	85º52.87'	23246	105			4240	NW	Ds	V
Ksun_gl 26		71H/16	2885_16	59_30,31	28º2.18'	85º52.81'	2228	55			4273	W	Cs	E
Ksun_gl 27		71H/16	2885_16	59_30,31	28º1.96'	85º53.06'	4294	95			4264	NW	Ds	E
Ksun_gl 28		71H/16	2885_16	59_30,31	28º1.07'	85º52.28'	12780	170			4270	NW	Ds	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ksun_gl 29		71H/16	2885_16	59_30,31	28º1.01'	85º52.34'	9377	155			4325	NW	Ds	E
Ksun_gl 30		71H/16	2885_16	59_30,31	28º0.57'	85º52.01'	13434	240			4008	SE	Ds	E
Ksun_gl 31		71H/16	2885_16	59_30,31	28º0.50'	85º52.73'	3092	70			4200	NW	Ds	E
Ksun_gl 32		71H/16	2885_16	59_30,31	28º0.89'	85º53.07'	4352	75			4267	SE	Cs	E
Ksun_gl 33		71H/16	2885_16	59_30,31	28º1.29'	85º53.24'	7850	115			4389	SE	Cs	E
Ksun_gl 34		71H/16	2885_16	59_30,31	28º1.63'	85º53.63'	14862	170			4420	SW	Cs	E
Ksun_gl 35		71H/16	2885_16	59_30,31	28º1.07'	85º55.82'	5598	90			4100	W	Cs	E

Glacial Lake Inventory of Indrawati Basin

Total Number : 18 Total Area : 0.278 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kin_gl 1		71H/8	2885_14	59_20,21	28º2.49'	85º29.74'	118854	435			3915	SE	Ds	E
Kin_gl 2		71H/8	2885_14	60_20,21	28º5.14'	85º27.75'	4060	115			4709	E	Cs	E
Kin_gl 3		71H/8	2885_14	60_20,21	28º5.14'	85º27.61'	10046	145			4718	SE	Cs	E
Kin_gl 4		71H/12	2885_15	60_20,21	28º5.30'	85º27.68'	4954	55			4767	SE	Cs	E
Kin_gl 5		71H/12	2885_15	60_23,24	28º6.40'	85º32.30'	9418	165			4267	SE	Ds	E
Kin_gl 6		71H/12	2885_15	60_23,24	28º5.08'	85º33.94'	2720	80			4142	NW	Ds	E
Kin_gl 7		71H/12	2885_15	60_23,24	28º5.89'	85º34.18'	7364	115			4346	SE	Ds	E
Kin_gl 8		71H/12	2885_15	60_23,24	28º6.06'	85º34.59'	21703	160			4962	SE	Ds	E
Kin_gl 9		71H/12	2885_15	60_23,24	28º9.22'	85º33.69'	12337	145	0	Kin_gr 8	4572	SE	Cs	S
Kin_gl 10		71H/12	2885_15	60_23,24	28º6.14'	85º36.99'	11195	105			4816	SW	Ds	E
Kin_gl 11		71H/12	2885_15	60_23,24	28º6.24'	85º37.35'	10689	90			4785	SW	Ds	E
Kin_gl 12		71H/12	2885_15	60_23,24	28º6.78'	85º38.28'	9647	125	425	Kin_gr 12	4435	SE	Ds	E
Kin_gl 13		71H/12	2885_15	60_23,24	28º6.50'	85º39.60'	15481	120			4042	S	Ds	E
Kin_gl 14	Panch Pokhar	71H/12	2885_15	59_23,24	28º2.54'	85º42.96'	4170	90			4045	SW	Ds	E
Kin_gl 15	Panch Pokhar	71H/12	2885_15	59_23,24	28º2.43'	85º43.12'	3524	75			4039	W	Ds	E
Kin_gl 16	Panch Pokhar	71H/12	2885_15	59_23,24	28º2.49'	85º43.08'	11396	195			4069	NW	Ds	E
Kin_gl 17	Panch Pokhar	71H/12	2885_15	59_23,24	28º2.51'	85º43.25'	16232	185			4069	SW	Ds	E
Kin_gl 18	Panch Pokhar	71H/12	2885_15	59_23,24	28º2.41'	85º43.21'	4844	105			4057	NW	Ds	E

Glacial Lake Inventory of Trishuli Basin

Total Number : 117   Total Area : 2.03 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Gtri_gl 1		71H/4	2885_13	62_15,16	28º13.98'	85º11.14'	9626	140			4389	S	Ds	V
Gtri_gl 2	Jagesor Kund	71H/4	2885_13	62_15,16	28º13.20'	85º13.12'	27146	180			4380	SW	Ds	V
Gtri_gl 3		71H/3	2885_09	63_9,10	28º16.95'	85º14.27'	6170	105			4511	NE	Cs	E
Gtri_gl 4		71H/3	2885_09	63_9,10	28º16.91'	85º13.84'	5161	80			4633	NE	Cs	E
Gtri_gl 5	Kalo Pokhari	71H/3	2885_09	63_9,10	28º17.49'	85º10.33'	214714	800	215	Gtri_gr 7	4705	NE	Cs	E
Gtri_gl 6		71H/3	2885_09	63_9,10	28º17.76'	85º10.23'	52452	210	415	Gtri_gr 9	4730	NE	Cs	B
Gtri_gl 7		71H/11	2885_11	63_40,41	28º17.35'	85º35.46'	5678	55	150	Gtri_gr 17	4980	SW	Ds	E
Gtri_gl 8		71H/11	2885_11	63_40,41	28º16.35'	85º36.09'	19430	120	0	Gtri_gr 19	4596	NW	Cs	S
Gtri_gl 9		71H/8	2885_14	62_21,22	28º14.16'	85º26.68'	29969	155	515	Gtri_gr 33	4602	NW	Ds	V
Gtri_gl 10		71H/8	2885_14	62_21,22	28º12.80'	85º25.86'	9983	155			4633	SW	Cs	E
Gtri_gl 11		71H/12	2885_15	62_24,25	28º13.53'	85º33.89'	11165	115	0	Gtri_gr 37	4057	S	Cs	S
Gtri_gl 12		71H/12	2885_15	62_24,25	28º12.57'	85º34.18'	20024	185	1065	Gtri_gr 37	3655	SE	Cs	E
Gtri_gl 13		71H/12	2885_15	62_24,25	28º12.96'	85º36.67'	6802	130			4880	SE	Cs	E
Gtri_gl 14		71H/12	2885_15	62_24,25	28º13.12'	85º36.61'	6093	105			4892	SE	Ds	E
Gtri_gl 15		71H/12	2885_15	62_25,26	28º13.33'	85º39.36'	3168	65	0	Gtri_gr 40	4414	SE	Cs	S
Gtri_gl 16		71H/12	2885_15	62_25,26	28º13.41'	85º39.08'	2223	65	0	Gtri_gr 40	4450	SE	Cs	S
Gtri_gl 17		71H/12	2885_15	62_25,26	28º13.47'	85º39.18'	3666	80	0	Gtri_gr 40	4450	SE	Cs	S
Gtri_gl 18		71H/12	2885_15	62_25,26	28º13.64'	85º39.03'	8993	145	0	Gtri_gr 40	4481	SE	Cs	S
Gtri_gl 19		71H/12	2885_15	62_25,26	28º13.75'	85º38.98'	1878	60	0	Gtri_gr 40	4503	SE	Cs	S
Gtri_gl 20		71H/12	2885_15	62_26,27	28º14.12'	85º42.21'	2216	55	0	Gtri_gr 44	4517	SW	Cs	S
Gtri_gl 21		71H/12	2885_15	62_26,27	28º14.30'	85º42.26'	3187	65	0	Gtri_gr 44	4532	SW	Cs	S
Gtri_gl 22		71H/12	2885_15	62_26,27	28º14.83'	85º42.93'	3756	80	0	Gtri_gr 44	4645	SW	Cs	S
Gtri_gl 23		71H/11	2885_11	62_43,44	28º15.52'	85º43.31'	977	40	0	Gtri_gr 44	4712	SW	Cs	S
Gtri_gl 24		71H/11	2885_11	62_43,44	28º15.52'	85º43.35'	1763	55	0	Gtri_gr 44	4712	SW	Cs	S
Gtri_gl 25		71H/11	2885_11	62_43,44	28º15.63'	85º43.59'	7096	115	0	Gtri_gr 44	4724	SW	Cs	S
Gtri_gl 26		71H/11	2885_11	62_43,44	28º15.88'	85º43.39'	5493	90	0	Gtri_gr 44	4737	SE	Cs	S
Gtri_gl 27		71H/11	2885_11	62_43,44	28º16.02'	85º43.54'	16045	170	0	Gtri_gr 44	4749	SW	Cs	S
Gtri_gl 28		71H/11	2885_11	62_43,44	28º16.24'	85º43.47'	7224	110	0	Gtri_gr 44	4770	SW	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gtri_gl 29		71H/11	2885_11	62_43,44	28º16.35'	85º43.44'	2791	65	0	Gtri_gr 44	4776	SW	Cs	S
Gtri_gl 30		71H/11	2885_11	62_43,44	28º16.36'	85º43.56'	4362	95	0	Gtri_gr 44	4779	SW	Cs	S
Gtri_gl 31		71H/11	2885_11	62_43,44	28º16.43'	85º43.36'	3289	75	0	Gtri_gr 44	4782	SW	Cs	S
Gtri_gl 32		71H/11	2885_11	62_43,44	28º16.52'	85º43.47'	1884	55	0	Gtri_gr 44	4782	SW	Cs	S
Gtri_gl 33		71H/11	2885_11	62_43,44	28º16.52'	85º43.33'	2798	60	0	Gtri_gr 44	4788	SW	Cs	S
Gtri_gl 34		71H/11	2885_11	62_43,44	28º16.70'	85º43.58'	1303	50	0	Gtri_gr 44	4801	SW	Cs	S
Gtri_gl 35		71H/11	2885_11	62_43,44	28º16.80'	85º43.47'	1124	40	0	Gtri_gr 44	4807	SW	Cs	S
Gtri_gl 36		71H/11	2885_11	62_43,44	28º16.90'	85º43.20'	7933	165	0	Gtri_gr 44	4819	SW	Cs	S
Gtri_gl 37		71H/11	2885_11	62_43,44	28º16.95'	85º43.13'	4471	90	0	Gtri_gr 44	4825	SW	Cs	S
Gtri_gl 38		71H/11	2885_11	62_43,44	28º17.22'	85º43.19'	7479	70	0	Gtri_gr 44	4834	SE	Cs	S
Gtri_gl 39		71H/11	2885_11	62_43,44	28º17.19'	85º42.96'	4203	80	0	Gtri_gr 44	4840	SW	Cs	S
Gtri_gl 40		71H/11	2885_11	62_43,44	28º17.16'	85º41.83'	6208	110	0	Gtri_gr 44	5026	NE	Cs	S
Gtri_gl 41		71H/11	2885_11	62_43,44	28º17.03'	85º41.50'	5410	110	0	Gtri_gr 44	5105	NE	Cs	S
Gtri_gl 42		71H/11	2885_11	62_43,44	28º16.97'	85º41.22'	3341	80	0	Gtri_gr 44	5136	NE	Cs	S
Gtri_gl 43		71H/11	2885_11	62_43,44	28º17.91'	85º42.78'	3034	80	0	Gtri_gr 44	4923	SW	Cs	S
Gtri_gl 44		71H/11	2885_11	62_43,44	28º18.16'	85º42.86'	10041	135	0	Gtri_gr 44	4938	SE	Cs	S
Gtri_gl 45		71H/11	2885_11	62_43,44	28º18.29'	85º42.92'	10373	170	0	Gtri_gr 44	4944	S	Cs	S
Gtri_gl 46		71H/11	2885_11	62_43,44	28º18.26'	85º42.71'	7103	145	0	Gtri_gr 44	4932	SW	Cs	S
Gtri_gl 47		71H/11	2885_11	62_43,44	28º19.13'	85º42.06'	11523	140	0	Gtri_gr 44	5014	SE	Cs	S
Gtri_gl 48		71H/11	2885_11	64_8,9	28º19.69'	85º41.66'	6260	115	0	Gtri_gr 44	5087	SE	Cs	S
Gtri_gl 49		71H/11	2885_11	64_8,10	28º19.72'	85º41.41'	7907	110	0	Gtri_gr 44	5090	SE	Cs	C
Gtri_gl 50		71H/11	2885_11	64_8,11	28º20.59'	85º42.16'	3826	75	0	Gtri_gr 44	5209	S	Cs	S
Gtri_gl 51		71H/11	2885_11	64_8,12	28º20.70'	85º42.16'	6042	95	0	Gtri_gr 44	5240	SW	Cs	S
Gtri_gl 52		71H/11	2885_11	64_8,13	28º20.68'	85º42.35'	6770	120	0	Gtri_gr 44	5227	SW	Cs	S
Gtri_gl 53		71H/12	2885_15	64_27,28	28º14.46'	85º43.00'	4075	65	50	Gtri_gr 48	4663	SW	Cs	L
Gtri_gl 54		71H/12	2885_15	64_27,28	28º14.22'	85º42.99'	6924	90	0	Gtri_gr 48	4660	NW	Cs	S
Gtri_gl 55		71H/12	2885_15	64_27,28	28º11.63'	85º41.77'	2606	55	0	Gtri_gr 48	4340	NW	Cs	S
Gtri_gl 56		71H/12	2885_15	64_27,28	28º11.30'	85º42.92'	4880	100	0	Gtri_gr 48	4694	SW	Cs	S
Gtri_gl 57		71H/12	2885_15	64_27,28	28º11.35'	85º43.08'	1642	40	0	Gtri_gr 48	4715	SW	Cs	S
Gtri_gl 58		71H/12	2885_15	64_27,28	28º11.51'	85º43.14'	3647	65	0	Gtri_gr 48	4785	S	Cs	S
Gtri_gl 59		71H/12	2885_15	64_27,28	28º11.33'	85º43.88'	5404	90	0	Gtri_gr 48	4874	W	Cs	S
Gtri_gl 60		71H/12	2885_15	64_27,28	28º11.19'	85º43.97'	4414	75	0	Gtri_gr 48	4886	W	Cs	S
Gtri_gl 61		71H/12	2885_15	64_27,28	28º11.24'	85º44.12'	3334	60	0	Gtri_gr 48	4877	SW	Cs	S
Gtri_gl 62		71H/12	2885_15	64_27,28	28º11.23'	85º44.77'	3500	80	0	Gtri_gr 48	4980	SW	Cs	S
Gtri_gl 63		71H/12	2885_15	64_27,28	28º10.93'	85º41.96'	3283	60	0	Gtri_gr 48	4788	NE	Cs	S
Gtri_gl 64		71H/12	2885_15	64_27,28	28º10.75'	85º41.92'	4484	70	0	Gtri_gr 48	4801	N	Cs	S
Gtri_gl 65		71H/12	2885_15	64_26,27	28º 9.70'	85º39.26'	13337	105	205	Gtri_gr 59	4959	NW	Cs	E
Gtri_gl 66		71H/12	2885_15	64_26,27	28º 9.12'	85º38.67'	8233	125			4919	NE	Cs	E
Gtri_gl 67		71H/12	2885_15	64_24,25	28º10.20'	85º34.58'	8980	125	0	Gtri_gr 64	5014	NW	Ds	E
Gtri_gl 68		71H/12	2885_15	64_24,25	28º10.13'	85º34.48'	3673	60	0	Gtri_gr 64	5014	NW	Cs	E
Gtri_gl 69		71H/12	2885_15	64_24,25	28º10.28'	85º33.82'	9332	125	0	Gtri_gr 64	4999	NE	Cs	S
Gtri_gl 70		71H/8	2885_14	60_19,20	28º 7.18'	85º29.13'	29043	230			4712	NW	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gtri_gl 71		71H/8	2885_14	60_19,20	28º 6.68'	85º29.36'	13068	200	170	Gtri_gr 71	4968	NE	Ds	E
Gtri_gl 72		71H/8	2885_14	60_19,20	28º 6.98'	85º29.16'	7990	155			4724	NE	Ds	V
Gtri_gl 73		71H/8	2885_14	60_19,20	28º 6.98'	85º29.01'	8157	135	800	Gtri_gr 72	4755	NE	Ds	V
Gtri_gl 74		71H/8	2885_14	60_19,20	28º 7.13'	85º28.83'	2989	60			4862	E	Ds	E
Gtri_gl 75		71H/8	2885_14	60_19,20	28º 7.54'	85º28.90'	6809	120			4682	N	Cs	V
Gtri_gl 76	Ganesh Kund	71H/8	2885_14	60_19,20	28º 7.59'	85º28.24'	4516	510	660	Gtri_gr 73	4822	NE	Cs	E
Gtri_gl 77		71H/8	2885_14	60_18,19	28º 7.44'	85º28.30'	144978	115			4816	E	Cs	E
Gtri_gl 78		71H/8	2885_14	60_18,19	28º 5.71'	85º27.03'	5174	110			4837	E	Ds	V
Gtri_gl 79		71H/8	2885_14	60_18,19	28º 6.57'	85º26.45'	15751	180			4569	N	Ds	V
Gtri_gl 80		71H/8	2885_14	60_18,19	28º 5.83'	85º26.51'	11363	170			4843	NW	Ds	V
Gtri_gl 81		71H/8	2885_14	60_18,19	28º 6.48'	85º26.38'	4394	80			4596	N	Cs	E
Gtri_gl 82		71H/8	2885_14	60_18,19	28º 6.02'	85º25.77'	4056	95			4785	NE	Cs	E
Gtri_gl 83		71H/8	2885_14	60_18,19	28º 5.17'	85º25.97'	7020	140			4770	NE	Ds	E
Gtri_gl 84		71H/8	2885_14	60_18,19	28º 5.50'	85º25.80'	13030	180			4694	NW	Cs	E
Gtri_gl 85		71H/8	2885_14	60_18,19	28º 5.37'	85º25.86'	8891	165			4740	NW	Cs	E
Gtri_gl 86		71H/8	2885_14	60_18,19	28º 5.26'	85º25.81'	7690	115			4715	NW	Ds	E
Gtri_gl 87	Saraswati Kur	71H/8	2885_14	60_18,19	28º 4.81'	85º24.14'	37953	280			4054	W	Ds	V
Gtri_gl 88	Bhairab Kund	71H/8	2885_14	60_18,19	28º 4.85'	85º24.60'	167467	565			4261	W	Ds	V
Gtri_gl 89	Gosai Kund	71H/8	2885_14	60_18,19	28º 5.00'	85º24.96'	138016	640			4381	SW	Ds	V
Gtri_gl 90		71H/8	2885_14	60_18,19	28º 5.18'	85º25.41'	3583	80			4554	S	Ds	V
Gtri_gl 91		71H/8	2885_14	60_18,19	28º 4.65'	85º25.52'	13445	155			4566	NW	Ds	V
Gtri_gl 92		71H/8	2885_14	60_18,19	28º 4.50'	85º25.71'	16217	190			4596	NW	Ds	V
Gtri_gl 93	Surja Kund	71H/8	2885_14	60_18,19	28º 4.26'	85º25.85'	45388	325			4609	N	Cs	E
Gtri_gl 94		71H/8	2885_14	60_18,19	28º 4.87'	85º25.14'	9178	165			4382	NW	Ds	V
Gtri_gl 95		71H/8	2885_14	60_18,19	28º 4.76'	85º25.20'	5436	115			4383	NW	Ds	V
Gtri_gl 96		71H/8	2885_14	60_18,19	28º 4.65'	85º25.21'	4976	110			4385	N	Ds	V
Gtri_gl 97		71H/8	2885_14	60_18,19	28º 4.23'	85º25.46'	30914	335			4468	NW	Ds	V
Gtri_gl 98		71H/8	2885_14	60_18,19	28º 3.90'	85º25.54'	46397	390			4502	NW	Ds	V
Gtri_gl 99		71H/8	2885_14	60_18,19	28º 4.21'	85º25.31'	32371	320			4709	N	Cs	E
Gtri_gl 100		71H/8	2885_14	60_18,19	28º 4.39'	85º24.80'	11242	155			4496	NW	Cs	E
Gtri_gl 101		71H/8	2885_14	60_18,19	28º 4.46'	85º24.23'	19245	290			4569	NW	Ds	V
Gtri_gl 102		71H/8	2885_14	60_18,19	28º 3.71'	85º24.56'	5308	130			4334	NW	Ds	V
Gtri_gl 103		71H/8	2885_14	60_18,19	28º 3.67'	85º23.49'	181941	1005			4471	NW	Cs	E
Gtri_gl 104	Nau Kund	71H/8	2885_14	60_18,19	28º 2.98'	85º23.88'	86228	570			4173	NW	Ds	V
Gtri_gl 105		71H/8	2885_14	60_18,19	28º 3.25'	85º24.02'	62346	435			4225	NW	Ds	V
Gtri_gl 106		71H/8	2885_14	60_18,19	28º 3.61'	85º23.76'	5103	120			4346	NW	Ds	V
Gtri_gl 107		71H/8	2885_14	60_18,19	28º 2.72'	85º24.07'	9696	175			4465	NW	Ds	V
Gtri_gl 108		71H/8	2885_14	60_18,19	28º 2.46'	85º24.01'	4248	95			4282	NW	Ds	V
Gtri_gl 109		71H/8	2885_14	60_18,19	28º 2.34'	85º24.02'	18242	205			4391	NW	Cs	E
Gtri_gl 110		71H/8	2885_14	60_18,19	28º 2.67'	85º23.53'	11695	215			4392	NW	Cs	E
Gtri_gl 111		71H/8	2885_14	60_18,19	28º 2.57'	85º23.63'	15163	235			4231	NW	Ds	V
Gtri_gl 112		71H/8	2885_14	59_19,20	28º 1.51'	85º24.25'	7671	110			4231	NW	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gtri_gl 113		71H/8	2885_14	59_19,20	28º 1.69'	85º24.34'	6898	95			4100	NW	Cs	E
Gtri_gl 114		71H/8	2885_14	59_19,20	28º 1.82'	85º23.97'	14563	120			4225	W	Cs	E
Gtri_gl 115		71H/8	2885_14	60_18,19	28º 2.43'	85º24.33'	7250	70			4234	W	Cs	E
Gtri_gl 116		71H/8	2885_14	60_18,19	28º 2.96'	85º24.70'	3385	65			4517	SW	Cs	E
Gtri_gl 117		71H/8	2885_14	60_18,19	28º 3.93'	85º25.81'	683	35			4465	S	Cs	E

Glacial Lake Inventory of Budhi Gandaki Basin

Total Number : 37 Total Area : 0.64 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Gbu_gl 1	Kai Tal	71D/4	2884_13	163_12,13	28º17.72'	84º46.58'	219541	535			3688	E	Ds	E
Gbu_gl 2		71D/10	2884_07	163_15,16	28º32.32'	84º42.24'	4957	80	0	Gbu_gr 22	3466	N	Cs	S
Gbu_gl 3		71D/10	2884_07	163_15,16	28º32.18'	84º42.26'	22018	190	0	Gbu_gr 22	3472	NW	Cs	S
Gbu_gl 4		71D/10	2884_07	163_15,16	28º32.04'	84º42.04'	14140	130	0	Gbu_gr 22	3517	NE	Cs	S
Gbu_gl 5		71D/10	2884_07	163_15,16	28º31.89'	84º41.95'	16840	145	0	Gbu_gr 22	3523	NE	Cs	S
Gbu_gl 6		71D/10	2884_07	163_15,16	28º31.62'	84º41.82'	54415	280	0	Gbu_gr 22	3536	E	Cs	S
Gbu_gl 7		71D/11	2884_11	162_7,8	28º28.96'	84º38.45'	9493	120	0	Gbu_gr 22	4109	SE	Cs	S
Gbu_gl 8		71D/11	2884_11	162_7,8	28º29.18'	84º37.04'	13897	175	0	Gbu_gr 22	4261	S	Cs	S
Gbu_gl 9		71D/10	2884_07	164_32,33	28º35.79'	84º38.09'	81545	230	0	Gbu_gr 32	3591	NE	Ds	M
Gbu_gl 10		71D/10	2884_07	164_32,33	28º38.72'	84º35.71'	4846	100	0	Gbu_gr 38	4261	NE	Cs	S
Gbu_gl 11		71D/10	2884_07	165_23,24	28º39.79'	84º33.64'	3275	70	0	Gbu_gr 46	4782	E	Cs	S
Gbu_gl 12		71D/10	2884_07	165_23,24	28º39.54'	84º33.14'	6041	80	0	Gbu_gr 46	4840	E	Cs	S
Gbu_gl 13		71D/10	2884_07	165_23,24	28º39.65'	84º33.08'	8741	105	0	Gbu_gr 46	4862	E	Cs	S
Gbu_gl 14		71D/10	2884_07	165_23,24	28º39.67'	84º32.93'	4713	75	0	Gbu_gr 46	4880	E	Cs	S
Gbu_gl 15		71D/10	2884_07	165_23,24	28º39.89'	84º32.92'	3408	65	0	Gbu_gr 46	4877	SE	Cs	S
Gbu_gl 16		71D/10	2884_07	165_23,24	28º40.30'	84º32.28'	3253	80	0	Gbu_gr 46	5090	SE	Cs	S
Gbu_gl 17		71D/10	2884_07	165_23,24	28º40.58'	84º32.23'	3452	65	0	Gbu_gr 46	5197	SE	Cs	S
Gbu_gl 18		71D/10	2884_07	165_23,24	28º39.96'	84º31.84'	10445	150	300	Gbu_gr 45	5060	SE	Cs	E
Gbu_gl 19		71D/10	2884_07	165_23,24	28º39.84'	84º31.61'	11175	180	530	Gbu_gr 45	5090	SE	Cs	E
Gbu_gl 20		71D/10	2884_07	165_23,24	28º40.05'	84º31.25'	5709	105	205	Gbu_gr 45	5236	SE	Cs	E
Gbu_gl 21		71D/10	2884_07	166_40	28º42.13'	84º36.23'	3939	55	0	Gbu_gr 52	4587	SE	Cs	S
Gbu_gl 22		71D/10	2884_07	166_40	28º42.03'	84º35.30'	3408	80	0	Gbu_gr 52	4673	NE	Cs	S
Gbu_gl 23		71D/10	2884_07	166_40	28º41.93'	84º35.22'	3297	70	0	Gbu_gr 52	4685	E	Cs	S
Gbu_gl 24		71D/10	2884_07	166_40	28º42.78'	84º33.45'	6816	110	0	Gbu_gr 53	4871	SE	Cs	S
Gbu_gl 25		71D/10	2884_07	166_40	28º42.91'	84º34.28'	6285	100	240	Gbu_gr 54	4828	SE	Ds	V
Gbu_gl 26		71H/2	2885_05	165_28,29	28º36.71'	84º59.91'	18190	180	0	Gbu_gr 114	5685	SE	Cs	S
Gbu_gl 27		71H/2	2885_05	165_28,29	28º38.18'	85º10.51'	7148	140	175	Gbu_gr 135	5209	SW	Ds	E
Gbu_gl 28		71H/3	2885_09	65_6,7	28º24.56'	85º 5.16'	5399	115	0	Gbu_gr 157	4030	N	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gbu_gl 29		71H/3	2885_09	65_6,7	28º24.18'	85º 5.17'	2589	50	0	Gbu_gr 157	4097	W	Cs	S
Gbu_gl 30		71H/3	2885_09	65_6,7	28º24.23'	85º 5.33'	5621	115	0	Gbu_gr 157	4084	N	Cs	S
Gbu_gl 31		71H/3	2885_09	65_6,7	28º23.38'	85º 5.33'	5001	85	0	Gbu_gr 157	4220	N	Cs	S
Gbu_gl 32		71H/3	2885_09	65_6,7	28º23.17'	85º 5.16'	5112	65	0	Gbu_gr 157	4252	NE	Cs	S
Gbu_gl 33		71H/3	2885_09	65_6,7	28º22.87'	85º 5.39'	2899	60	0	Gbu_gr 157	4295	N	Cs	S
Gbu_gl 34		71H/3	2885_09	63_7,8	28º22.81'	85º 5.42'	6661	80	0	Gbu_gr 157	4313	N	Cs	S
Gbu_gl 35	Seto Daha	71H/3	2885_09	63_7,8	28º16.60'	85º 7.64'	5532	125			4069	NE	Cs	E
Gbu_gl 36	Kalo Daha	71H/3	2885_09	63_7,8	28º16.42'	85º 7.33'	46603	215			4017	NW	Ds	V
Gbu_gl 37		71H/3	2885_09	63_7,8	28º16.34'	85º 8.02'	4913	80			4380	NW	Ds	V

Glacial Lake Inventory of Marsyangdi Basin

Total Number : 78   Total Area :6.28 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Gmar_gl 1		62P/14	2883_08	166_23,24	28º40.27'	83º51.66'	59861	360	375	Gmar_gr 35	5023	SE	Cs	E
Gmar_gl 2		62P/14	2883_08	166_23,24	28º41.49'	83º51.46'	3945017	4140	900	Gmar_gr 37	4919	SE	Cs	E
Gmar_gl 3		62P/14	2883_08	166_23,24	28º41.82'	83º52.88'	66752	345	455	Gmar_gr 40	5121	SW	Cs	C
Gmar_gl 4		62P/14	2883_08	166_23,24	28º43.56'	83º53.60'	94564	520	790	Gmar_gr 42	5090	SE	Ds	V
Gmar_gl 5		62P/14	2883_08	166_24,25	28º42.72'	83º55.43'	175546	550	1435	Gmar_gr 44	4990	SE	Ds	V
Gmar_gl 6		62P/13	2883_04	167_18,19	28º49.47'	83º58.90'	6847	80	0	Gmar_gr 57	5883	NE	Cs	S
Gmar_gl 7		62P/13	2883_04	167_18,19	28º49.42'	83º59.08'	2453	55	10	Gmar_gr 57	5785	NE	Cs	S
Gmar_gl 8		71D/2	2884_05	166_28	28º40.81'	84º 3.80'	31559	285			4633	SW	Ds	V
Gmar_gl 9		71D/2	2884_05	166_30	28º41.35'	84º 7.71'	11954	90			5176	NE	Cs	E
Gmar_gl 10		71D/1	2884_01	134_49,50	28º46.30'	84º 7.09'	2899	60	425	Gmar_gr 100	5447	SE	Ds	V
Gmar_gl 11		71D/1	2884_01	134_49,50	28º46.78'	84º 7.55'	4483	90	65	Gmar_gr 102	5142	NE	Ds	V
Gmar_gl 12		71D/1	2884_01	134_49,50	28º46.79'	84º 7.11'	5620	95	354	Gmar_gr 103	5179	NE	Ds	V
Gmar_gl 13		71D/1	2884_01	134_49,50	28º47.92'	84º 3.67'	3011	65	850	Gmar_gr 114	5081	SE	Ds	V
Gmar_gl 14		71D/1	2884_01	134_49,50	28º49.13'	84º 3.22'	5375	75			5212	S	Cs	C
Gmar_gl 15		71D/1	2884_01	134_49,50	28º49.03'	84º 3.80'	4059	55	290	Gmar_gr 117	5328	NE	Ds	V
Gmar_gl 16		71D/1	2884_01	134_49,50	28º49.29'	84º 3.65'	5442	80	260	Gmar_gr 117	5300	E	Cs	E
Gmar_gl 17		71D/1	2884_01	134_49,50	28º49.49'	84º 3.49'	1851	45	420	Gmar_gr 118	5236	SE	Ds	E
Gmar_gl 18		71D/1	2884_01	134_49,50	28º49.50'	84º 3.34'	8564	165	150	Gmar_gr 118	5243	SE	Cs	E
Gmar_gl 19		71D/1	2884_01	134_52,53	28º52.17'	84º 6.42'	34213	270	345	Gmar_gr 122	5517	SE	Ds	V
Gmar_gl 20		71D/1	2884_01	134_52,53	28º51.71'	84º 7.37'	54129	180	0	Gmar_gr 127	5669	SW	Cs	S
Gmar_gl 21		71D/1	2884_01	134_52,53	28º51.85'	84º 7.40'	20363	175	0	Gmar_gr 127	5639	NW	Cs	S
Gmar_gl 22		71D/1	2884_01	134_52,53	28º51.46'	84º 8.56'	31425	245	0	Gmar_gr 129	5669	SW	Cs	S
Gmar_gl 23		71D/1	2884_01	134_52,53	28º49.92'	84º 7.70'	4594	70	0	Gmar_gr 130	5669	NW	Cs	S
Gmar_gl 24		71D/1	2884_01	134_52,53	28º49.12'	84º 7.47'	7739	120	485	Gmar_gr 133	5288	SW	Ds	V
Gmar_gl 25		71D/1	2884_01	134_52,53	28º49.29'	84º 7.50'	19270	150	295	Gmar_gr 133	5300	SW	Ds	V
Gmar_gl 26		71D/1	2884_01	134_52,53	28º49.36'	84º 9.30'	2877	55	225	Gmar_gr 138	5258	S	Ds	V
Gmar_gl 27		71D/1	2884_01	134_53,54	28º48.51'	84º12.26'	5420	100	5	Gmar_gr 146	5243	E	Ds	S
Gmar_gl 28		71D/1	2884_01	134_53,54	28º51.41'	84º10.44'	8007	80	350	Gmar_gr 152	5822	SE	Cs	E
Gmar_gl 29		71D/1	2884_01	134_53,54	28º50.86'	84º11.53'	30689	255	310	Gmar_gr 153	5636	S	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gmar_gl 30		71D/1	2884_01	134_53,54	28º49.67'	84º13.35'	9657	170	40	Gmar_gr 156	5523	NW	Cs	E
Gmar_gl 31		71D/1	2884_01	134_53,54	28º50.25'	84º14.20'	7494	135	510	Gmar_gr 165	5502	NE	Ds	V
Gmar_gl 32		71D/1	2884_01	134_53,54	28º49.87'	84º13.42'	5330	105	50	Gmar_gr 165	5624	NE	Cs	E
Gmar_gl 33		71D/1	2884_01	134_53,54	28º52.00'	84º13.68'	12066	175	0	Gmar_gr 167	5236	E	Cs	S
Gmar_gl 34		71D/5	2884_02	135_8,9	28º52.92'	84º15.28'	3791	85	470	Gmar_gr 173	5547	SW	Cs	M
Gmar_gl 35		71D/5	2884_02	135_8,9	28º52.53'	84º15.85'	6245	110	0	Gmar_gr 173	5380	SW	Cs	S
Gmar_gl 36		71D/5	2884_02	135_8,9	28º52.70'	84º16.17'	3769	75	0	Gmar_gr 173	5439	S	Cs	S
Gmar_gl 37		71D/5	2884_02	134_58,59	28º49.19'	84º22.05'	9100	100	455	Gmar_gr 191	5099	SW	Ds	V
Gmar_gl 38		71D/5	2884_02	134_58,59	28º50.83'	84º22.11'	6669	125	0	Gmar_gr 190	5674	SW	Cs	S
Gmar_gl 39		71D/5	2884_02	134_58,59	28º47.34'	84º18.34'	3011	50	0	Gmar_gr 206	4526	W	Cs	S
Gmar_gl 40		71D/5	2884_02	134_58,59	28º47.11'	84º18.94'	7070	50	0	Gmar_gr 206	4587	W	Cs	S
Gmar_gl 41		71D/5	2884_02	134_58,59	28º46.69'	84º19.70'	1673	50	0	Gmar_gr 206	4705	NW	Cs	S
Gmar_gl 42		71D/5	2884_02	134_58,59	28º46.65'	84º20.27'	4104	65	0	Gmar_gr 206	4791	W	Cs	S
Gmar_gl 43		71D/5	2884_02	134_58,59	28º45.94'	84º21.51'	8007	140	0	Gmar_gr 206	4932	NW	Cs	S
Gmar_gl 44		71D/6	2884_06	165_16,17	28º38.70'	84º15.89'	26853	170	350	Gmar_gr 228	5023	W	Ds	V
Gmar_gl 45		71D/6	2884_06	165_16,17	28º37.62'	84º17.60'	50315	410	930	Gmar_gr 230	4804	SW	Ds	V
Gmar_gl 46		71D/6	2884_06	165_16,17	28º37.20'	84º19.00'	22013	225	510	Gmar_gr 233	5026	W	Cs	B
Gmar_gl 47		71D/6	2884_06	165_16,17	28º36.60'	84º18.09'	29217	235			4682	NW	Ds	E
Gmar_gl 48		71D/6	2884_06	165_18,19	28º38.31'	84º22.11'	51497	285	405	Gmar_gr 238	4023	E	Ds	V
Gmar_gl 49		71D/6	2884_06	165_18,19	28º38.69'	84º22.65'	49914	360	0	Gmar_gr 238	3968	SE	Cs	S
Gmar_gl 50		71D/6	2884_06	165_18,19	28º38.24'	84º23.88'	38361	420			3627	SE	Ds	B
Gmar_gl 51		71D/6	2884_06	165_21,22	28º38.25'	84º27.82'	12467	190			3815	SE	Ds	V
Gmar_gl 52		71D/6	2884_06	165_21,22	28º40.70'	84º25.97'	108704	665			4298	SE	Ds	V
Gmar_gl 53		71D/6	2884_06	165_21,22	28º39.36'	84º27.18'	27945	210	0	Gmar_gr 248	4154	SE	Cs	S
Gmar_gl 54		71D/6	2884_06	165_21,22	28º40.63'	84º26.52'	22459	170	0	Gmar_gr 248	4292	E	Cs	S
Gmar_gl 55		71D/6	2884_06	165_21,22	28º40.74'	84º26.48'	22414	140	0	Gmar_gr 248	4304	SE	Cs	S
Gmar_gl 56		71D/6	2884_06	165_21,22	28º40.89'	84º26.36'	31759	190	0	Gmar_gr 248	4316	SE	Cs	S
Gmar_gl 57		71D/6	2884_06	165_21,22	28º40.97'	84º26.14'	4639	70	0	Gmar_gr 248	4343	E	Cs	S
Gmar_gl 58		71D/6	2884_06	165_21,22	28º41.18'	84º26.21'	23083	160	0	Gmar_gr 248	4356	S	Cs	S
Gmar_gl 59		71D/6	2884_06	165_21,22	28º41.35'	84º26.00'	33031	190	0	Gmar_gr 248	4356	SE	Cs	S
Gmar_gl 60		71D/6	2884_06	165_21,22	28º39.39'	84º27.59'	183240	730			4066	SE	Cs	B
Gmar_gl 61		71D/6	2884_06	165_21,22	28º39.71'	84º27.69'	5063	125			4145	E	Cs	E
Gmar_gl 62		71D/6	2884_06	165_21,22	28º39.85'	84º27.84'	15032	185			4165	SW	Cs	B
Gmar_gl 63		71D/6	2884_06	165_21,22	28º40.72'	84º27.96'	9412	165			4840	SW	Ds	B
Gmar_gl 64		71D/6	2884_06	165_21,22	28º40.95'	84º27.42'	6958	105			4648	SE	Ds	E
Gmar_gl 65		71D/6	2884_06	165_21,22	28º41.34'	84º28.41'	9323	135			4295	S	Cs	B
Gmar_gl 66		71D/6	2884_06	165_21,22	28º39.71'	84º28.42'	269240	1370			4107	SW	Cs	B
Gmar_gl 67		71D/10	2884_07	165_21,22	28º39.68'	84º31.37'	23530	240	125	Gmar_gr 254	5075	W	Cs	E
Gmar_gl 68		71D/10	2884_07	165_21,22	28º39.66'	84º31.54'	49133	185	20	Gmar_gr 254	5081	NW	Cs	E
Gmar_gl 69		71D/6	2884_06	164_28,29	28º31.12'	84º28.59'	22102	255	305	Gmar_gr 273	3924	W	Ds	V
Gmar_gl 70	Thulagi	71D/7	2884_10	162_4,5	28º29.69'	84º29.01'	223385	420	0	Gmar_gr 277	3825	NW	Ds	M
Gmar_gl 71	Mimi Pokhari	71D/11	2884_11	161_12,13	28º22.58'	84º34.93'	9858	190			4292	S	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gmar_gl 72	Mimi Pokhari	71D/11	2884_11	161_12,13	28º22.70'	84º34.94'	7717	135			4343	SW	Cs	E
Gmar_gl 73		71D/11	2884_11	110_14,15	28º20.62'	84º38.29'	6044	130			4343	N	Ds	E
Gmar_gl 74		71D/11	2884_11	110_14,15	28º20.91'	84º38.06'	6200	120			3923	NW	Ds	E
Gmar_gl 75		71D/11	2884_11	110_14,15	28º21.18'	84º37.76'	8141	120			3749	NE	Ds	E
Gmar_gl 76	Dudh Pokhari	71D/11	2884_11	110_14,15	28º19.77'	84º39.50'	69986	440			4261	W	Ds	V
Gmar_gl 77		71D/11	2884_11	110_14,15	28º19.97'	84º39.87'	17463	160	610	Gmar_gr 306	4377	SW	Cs	E
Gmar_gl 78	Narte Pokhari	71D/11	2884_11	110_13,14	28º20.20'	84º43.18'	42643	385			4261	SE	Cs	E

Glacial Lake Inventory of Seti Basin

Total Number : 10   Total Area : 0.26 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Gset_gl 1		62P/15	2883_12	163_37	28º28.10'	83º46.47'	22940	250			4221	SE	Cs	E
Gset_gl 2		62P/14	2883_08	163_37	28º32.02'	83º52.21'	13333	160	86	Gset_gr 15	4115	E	Cs	B
Gset_gl 3		71D/2	2884_05	164_20	28º32.97'	84º 2.07'	11485	185			4656	S	Cs	E
Gset_gl 4		71D/2	2884_05	164_20	28º32.79'	84º 2.27'	29117	220			4656	SE	Cs	E
Gset_gl 5		71D/2	2884_05	164_20	28º32.80'	84º 2.74'	16761	125	845	Gset_gr 41	4688	SW	Ds	V
Gset_gl 6		62P/15	2884_12	162_18	28º24.71'	83º57.61'	6615	60			3322	SW	Cs	E
Gset_gl 7		71D/3	2884_09	162_14	28º26.56'	84º 7.19'	28165	240	0	Gset_gr 52	2377	S	Ds	V
Gset_gl 8		71D/3	2884_09	162_10	28º26.01'	84º12.49'	13637	185			4221	SW	Cs	E
Gset_gl 9		71D/3	2884_09	162_10	28º25.93'	84º13.03'	21362	195			4328	SW	Cs	E
Gset_gl 10		71D/3	2884_09	162_10	28º24.59'	84º13.36'	104519	325			4206	W	Cs	E

Glacial Lake Inventory of Kali Gandaki Basin

Total Number : 96   Total Area :3.29 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Gka_gl 1		62P/9	2883_03	167_27,28	28º46.35'	83º30.97'	5137	85	0	Gka_gr 14	5105	S	Cs	S
Gka_gl 2		62P/9	2883_03	167_27,28	28º46.66'	83º30.99'	16771	220	0	Gka_gr 14	5148	SE	Cs	S
Gka_gl 3		62P/9	2883_03	167_27,28	28º46.90'	83º30.70'	6632	105	0	Gka_gr 14	5197	SE	Cs	S
Gka_gl 4		62P/10	2883_07	105_45,46	28º38.42'	83º33.53'	7557	135			4404	E	Ds	E
Gka_gl 5		62P/10	2883_07	105_45,46	28º38.02'	83º33.54'	3805	75			4237	S	Cs	E
Gka_gl 6		62P/10	2883_07	105_45,46	28º38.00'	83º33.75'	37185	260			4298	SW	Cs	E
Gka_gl 7		62P/10	2883_07	105_45,46	28º37.61'	83º33.65'	5219	60			4414	NW	Cs	E
Gka_gl 8		62P/10	2883_07	166_17,18	28º35.24'	83º34.65'	13618	195			4203	SE	Ds	E
Gka_gl 9		62P/10	2883_07	166_17,18	28º40.93'	83º35.63'	5246	105			2880	SE	Cs	E
Gka_gl 10		62P/10	2883_07	166_17,18	28º41.02'	83º35.92'	10628	215			2844	SE	Cs	E
Gka_gl 11		62P/9	2883_03	135_25,26	28º53.42'	83º43.75'	12504	140			4191	N	Ds	E
Gka_gl 12		62P/9	2883_03	134_35,36	28º49.99'	83º37.69'	10927	160	510	Gka_gr 63	5486	NE	Cs	M
Gka_gl 13		62P/9	2883_03	167_27,28	28º47.40'	83º33.88'	13972	185	0	Gka_gr 66	5136	SE	Cs	S
Gka_gl 14		62P/9	2883_03	134_33,34	28º49.01'	83º32.75'	7366	160	105	Gka_gr 73	5447	SW	Ds	C
Gka_gl 15		62P/9	2883_03	134_33,34	28º48.91'	83º33.08'	12667	160	23	Gka_gr 73	5575	SW	Ds	C
Gka_gl 16		62P/9	2883_03	134_33,34	28º50.74'	83º32.67'	6116	125	0	Gka_gr 78	5410	SE	Ds	L
Gka_gl 17		62P/9	2883_03	134_33,34	28º51.18'	83º33.10'	49743	420	485	Gka_gr 82	5654	S	Ds	V
Gka_gl 18		62P/9	2883_03	136_35,36	28º56.66'	83º35.89'	3941	75			5471	NW	Ds	C
Gka_gl 19		62P/9	2883_03	136_35,36	28º56.59'	83º36.02'	80975	340	120	Gka_gr 103	5480	NW	Ds	C
Gka_gl 20		62P/9	2883_03	136_35,36	28º58.28'	83º38.56'	24817	300	45	Gka_gr 112	5538	SE	Ds	M
Gka_gl 21		62O/12	2983_15	137_22,23	29º 1.48'	83º38.06'	21610	200	470	Gka_gr 122	5636	SW	Cs	E
Gka_gl 22		62O/12	2983_15	137_22,23	29º 1.58'	83º38.87'	6823	95	0	Gka_gr 122	5730	SW	Cs	S
Gka_gl 23		62O/12	2983_15	137_22,23	29º 0.54'	83º37.94'	8100	65			5471	W	Ds	V
Gka_gl 24		62O/12	2983_15	137_20,21	29º 1.31'	83º41.10'	7366	155	0	Gka_gr 131	5880	SE	Cs	S
Gka_gl 25		62O/12	2983_15	137_20,21	29º 0.63'	83º41.42'	20821	80	0	Gka_gr 131	5669	S	Cs	S
Gka_gl 26		62O/12	2983_15	137_20,21	29º 0.23'	83º43.71'	2800	50	0	Gka_gr 137	5873	SW	Cs	S
Gka_gl 27		62O/12	2983_15	137_20,21	29º 0.26'	83º43.82'	4213	85	0	Gka_gr 137	5873	S	Cs	S
Gka_gl 28		62P/9	2883_03	136_39	28º57.78'	83º42.66'	30090	345	195	Gka_gr 142	5459	W	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gka_gl 29		62P/13	2883_04	136_39	28º51.39'	83º45.62'	8209	125			3368	SE	Cs	E
Gka_gl 30		62P/13	2883_04	136_40,41	28º59.77'	83º45.44'	19734	230	160	Gka_gr 157	5547	SE	Ds	V
Gka_gl 31		62P/13	2883_04	136_40,41	28º59.92'	83º45.80'	18076	230	775	Gka_gr 157	5572	S	Ds	V
Gka_gl 32		62O/16	2983_16	136_40,41	29º 2.76'	83º45.50'	52271	320	275	Gka_gr 174	*	NW	Ds	V
Gka_gl 33		62O/12	2983_15	137_19,20	29º 2.25'	83º44.02'	40528	275	0	Gka_gr 176	5465	N	Ds	M
Gka_gl 34		62O/12	2983_15	137_19,20	29º 2.50'	83º43.07'	7067	145	0	Gka_gr 178	5471	N	Ds	M
Gka_gl 35		62O/12	2983_15	137_19,20	29º 2.70'	83º42.82'	9867	140	145	Gka_gr 179	5477	NE	Ds	V
Gka_gl 36		62O/12	2983_15	137_19,20	29º 2.53'	83º41.23'	14624	135	0	Gka_gr 182	5538	NE	Ds	M
Gka_gl 37		62O/12	2983_15	137_22,23	29º 2.52'	83º40.56'	10628	85	80	Gka_gr 183	5444	NE	Cs	M
Gka_gl 38		62O/12	2983_15	137_22,23	29º 2.76'	83º40.52'	149202	600	0	Gka_gr 184	5419	NE	Ds	M
Gka_gl 39		62O/12	2983_15	137_22,23	29º 2.98'	83º39.55'	9677	175	425	Gka_gr 184	5654	SE	Ds	B
Gka_gl 40		62O/12	2983_15	137_22,23	29º 4.37'	83º39.99'	4213	85	395	Gka_gr 187	5471	N	Cs	V
Gka_gl 41		62O/12	2983_15	138_21,22	29º 4.55'	83º39.39'	21583	260	90	Gka_gr 183	5444	NE	Cs	M
Gka_gl 42		62O/12	2983_15	138_21,22	29º 4.62'	83º39.23'	26829	195	60	Gka_gr 183	5450	NE	Cs	M
Gka_gl 43		62O/12	2983_15	138_21,22	29º 5.41'	83º38.19'	21447	245	365	Gka_gr 190	5569	NE	Ds	M
Gka_gl 44		62O/12	2983_15	138_21,22	29º 5.53'	83º38.15'	5328	90	440	Gka_gr 190	5570	S	Ds	M
Gka_gl 45		62O/12	2983_15	138_21,22	29º 5.62'	83º38.07'	9405	75	530	Gka_gr 192	5575	SE	Ds	M
Gka_gl 46		62O/12	2983_15	138_21,22	29º 6.29'	83º38.44'	60915	460			5663	S	Ds	E
Gka_gl 47		62O/12	2983_15	138_21,22	29º 6.38'	83º40.45'	34412	300	65	Gka_gr 195	5630	SW	Cs	M
Gka_gl 48		62O/12	2983_15	138_21,22	29º 5.65'	83º40.32'	6007	80			5657	SW	Cs	E
Gka_gl 49		62O/12	2983_15	138_21,22	29º 5.53'	83º40.81'	7557	105	0	Gka_gr 196	5697	NW	Ds	S
Gka_gl 50		62O/12	2983_15	138_21,22	29º 5.18'	83º41.81'	7557	130	1485	Gka_gr 197	5523	SE	Ds	V
Gka_gl 51		62O/12	2983_15	138_21,22	29º 5.88'	83º41.67'	10112	250	730	Gka_gr 198	2484	S	Ds	V
Gka_gl 52		62O/12	2983_15	138_19,20	29º 6.06'	83º43.45'	21583	230			5666	S	Ds	V
Gka_gl 53		62O/12	2983_15	138_19,20	29º 8.58'	83º43.34'	11308	150	230	Gka_gr 208	5785	SE	Cs	C
Gka_gl 54		62O/12	2983_15	138_19,20	29º 7.87'	83º44.19'	15222	170			5660	S	Ds	V
Gka_gl 55		62O/16	2983_16	139_48	29º 7.14'	83º46.94'	46291	235	0	Gka_gr 211	*	SE		M
Gka_gl 56		62O/16	2983_16	139_48	29º 6.99'	83º47.36'	83612	625	550	Gka_gr 211	*	SE		V
Gka_gl 57		62O/16	2983_16	139_47	29º 8.98'	83º48.35'	40936	365	45	Gka_gr 217	*	NE		M
Gka_gl 58		62O/16	2983_16	139_49	29º10.21'	83º45.94'	54690	405	60	Gka_gr 224	*	N		M
Gka_gl 59		62O/16	2983_16	216_1	29º11.58'	83º47.32'	72956	315			*	W		V
Gka_gl 60		62O/12	2983_15	139_49,50	29º10.56'	83º44.87'	213460	940			5317	SW	Ds	V
Gka_gl 61		62O/12	2983_15	139_50,51	29º 9.17'	83º40.70'	10465	155	0	Gka_gr 229	5636	NE	Cs	S
Gka_gl 62		62O/12	2983_15	139_50,51	29º 9.68'	83º39.97'	9541	105	560	Gka_gr 230	5685	E	Cs	E
Gka_gl 63		62O/12	2983_15	139_50,51	29º 9.96'	83º40.56'	11416	180	105	Gka_gr 231	5685	SE	Cs	E
Gka_gl 64		62O/12	2983_15	139_50,51	29º10.42'	83º42.76'	128054	545	785	Gka_gr 233	5593	SE	Ds	V
Gka_gl 65		62O/12	2983_15	139_50,51	29º10.84'	83º42.53'	13890	105	110	Gka_gr 233	5633	SE	Cs	M
Gka_gl 66		62O/12	2983_15	140_41,42	29º11.85'	83º44.58'	4322	85	15	Gka_gr 238	5788	SE	Ds	M
Gka_gl 67		62O/12	2983_15	140_40,41	29º12.79'	83º41.79'	1013344	3610	0	Gka_gr 247	5453	NE	Ds	M
Gka_gl 68		62O/12	2983_15	140_40,41	29º11.66'	83º40.16'	62111	180	232	Gka_gr 248	5633	NE	Cs	E
Gka_gl 69		62O/12	2983_15	140_40,41	29º11.88'	83º39.99'	48003	255	310	Gka_gr 248	5654	SE	Cs	E
Gka_gl 70		62O/16	2983_16	140_45	29º12.54'	83º50.99'	28650	315	130	Gka_gr 259	*	SE		V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Gka_gl 71		62O/15	2983_12	141_45,46	29º15.64'	83º50.98'	36505	250	0	Gka_gr 276	5364	SE	Ds	M
Gka_gl 72		62O/15	2983_12	141_44,45	29º16.60'	83º48.05'	36016	135	0	Gka_gr 279	6017	S	Cs	S
Gka_gl 73		62O/15	2983_12	141_45,46	29º17.33'	83º52.34'	32401	145	65	Gka_gr 282	5313	SE	Ds	V
Gka_gl 74		71D/1	2884_01	136_51,52	28º59.20'	84º12.23'	30145	345			5334	N	Ds	V
Gka_gl 75		71D/1	2884_01	136_47,48	28º55.20'	84º12.21'	6741	120	0	Gka_gr 292	5547	NE	Cs	S
Gka_gl 76		71D/1	2884_01	136_47,48	28º58.14'	84º 4.06'	12205	160			4740	SE	Ds	V
Gka_gl 77		71D/1	2884_01	136_47,48	28º58.74'	84º 3.18'	6768	110			5063	NW	Ds	V
Gka_gl 78		71D/1	2884_01	136_47,48	28º58.57'	84º 3.30'	4757	115			5047	W	Ds	V
Gka_gl 79		71D/1	2884_01	136_47,48	28º56.79'	84º 3.74'	14678	245	250	Gka_gr 312	5328	W	Cs	V
Gka_gl 80		71D/1	2884_01	134_47,48	28º50.01'	84º 1.78'	4186	75	215	Gka_gr 331	5364	NE	Cs	E
Gka_gl 81		71D/1	2884_01	134_47,48	28º50.60'	84º 0.57'	3887	80			5090	E	Ds	V
Gka_gl 82		71D/1	2884_01	134_47,48	28º49.60'	84º 0.07'	4974	95			5474	SW	Ds	V
Gka_gl 83		71D/1	2884_01	134_47,48	28º49.94'	84º 0.06'	25959	115	740	Gka_gr 339	5474	NE	Ds	E
Gka_gl 84		62P/13	2883_04	135_19,20	28º49.35'	83º59.15'	29601	150	0	Gka_gr 338	5785	NE	Cs	E
Gka_gl 85		62P/13	2883_04	135_19,20	28º51.82'	83º58.66'	7258	130			5136	NW	Ds	E
Gka_gl 86		62P/13	2883_04	134_44,45	28º47.45'	83º56.46'	7720	145	125	Gka_gr 346	5392	NW	Ds	E
Gka_gl 87		62P/13	2883_04	134_43,44	28º49.24'	83º51.95'	9378	125			4633	NW	Cs	V
Gka_gl 88		62P/13	2883_04	166_21,22	28º48.34'	83º51.00'	17097	175			4569	NW	Cs	E
Gka_gl 89		62P/14	2883_08	167_23,24	28º44.11'	83º46.10'	20577	255			3703	NE	Cs	E
Gka_gl 90		62P/9	2883_03	165_43,44	28º45.79'	83º43.07'	16037	195			3246	NW	Ds	E
Gka_gl 91		62P/10	2883_07	165_43,44	28º39.33'	83º36.68'	8970	116			2633	SE	Ds	E
Gka_gl 92		62P/10	2883_07	165_43,44	28º39.14'	83º37.06'	10655	160			2649	SW	Ds	E
Gka_gl 93		62P/10	2883_07	165_5,6	28º39.12'	83º37.30'	49471	245			2649	W	Cs	E
Gka_gl 94		62P/14	2883_08	165_5,6	28º38.44'	83º47.63'	2609	65	0	Gka_gr 384	4189	W	Cs	S
Gka_gl 95		62P/14	2883_08	165_5,6	28º38.41'	83º47.76'	11145	205	0	Gka_gr 384	4206	NW	Cs	S
Gka_gl 96		62P/14	2883_08	165_5,6	28º37.72'	83º46.93'	7665	115	815	Gka_gr 386	4060	W	Cs	M

Glacial Lake Inventory of Mugu Basin

Total Number : 280   Total Area : 8.56 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kmu_gl 1		62K/2	2982_05	147_29,30	29°39.03'	82°12.46'	17614	215			4282	SW	Ds	V
Kmu_gl 2		62K/2	2982_05	147_29,30	29°38.80'	82°12.78'	4332	70			4191	SE	Ds	E
Kmu_gl 3		62K/2	2982_05	147_29,30	29°38.99'	82°12.78'	10011	145			4359	SW	Ds	E
Kmu_gl 4		62K/2	2982_05	147_29,30	29°38.91'	82°13.15'	34520	245			4420	SE	Ds	V
Kmu_gl 5		62K/2	2982_05	147_29,30	29°39.15'	82°13.45'	121659	335			4389	SW	Ds	V
Kmu_gl 6		62K/2	2982_05	147_29,30	29°39.54'	82°13.42'	35625	250			4523	S	Ds	E
Kmu_gl 7		62K/2	2982_05	147_29,30	29°39.18'	82°14.53'	27581	145			4441	SE	Ds	V
Kmu_gl 8	Jaipa Tal	62K/6	2982_06	147_27,28	29°38.86'	82°15.49'	86388	230			4191	SW	Ds	V
Kmu_gl 9		62K/6	2982_06	147_27,28	29°39.24'	82°15.49'	60244	340			4511	SW	Ds	E
Kmu_gl 10		62K/6	2982_06	147_27,28	29°39.05'	82°15.77'	22984	190			4343	SW	Ds	E
Kmu_gl 11	Kochakan	62K/6	2982_06	147_27,28	29°38.99'	82°17.04'	26697	240			4322	E	Ds	B
Kmu_gl 12		62K/6	2982_06	147_27,28	29°39.22'	82°17.22'	19183	100			4252	SE	Ds	V
Kmu_gl 13		62K/6	2982_06	147_27,28	29°39.56'	82°16.68'	19558	230			4587	SE	Ds	E
Kmu_gl 14		62K/6	2982_06	147_27,28	29°39.67'	82°16.56'	12950	120			4593	E	Cs	E
Kmu_gl 15		62K/6	2982_06	147_27,28	29°39.75'	82°15.64'	63183	515			4502	NE	Ds	V
Kmu_gl 16	Dudhiya Tal	62K/2	2982_05	147_27,28	29°41.60'	82°14.52'	94035	595	100	Kmu_gr 3	4682	NE	Ds	E
Kmu_gl 17		62K/6	2982_05	147_26,27	29°42.02'	82°19.70'	49879	435	1305	Kmu_gr 5	4404	S	Ds	V
Kmu_gl 18		62K/6	2982_06	147_26,27	29°42.25'	82°20.31'	122168	610			4554	SW	Ds	E
Kmu_gl 19		62K/6	2982_06	147_26,27	29°41.55'	82°22.69'	16951	200	345	Kmu_gr 7	4764	NW	Ds	E
Kmu_gl 20		62K/6	2982_06	147_26,27	29°39.26'	82°22.06'	88421	685			4328	NE	Ds	V
Kmu_gl 21		62K/6	2982_06	147_25,26	29°38.96'	82°22.15'	45393	328			4474	NE	Ds	V
Kmu_gl 22		62K/6	2982_06	147_25,26	29°39.73'	82°21.31'	15934	185			4441	SW	Cs	E
Kmu_gl 23		62K/6	2982_06	147_25,26	29°39.70'	82°21.21'	16111	125			4441	SW	Cs	E
Kmu_gl 24		62K/6	2982_06	147_25,26	29°39.31'	82°21.30'	16000	180			4383	SW	Ds	E
Kmu_gl 25		62K/6	2982_06	147_25,26	29°38.18'	82°21.49'	77460	465			4263	NW	Ds	V
Kmu_gl 26		62K/6	2982_06	147_25,26	29°38.89'	82°24.03'	19912	185			4660	SE	Ds	V
Kmu_gl 27		62K/6	2982_06	147_25,26	29°39.92'	82°25.07'	37879	325	685	Kmu_gr 14	4679	SE	Ds	V
Kmu_gl 28		62K/6	2982_06	147_25,26	29°39.84'	82°24.72'	70123	415	345	Kmu_gr 14	4834	NW	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 29		62K/6	2982_06	147_25,26	29°40.16'	82°25.08'	24575	220	300	Kmu_gr 14	4822	SSE	Cs	E
Kmu_gl 30		62K/6	2982_06	147_25,26	29°39.49'	82°25.67'	5216	60	245	Kmu_gr 15	4374	NE	Cs	E
Kmu_gl 31		62K/6	2982_06	147_25,26	29°41.27'	82°25.22'	35514	305			4651	NE	Ds	V
Kmu_gl 32		62K/6	2982_06	147_25,26	29°39.51'	82°26.69'	24641	245	685	Kmu_gr 22	4679	NW	Cs	E
Kmu_gl 33		62K/5	2982_02	149_49,50	29°45.23'	82°24.93'	350348	1030			4654	SE	Ds	E
Kmu_gl 34		62K/5	2982_02	149_49,50	29°47.34'	82°26.26'	23205	290			4801	SW	Ds	V
Kmu_gl 35		62K/5	2982_02	149_49,50	29°48.39'	82°26.88'	6475	60			5197	S	Ds	V
Kmu_gl 36		62K/5	2982_02	149_49,50	29°48.48'	82°26.94'	11602	150			5209	SW	Ds	E
Kmu_gl 37		62K/5	2982_02	149_49,50	29°47.51'	82°26.42'	42498	330	700	Kmu_gr 26	4843	SW	Ds	V
Kmu_gl 38		62K/5	2982_02	149_49,50	29°46.44'	82°27.19'	19183	215	665	Kmu_gr 27	4916	SE	Ds	V
Kmu_gl 39		62K/5	2982_02	149_49,50	29°46.53'	82°27.05'	68576	320	715	Kmu_gr 27	4929	SE	Ds	V
Kmu_gl 40		62K/5	2982_02	149_49,50	29°45.76'	82°28.37'	27647	260			4740	SW	Ds	V
Kmu_gl 41		62K/6	2982_06	149_51	29°43.96'	82°27.52'	64023	310			4587	SW	Ds	V
Kmu_gl 42		62K/6	2982_06	149_51	29°44.00'	82°27.89'	30166	245			4764	SW	Cs	E
Kmu_gl 43		62K/6	2982_06	149_51	29°44.43'	82°28.18'	67780	335			5044	SW	Ds	E
Kmu_gl 44		62K/6	2982_06	149_51	29°43.29'	82°27.95'	26122	265			4624	SW	Ds	V
Kmu_gl 45		62K/6	2982_06	149_51	29°43.64'	82°28.31'	51912	340			4926	SW	Ds	V
Kmu_gl 46		62K/6	2982_06	149_51	29°42.96'	82°28.01'	12089	185			4651	SW	Ds	E
Kmu_gl 47		62K/5	2982_02	144_50,51	29°47.02'	82°28.59'	51095	295			4545	NE	Ds	V
Kmu_gl 48		62K/5	2982_02	144_50,51	29°46.72'	82°28.30'	12000	155			4709	NE	Ds	V
Kmu_gl 49		62K/5	2982_02	144_50,51	29°49.14'	82°27.27'	13680	160	0	Kmu_gr 29	5075	NE	Ds	E
Kmu_gl 50		62K/5	2982_02	150_11,12	29°51.64'	82°26.44'	7890	65			5206	SE	Ds	E
Kmu_gl 51		62K/5	2982_02	150_11,12	29°50.59'	82°27.97'	13459	110			4932	SE	Ds	V
Kmu_gl 52		62K/5	2982_02	150_11,12	29°50.71'	82°27.99'	25680	150			4953	SE	Ds	V
Kmu_gl 53		62K/5	2982_02	150_11,12	29°50.82'	82°28.05'	15669	205			4962	W	Ds	V
Kmu_gl 54		62K/5	2982_02	150_11,12	29°50.72'	82°28.15'	8862	130			4962	SW	Ds	V
Kmu_gl 55		62K/5	2982_02	150_11,12	29°50.49'	82°28.42'	49017	250			4874	SW	Ds	V
Kmu_gl 56		62K/5	2982_02	150_11,12	29°50.53'	82°28.69'	69769	450			4929	SW	Ds	V
Kmu_gl 57		62K/5	2982_02	150_11,12	29°50.79'	82°28.57'	3646	65			5017	SE	Ds	V
Kmu_gl 58		62K/5	2982_02	150_11,12	29°50.61'	82°28.94'	10807	155			4983	W	Ds	V
Kmu_gl 59		62K/5	2982_02	150_11,12	29°50.29'	82°28.63'	21592	220			4901	NW	Ds	V
Kmu_gl 60		62K/5	2982_02	150_11,12	29°51.47'	82°29.17'	27890	280			4898	NE	Ds	V
Kmu_gl 61		62K/5	2982_02	151_23,24	29°53.87'	82°28.55'	37879	315			4903	S	Ds	V
Kmu_gl 62		62K/9	2982_03	151_24,25	29°54.32'	82°31.17'	119140	670			4852	NW	Ds	V
Kmu_gl 63		62K/9	2982_03	151_24,25	29°53.66'	82°30.88'	95781	500			5026	NW	Ds	E
Kmu_gl 64		62K/9	2982_03	151_24,25	29°53.43'	82°30.49'	51758	215			4871	NW	Ds	V
Kmu_gl 65		62K/9	2982_03	151_24,25	29°52.84'	82°31.47'	15735	155			4801	S	Cs	E
Kmu_gl 66		62K/9	2982_03	151_24,25	29°53.62'	82°32.34'	22188	210			4862	SE	Ds	V
Kmu_gl 67		62K/9	2982_03	151_24,25	29°53.56'	82°32.06'	5459	155			4987	NE	Cs	E
Kmu_gl 68		62K/9	2982_03	151_24,25	29°53.91'	82°32.27'	5724	105			5026	SE	Ds	E
Kmu_gl 69		62K/9	2982_03	152_23,24	29°57.11'	82°32.18'	101615	950			4889	SE	Ds	V
Kmu_gl 70		62K/9	2982_03	152_23,24	29°57.91'	82°31.33'	13790	215			5111	SW	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 71		62K/9	2982_03	152_23,24	29°57.80'	82°32.08'	5569	115			4923	SE	Ds	V
Kmu_gl 72		62K/9	2982_03	152_23,24	29°58.08'	82°31.94'	24685	220			4953	SE	Ds	E
Kmu_gl 73		62K/9	2982_03	152_23,24	29°57.27'	82°32.89'	133350	605	660	Kmu_gr 38	5099	SE	Cs	E
Kmu_gl 74		62K/9	2982_03	152_23,24	29°57.15'	82°33.42'	3271	60	15	Kmu_gr 38	5200	NW	Cs	E
Kmu_gl 75		62K/9	2982_03	151_23,24	29°54.17'	82°34.30'	40023	350			4865	S	Ds	V
Kmu_gl 76		62K/9	2982_03	151_23,24	29°54.26'	82°34.47'	9039	120			4913	W	Cs	E
Kmu_gl 77		62K/9	2982_03	151_23,24	29°54.35'	82°34.56'	19448	215			4932	SW	Cs	E
Kmu_gl 78		62K/9	2982_03	151_23,24	29°53.82'	82°34.56'	84996	655			4749	SW	Ds	V
Kmu_gl 79		62K/9	2982_03	151_23,24	29°52.73'	82°34.57'	19492	215			5072	NW	Ds	V
Kmu_gl 80		62K/9	2982_03	151_23,24	29°51.36'	82°33.84'	40995	275			4889	NW	Ds	E
Kmu_gl 81		62K/9	2982_03	151_23,24	29°50.95'	82°34.57'	12354	185			5236	SE	Cs	E
Kmu_gl 82		62K/9	2982_03	151_23,24	29°50.95'	82°34.79'	7713	115			5188	E	Cs	E
Kmu_gl 83		62K/9	2982_03	151_23,24	29°52.18'	82°36.38'	14807	200			5105	S	Ds	V
Kmu_gl 84		62K/9	2982_03	151_23,24	29°52.44'	82°36.36'	53371	245			5136	SE	Ds	V
Kmu_gl 85		62K/9	2982_03	151_23,24	29°52.56'	82°35.91'	26321	195			5236	S	Cs	E
Kmu_gl 86		62K/9	2982_03	151_23,24	29°52.84'	82°36.51'	7514	105	100	Kmu_gr 40	5386	S	Cs	E
Kmu_gl 87		62K/9	2982_03	151_23,24	29°52.52'	82°36.73'	27315	230	550	Kmu_gr 40	5279	W	Ds	V
Kmu_gl 88		62K/9	2982_03	151_23,24	29°52.24'	82°36.66'	16265	160	200	Kmu_gr 46	5145	SE	Ds	E
Kmu_gl 89		62K/9	2982_03	149_54,55	29°48.04'	82°36.15'	19691	245	30	Kmu_gr 47	5121	SE	Ds	V
Kmu_gl 90		62K/9	2982_03	149_54,55	29°48.45'	82°35.71'	17083	185	270	Kmu_gr 49	5218	SE	Ds	V
Kmu_gl 91		62K/9	2982_03	149_55,56	29°49.07'	82°40.11'	8243	135	45	Kmu_gr 54	5148	SE	Cs	E
Kmu_gl 92		62K/9	2982_03	149_55,56	29°49.41'	82°40.72'	15868	155			5105	SE	Cs	L
Kmu_gl 93		62K/9	2982_03	149_55,56	29°49.13'	82°41.64'	50012	370			4868	SW	Ds	V
Kmu_gl 94		62K/9	2982_03	149_55,56	29°48.03'	82°40.28'	60863	245			4730	NW	Cs	M
Kmu_gl 95		62K/9	2982_03	145_54,55	29°46.32'	82°38.45'	20929	190			4866	NW	Cs	E
Kmu_gl 96		62K/9	2982_03	145_54,55	29°45.66'	82°36.18'	15868	180			4785	N	Ds	V
Kmu_gl 97		62K/9	2982_03	145_54,55	29°45.08'	82°36.92'	13149	165			5026	NW	Ds	E
Kmu_gl 98		62K/9	2982_03	145_54,55	29°46.77'	82°34.54'	76576	495			4359	NW	Ds	V
Kmu_gl 99		62K/10	2982_07	148_14,15	29°41.85'	82°33.78'	149638	720			4831	SW	Ds	V
Kmu_gl 100		62K/10	2982_07	148_14,15	29°42.08'	82°34.67'	40376	185			4831	E	Ds	V
Kmu_gl 101		62K/10	2982_07	148_14,15	29°42.07'	82°36.33'	44222	415			4919	W	Ds	V
Kmu_gl 102		62K/10	2982_07	148_14,15	29°41.69'	82°36.62'	37017	305			4904	W	Ds	V
Kmu_gl 103		62K/10	2982_07	148_14,15	29°41.01'	82°37.09'	48796	335			4871	S	Ds	V
Kmu_gl 104		62K/10	2982_07	147_20,21	29°37.83'	82°35.60'	18962	185	900	Kmu_gr 64	5017	SE	Ds	V
Kmu_gl 105		62K/10	2982_07	147_20,21	29°37.76'	82°36.76'	11713	100	500	Kmu_gr 65	5136	SE	Ds	V
Kmu_gl 106		62K/10	2982_07	147_20,21	29°38.36'	82°38.98'	17216	205	515	Kmu_gr 67	5212	SE	Ds	V
Kmu_gl 107		62K/10	2982_07	147_20,21	29°39.96'	82°38.93'	25835	265			5176	SE	Ds	E
Kmu_gl 108		62K/10	2982_07	148_10,11,12	29°43.47'	82°38.79'	165594	910			4987	SE	Ds	V
Kmu_gl 109		62K/10	2982_07	148_10,11,12	29°43.89'	82°38.37'	70056	430	330	Kmu_gr 70	5081	SE	Ds	E
Kmu_gl 110		62K/10	2982_07	148_10,11,12	29°44.03'	82°38.62'	3293	65	0	Kmu_gr 70	5227	S	Cs	S
Kmu_gl 111		62K/10	2982_07	148_10,11,12	29°44.63'	82°38.92'	63603	435	255	Kmu_gr 71	5145	SE	Ds	V
Kmu_gl 112		62K/9	2982_03	149_54,55	29°45.20'	82°38.58'	9636	135			5502	NE	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 113		62K/10	2982_07	148_10,11,12	29°44.19'	82°41.23'	26034	270	140	Kmu_gr 76	5276	SW	Ds	E
Kmu_gl 114		62K/10	2982_07	148_10,11,12	29°43.75'	82°41.05'	58189	265			5236	SW	Ds	C
Kmu_gl 115		62K/10	2982_07	148_10,11,12	29°43.39'	82°41.93'	10431	130	350	Kmu_gr 77	5236	SE	Ds	V
Kmu_gl 116		62K/10	2982_07	148_10,11,12	29°43.94'	82°44.45'	12508	180	0	Kmu_gr 81	5008	SW	Ds	S
Kmu_gl 117		62K/10	2982_07	148_10,11,12	29°44.58'	82°44.25'	25437	180	225	Kmu_gr 81	5118	SE	Cs	V
Kmu_gl 118		62K/10	2982_07	148_10,11,12	29°44.46'	82°44.96'	14387	120	0	Kmu_gr 81	5093	W	Cs	S
Kmu_gl 119		62K/10	2982_07	148_10,11,12	29°42.68'	82°44.71'	23315	210	0	Kmu_gr 82	5118	W	Ds	S
Kmu_gl 120		62K/10	2982_07	148_10,11,12	29°42.82'	82°44.87'	27669	275	0	Kmu_gr 82	5145	SW	Ds	S
Kmu_gl 121		62K/14	2982_08	148_7,8,9	29°42.96'	82°45.09'	5149	100	0	Kmu_gr 82	5230	SW	Cs	S
Kmu_gl 122		62K/14	2982_08	148_7,8,9	29°41.88'	82°46.13'	10763	140	190	Kmu_gr 84	4938	NW	Ds	E
Kmu_gl 123		62K/14	2982_08	148_7,8,9	29°42.29'	82°46.65'	5525	90	0	Kmu_gr 84	4996	SE	Cs	S
Kmu_gl 124		62K/14	2982_08	148_7,8,9	29°42.44'	82°46.67'	6321	110	0	Kmu_gr 84	5023	SE	Cs	S
Kmu_gl 125		62K/14	2982_08	148_7,8,9	29°42.61'	82°46.80'	5193	90	0	Kmu_gr 84	5049	SE	Cs	S
Kmu_gl 126		62K/14	2982_08	148_7,8,9	29°42.74'	82°46.57'	3381	85	0	Kmu_gr 84	5078	SE	Cs	S
Kmu_gl 127		62K/14	2982_08	148_7,8,9	29°42.79'	82°46.49'	14851	200	0	Kmu_gr 84	5084	NE	Cs	S
Kmu_gl 128		62K/14	2982_08	148_7,8,9	29°39.79'	82°46.53'	33017	295			4868	SW	Ds	E
Kmu_gl 129		62K/14	2982_08	148_7,8,9	29°39.70'	82°47.76'	681094	2020	0	Kmu_gr 85	4712	SW	Ds	M
Kmu_gl 130		62K/14	2982_08	148_7,8,9	29°41.03'	82°47.88'	4530	110	0	Kmu_gr 85	4871	SW	Cs	S
Kmu_gl 131		62K/14	2982_08	148_7,8,9	29°41.52'	82°48.51'	3580	95			5044	NW	Cs	E
Kmu_gl 132		62K/14	2982_08	148_7,8,9	29°41.13'	82°48.79'	12884	175	545	Kmu_gr 86	5218	W	Cs	E
Kmu_gl 133		62K/14	2982_08	148_7,8,9	29°40.85'	82°48.82'	77040	415	345	Kmu_gr 86	5105	SW	Ds	E
Kmu_gl 134		62K/14	2982_08	148_7,8,9	29°39.77'	82°48.88'	133881	670	850	Kmu_gr 86	4962	SW	Ds	V
Kmu_gl 135		62K/14	2982_08	148_7,8,9	29°39.19'	82°49.59'	24641	195			5240	W	Ds	E
Kmu_gl 136		62K/14	2982_08	147_13,14,15	29°37.79'	82°46.02'	4486	80			4877	W	Ds	V
Kmu_gl 137		62K/14	2982_08	147_13,14,15	29°37.93'	82°47.43'	72045	410	140	Kmu_gr 87	5179	SW	Ds	V
Kmu_gl 138		62K/14	2982_08	147_13,14,15	29°37.48'	82°46.78'	3359	65			5105	NW	Cs	E
Kmu_gl 139		62K/14	2982_08	147_13,14,15	29°37.65'	82°45.73'	11227	175			4865	NW	Cs	E
Kmu_gl 140		62K/14	2982_08	147_13,14,15	29°37.41'	82°45.97'	6542	105	530	Kmu_gr 88	4999	NW	Ds	V
Kmu_gl 141		62K/14	2982_08	147_13,14,15	29°37.85'	82°48.20'	10785	145	400	Kmu_gr 90	5270	SE	Ds	E
Kmu_gl 142		62K/14	2982_08	148_7,8,9	29°40.44'	82°50.26'	18033	205	90	Kmu_gr 91	5267	NE	Ds	V
Kmu_gl 143		62K/14	2982_08	148_7,8,9	29°40.22'	82°51.23'	17967	185			5389	S	Cs	E
Kmu_gl 144		62K/14	2982_08	148_7,8,9	29°38.95'	82°51.76'	6851	140			5349	SW	Cs	E
Kmu_gl 145		62K/14	2982_08	148_7,8,9	29°39.08'	82°51.79'	12111	165	165	Kmu_gr 93	5389	SW	Cs	E
Kmu_gl 146		62K/14	2982_08	148_7,8,9	29°39.32'	82°52.68'	32553	255	850	Kmu_gr 94	4959	SE	Ds	V
Kmu_gl 147		62K/14	2982_08	148_7,8,9	29°39.72'	82°52.50'	37791	340	40	Kmu_gr 94	5090	SE	Ds	M
Kmu_gl 148		62K/14	2982_08	148_7,8,9	29°40.20'	82°53.93'	7182	135	0	Kmu_gr 96	5227	SW	Cs	S
Kmu_gl 149		62K/14	2982_08	148_7,8,9	29°40.25'	82°54.01'	4221	70	0	Kmu_gr 96	5236	SE	Cs	S
Kmu_gl 150		62K/14	2982_08	148_7,8,9	29°40.34'	82°53.91'	11625	180	0	Kmu_gr 96	5258	SW	Cs	S
Kmu_gl 151		62K/14	2982_08	148_6,7,8	29°40.36'	82°53.98'	6497	105	0	Kmu_gr 96	5261	S	Cs	S
Kmu_gl 152		62K/14	2982_08	148_6,7,8	29°40.45'	82°53.79'	5238	110	0	Kmu_gr 96	5288	SW	Cs	S
Kmu_gl 153		62K/14	2982_08	148_6,7,8	29°40.46'	82°53.88'	4619	70	0	Kmu_gr 96	5279	E	Cs	S
Kmu_gl 154		62K/14	2982_08	148_6,7,8	29°40.56'	82°54.03'	5967	100	0	Kmu_gr 96	5288	NE	Cs	S

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 155		62K/14	2982_08	148_6,7,8	29°40.45'	82°53.63'	5414	65	0	Kmu_gr 96	5316	SE	Cs	S
Kmu_gl 156		62K/14	2982_08	148_6,7,8	29°40.60'	82°53.72'	5702	150	0	Kmu_gr 96	5316	NE	Cs	S
Kmu_gl 157		62K/14	2982_08	148_6,7,8	29°40.59'	82°53.61'	7138	135	0	Kmu_gr 96	5334	S	Cs	S
Kmu_gl 158		62K/14	2982_08	148_6,7,8	29°40.53'	82°53.44'	11978	160	0	Kmu_gr 96	5355	E	Cs	S
Kmu_gl 159		62K/14	2982_08	148_6,7,8	29°40.63'	82°53.34'	10276	175	0	Kmu_gr 96	5371	SE	Cs	S
Kmu_gl 160		62K/14	2982_08	148_6,7,8	29°40.77'	82°53.54'	8310	140	0	Kmu_gr 96	5360	SW	Cs	S
Kmu_gl 161		62K/14	2982_08	148_5,6,7	29°40.91'	82°53.40'	14962	235	0	Kmu_gr 96	5395	SW	Cs	S
Kmu_gl 162		62K/14	2982_08	148_5,6,7	29°40.90'	82°54.24'	3448	70	0	Kmu_gr 96	5355	SW	Cs	S
Kmu_gl 163		62K/14	2982_08	148_5,6,7	29°41.21'	82°55.21'	2785	95	605	Kmu_gr 97	5377	SW	Cs	E
Kmu_gl 164		62K/14	2982_08	148_5,6,7	29°41.28'	82°55.19'	2033	45	465	Kmu_gr 97	5389	SE	Cs	E
Kmu_gl 165		62K/14	2982_08	148_5,6,7	29°41.30'	82°55.10'	3381	70	365	Kmu_gr 97	5441	SE	Cs	E
Kmu_gl 166		62K/14	2982_08	148_5,6,7	29°41.44'	82°55.45'	17481	160	385	Kmu_gr 97	5444	SE	Cs	E
Kmu_gl 167		62K/14	2982_08	148_5,6,7	29°41.21'	82°55.60'	17790	150			5428	SW	Ds	V
Kmu_gl 168		62K/14	2982_08	148_5,6,7	29°41.42'	82°56.16'	20332	220	780	Kmu_gr 97	5544	W	Ds	V
Kmu_gl 169		62K/14	2982_08	148_5,6,7	29°41.50'	82°56.35'	42012	360			5566	SW	Ds	V
Kmu_gl 170		62K/14	2982_08	148_5,6,7	29°40.94'	82°55.64'	19249	215			5392	W	Ds	V
Kmu_gl 171		62K/14	2982_08	148_5,6,7	29°41.18'	82°56.04'	8199	135			5517	S	Cs	E
Kmu_gl 172		62K/14	2982_08	148_5,6,7	29°41.24'	82°56.14'	9459	130			5553	SW	Cs	E
Kmu_gl 173		62K/14	2982_08	148_5,6,7	29°41.23'	82°56.39'	68090	500			5511	SW	Ds	E
Kmu_gl 174		62K/14	2982_08	148_5,6,7	29°39.76'	82°56.71'	11359	105	0	Kmu_gr 99	5599	NW	Cs	S
Kmu_gl 175		62K/14	2982_08	148_5,6,7	29°38.73'	82°55.28'	7448	140	0	Kmu_gr 100	5328	W	Cs	S
Kmu_gl 176		62K/14	2982_08	148_5,6,7	29°39.23'	82°58.01'	5967	110			5389	E	Cs	E
Kmu_gl 177		62K/14	2982_08	148_5,6,7	29°39.34'	82°58.70'	11072	135			5300	SE	Cs	E
Kmu_gl 178		62K/14	2982_08	148_5,6,7	29°39.70'	82°58.67'	12464	150			5474	SE	Ds	V
Kmu_gl 179		62O/2	2983_05	147_8,9	29°38.85'	83°2.02'	12243	175			5496	SW	Ds	V
Kmu_gl 180		62O/2	2983_05	147_8,9	29°37.51'	83°1.64'	11138	160			5352	SW	Cs	E
Kmu_gl 181		62O/2	2983_05	147_8,9	29°38.32'	83°2.07'	7271	130			5526	SW	Ds	V
Kmu_gl 182		62O/2	2983_05	146_30	29°35.48'	83°0.48'	13481	155			5179	N	Ds	E
Kmu_gl 183		62O/2	2983_05	146_35,30	29°36.41'	83°7.96'	7315	110			5169	SE	Ds	V
Kmu_gl 184		62O/2	2983_05	146_35,30	29°36.77'	83°7.72'	44288	285			5270	NW	Ds	E
Kmu_gl 185		62O/2	2983_05	146_35,30	29°36.33'	83°8.72'	16288	240			5215	S	Cs	E
Kmu_gl 186		62O/2	2983_05	146_35,30	29°35.14'	83°11.11'	16265	245			5304	SW	Ds	V
Kmu_gl 187		62O/2	2983_05	146_35,30	29°33.78'	83°10.81'	60576	385			5090	W	Ds	V
Kmu_gl 188		62O/2	2983_05	146_35,30	29°34.25'	83°11.43'	59802	365			5221	W	Ds	E
Kmu_gl 189		62O/6	2983_06	146_38	29°33.93'	83°15.63'	21835	220			5258	W	Ds	V
Kmu_gl 190		62O/6	2983_06	146_38	29°34.07'	83°15.87'	40907	310			5300	SW	Ds	V
Kmu_gl 191		62O/6	2983_06	146_38	29°33.56'	83°15.87'	7160	90			5389	NW	Ds	V
Kmu_gl 192		62O/6	2983_06	146_38	29°33.52'	83°16.30'	25459	265			5441	W	Ds	V
Kmu_gl 193		62O/2	2983_05	145_5,6	29°33.19'	83°14.69'	87803	435			5270	SW	Ds	V
Kmu_gl 194		62O/2	2983_05	145_5,6	29°33.08'	83°14.93'	6321	120			5297	S	Ds	V
Kmu_gl 195		62O/2	2983_05	145_5,6	29°32.22'	83°14.02'	24708	215			5151	NW	Ds	V
Kmu_gl 196		62O/2	2983_05	145_5,6	29°32.41'	83°14.70'	20487	225			5364	SW	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 197		62O/6	2983_06	145_5,6	29°32.49'	83°15.13'	88687	200			5410	SW	Ds	E
Kmu_gl 198		62O/2	2983_05	145_5,6	29°31.89'	83°14.47'	6674	75			5236	S	Cs	E
Kmu_gl 199		62O/2	2983_05	145_5,6	29°31.76'	83°14.44'	5768	95			5236	E	Cs	E
Kmu_gl 200		62O/2	2983_05	145_5,6	29°31.84'	83°14.21'	26277	275			5209	NE	Cs	E
Kmu_gl 201		62O/2	2983_05	145_5,6	29°32.03'	83°14.02'	22940	280			5191	SE	Cs	E
Kmu_gl 202		62O/2	2983_05	145_5,6	29°30.97'	83°13.23'	68465	485			4918	SW	Ds	E
Kmu_gl 203		62O/2	2983_05	145_5,6	29°31.00'	83°13.73'	42343	580			4938	SW	Ds	V
Kmu_gl 204		62O/6	2983_06	145_3,4	29°31.18'	83°15.17'	15315	165			5121	SW	Ds	E
Kmu_gl 205		62O/6	2983_06	145_3,4	29°31.33'	83°15.87'	6807	85			5322	S	Ds	V
Kmu_gl 206		62O/6	2983_06	145_3,4	29°31.54'	83°15.72'	32266	275			5371	SW	Ds	E
Kmu_gl 207		62O/6	2983_06	145_3,4	29°30.83'	83°15.49'	4265	80			5192	W	Cs	E
Kmu_gl 208		62O/6	2983_06	145_3,4	29°30.82'	83°15.56'	3801	75			5203	W	Cs	E
Kmu_gl 209		62O/7	2983_10	144_30,31	29°29.04'	83°18.69'	77659	810			5090	SE	Ds	V
Kmu_gl 210		62O/7	2983_10	144_30,31	29°29.63'	83°18.82'	8950	145			5285	SW	Cs	E
Kmu_gl 211		62O/7	2983_10	144_30,31	29°29.96'	83°18.75'	17039	205			5340	SE	Ds	V
Kmu_gl 212		62O/6	2983_06	145_3,4	29°30.18'	83°18.94'	21503	225			5410	S	Ds	V
Kmu_gl 213		62O/7	2983_10	144_30,31	29°29.37'	83°20.10'	15337	145			5331	S	Ds	V
Kmu_gl 214		62O/7	2983_10	144_30,31	29°29.55'	83°20.33'	15514	180			5395	SW	Ds	V
Kmu_gl 215		62O/7	2983_10	143_30,31	29°27.12'	83°20.81'	15558	80			5255	W	Ds	V
Kmu_gl 216		62O/7	2983_10	143_30,31	29°26.01'	83°20.41'	14873	265			5349	SE	Ds	E
Kmu_gl 217		62O/7	2983_10	143_30,31	29°26.10'	83°20.69'	13459	150			5261	E	Ds	E
Kmu_gl 218		62O/7	2983_10	143_31,32	29°23.20'	83°25.03'	18166	235			5547	NW	Ds	E
Kmu_gl 219		62O/7	2983_10	143_31,32	29°22.77'	83°23.25'	4995	100			5166	NW	Ds	E
Kmu_gl 220		62O/7	2983_10	143_31,32	29°22.59'	83°23.50'	139030	590			5176	NW	Ds	V
Kmu_gl 221		62O/7	2983_10	143_31,32	29°22.26'	83°23.83'	76487	665			5261	NW	Cs	V
Kmu_gl 222		62O/7	2983_10	142_21,22	29°21.71'	83°22.40'	17702	235			5206	SW	Ds	V
Kmu_gl 223		62O/7	2983_10	142_21,22	29°21.89'	83°23.03'	14718	160	125	Kmu_gr 106	5334	W	Ds	E
Kmu_gl 224		62O/7	2983_10	142_21,22	29°21.73'	83°24.59'	9083	115	180	Kmu_gr 107	5468	SW	Ds	V
Kmu_gl 225		62O/7	2983_10	142_21,22	29°19.85'	83°26.51'	5812	95	85	Kmu_gr 109	5505	SW	Ds	E
Kmu_gl 226		62O/7	2983_10	142_21,22	29°19.58'	83°26.35'	6763	120	315	Kmu_gr 110	5453	NW	Ds	E
Kmu_gl 227		62O/7	2983_10	142_21,22	29°19.32'	83°26.16'	4751	80	255	Kmu_gr 110	5453	NW	Ds	E
Kmu_gl 228		62O/7	2983_10	141_32,33	29°18.05'	83°26.19'	11912	135	515	Kmu_gr 115	5456	SW	Ds	V
Kmu_gl 229		62O/7	2983_10	141_32,33	29°17.64'	83°26.29'	8265	75			5389	SW	Ds	V
Kmu_gl 230		62O/7	2983_10	141_32,33	29°17.51'	83°26.74'	16310	185	435	Kmu_gr 117	5486	S	Ds	V
Kmu_gl 231		62O/7	2983_10	141_32,33	29°17.36'	83°24.72'	9834	140	1050	Kmu_gr 127	5304	NW	Ds	V
Kmu_gl 232		62O/7	2983_10	141_32,33	29°15.24'	83°23.21'	36288	275	75	Kmu_gr 129	5044	N	Ds	V
Kmu_gl 233		62O/8	2983_14	140_30,31	29°14.77'	83°20.30'	12044	140			5486	W	Cs	E
Kmu_gl 234		62O/7	2983_10	140_30,31	29°20.61'	83°17.57'	16553	200			4264	SW	Ds	E
Kmu_gl 235		62O/7	2983_10	141_33,34	29°17.81'	83°18.74'	17989	155			4801	SW	Cs	E
Kmu_gl 236		62O/7	2983_10	141_33,34	29°15.14'	83°18.97'	45371	275			5243	NW	Ds	V
Kmu_gl 237		62O/7	2983_10	141_33,34	29°15.04'	83°19.31'	17503	145	905	Kmu_gr 131	5270	W	Ds	V
Kmu_gl 238		62O/8	2983_14	140_30,31	29°14.95'	83°19.86'	5901	130	50	Kmu_gr 131	5438	SW	Ds	B

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kmu_gl 239		62O/8	2983_14	140_30,31	29°14.75'	83°19.78'	12243	105	450	Kmu_gr 131	5352	NW	Ds	E
Kmu_gl 240		62O/8	2983_14	140_30,31	29°13.36'	83°20.02'	77836	390	755	Kmu_gr 132	5267	SW	Ds	V
Kmu_gl 241		62O/8	2983_14	140_30,31	29°13.43'	83°20.58'	13680	190	60	Kmu_gr 132	5477	SW	Cs	E
Kmu_gl 242		62O/8	2983_14	140_30,31	29°13.15'	83°21.72'	11868	180	715	Kmu_gr 134	5243	SE	Ds	B
Kmu_gl 243		62O/8	2983_14	140_30,31	29°14.83'	83°27.92'	33614	300			5474	SW	Ds	E
Kmu_gl 244		62O/7	2983_10	141_33,34	29°15.25'	83°29.66'	9569	180	410	Kmu_gr 137	5557	NW	Cs	E
Kmu_gl 245		62O/7	2983_10	141_33,34	29°15.38'	83°29.70'	24774	285	55	Kmu_gr 137	5560	NW	Cs	E
Kmu_gl 246		62O/8	2983_14	140_34,35	29°14.14'	83°29.50'	15050	200			5386	NW	Cs	E
Kmu_gl 247		62O/12	2983_15	140_34,35	29°13.97'	83°30.76'	15912	175			5456	NW	Ds	E
Kmu_gl 248		62O/8	2983_14	140_34,35,32	29°13.38'	83°29.23'	18166	200			5243	NW	Ds	V
Kmu_gl 249		62O/8	2983_14	140_34,35,32	29°12.66'	83°29.94'	6055	95	35	Kmu_gr 142	5471	N	Cs	E
Kmu_gl 250		62O/8	2983_14	140_34,35,32	29°12.48'	83°29.56'	6055	120	355	Kmu_gr 143	5416	NE	Cs	E
Kmu_gl 251		62O/8	2983_14	140_32,33,34	29°11.93'	83°29.22'	12155	170	0	Kmu_gr 143	5538	NE	Cs	E
Kmu_gl 252		62O/8	2983_14	140_32,33,34	29°12.31'	83°29.11'	25194	270	225	Kmu_gr 143	5465	N	Cs	E
Kmu_gl 253		62O/8	2983_14	140_32,33,34	29°12.51'	83°28.77'	9901	165			5422	NE	Cs	E
Kmu_gl 254		62O/8	2983_14	140_32,33,34	29°13.45'	83°28.00'	11978	180	570	Kmu_gr 144	5352	NE	Ds	V
Kmu_gl 255		62O/8	2983_14	140_32,33,34	29°13.61'	83°27.56'	15558	230	140	Kmu_gr 146	5502	NE	Ds	E
Kmu_gl 256		62O/8	2983_14	140_32,33,34	29°13.11'	83°27.57'	1901	50	60	Kmu_gr 145	5505	E	Cs	E
Kmu_gl 257		62O/8	2983_14	140_32,33,34	29°12.89'	83°27.54'	14276	200	95	Kmu_gr 145	5578	NE	Cs	L
Kmu_gl 258		62O/8	2983_14	140_32,33,34	29°13.51'	83°26.91'	13149	105	0	Kmu_gr 147	5358	N	Ds	S
Kmu_gl 259		62O/8	2983_14	140_32,33,34	29°12.69'	83°26.24'	25415	250	265	Kmu_gr 150	5380	NW	Ds	E
Kmu_gl 260		62O/8	2983_14	140_32,33,34	29°11.79'	83°26.12'	30851	300	115	Kmu_gr 151	5142	NW	Ds	E
Kmu_gl 261		62O/8	2983_14	140_32,33,34	29°11.55'	83°24.34'	5414	110	245	Kmu_gr 155	5364	NW	Ds	L
Kmu_gl 262		62O/8	2983_14	138_31,32	29°7.27'	83°18.51'	49901	345	0	Kmu_gr 157	5270	NE	Ds	M
Kmu_gl 263		62O/8	2983_14	138_31,32	29°8.25'	83°17.31'	16818	210			5267	NW	Ds	E
Kmu_gl 264		62O/4	2983_13	140_27,28	29°10.30'	83°14.83'	8243	170			5047	NE	Ds	V
Kmu_gl 265		62O/4	2983_13	140_27,28	29°9.99'	83°14.83'	21879	290			5084	N	Ds	E
Kmu_gl 266		62O/4	2983_13	140_27,28	29°10.23'	83°14.49'	13812	185			5090	NE	Ds	E
Kmu_gl 267		62O/3	2983_09	142_27,28	29°23.63'	83°7.69'	8950	130			4743	SW	Cs	E
Kmu_gl 268		62K/6	2983_09	145_25,26	29°31.57'	82°28.40'	16243	195			4514	NW	Cs	E
Kmu_gl 269		62K/6	2982_06	145_25,26	29°31.17'	82°27.37'	25923	275	415	Kmu_gr 249	4767	W	Cs	E
Kmu_gl 270		62K/6	2982_06	145_25,26	29°31.37'	82°26.79'	36133	235			4581	NE	Ds	V
Kmu_gl 271		62K/6	2982_06	145_25,26	29°31.31'	82°26.10'	8066	90	500	Kmu_gr 250	4767	NE	Cs	E
Kmu_gl 272		62K/7	2982_06	144_47,48	29°29.95'	82°21.23'	21282	135			4651	NE	Ds	E
Kmu_gl 273		62K/6	2983_10	144_47,48	29°31.11'	82°18.75'	7956	140			4502	SW	Cs	E
Kmu_gl 274	Sat Daha	62K/6	2982_06	145_29	29°30.86'	82°18.64'	39316	265			4444	NW	Ds	E
Kmu_gl 275		62K/6	2982_06	145_29	29°30.58'	82°18.38'	11116	160			4383	NW	Ds	E
Kmu_gl 276		62K/6	2982_06	145_29	29°30.01'	82°18.35'	26476	110			4502	NW	Ds	E
Kmu_gl 277	Rinimoksha T	62K/7	2983_10	127_4,5	29°26.97'	82°16.74'	9746	145			4264	NE	Ds	V
Kmu_gl 278	Rinimoksha T	62K/2	2983_05	127_4,5	29°26.97'	82°16.56'	20685	175			4307	NW	Cs	V
Kmu_gl 279	Rinimoksha T	62K/2	2983_05	127_4,5	29°26.93'	82°16.40'	8508	115			4325	NW	Cs	V
Kmu_gl 280	Rinimoksha T	62K/2	2983_05	127_4,5	29°26.87'	82°16.53'	1260	40			4340	NW	Cs	E

Glacial Lake Inventory of Bheri Basin

Total Number : 152 Total Area :9.16 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kbh_gl 1	Dudh Kundali	62K/12	2982_15	140_9,10	29°14.94'	82°33.97'	327131	750	1310	Kbh_gr 10	4633	NE	Ds	V
Kbh_gl 2		62kK/11	2982_11	142_40,41	29°21.18'	82°42.02'	3042	70	0	Kbh_gr 42	4100	S	Cs	S
Kbh_gl 3		62K/11	2982_11	142_40,41	29°21.29'	82°41.89'	12277	70	0	Kbh_gr 42	4130	S	Cs	S
Kbh_gl 4		62K/12	2982_15	139_21,22	29°6.15'	82°43.27'	40742	120			4206	S	Ds	V
Kbh_gl 5		62K/12	2982_15	139_21,22	29°6.78'	82°43.05'	24065	200	880	Kbh_gr 74	4633	SW	Ds	E
Kbh_gl 6		62K/12	2982_15	139_21,22	29°6.58'	82°43.46'	61928	340	1010	Kbh_gr 75	4298	S	Ds	C
Kbh_gl 7		62K/16	2982_16	141_16,17	29°14.05'	82°49.90'	125485	660			4145	SE	Ds	V
Kbh_gl 8		62K/16	2982_16	141_16,17	29°14.91'	82°48.91'	162017	810	415	Kbh_gr 95	4237	SE	Ds	E
Kbh_gl 9	Chhokarbo	62K/16	2982_16	141_16,17	29°14.96'	82°49.79'	34169	300	400	Kbh_gr 97	4481	SE	Ds	E
Kbh_gl 10	Phoksundo Ta	62K/16	2982_16	141_16,17	29°11.54'	82°57.12'	4528441	5150			3621	SW	Ds	V
Kbh_gl 11		62K/15	2982_12	141_19,20	29°18.07'	82°55.66'	6084	80			5105	SE	Ds	E
Kbh_gl 12		62K/15	2982_12	141_19,20	29°17.81'	82°56.21'	12467	150			5075	SW	Ds	B
Kbh_gl 13		62K/15	2982_12	141_19,20	29°15.93'	82°56.45'	20262	190			4953	S	Ds	E
Kbh_gl 14		62K/15	2982_12	141_21,22	29°16.89'	82°58.21'	31534	230	0	Kbh_gr 143	4968	E	Ds	E
Kbh_gl 15		62K/15	2982_12	141_21,22	29°17.27'	82°58.13'	18741	170	0	Kbh_gr 145	5029	SE	Ds	E
Kbh_gl 16		62O/3	2982_9	141_22,23	29°17.40'	83°1.16'	38406	386			4923	SE	Ds	V
Kbh_gl 17		62O/4	2982_13	140_22,23	29°14.57'	83°4.23'	18687	200			4938	SE	Ds	V
Kbh_gl 18		62O/4	2982_13	139_13,14	29°10.42'	83°0.49'	11136	140	285	Kbh_gr 157	5182	SE	Ds	E
Kbh_gl 19		62O/4	2982_13	139_11,12	29°6.80'	83°1.68'	48374	290	1365	Kbh_gr 159	4923	S	Ds	V
Kbh_gl 20		62O/4	2982_13	139_11,12	29°6.53'	83°1.55'	165032	615			4892	N	Ds	V
Kbh_gl 21		62O/4	2982_13	139_11,12	29°5.58'	83°1.01'	14558	195	630	Kbh_gr 169	4877	W	Ds	M
Kbh_gl 22		62O/4	2982_13	139_11,12	29°5.34'	83°0.98'	8882	150			5044	E	Ds	V
Kbh_gl 23		62O/4	2982_13	139_11,12	29°0.95'	83°1.67'	55816	255	330	Kbh_gr 172	4968	SW	Ds	V
Kbh_gl 24		62O/4	2982_13	138_38,39	28°59.22'	83°1.16'	3667	80			5090	SW	Ds	V
Kbh_gl 25		62P/1	2883_1	136_19,20	28°59.49'	83°0.56'	62444	460			5060	NE	Cs	E
Kbh_gl 26		62P/1	2883_1	136_19,20	28°59.95'	83°0.65'	5975	110			4740	NE	Ds	V
Kbh_gl 27		62P/1	2883_1	136_19,20	28°59.85'	83°0.41'	49379	405			4709	E	Ds	E
Kbh_gl 28		62P/1	2882_4	136_19,20	28°59.13'	82°57.67'	24934	235			4740	NE	Ds	E
Kbh_gl 29	Chama Kuni D	62L/13	2883_1	136_19,20	28°57.80'	83°0.62'	5188	100			4694	S	Ds	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kbh_gl 30		62P/1	2883_1	136_19,20	28°57.94'	83°0.44'	42372	295			4618	NW	Ds	V
Kbh_gl 31		62P/1	2883_1	136_19,20	29°4.50'	83°3.00'	21403	220			4496	SW	Ds	V
Kbh_gl 32		62O/4	2983_13	139_11,12	29°4.79'	83°2.40'	40253	330			4846	S	Ds	V
Kbh_gl 33		62O/4	2983_13	139_11,12	29°6.11'	83°4.19'	23304	230			4968	S	Ds	V
Kbh_gl 34		62O/4	2983_13	139_11,12	29°11.06'	83°10.74'	132411	1400			5243	S	Ds	V
Kbh_gl 35		62O/8	2983_14	139_62,63	29°7.90'	83°16.48'	29497	305			5113	NW	Ds	V
Kbh_gl 36		62O/8	2983_14	139_62,63	29°7.70'	83°17.00'	12684	150			5250	NW		V
Kbh_gl 37		62O/8	2983_14	139_62,63	29°6.60'	83°16.40'	13282	110			5182	NW	Ds	V
Kbh_gl 38		62O/8	2983_14	137_32,33	29°3.25'	83°16.44'	38379	315	30	Kbh_gr 183	5235	N	Ds	E
Kbh_gl 39		62O/8	2983_14	137_32,33	29°0.94'	83°15.39'	8176	100	0	Kbh_gr 186	5342	NE	Cs	S
Kbh_gl 40		62O/8	2983_14	137_32,33	29°1.15'	83°15.07'	6084	105	240	Kbh_gr 187	5273	NE	Cs	M
Kbh_gl 41		62O/4	2983_13	137_34,35	29°1.23'	83°11.80'	5378	105	800	Kbh_gr 192	5197	NE	Ds	M
Kbh_gl 42		62O/4	2983_13	137_34,35	29°0.49'	83°10.76'	15102	190			5197	SW	Ds	V
Kbh_gl 43		62O/4	2983_13	137_34,35	29°0.10'	83°11.00'	85477	450	265	Kbh_gr 196	5014	NW	Ds	V
Kbh_gl 44		62O/4	2883_1	137_34,35	28°59.81'	83°11.81'	24880	185	0	Kbh_gr 207	5212	SE	Ds	S
Kbh_gl 45		62O/4	2983_13	137_34,35	29°0.31'	83°13.95'	5921	95	40	Kbh_gr 209	5197	SW	Ds	E
Kbh_gl 46		62P/5	2883_2	136_26,27	28°57.85'	83°16.63'	6003	90	185	Kbh_gr 212	5326	W	Ds	V
Kbh_gl 47		62P/5	2883_2	136_26,27	28°57.00'	83°18.15'	10837	185	15	Kbh_gr 216	5380	W	Ds	V
Kbh_gl 48		62P/5	2883_2	135_35,36	28°53.59'	83°20.23'	20914	175			4534	SE		V
Kbh_gl 49		62O/8	2983_14	137_32,33	29°0.85'	83°17.65'	6111	90	30	Kbh_gr 231	5395	N	Ds	E
Kbh_gl 50		62O/8	2983_14	137_32,33	29°0.74'	83°16.71'	9045	90			5479	E		E
Kbh_gl 51		62O/8	2983_14	137_32,33	29°1.26'	83°16.72'	14776	120	0	Kbh_gr 232	5258	NW	Ds	M
Kbh_gl 52		62O/8	2983_14	137_32,33	29°3.40'	83°19.60'	8447	115			4359	N	Cs	E
Kbh_gl 53		62O/8	2983_14	136_29,30	29°6.49'	83°22.33'	6872	105			4808	SW	Cs	E
Kbh_gl 54		62O/8	2983_14	140_34	29°12.06'	83°27.38'	19339	225			5235	SW		E
Kbh_gl 55		62O/8	2983_14	140_34	29°11.46'	83°28.79'	14504	210			5456	SW		V
Kbh_gl 56		62O/8	2983_14	140_35	29°11.23'	83°28.95'	7768	115			5418	S		E
Kbh_gl 57		62O/12	2983_15	139_54,55	29°10.39'	83°30.60'	40905	242			5532	E	Ds	E
Kbh_gl 58		62O/12	2983_15	139_54,55	29°11.63'	83°30.42'	64807	425	365	Kbh_gr 239	5532	S	Ds	V
Kbh_gl 59		62O/12	2983_15	139_54,55	29°11.16'	83°30.78'	29361	290			5410	S	Ds	V
Kbh_gl 60		62O/12	2983_15	139_54,55	29°11.67'	83°30.73'	17492	175			5479	S		E
Kbh_gl 61		62O/12	2983_15	139_54,55	29°11.98'	83°32.29'	6709	150	45	Kbh_gr 241	5479	SW		M
Kbh_gl 62		62O/12	2983_15	139_54,55	29°10.13'	83°33.90'	34929	310			5288	SW	Ds	V
Kbh_gl 63		62O/12	2983_15	139_54,55	29°9.92'	83°33.41'	20588	165			5349	NW	Ds	V
Kbh_gl 64		62O/12	2983_15	139_54,55	29°9.53'	83°33.05'	48184	286			5410	N	Ds	E
Kbh_gl 65		62O/12	2983_15	139_54,55	29°8.96'	83°32.82'	27379	335			5418	W	Ds	E
Kbh_gl 66		62O/12	2983_15	139_54,55	29°8.45'	83°31.61'	46853	335			5349	N	Ds	V
Kbh_gl 67		62O/12	2983_15	138_24,25	29°5.73'	83°32.02'	106038	850			4938	SW	Ds	V
Kbh_gl 68		62O/12	2983_15	139_54,55	29°11.48'	83°34.98'	28384	262			5502	N	Cs	E
Kbh_gl 69		62O/12	2983_15	139_54,55	29°11.65'	83°35.27'	44979	325			5502	SE	Cs	E
Kbh_gl 70		62O/12	2983_15	138_24,25	29°7.41'	83°33.92'	15020	212			5410	SE	Ds	E
Kbh_gl 71		62O/12	2983_15	139_52	29°9.61'	83°37.59'	20208	210			5540	S	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kbh_gl 72		62O/12	2983_15	139_52	29°9.41'	83°38.52'	29796	342			5608	E	Ds	E
Kbh_gl 73		62O/12	2983_15	139_52	29°9.72'	83°39.75'	35989	335			5685	E	Cs	E
Kbh_gl 74		62O/12	2983_15	138_22,23	29°7.79'	83°40.48'	16894	121	0	Kbh_gr 244	5319	NW	Ds	S
Kbh_gl 75		62O/12	2983_15	138_22,23	29°7.93'	83°39.43'	6519	150	50	Kbh_gr 246	5563	N	Cs	E
Kbh_gl 76		62O/12	2983_15	138_22,23	29°7.87'	83°39.22'	19964	210	0	Kbh_gr 246	5593	N	Cs	L
Kbh_gl 77		62O/12	2983_15	138_22,23	29°7.15'	83°38.54'	8257	187			5563	NW	Cs	L
Kbh_gl 78		62O/12	2983_15	138_22,23	29°7.12'	83°38.65'	7714	165			5563	NW	Cs	L
Kbh_gl 79		62O/12	2983_15	138_22,23	29°6.94'	83°38.03'	3612	83			5563	N	Ds	V
Kbh_gl 80		62O/12	2983_15	138_22,23	29°6.31'	83°37.14'	7062	125			5509	N	Cs	E
Kbh_gl 81		62O/12	2983_15	138_22,23	29°5.81'	83°36.03'	9642	185			5532	SW		E
Kbh_gl 82		62O/12	2983_15	138_22,23	29°5.70'	83°36.59'	14531	155			5563	SW		V
Kbh_gl 83		62O/12	2983_15	138_22,23	29°4.76'	83°36.84'	11109	130			5486	SW		V
Kbh_gl 84		62O/12	2983_15	138_22,23	29°5.10'	83°37.12'	29035	325	40	Kbh_gr 253	5532	W		E
Kbh_gl 85		62O/12	2983_15	138_22,23	29°4.38'	83°35.07'	8963	125	0	Kbh_gr 258	5357	N		E
Kbh_gl 86		62O/12	2983_15	137_24,25	29°3.83'	83°34.23'	14205	195	90	Kbh_gr 259	5395	N		L
Kbh_gl 87		62O/12	2983_15	137_24,25	29°4.13'	83°32.78'	26374	260	165	Kbh_gr 262	5380	N		E
Kbh_gl 88		62O/12	2983_15	137_24,25	29°3.10'	83°36.46'	36505	255	0	Kbh_gr 263	5540	W		E
Kbh_gl 89		62O/12	2983_15	137_24,25	29°2.60'	83°35.70'	40742	275	80	Kbh_gr 264	5364	W		E
Kbh_gl 90		62O/12	2983_15	137_24,25	29°2.09'	83°35.30'	7279	80	0	Kbh_gr 265	5395	NW		S
Kbh_gl 91		62O/12	2983_15	137_24,25	29°2.53'	83°34.31'	10294	110	0	Kbh_gr 267	5715	N		M
Kbh_gl 92		62O/12	2983_15	137_24,25	29°1.75'	83°36.73'	37075	165	0	Kbh_gr 270	5593	N		E
Kbh_gl 93		62O/12	2983_15	137_24,25	29°0.17'	83°34.34'	14667	180	30	Kbh_gr 276	5212	N		E
Kbh_gl 94		62O/12	2983_15	137_24,25	29°0.27'	83°33.69'	12413	150	30	Kbh_gr 277	5349	N		M
Kbh_gl 95		62O/12	2983_15	137_24,25	29°0.33'	83°33.30'	14721	160	0	Kbh_gr 278	5410	N		M
Kbh_gl 96		62P/9	2883_3	136_33,34	28°57.53'	83°34.60'	7822	120			5540	N	Cs	E
Kbh_gl 97		62P/9	2883_3	136_33,34	28°57.19'	83°34.24'	10593	200			5563	W	Ds	V
Kbh_gl 98		62P/9	2883_3	136_33,34	28°57.16'	83°33.75'	5622	55	325	Kbh_gr 289	5418	NW	Ds	V
Kbh_gl 99		62P/5	2883_2	135_31,32	28°53.34'	83°29.63'	11897	105	0	Kbh_gr 295	5425	N	Ds	E
Kbh_gl 100		62P/9	2883_3	135_31,32	28°55.59'	83°30.05'	14341	145	380	Kbh_gr 298	5608	N	Ds	E
Kbh_gl 101		62P/5	2883_2	135_31,32	28°55.02'	83°28.44'	10050	135	30	Kbh_gr 300	5456	W		E
Kbh_gl 102		62P/5	2883_2	135_31,32	28°54.72'	83°27.92'	18986	175	240	Kbh_gr 301	5532	N	Ds	E
Kbh_gl 103		62O/8	2983_14	135_31,32	29°2.29'	83°25.91'	9262	80	155	Kbh_gr 312	5334	N	Ds	V
Kbh_gl 104		62O/8	2983_14	135_31,32	29°4.31'	83°23.25'	16460	190			5227	NE	Ds	E
Kbh_gl 105		62O/8	2983_14	135_31,32	29°4.09'	83°23.05'	26998	330			5227	NE	Ds	V
Kbh_gl 106		62P/5	2883_2	135_31,32	28°56.71'	83°25.86'	17166	190	274	Kbh_gr 324	5144	NW		E
Kbh_gl 107		62P/5	2883_2	135_31,32	28°56.47'	83°25.23'	15835	150	205	Kbh_gr 325	5227	NW	Ds	V
Kbh_gl 108		62P/5	2883_2	135_31,32	28°53.75'	83°28.07'	18443	220			5569	S	Ds	E
Kbh_gl 109		62P/5	2883_2	135_31,32	28°51.20'	83°25.01'	19339	155	0	Kbh_gr 336	5334	S	Ds	E
Kbh_gl 110		62P/5	2883_2	135_31,32	28°52.07'	83°29.52'	26265	335	320	Kbh_gr 338	5563	SW	Ds	L
Kbh_gl 111		62P/5	2883_2	135_31,32	28°52.18'	83°29.63'	10158	150	195	Kbh_gr 338	5563	SW	Ds	V
Kbh_gl 112		62P/5	2883_2	135_31,32	28°51.44'	83°28.54'	38080	345	475	Kbh_gr 339	5188	W	Ds	V
Kbh_gl 113		62P/5	2883_2	167_32,33	28°48.75'	83°26.01'	46609	325	1125	Kbh_gr 348	4663	NW	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kbh_gl 114		62P/5	2883_2	167_33,34	28°48.72'	83°20.23'	3205	50			5334	S	Cs	V
Kbh_gl 115		62P/5	2883_2	167_33,34	28°48.25'	83°20.58'	4617	90			5395	SW	Cs	E
Kbh_gl 116		62P/5	2883_2	167_33,34	28°48.30'	83°20.65'	4835	100			5364	SW	Cs	E
Kbh_gl 117		62P/5	2883_2	167_33,34	28°47.23'	83°19.89'	396120	1060	10	Kbh_gr 357	4438	NW	Ds	V
Kbh_gl 118		62P/1	2883_1	167_37,38	28°46.89'	83°10.82'	6274	100	0	Kbh_gr 386	5532	NE		E
Kbh_gl 119		62P/1	2883_1	167_37,38	28°47.44'	83°10.89'	7551	100	245	Kbh_gr 387	5502	E	Ds	E
Kbh_gl 120		62P/1	2883_1	167_37,38	28°47.88'	83°11.25'	81348	775	410	Kbh_gr 388	5307	E	Ds	V
Kbh_gl 121		62P/1	2883_1	167_37,38	28°49.28'	83°10.31'	8284	125	60	Kbh_gr 392	5235	E		V
Kbh_gl 122		62P/1	2883_1	167_37,38	28°48.32'	83°8.89'	5541	95	0	Kbh_gr 396	4938	NW		S
Kbh_gl 123		62P/1	2883_1	167_37,38	28°48.16'	83°7.41'	9751	115	0	Kbh_gr 404	4930	NE		S
Kbh_gl 124		62P/1	2883_1	167_37,38	28°48.07'	83°7.28'	6709	100	0	Kbh_gr 404	4950	NE		S
Kbh_gl 125		62P/1	2883_1	167_37,38	28°48.22'	83°6.42'	29714	230	90	Kbh_gr 407	5258	E		M
Kbh_gl 126		62P/1	2883_1	167_39,40	28°48.95'	83°6.95'	13934	155	540	Kbh_gr 408	5182	E		M
Kbh_gl 127		62P/1	2883_1	167_39,40	28°48.90'	83°6.61'	13825	185	1100	Kbh_gr 408	5206	E		M
Kbh_gl 128		62P/1	2883_1	167_39,40	28°49.78'	83°7.94'	15237	165			4648	NE		V
Kbh_gl 129		62P/1	2883_1	167_39,40	28°50.56'	83°4.48'	20778	190	50	Kbh_gr 411	4983	NE		E
Kbh_gl 130		62P/1	2883_1	167_39,40	28°47.62'	83°3.79'	22299	230	85	Kbh_gr 413	5005	NE		E
Kbh_gl 131		62P/1	2883_1	167_39,40	28°48.11'	83°3.88'	13391	150	390	Kbh_gr 413	4961	N		E
Kbh_gl 132		62L/13	2882_4	135_49,50	28°53.24'	82°45.56'	4780	95			4435	SE		E
Kbh_gl 133		62L/13	2882_4	135_49,50	28°52.27'	82°45.16'	23087	270			4511	SE		E
Kbh_gl 134	Sun Daha	62L/13	2882_4	134_14,15	28°49.68'	82°51.69'	43186	355			4389	SW		E
Kbh_gl 135	Sun Daha	62L/13	2882_4	134_14,15	28°49.26'	82°52.16'	126246	565			4389	SE		E
Kbh_gl 136		62P/2	2883_5	166_1,2	28°44.53'	83°1.89'	25613	240			4663	SW		E
Kbh_gl 137		62P/2	2883_5	166_1,2	28°44.52'	83°2.13'	79691	575			4663	SW		E
Kbh_gl 138		62P/2	2883_5	166_1,2	28°44.21'	83°2.78'	22544	260			4755	S		E
Kbh_gl 139		62P/2	2883_5	166_1,2	28°44.88'	83°4.16'	42290	275			4755	SE		E
Kbh_gl 140		62P/2	2883_5	166_2,3	28°43.33'	83°5.64'	7143	135			4770	SW		E
Kbh_gl 141		62P/2	2883_5	166_2,3	28°42.11'	83°6.36'	16405	95			4709	SW		V
Kbh_gl 142		62P/2	2883_5	166_2,3	28°42.36'	83°6.48'	66627	235			4785	S		V
Kbh_gl 143		62P/2	2883_5	166_2,3	28°43.06'	83°7.64'	14205	170	380	Kbh_gr 434	5052	SE		V
Kbh_gl 144		62P/2	2883_5	166_2,3	28°43.17'	83°7.33'	7659	135	865	Kbh_gr 434	5083	SE		E
Kbh_gl 145		62P/2	2883_5	165_55,56,57	28°39.49'	83°6.51'	36260	140			4481	SW		E
Kbh_gl 146		62P/2	2883_5	165_55,56,57	28°39.11'	83°7.34'	28465	235			4282	SW		V
Kbh_gl 147		62P/2	2883_5	165_55,56,57	28°39.58'	83°8.30'	38786	170			4465	SW		V
Kbh_gl 148		62P/2	2883_5	165_55,56,57	28°42.43'	83°11.12'	19366	195	895	Kbh_gr 443	4389	SE		M
Kbh_gl 149		62P/2	2883_5	165_55,56,57	28°39.08'	83°11.32'	16568	175			4328	SW		E
Kbh_gl 150		62L/10	2882_07	165_55,56,57	28°44.51'	82°38.47'	5269	95			3353	N	Cs	E
Kbh_gl 151		62L/10	2882_07	165_55,56,57	28°44.60'	82°38.30'	17410	155			3399	N	Ds	E
Kbh_gl 152		62L/9	2882_08	165_55,56,57	28°47.54'	82°30.95'	9642	190			2370	N	Cs	E

Glacial Lake Inventory of Tila Basin

Total Number : 71 Total Area : 4.97 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kti_gl 1		62K/7	2982_10	144_4	29°26.33'	82°16.01'	11712	150			4264	NW	Ds	E
Kti_gl 2		62K/7	2982_10	144_4	29°26.19'	82°16.42'	15629	190			4264	SE	Cs	E
Kti_gl 3		62K/7	2982_10	144_4	29°26.80'	82°18.72'	9739	130			4496	NE	Ds	E
Kti_gl 4		62K/7	2982_10	144_4	29°27.18'	82°18.26'	40622	315			4441	E	Ds	E
Kti_gl 5		62K/7	2982_10	145_30	29°28.14'	82°18.69'	26085	265			4264	NW	Ds	E
Kti_gl 6		62K/7	2982_10	145_30	29°28.18'	82°18.51'	24975	250			4282	N	Ds	E
Kti_gl 7		62K/7	2982_10	145_30	29°29.81'	82°19.03'	4272	85			4496	SE	Ds	E
Kti_gl 8		62K/7	2982_10	145_30	29°29.92'	82°18.86'	31355	255			4532	NE	Ds	E
Kti_gl 9		62K/7	2982_10	145_30	29°29.73'	82°20.34'	10456	195			4420	NW	Ds	E
Kti_gl 10		62K/7	2982_10	145_30	29°29.37'	82°20.33'	14427	215			4258	S	Ds	E
Kti_gl 11		62K/7	2982_10	145_28	29°28.52'	82°21.10'	16168	200			4382	SE	Ds	C
Kti_gl 12		62K/7	2982_10	145_28	29°29.18'	82°21.10'	86951	405			4709	SE	Ds	C
Kti_gl 13		62K/7	2982_10	145_28	29°29.43'	82°21.07'	18957	240			4892	S	Ds	E
Kti_gl 14	Lamo Daha	62K/7	2982_10	145_28	29°27.84'	82°23.02'	227069	1215			3978	W	Ds	V
Kti_gl 15		62K/7	2982_10	145_28	29°28.60'	82°22.57'	92258	490			4435	S	Ds	C
Kti_gl 16		62K/7	2982_10	145_27	29°28.57'	82°23.23'	33727	465			4404	S	Ds	V
Kti_gl 17		62K/7	2982_10	145_27	29°29.46'	82°23.44'	66198	350			4740	SW	Ds	C
Kti_gl 18		62K/7	2982_10	145_27	29°28.72'	82°23.87'	8495	105			4709	S	Ds	E
Kti_gl 19		62K/7	2982_10	145_27	29°27.99'	82°23.96'	57458	415	400	Kti_gr 1	4420	W	Ds	E
Kti_gl 20	Dahatheki Da	62K/7	2982_10	144_48	29°25.95'	82°21.72'	275377	635			4420	SW	Ds	C
Kti_gl 21		62K/7	2982_10	144_48	29°25.69'	82°24.17'	22585	300			4569	N	Ds	E
Kti_gl 22		62K/7	2982_10	144_48	29°25.97'	82°24.20'	42963	250			4526	SE	Ds	V
Kti_gl 23		62K/7	2982_10	144_48	29°25.57'	82°26.21'	13894	190			4526	S	Ds	E
Kti_gl 24		62K/7	2982_10	144_48	29°24.44'	82°25.89'	162011	630			4404	NW	Ds	C
Kti_gl 25		62K/7	2982_10	143_6	29°24.33'	82°26.52'	13962	170			4724	NW	Ds	E
Kti_gl 26		62K/7	2982_10	143_6	29°23.45'	82°23.78'	213549	740			4100	NW	Ds	V
Kti_gl 27		62K/7	2982_10	143_6	29°22.89'	82°24.66'	78836	415			4343	NW	Ds	V
Kti_gl 28		62K/7	2982_10	143_6	29°23.24'	82°24.98'	156857	570			4526	SW	Ds	C
Kti_gl 29	Dhauli Daha	62K/7	2982_10	143_6	29°23.03'	82°25.48'	444117	1150			4282	W	Ds	C

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kti_gl 30		62K/7	2982_10	143_6	29°22.89'	82°23.88'	46077	290			4496	N	Ds	C
Kti_gl 31		62K/7	2982_10	142_48	29°23.35'	82°23.04'	10266	140			4321	NE	Ds	E
Kti_gl 32		62K/7	2982_10	142_50	29°23.12'	82°20.21'	8047	135			4359	SE	Ds	E
Kti_gl 33		62K/7	2982_10	143_6	29°22.72'	82°22.94'	4082	85			4359	SW	Cs	E
Kti_gl 34		62K/7	2982_10	143_6	29°22.68'	82°23.09'	3083	80			4435	SW	Cs	E
Kti_gl 35		62K/7	2982_10	143_6	29°22.77'	82°23.13'	19956	240			4435	SW	Cs	E
Kti_gl 36		62K/7	2982_10	143_6	29°22.27'	82°23.67'	13937	180			4252	SE	Ds	V
Kti_gl 37		62K/7	2982_10	143_7	29°23.20'	82°28.47'	29155	285			4526	E	Ds	V
Kti_gl 38		62K/7	2982_10	143_7	29°23.18'	82°28.05'	26556	240			4572	E	Ds	C
Kti_gl 39		62K/7	2982_10	143_7	29°23.36'	82°28.35'	13416	170			4587	E	Ds	E
Kti_gl 40		62K/7	2982_10	143_7	29°24.20'	82°26.93'	16389	190			4618	SE	Ds	E
Kti_gl 41		62K/7	2982_10	144_8	29°25.02'	82°27.47'	14703	165			4587	SE	Ds	V
Kti_gl 42		62K/7	2982_10	144_8	29°25.26'	82°27.51'	15512	175			4648	S	Ds	V
Kti_gl 43		62K/11	2982_11	143_9	29°23.13'	82°30.83'	604020	2800	1750	Kti_gr 22	3810	SW	Ds	V
Kti_gl 44		62K/11	2982_11	143_9	29°24.61'	82°32.21'	62190	465	0	Kti_gr 22	4930	SW	Ds	S
Kti_gl 45		62K/11	2982_10	142_46	29°19.18'	82°29.00'	39329	350			4313	W	Cs	E
Kti_gl 46		62K/11	2982_10	142_46	29°18.53'	82°28.59'	195456	900			4039	NW	Ds	V
Kti_gl 47		62K/11	2982_10	142_46	29°16.36'	82°28.42'	9451	130			4374	S	Cs	E
Kti_gl 48		62K/11	2982_10	142_46	29°17.27'	82°29.60'	18442	235			4801	NE	Cs	E
Kti_gl 49		62K/11	2982_10	142_46	29°18.63'	82°29.81'	22830	215			4587	NE	Cs	C
Kti_gl 50		62K/11	2982_11	141_8	29°15.56'	82°30.63'	39390	290			4374	NW	Ds	V
Kti_gl 51		62K/8	2982_14	141_7	29°12.50'	82°29.03'	66370	360			4237	SW	Ds	C
Kti_gl 52		62K/12	2982_15	140_9	29°12.93'	82°30.30'	49068	370			4450	S	Ds	E
Kti_gl 53		62K/12	2982_15	140_9	29°10.52'	82°30.91'	19380	185			4374	SW	Cs	E
Kti_gl 54		62K/12	2982_15	140_9	29°10.76'	82°31.10'	102309	585			4496	SW	Ds	C
Kti_gl 55		62K/8	2982_14	139_28	29° 6.93'	82°20.02'	13710	155			4176	N	Ds	E
Kti_gl 56		62K/8	2982_14	139_28	29° 7.56'	82°18.05'	23002	250			4191	NE	Ds	E
Kti_gl 57		62K/8	2982_14	139_28	29° 7.31'	82°17.97'	35327	290			4267	NW	Ds	C
Kti_gl 58		62K/4	2982_13	124_7	29° 9.73'	82°10.25'	40941	325			3478	NW	Ds	V
Kti_gl 59	Giri Daha	62K/4	2982_13	124_7	29° 9.64'	82°10.71'	258486	1200			3480	NW	Ds	V
Kti_gl 60		62K/8	2982_14	139_27	29° 7.17'	82°15.49'	175280	725			4450	NW	Ds	V
Kti_gl 61		62K/8	2982_14	139_27	29° 6.67'	82°15.67'	101182	445			4569	NW	Ds	E
Kti_gl 62	Visht Daha	62K/4	2982_13	138_58	29° 6.96'	82°14.28'	132605	810			4267	NW	Ds	V
Kti_gl 63		62K/4	2982_13	138_58	29° 6.65'	82°14.84'	29676	375			4420	N	Ds	V
Kti_gl 64	Shankh Daha	62K/4	2982_13	138_58	29° 6.35'	82°14.34'	118821	630			4526	NW	Ds	C
Kti_gl 65		62K/4	2982_13	138_58	29° 6.73'	82°13.87'	46537	310			4481	N	Cs	E
Kti_gl 66		62K/4	2982_13	138_58	29° 6.67'	82°13.27'	37282	340			4359	NW	Ds	V
Kti_gl 67		62K/4	2982_13	138_58	29° 5.83'	82°12.21'	49289	410			4359	N	Ds	C
Kti_gl 68		62K/4	2982_13	138_58	29° 6.25'	82°12.05'	47787	495			4275	NE	Ds	V
Kti_gl 69	Jogni Daha	62K/8	2982_13	138_58	29° 5.04'	82°11.27'	124459	630			4240	NW	Ds	V
Kti_gl 70	Shankh Daha	62K/8	2982_14	139_27	29° 5.09'	82°16.43'	39035	320			4496	SE	Cs	E
Kti_gl 71		62K/8	2982_14	139_27	29° 6.46'	82°16.21'	26226	230			4481	NE	Ds	E

Glacial Lake Inventory of Humla Basin

Total Number : 345   Total Area : 13.01 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Khu_gl 1		62G/13	2981_4	151_6,7	29º55.29'	81º45.84'	5003	95			4255	NW	Ds	V
Khu_gl 2		62G/9	2981_3	152_2,3	29º57.82'	81º42.24'	14973	190			4368	E	Ds	V
Khu_gl 3		62F/12	3081_15	153_17,18	30º 0.52'	81º43.46'	10075	65			3837	NW	Ds	C
Khu_gl 4		62G/9	2981_3	152_1,2	29º56.46'	81º37.39'	3498	65			4730	E	Cs	V
Khu_gl 5		62G/9	2981_3	152_1,2	29º57.11'	81º36.53'	3743	85			4746	SW	Ds	V
Khu_gl 6		62G/9	2981_3	152_1,2	29º56.84'	81º36.36'	28862	310			4668	SE	Ds	V
Khu_gl 7		62G/9	2981_3	152_1,2	29º56.47'	81º34.72'	6087	90	0	Khu_gr 8	4831	W	Cs	S
Khu_gl 8		62G/5	2981_2	170_18	29º58.97'	81º28.50'	35544	145	1505	Khu_gr 24	4962	SW	Ds	V
Khu_gl 9		62F/12	3081_15	153_13,14	30º 0.17'	81º33.30'	10355	150			4889	E	Cs	E
Khu_gl 10		62F/8	3081_14	154_10	30º 4.76'	81º17.58'	8956	165			*	SW		V
Khu_gl 11		62F/8	3081_14	154_10	30º 6.80'	81º21.06'	7941	70	1150	Khu_gr 37	*	SW		E
Khu_gl 12		62F/8	3081_14	156_10	30º11.86'	81º24.63'	5947	120			*	W		E
Khu_gl 13		62F/7	3081_10	157_23,24	30º17.06'	81º29.94'	70633	525			5044	SW	Ds	V
Khu_gl 14		62F/7	3081_10	157_23,24	30º16.74'	81º29.37'	111949	550	375	Khu_gr 41	5177	SE	Ds	M
Khu_gl 15		62F/7	3081_10	157_23,24	30º18.09'	81º29.87'	32990	345			5136	NE	Ds	V
Khu_gl 16		62F/7	3081_10	158_24,25	30º18.85'	81º25.95'	81163	410			5499	SE	Ds	V
Khu_gl 17		62F/7	3081_10	158_24,25	30º18.72'	81º25.65'	17457	155			5590	SE	Cs	C
Khu_gl 18		62F/7	3081_10	158_24,25	30º19.04'	81º25.67'	56254	385			5541	SE	Ds	V
Khu_gl 19		62F/7	3081_10	158_24,25	30º19.22'	81º24.92'	10915	125			5633	SE	Cs	C
Khu_gl 20		62F/7	3081_10	158_24,25	30º19.51'	81º24.42'	12629	155	0	Khu_gr 48	5745	SE	Ds	L
Khu_gl 21		62F/7	3081_10	158_24,25	30º20.68'	81º24.79'	307020	990	0	Khu_gr 49	5742	SE	Ds	M
Khu_gl 22		62F/7	3081_10	158_24,25	30º19.01'	81º26.88'	8886	110	90	Khu_gr 50	5477	SE	Cs	M
Khu_gl 23		62F/7	3081_10	158_24,25	30º19.14'	81º26.93'	13539	120	0	Khu_gr 50	5474	E	Cs	M
Khu_gl 24		62F/7	3081_10	158_24,25	30º19.23'	81º27.24'	2449	50	385	Khu_gr 50	5502	E	Cs	C
Khu_gl 25		62F/7	3081_10	158_24,25	30º19.25'	81º27.13'	5842	80	220	Khu_gr 50	5477	E	Cs	C
Khu_gl 26		62F/7	3081_10	158_24,25	30º19.29'	81º27.01'	5947	75	80	Khu_gr 50	5477	E	Cs	M
Khu_gl 27		62F/7	3081_10	158_24,25	30º19.34'	81º27.18'	4093	75	305	Khu_gr 50	5486	E	Cs	C
Khu_gl 28		62F/7	3081_10	158_24,25	30º19.41'	81º29.19'	9796	160	655	Khu_gr 52	5328	SE	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 29		62F/7	3081_10	158_24,25	30º20.02'	81º28.40'	5423	110	365	Khu_gr 53	5368	NE	Ds	V
Khu_gl 30		62F/7	3081_10	158_24,25	30º19.83'	81º27.78'	5353	120	85	Khu_gr 53	5492	NE	Cs	L
Khu_gl 31		62F/7	3081_10	158_24,25	30º20.08'	81º27.76'	14029	190	480	Khu_gr 53	5453	NE	Cs	V
Khu_gl 32		62F/7	3081_10	158_24,25	30º20.28'	81º27.88'	2029	40	620	Khu_gr 54	5459	E	Cs	C
Khu_gl 33		62F/7	3081_10	158_24,25	30º20.28'	81º27.78'	2379	45	455	Khu_gr 54	5468	E	Cs	C
Khu_gl 34		62F/7	3081_10	158_24,25	30º20.52'	81º27.95'	12139	80	225	Khu_gr 55	5441	SE	Ds	V
Khu_gl 35		62F/7	3081_10	158_24,25	30º20.62'	81º28.09'	7172	95	465	Khu_gr 55	5438	E	Cs	V
Khu_gl 36		62F/7	3081_10	158_24,25	30º20.62'	81º27.83'	8781	175	40	Khu_gr 55	5471	SW	Cs	M
Khu_gl 37		62F/7	3081_10	158_24,25	30º21.44'	81º26.43'	41351	330	70	Khu_gr 56	5492	NE	Ds	M
Khu_gl 38		62F/7	3081_10	158_24,25	30º21.71'	81º24.99'	13014	160	140	Khu_gr 57	5694	NE	Ds	V
Khu_gl 39		62F/7	3081_10	158_24,25	30º21.62'	81º24.92'	8746	160	315	Khu_gr 57	5709	N	Cs	M
Khu_gl 40		62F/7	3081_10	159_2,3	30º23.69'	81º25.90'	20501	190			5441	SE	Ds	V
Khu_gl 41		62F/7	3081_10	159_2,3	30º23.82'	81º25.56'	30786	205			5450	SE	Ds	V
Khu_gl 42		62F/7	3081_10	159_2,3	30º24.37'	81º25.72'	99985	675			5502	SW	Ds	V
Khu_gl 43		62F/7	3081_10	159_2,3	30º24.52'	81º25.48'	20501	185			5508	E	Cs	V
Khu_gl 44		62F/7	3081_10	159_2,3	30º25.07'	81º25.20'	11615	150			5575	SW	Cs	C
Khu_gl 45		62F/7	3081_10	159_2,3	30º25.13'	81º25.64'	148962	595			5544	SW	Ds	V
Khu_gl 46		62F/7	3081_10	159_2,3	30º24.39'	81º27.10'	198360	555			5724	SW	Ds	V
Khu_gl 47		62F/7	3081_10	158_24,25	30º22.53'	81º29.30'	36383	235			5209	E	Ds	V
Khu_gl 48		62F/11	3081_11	158_24,26	30º22.68'	81º34.41'	250836	1320			1556	NW	Cs	V
Khu_gl 49		62F/11	3081_11	158_24,27	30º23.03'	81º34.13'	29946	295			1556	NW	Cs	V
Khu_gl 50		62F/11	3081_11	158_24,28	30º23.26'	81º33.94'	23264	265			1557	NW	Ds	V
Khu_gl 51		62F/11	3081_11	158_24	30º23.95'	81º33.46'	8256	130			1562	NW	Ds	V
Khu_gl 52		62F/11	3081_11	158_21	30º24.49'	81º38.12'	6857	130			1482	S	Ds	E
Khu_gl 53		62F/11	3081_11	157_19	30º18.81'	81º40.55'	6052	115			*	SE	Cs	E
Khu_gl 54		62F/11	3081_11	157_19	30º18.84'	81º40.44'	12664	195			*	SE	Cs	E
Khu_gl 55		62F/11	3081_11	157_19	30º19.14'	81º40.52'	13224	235			*	S	Cs	E
Khu_gl 56		62F/11	3081_11	157_19	30º18.82'	81º41.19'	39532	320			*	SW	Cs	E
Khu_gl 57		62F/15	3081_12	158_14,15	30º22.73'	81º45.89'	9026	145			5480	SW	Ds	V
Khu_gl 58		62F/15	3081_12	158_13,14	30º22.08'	81º50.93'	5423	90	125	Khu_gr 61	5520	SW	Ds	V
Khu_gl 59		62F/15	3081_12	158_13,14	30º21.95'	81º52.11'	8326	140	0	Khu_gr 63	5669	S	Ds	M
Khu_gl 60		62F/15	3081_12	158_13,14	30º20.80'	81º51.74'	155224	605	210	Khu_gr 64	5505	NW	Ds	V
Khu_gl 61		62F/15	3081_12	158_13,14	30º20.33'	81º51.45'	18856	220	175	Khu_gr 64	5663	NE	Ds	V
Khu_gl 62		62F/15	3081_12	158_13,14	30º20.95'	81º50.72'	4793	85	265	Khu_gr 65	5541	N	Cs	E
Khu_gl 63		62F/15	3081_12	158_13,14	30º20.72'	81º50.59'	68044	355	0	Khu_gr 65	5578	NE	Cs	M
Khu_gl 64		62F/15	3081_12	158_13,14	30º20.76'	81º49.96'	83717	710	0	Khu_gr 66	5578	NE	Ds	M
Khu_gl 65		62F/15	3081_12	158_13,14	30º19.60'	81º49.19'	22460	285	0	Khu_gr 69	5624	SW	Cs	M
Khu_gl 66		62F/15	3081_12	158_13,14	30º19.66'	81º49.01'	5947	95	515	Khu_gr 70	5572	SW	Ds	V
Khu_gl 67		62F/15	3081_12	158_13,14	30º19.54'	81º48.91'	11545	150	240	Khu_gr 70	5560	SW	Ds	V
Khu_gl 68		62F/15	3081_12	158_13,14	30º19.43'	81º48.75'	5982	95	85	Khu_gr 70	5541	SW	Ds	V
Khu_gl 69		62F/15	3081_12	158_14,15	30º18.18'	81º47.80'	163271	1850			5083	SW	Ds	V
Khu_gl 70		62F/15	3081_12	158_13,14	30º19.46'	81º50.37'	5003	100	435	Khu_gr 72	5599	S	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 71		62F/15	3081_12	158_13,14	30º19.50'	81º50.13'	77665	330	0	Khu_gr 72	5633	SE	Ds	M
Khu_gl 72		62F/15	3081_12	158_13,14	30º19.59'	81º50.29'	16827	210	325	Khu_gr 72	5633	E	Ds	V
Khu_gl 73		62F/15	3081_12	158_13,14	30º19.80'	81º50.13'	31136	190	95	Khu_gr 73	5662	SE	Ds	V
Khu_gl 74		62F/15	3081_12	158_13,14	30º19.31'	81º50.60'	5702	110	245	Khu_gr 76	5608	SW	Ds	V
Khu_gl 75		62F/15	3081_12	158_13,14	30º19.26'	81º50.70'	17212	185	45	Khu_gr 76	5578	SW	Ds	V
Khu_gl 76		62F/15	3081_12	158_13,14	30º19.53'	81º52.45'	37748	260			5660	S	Ds	V
Khu_gl 77		62F/15	3081_12	158_13,14	30º20.00'	81º52.32'	9061	140			5715	SE	Ds	V
Khu_gl 78		62F/15	3081_12	158_13,14	30º19.34'	81º52.95'	5597	45	445	Khu_gr 78	5700	SW	Cs	E
Khu_gl 79		62F/15	3081_12	158_13,14	30º18.99'	81º53.07'	5632	100	0	Khu_gr 79	5611	W	Cs	M
Khu_gl 80		62F/15	3081_12	158_13,14	30º18.86'	81º52.55'	50167	375	80	Khu_gr 79	5584	SW	Ds	V
Khu_gl 81		62F/15	3081_12	158_13,14	30º18.51'	81º52.02'	137592	405	170	Khu_gr 80	5514	NW	Cs	E
Khu_gl 82		62F/15	3081_12	157_11,12	30º18.09'	81º50.63'	80254	495	0	Khu_gr 81	5389	N	Ds	M
Khu_gl 83		62F/15	3081_12	157_11,12	30º15.83'	81º52.50'	3918	70	730	Khu_gr 87	5450	SW	Cs	E
Khu_gl 84		62F/15	3081_12	157_11,12	30º16.13'	81º52.41'	88335	530	0	Khu_gr 87	5450	SW	Ds	M
Khu_gl 85		62F/15	3081_12	157_11,12	30º16.67'	81º52.66'	31836	260	400	Khu_gr 87	5544	W	Cs	E
Khu_gl 86		62F/15	3081_12	157_11,12	30º15.20'	81º53.06'	11055	115	350	Khu_gr 91	5547	NW	Cs	C
Khu_gl 87		62F/16	3081_16	156_20,21	30º12.67'	81º52.63'	14833	195	60	Khu_gr 92	5694	SW	Cs	V
Khu_gl 88		62F/16	3081_16	156_20,21	30º12.31'	81º52.58'	14169	145	365	Khu_gr 92	5724	NW	Cs	E
Khu_gl 89		62F/16	3081_16	156_20,21	30º11.77'	81º51.84'	4688	110	215	Khu_gr 93	5179	N	Cs	L
Khu_gl 90		62F/16	3081_16	156_20,21	30º10.77'	81º52.43'	10915	100	270	Khu_gr 93	5361	W	Cs	V
Khu_gl 91		62F/16	3081_16	156_20,21	30º10.92'	81º52.85'	19066	255	290	Khu_gr 93	5581	SW	Ds	V
Khu_gl 92		62F/16	3081_16	156_19,20	30º11.77'	81º49.60'	7766	135	165	Khu_gr 94	5072	SW	Cs	C
Khu_gl 93		62F/16	3081_16	156_19,20	30º11.41'	81º48.61'	2939	60			5182	E	Cs	V
Khu_gl 94		62F/16	3081_16	156_19,20	30º10.90'	81º48.28'	12559	175	110	Khu_gr 96	5300	E	Cs	E
Khu_gl 95		62F/16	3081_16	156_19,20	30º11.00'	81º48.16'	6332	105	10	Khu_gr 96	5307	E	Cs	E
Khu_gl 96		62F/16	3081_16	156_19,20	30º11.36'	81º47.58'	4618	90	50	Khu_gr 97	5456	NE	Cs	E
Khu_gl 97		62F/16	3081_16	156_19,20	30º14.08'	81º48.61'	3428	95			4947	NE	Ds	V
Khu_gl 98		62F/16	3081_16	156_19,20	30º13.44'	81º48.25'	9096	125			5398	NW	Ds	V
Khu_gl 99		62F/16	3081_16	156_19,20	30º13.35'	81º48.33'	3184	105			5389	NE	Cs	E
Khu_gl 100		62F/16	3081_16	156_19,20	30º13.16'	81º48.19'	124194	500	35	Khu_gr 101	5416	N	Ds	V
Khu_gl 101		62F/16	3081_16	156_19,20	30º13.64'	81º46.57'	17422	95	30	Khu_gr 102	5389	NE	Ds	V
Khu_gl 102		62F/16	3081_16	156_19,20	30º13.48'	81º46.61'	8396	170	275	Khu_gr 102	5393	N	Ds	M
Khu_gl 103		62F/16	3081_16	156_19,20	30º12.59'	81º45.13'	48663	325	265	Khu_gr 103	5483	NE	Ds	V
Khu_gl 104		62F/12	3081_15	156_17,18	30º11.16'	81º44.97'	50552	385	230	Khu_gr 105	5108	W	Ds	V
Khu_gl 105		62F/12	3081_15	156_17,18	30º11.70'	81º44.07'	5318	105			4962	NW	Ds	V
Khu_gl 106		62F/12	3081_15	156_17,18	30º11.56'	81º44.04'	4583	85			4999	NE	Ds	V
Khu_gl 107		62F/12	3081_15	156_17,18	30º11.32'	81º44.33'	5318	85			5090	NW	Cs	V
Khu_gl 108		62F/12	3081_15	156_17,18	30º11.83'	81º43.74'	3463	55			5029	NW	Cs	V
Khu_gl 109		62F/12	3081_15	156_17,18	30º11.71'	81º43.80'	3673	75			4996	NE	Ds	V
Khu_gl 110		62F/12	3081_15	156_17,18	30º11.22'	81º43.23'	3393	65			4999	E	Ds	V
Khu_gl 111		62F/12	3081_15	156_17,18	30º11.09'	81º43.01'	6087	100			4999	W	Cs	V
Khu_gl 112		62F/12	3081_15	156_17,18	30º11.31'	81º42.66'	5458	100			4877	NW	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 113		62F/12	3081_15	155_19,20	30º 9.60'	81º41.88'	8081	115			4843	NW	Ds	V
Khu_gl 114		62F/12	3081_15	155_19,20	30º 9.45'	81º41.95'	4093	105			4877	NE	Cs	V
Khu_gl 115		62F/12	3081_15	155_19,20	30º 9.81'	81º39.94'	77700	500	75	Khu_gr 106	4892	NE	Cs	B
Khu_gl 116		62F/12	3081_15	155_19,20	30º 9.82'	81º39.60'	3044	80	125	Khu_gr 107	4953	NE	Cs	B
Khu_gl 117		62F/12	3081_15	155_19,20	30º10.46'	81º39.26'	5458	80	115	Khu_gr 108	5224	E	Cs	V
Khu_gl 118		62F/12	3081_15	155_20,21	30º11.87'	81º38.66'	7906	130	110	Khu_gr 111	5221	NE	Ds	V
Khu_gl 119		62F/12	3081_15	155_20,21	30º 8.05'	81º37.49'	13154	175			4679	SE	Ds	V
Khu_gl 120		62F/12	3081_15	155_20,21	30º 9.34'	81º38.68'	124473	670	0	Khu_gr 135	4907	SE	Ds	M
Khu_gl 121		62F/12	3081_15	155_20,21	30º 9.83'	81º38.18'	5458	95	0	Khu_gr 135	5090	SE	Cs	S
Khu_gl 122		62F/12	3081_15	155_20,21	30º 7.12'	81º39.79'	20851	235			4816	SE	Cs	E
Khu_gl 123		62F/12	3081_15	155_20,21	30º 7.37'	81º39.81'	10320	165			4907	SE	Cs	E
Khu_gl 124	Kyam Daha	62F/12	3081_15	155_20,21	30º 7.41'	81º42.16'	12314	200			4871	NE	Ds	V
Khu_gl 125		62F/12	3081_15	156_17,18	30º 8.50'	81º41.66'	36698	135			4602	S	Ds	V
Khu_gl 126	Chhyungar Da	62F/12	3081_15	156_17,18	30º 8.42'	81º41.13'	202033	890			4679	SE	Ds	V
Khu_gl 127	Selima Daha	62F/12	3081_15	156_17,18	30º 8.88'	81º43.25'	36418	455			4578	SE	Ds	V
Khu_gl 128		62F/12	3081_15	156_17,18	30º 9.99'	81º43.45'	18157	215			4874	S	Ds	V
Khu_gl 129	Tarchi Daha	62F/12	3081_15	156_17,18	30º10.47'	81º43.68'	39077	265			4996	SW	Ds	V
Khu_gl 130		62F/12	3081_15	156_17,18	30º10.83'	81º44.03'	7032	135			5151	S	Ds	V
Khu_gl 131		62F/12	3081_15	156_17,18	30º10.63'	81º44.37'	3079	75			5240	SW	Ds	V
Khu_gl 132		62F/12	3081_15	156_17,18	30º10.16'	81º44.11'	3533	85			5182	SW	Cs	C
Khu_gl 133		62F/12	3081_15	156_17,18	30º 9.94'	81º43.66'	7032	100			4907	W	Ds	V
Khu_gl 134		62F/12	3081_15	156_17,18	30º10.07'	81º44.67'	4128	75			5081	SW	Ds	V
Khu_gl 135		62F/12	3081_15	156_17,18	30º10.09'	81º44.60'	3638	70			5075	SE	Ds	V
Khu_gl 136		62F/12	3081_15	156_17,18	30º10.01'	81º44.53'	6787	140			5093	S	Ds	V
Khu_gl 137		62F/12	3081_15	156_17,18	30º10.14'	81º44.37'	2589	50			4831	SE	Ds	V
Khu_gl 138	Chhaung Dah	62F/12	3081_15	156_17,18	30º 9.77'	81º44.93'	175865	410			5054	SW	Ds	V
Khu_gl 139		62F/12	3081_15	156_17,18	30º 9.10'	81º44.42'	7487	115			4749	W	Cs	E
Khu_gl 140		62F/16	3081_16	155_18,19	30º 9.07'	81º45.93'	3393	75	870	Khu_gr 141	4923	SW	Cs	V
Khu_gl 141		62F/16	3081_16	155_18,19	30º 9.07'	81º45.85'	2449	75			4923	SE	Cs	V
Khu_gl 142		62F/16	3081_16	155_18,19	30º 9.56'	81º46.19'	5388	110	330	Khu_gr 141	5258	SE	Cs	V
Khu_gl 143		62F/16	3081_16	155_18,19	30º 9.08'	81º46.09'	14204	195	605	Khu_gr 141	4929	SW	Ds	C
Khu_gl 144		62F/16	3081_16	155_18,19	30º 8.34'	81º46.51'	4828	65			5090	E	Ds	V
Khu_gl 145	Chhhungsa D	62F/16	3081_16	155_18,19	30º 7.73'	81º46.94'	689887	740	770	Khu_gr 143	4907	SW	Ds	M
Khu_gl 146		62F/16	3081_16	155_18,19	30º 7.30'	81º46.41'	7207	140			4871	NE	Cs	E
Khu_gl 147		62F/16	3081_16	155_18,19	30º 7.24'	81º46.35'	5108	110			4874	NE	Cs	E
Khu_gl 148		62F/16	3081_16	155_18,19	30º 7.43'	81º46.18'	7487	130			4874	E	Cs	E
Khu_gl 149		62F/16	3081_16	155_18,19	30º 7.23'	81º46.08'	5143	95			4919	NW	Cs	E
Khu_gl 150		62F/16	3081_16	155_18,19	30º 7.04'	81º45.75'	6227	125			4953	NW	Ds	E
Khu_gl 151		62F/12	3081_15	155_20,21	30º 6.79'	81º44.81'	5527	125			4737	NW	Ds	V
Khu_gl 152		62F/12	3081_15	155_20,21	30º 6.35'	81º43.79'	8571	160			4566	NW	Ds	V
Khu_gl 153		62F/12	3081_15	155_20,21	30º 6.31'	81º44.47'	18856	170			4755	NW	Cs	V
Khu_gl 154		62F/12	3081_15	155_20,21	30º 6.23'	81º44.62'	3883	90			4776	W	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 155		62F/12	3081_15	155_20,21	30º 6.23'	81º44.38'	3813	65			4785	W	Ds	V
Khu_gl 156		62F/12	3081_15	155_20,21	30º 6.03'	81º44.53'	25713	295			4755	NW	Ds	V
Khu_gl 157	Nalev Daha	62F/12	3081_15	155_20,21	30º 6.29'	81º43.70'	33025	330			4566	NW	Ds	V
Khu_gl 158		62F/12	3081_15	155_20,21	30º 4.94'	81º44.59'	2519	55			4292	SW	Cs	C
Khu_gl 159		62F/16	3081_16	154_21,22	30º 4.88'	81º45.37'	319825	1675			4228	SW	Ds	V
Khu_gl 160	Kancha Daha	62F/16	3081_16	154_21,22	30º 5.38'	81º46.41'	14309	170			4560	NW	Ds	V
Khu_gl 161		62F/16	3081_16	154_22,23	30º 4.91'	81º48.52'	6192	105			4417	NW	Ds	V
Khu_gl 162		62F/16	3081_16	154_22,23	30º 4.76'	81º48.70'	32290	345			4423	NW	Ds	V
Khu_gl 163		62F/16	3081_16	154_22,23	30º 5.36'	81º48.97'	50727	190			4831	SE	Ds	V
Khu_gl 164		62F/16	3081_16	154_22,23	30º 5.63'	81º48.82'	22075	245			4953	SE	Cs	C
Khu_gl 165		62F/16	3081_16	154_22,23	30º 6.39'	81º50.43'	18087	80	690	Khu_gr 149	4569	NE	Ds	V
Khu_gl 166		62F/16	3081_16	154_22,23	30º 6.41'	81º50.29'	2974	85	795	Khu_gr 149	4569	E	Ds	V
Khu_gl 167		62F/16	3081_16	154_22,23	30º 6.41'	81º50.06'	7627	110			4674	E	Ds	V
Khu_gl 168		62F/16	3081_16	154_22,23	30º 5.88'	81º49.64'	50867	255	0	Khu_gr 150	4781	NE	Cs	M
Khu_gl 169		62F/16	3081_16	154_22,23	30º 6.05'	81º49.07'	9236	125			4682	N	Cs	E
Khu_gl 170		62F/16	3081_16	154_22,23	30º 6.28'	81º48.35'	14903	185	105	Khu_gr 158	4813	E	Ds	V
Khu_gl 171		62F/16	3081_16	154_22,23	30º 6.68'	81º48.94'	22915	245	520	Khu_gr 153	4746	SE	Ds	V
Khu_gl 172		62F/16	3081_16	154_23,24	30º 7.11'	81º52.63'	44220	290	160	Khu_gr 156	5026	SW	Cs	C
Khu_gl 173		62F/16	3081_16	154_20,21	30º 1.77'	81º51.45'	10005	155			4642	SW	Cs	E
Khu_gl 174		62F/16	3081_16	154_20,21	30º 1.66'	81º52.08'	5912	110			4322	SW	Cs	E
Khu_gl 175		62F/16	3081_16	155_23,24	30º 2.63'	81º58.12'	81233	425	485	Khu_gr 167	3968	SE	Ds	V
Khu_gl 176		62F/16	3081_16	155_23,24	30º 2.93'	81º56.59'	29771	350			4627	E	Ds	V
Khu_gl 177		62F/16	3081_16	155_23,24	30º 3.46'	81º56.53'	116742	460	60	Khu_gr 168	4563	E	Ds	V
Khu_gl 178		62F/16	3081_16	155_23,24	30º 3.50'	81º57.40'	105407	465			4435	SE	Ds	V
Khu_gl 179		62F/16	3081_16	154_27,28	30º 5.48'	81º59.10'	5632	95	0	Khu_gr 171	5096	NW	Cs	S
Khu_gl 180		62F/16	3081_16	154_27,28	30º 5.28'	81º57.77'	4583	95	355	Khu_gr 172	4566	NE	Cs	E
Khu_gl 181		62F/16	3081_16	154_27,28	30º 5.29'	81º57.35'	1609	55	485	Khu_gr 175	4618	NE	Cs	E
Khu_gl 182		62F/16	3081_16	154_27,28	30º 5.24'	81º57.28'	3358	50	340	Khu_gr 175	4633	NE	Cs	E
Khu_gl 183		62F/16	3081_16	154_27,28	30º 7.09'	81º59.07'	108206	1000			4054	E	Ds	V
Khu_gl 184		62F/16	3081_16	155_13,14	30º10.16'	81º55.33'	11895	155	0	Khu_gr 180	5179	SE	Cs	S
Khu_gl 185		62F/16	3081_16	155_11,12	30º 8.39'	81º59.95'	36663	260			5151	NW	Cs	E
Khu_gl 186		62F/16	3081_16	155_11,12	30º 8.40'	81º58.93'	23229	195	10	Khu_gr 182	5105	NW	Ds	C
Khu_gl 187		62F/16	3081_16	155_13,14	30º10.00'	81º57.16'	25818	310	80	Khu_gr 183	5099	SE	Ds	V
Khu_gl 188		62F/16	3081_16	155_13,14	30º11.25'	81º57.18'	35824	355	0	Khu_gr 187	4697	SW	Ds	M
Khu_gl 189		62F/16	3081_16	155_13,14	30º11.68'	81º56.04'	6297	100	115	Khu_gr 188	5044	E	Ds	V
Khu_gl 190		62F/16	3081_16	155_13,14	30º12.09'	81º56.87'	13154	175	1000	Khu_gr 189	5304	SW	Ds	V
Khu_gl 191		62F/16	3081_16	155_13,14	30º12.32'	81º54.18'	13224	220	0	Khu_gr 190	5374	E	Cs	S
Khu_gl 192		62F/16	3081_16	156_23,24	30º12.56'	81º53.61'	35684	180	0	Khu_gr 190	5297	E	Cs	S
Khu_gl 193		62F/16	3081_16	156_23,24	30º13.17'	81º53.22'	4303	80	0	Khu_gr 190	5224	E	Cs	S
Khu_gl 194		62F/16	3081_16	156_23,24	30º14.03'	81º54.28'	5458	75	740	Khu_gr 191	5346	SE	Cs	E
Khu_gl 195		62F/16	3081_12	157_10,11	30º15.59'	81º57.59'	54890	590	760	Khu_gr 193	4511	SE	Ds	V
Khu_gl 196		62F/15	3081_12	157_10,11	30º15.71'	81º55.82'	16617	175	705	Khu_gr 194	5063	NE	Cs	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 197		62F/15	3081_12	157_10,11	30º15.96'	81º55.26'	34075	275			5090	NE	Ds	V
Khu_gl 198		62F/15	3081_12	157_10,11	30º15.39'	81º54.37'	19346	230	0	Khu_gr 196	5471	NW	Ds	M
Khu_gl 199		62F/15	3081_12	157_10,11	30º15.82'	81º53.98'	13749	205	25	Khu_gr 196	5471	NE	Cs	M
Khu_gl 200		62F/15	3081_12	157_10,11	30º16.58'	81º53.74'	14099	220	235	Khu_gr 197	5371	SE	Cs	E
Khu_gl 201		62F/15	3081_12	157_10,11	30º17.30'	81º52.72'	14204	185	0	Khu_gr 198	5636	NE	Ds	M
Khu_gl 202		62F/15	3081_12	157_10,11	30º17.12'	81º52.48'	66120	430			5660	NE	Ds	V
Khu_gl 203		62F/15	3081_12	157_10,11	30º16.99'	81º52.24'	11405	70			5831	NE	Ds	V
Khu_gl 204		62F/15	3081_12	157_10,11	30º17.60'	81º53.57'	5632	110	70	Khu_gr 198	5511	S	Ds	V
Khu_gl 205		62F/15	3081_12	157_10,11	30º18.11'	81º53.24'	8991	195	20	Khu_gr 198	5636	SW	Cs	E
Khu_gl 206		62F/15	3081_12	157_10,11	30º18.16'	81º52.95'	14763	145			5736	SE	Cs	E
Khu_gl 207		62F/15	3081_12	157_10,11	30º17.28'	81º55.54'	11790	170			5057	SE	Ds	V
Khu_gl 208		62F/15	3081_12	157_10,11	30º17.62'	81º55.50'	26098	385			5081	SW	Ds	V
Khu_gl 209		62F/15	3081_12	157_10,11	30º18.09'	81º55.37'	4688	105	840	Khu_gr 201	5145	SE	Ds	V
Khu_gl 210		62F/15	3081_12	157_10,11	30º18.29'	81º55.17'	59333	540			5176	SE	Ds	V
Khu_gl 211		62F/15	3081_12	157_10,11	30º18.22'	81º54.94'	6192	95	540	Khu_gr 202	5233	SE	Cs	B
Khu_gl 212		62F/15	3081_12	157_10,11	30º18.89'	81º54.19'	10355	105	80	Khu_gr 203	5395	SE	Cs	E
Khu_gl 213		62F/15	3081_12	157_10,11	30º19.23'	81º54.91'	8746	165	285	Khu_gr 205	5441	SE	Cs	E
Khu_gl 214		62F/15	3081_12	157_10,11	30º19.07'	81º55.44'	5772	1115			5468	S	Cs	C
Khu_gl 215		62F/15	3081_12	157_10,11	30º18.48'	81º55.51'	6087	140			5349	NW	Cs	C
Khu_gl 216		62F/15	3081_12	158_10,11,12	30º20.18'	81º55.29'	71822	370	175	Khu_gr 207	5166	SE	Ds	V
Khu_gl 217		62F/15	3081_12	158_10,11,12	30º20.35'	81º54.86'	243035	875	325	Khu_gr 207	5179	SE	Ds	V
Khu_gl 218		62F/15	3081_12	158_10,11,12	30º20.36'	81º54.34'	47054	390	270	Khu_gr 208	5218	SE	Ds	V
Khu_gl 219		62F/15	3081_12	158_10,11,12	30º20.89'	81º53.20'	22110	195			5605	SE	Cs	V
Khu_gl 220		62F/15	3081_12	158_10,11,12	30º20.82'	81º52.87'	4233	110			5630	NW	Ds	V
Khu_gl 221		62F/15	3081_12	158_10,11,12	30º20.64'	81º52.39'	2274	45			5633	NE	Cs	C
Khu_gl 222		62F/15	3081_12	158_10,11,12	30º20.94'	81º52.50'	60837	505	555	Khu_gr 211	5499	E	Ds	V
Khu_gl 223		62F/15	3081_12	158_10,11,12	30º20.96'	81º54.45'	28127	255	0	Khu_gr 214	5599	SW	Cs	M
Khu_gl 224		62F/15	3081_12	158_10,11,12	30º19.85'	81º57.96'	9446	145			5435	SW	Ds	V
Khu_gl 225		62F/15	3081_12	158_10,11,12	30º20.09'	81º58.25'	19136	200	115	Khu_gr 218	5541	SW	Cs	C
Khu_gl 226		62F/15	3081_12	157_10,11	30º18.63'	81º58.81'	9026	130			5480	SW	Cs	C
Khu_gl 227		62F/15	3081_12	157_10,11	30º17.93'	81º59.23'	11300	145			5383	SE	Ds	V
Khu_gl 228		62J/3	3081_09	157_6,7,8	30º18.27'	82º 0.69'	3568	85			5422	SE	Ds	V
Khu_gl 229		62J/3	3081_09	157_6,7,8	30º15.77'	82º 0.27'	25084	330			5267	NE	Cs	C
Khu_gl 230		62F/16	3081_16	156_23,24	30º14.35'	81º59.90'	28687	90			5060	NW	Ds	V
Khu_gl 231		62J/3	3082_09	157_6,7,8	30º16.58'	82º 2.36'	11475	155			5258	NE	Cs	C
Khu_gl 232		62J/3	3082_09	157_6,7,8	30º17.61'	82º 2.64'	6787	115			5441	NE	Cs	E
Khu_gl 233		62J/3	3082_09	157_6,7,8	30º18.16'	82º 2.96'	8466	105			5508	SE	Cs	E
Khu_gl 234		62J/3	3082_09	157_6,7,8	30º19.90'	82º 5.73'	314962	1500			5182	S	Ds	V
Khu_gl 235		62J/3	3082_09	157_6,7,8	30º20.82'	82º 5.29'	9481	185	35	Khu_gr 226	5438	SE	Cs	M
Khu_gl 236		62J/3	3082_09	157_6,7,8	30º21.06'	82º 5.43'	35229	275	435	Khu_gr 226	5383	SE	Cs	V
Khu_gl 237		62J/3	3082_09	157_6,7,8	30º21.03'	82º 5.31'	5003	110	325	Khu_gr 226	5389	SE	Cs	V
Khu_gl 238		62J/3	3082_09	157_6,7,8	30º21.28'	82º 5.37'	62167	365	160	Khu_gr 227	5416	SE	Cs	M

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 239		62J/3	3082_09	157_6,7,8	30º21.01'	82º 5.67'	3254	60			5383	E	Cs	V
Khu_gl 240		62J/3	3082_09	157_6,7,8	30º20.99'	82º 5.77'	5038	100			5212	S	Cs	V
Khu_gl 241		62J/3	3082_09	157_6,7,8	30º20.53'	82º 6.17'	5702	105			5304	NW	Cs	C
Khu_gl 242		62J/3	3082_09	157_6,7,8	30º18.55'	82º 5.63'	4023	60			4944	SE	Ds	V
Khu_gl 243		62J/3	3082_09	157_6,7,8	30º18.52'	82º 6.71'	10285	225	15	Khu_gr 228	5395	SW	Cs	M
Khu_gl 244		62J/3	3082_09	157_6,7,8	30º18.13'	82º 6.20'	8851	165			5304	NW	Ds	C
Khu_gl 245		62J/3	3082_09	157_6,7,8	30º18.09'	82º 6.46'	5178	225	620	Khu_gr 228	5386	NW	Cs	V
Khu_gl 246		62J/3	3082_09	157_6,7,8	30º16.87'	82º 5.43'	17492	190			5230	NW	Cs	V
Khu_gl 247		62J/3	3082_09	157_6,7,8	30º15.78'	82º 6.14'	76405	415	15	Khu_gr 230	5351	NW	Cs	M
Khu_gl 248		62J/4	3082_13	156_28	30º13.14'	82º 6.23'	13119	135	0	Khu_gr 231	*	SE	Cs	S
Khu_gl 249		62J/4	3082_13	156_28	30º13.31'	82º 6.68'	9726	85	0	Khu_gr 231	*	SE	Cs	S
Khu_gl 250		62J/4	3082_13	156_28	30º13.51'	82º 6.77'	13329	130	0	Khu_gr 231	*	S	Cs	S
Khu_gl 251		62J/4	3082_13	156_28	30º 4.28'	82º 7.57'	681700	2335	425	Khu_gr 270	*	SE	Ds	V
Khu_gl 252	Lurupya	62K/1	2982_01	152_14,15	29º59.58'	82º11.78'	180798	700	235	Khu_gr 276	4404	NE	Ds	V
Khu_gl 253		62K/1	2982_01	151_12,13	29º53.04'	82º 3.96'	9551	135			4295	NW	Ds	V
Khu_gl 254		62K/1	2982_01	151_12,13	29º52.87'	82º 3.87'	7662	110			4328	W	Ds	V
Khu_gl 255		62K/1	2982_01	151_12,13	29º52.76'	82º 3.74'	18961	230			4298	NE	Ds	V
Khu_gl 256		62K/1	2982_01	151_12,13	29º52.71'	82º 3.59'	14343	155			4343	E	Ds	V
Khu_gl 257		62K/1	2982_01	151_12,13	29º53.10'	82º 2.97'	126328	595			4374	NE	Ds	V
Khu_gl 258		62K/1	2982_01	151_12,13	29º52.89'	82º 2.26'	95647	235			4514	NE	Ds	V
Khu_gl 259		62K/1	2982_01	151_12,13	29º53.52'	82º 2.54'	13399	145			4383	NE	Ds	V
Khu_gl 260		62K/1	2982_01	151_12,13	29º53.33'	82º 2.67'	11545	185			4450	NW	Ds	V
Khu_gl 261		62K/1	2982_01	151_12,13	29º53.28'	82º 2.50'	5982	95			4292	NE	Ds	V
Khu_gl 262		62K/1	2982_01	151_12,13	29º53.21'	82º 2.45'	4933	95			4307	NE	Ds	V
Khu_gl 263		62K/1	2982_01	151_12,13	29º53.08'	82º 2.13'	29771	310			4374	NE	Ds	V
Khu_gl 264		62K/1	2982_01	151_12,13	29º53.05'	82º 1.67'	7836	105			4505	SE	Ds	V
Khu_gl 265		62K/1	2982_01	151_12,13	29º53.43'	82º 2.11'	40582	340			4404	SE	Ds	V
Khu_gl 266		62K/1	2982_01	151_12,13	29º53.57'	82º 1.98'	11300	140			4481	SE	Ds	V
Khu_gl 267		62K/1	2982_01	151_12,13	29º53.37'	82º 1.59'	6752	115			4627	N	Ds	V
Khu_gl 268		62K/1	2982_01	151_12,13	29º54.07'	82º 0.41'	22600	290			4282	N	Ds	V
Khu_gl 269		62K/1	2982_01	151_12,13	29º53.89'	82º 0.46'	12944	130			4289	NW	Ds	V
Khu_gl 270		62K/1	2982_01	151_12,13	29º53.67'	82º 0.65'	34040	415			4295	NW	Ds	V
Khu_gl 271		62G/13	2981_04	151_11	29º54.08'	81º59.34'	13644	150			4679	NE	Cs	V
Khu_gl 272		62G/13	2981_04	151_11	29º53.95'	81º59.38'	46214	260			4682	E	Cs	V
Khu_gl 273		62G/13	2981_04	151_11	29º54.15'	81º58.78'	62342	430			4526	NE	Ds	V
Khu_gl 274		62G/13	2981_04	151_11	29º54.24'	81º58.56'	78085	415			4435	NE	Ds	V
Khu_gl 275		62K/1	2982_01	151_12,13	29º52.09'	82º 2.26'	14553	170			4474	SE	Ds	V
Khu_gl 276		62K/1	2982_01	151_17,18	29º55.70'	82º12.42'	319370	1130	190	Khu_gr 291	4526	SW	Ds	B
Khu_gl 277		62K/1	2982_01	151_17,18	29º54.89'	82º12.98'	14204	145	0	Khu_gr 293	4993	N	Cs	S
Khu_gl 278		62K/1	2982_01	151_17,18	29º53.21'	82º14.10'	64441	395			4648	SE	Ds	V
Khu_gl 279		62K/1	2982_01	151_17,18	29º53.82'	82º15.01'	67519	345	280	Khu_gr 294	4404	NE	Ds	V
Khu_gl 280		62K/1	2982_01	151_17,18	29º55.69'	82º14.19'	114958	725			4179	SE	Ds	V

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 281		62K/1	2982_01	151_17,18	29º56.74'	82º14.73'	76335	325			5051	SW	Ds	C
Khu_gl 282		62K/5	2982_02	162_16,17	29º55.55'	82º15.94'	5667	115			4782	E	Ds	V
Khu_gl 283		62J/8	2982_02	152_14,15	29º58.28'	82º15.05'	160052	665	735	Khu_gr 303	4865	SE	Ds	V
Khu_gl 284		62J/8	3082_14	153_30,31	30º 1.45'	82º16.32'	23684	275	335	Khu_gr 310	4624	NW	Ds	V
Khu_gl 285		62K/5	2982_02	152_16,17	29º59.81'	82º16.81'	8186	130			4947	W	Cs	C
Khu_gl 286		62K/5	2982_02	152_16,17	29º59.90'	82º18.08'	76825	525			4871	SW	Ds	V
Khu_gl 287		62J/8	3082_14	153_30,31,32	30º 0.18'	82º18.11'	33760	225			4923	S	Ds	V
Khu_gl 288		62J/8	3082_14	153_30,31,32	30º 0.62'	82º18.15'	87740	330			5099	SW	Ds	V
Khu_gl 289		62K/5	2982_02	152_16,17	29º56.85'	82º18.17'	29317	245	145	Khu_gr 314	4831	SW	Ds	V
Khu_gl 290		62K/5	2982_02	152_16,17	29º58.24'	82º19.36'	8186	150			4983	W	Ds	V
Khu_gl 291		62K/5	2982_02	152_19,20	29º59.87'	82º23.48'	35579	285	930	Khu_gr 333	4715	SW	Ds	V
Khu_gl 292		62J/8	3082_14	153_34,35	30º 0.25'	82º23.82'	57129	500	0	Khu_gr 328	5066	SW	Ds	M
Khu_gl 293		62K/5	2982_02	152_19,20	29º58.76'	82º23.77'	39007	250			5185	SW	Ds	V
Khu_gl 294		62K/5	2982_02	152_19,20	29º56.78'	82º24.68'	9446	145			5125	SW	Ds	V
Khu_gl 295		62K/5	2982_02	152_19,20	29º57.90'	82º25.24'	102433	600			4551	SE	Ds	V
Khu_gl 296		62K/5	2982_02	152_19,20	29º58.67'	82º25.93'	9341	150	605	Khu_gr 335	5041	SE	Ds	V
Khu_gl 297		62K/5	2982_02	152_19,20	29º57.04'	82º27.74'	7452	105	665	Khu_gr 337	5115	E	Ds	C
Khu_gl 298		62K/5	2982_02	152_19,20	29º55.98'	82º29.16'	35369	280			4871	NE	Ds	V
Khu_gl 299		62K/5	2982_02	152_19,20	29º55.65'	82º28.82'	17947	180			4916	NW	Ds	V
Khu_gl 300		62K/5	2982_02	152_19,20	29º55.43'	82º26.70'	24244	205			4493	NW	Ds	V
Khu_gl 301		62K/5	2982_02	151_22,23	29º52.82'	82º23.46'	8151	100	110	Khu_gr 348	5041	NW	Ds	M
Khu_gl 302		62K/5	2982_02	151_22,23	29º52.75'	82º23.07'	140111	480	110	Khu_gr 348	4944	NW	Ds	B
Khu_gl 303		62K/5	2982_02	150_14,15	29º48.48'	82º19.68'	34110	315			3975	SW	Ds	V
Khu_gl 304		62K/5	2982_02	150_14,15	29º49.91'	82º20.38'	8886	155	540	Khu_gr 371	4694	SE	Ds	C
Khu_gl 305		62K/5	2982_02	150_14,15	29º50.20'	82º21.03'	25084	250			4804	SW	Ds	C
Khu_gl 306		62K/5	2982_02	150_14,15	29º50.33'	82º21.38'	24594	230			4941	SE	Ds	V
Khu_gl 307		62K/5	2982_02	150_14,15	29º50.36'	82º21.13'	7871	115			5023	E	Ds	V
Khu_gl 308		62K/5	2982_02	150_14,15	29º50.50'	82º22.30'	30821	325			4642	SE	Ds	V
Khu_gl 309		62K/5	2982_02	150_14,15	29º50.79'	82º21.96'	5562	110			4755	SE	Ds	V
Khu_gl 310		62K/5	2982_02	150_14,15	29º50.70'	82º21.58'	7137	120			4974	S	Cs	V
Khu_gl 311		62K/5	2982_02	150_14,15	29º50.98'	82º21.40'	32605	285			5017	E	Ds	C
Khu_gl 312		62K/5	2982_02	150_14,15	29º51.82'	82º23.33'	6052	105	25	Khu_gr 374	5084	SE	Ds	V
Khu_gl 313		62K/5	2982_02	151_22,23	29º52.35'	82º24.77'	12139	215			5172	SE	Ds	C
Khu_gl 314		62K/5	2982_02	150_14,15	29º50.02'	82º25.11'	6752	95	1035	Khu_gr 376	4749	NW	Ds	V
Khu_gl 315		62K/5	2982_02	150_14,15	29º49.73'	82º25.40'	6787	110	305	Khu_gr 376	4843	NW	Ds	V
Khu_gl 316		62K/5	2982_02	150_14,15	29º47.48'	82º19.43'	83542	595	1540	Khu_gr 395	4145	NW	Ds	V
Khu_gl 317		62K/6	2982_06	148_21,22	29º43.83'	82º21.20'	35229	275	290	Khu_gr 401	4621	NW	Ds	C
Khu_gl 318		62K/6	2982_06	148_21,22	29º42.82'	82º15.12'	60907	465	15	Khu_gr 412	4627	NW	Ds	B
Khu_gl 319		62K/6	2982_05	147_29,30	29º42.79'	82º15.23'	18507	190	0	Khu_gr 412	4663	NE	Cs	S
Khu_gl 320		62K/2	2982_05	147_29,30	29º42.09'	82º14.86'	28057	310	20	Khu_gr 412	4688	NE	Ds	E
Khu_gl 321		62K/2	2982_05	147_29,30	29º42.51'	82º14.67'	13119	155	505	Khu_gr 412	4801	NE	Ds	V
Khu_gl 322		62K/2	2982_05	147_29,30	29º42.68'	82º14.57'	24384	190	120	Khu_gr 413	4840	E	Ds	B

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Khu_gl 323		62K/2	2982_05	148_23,24	29º42.89'	82º14.50'	6682	125	0	Khu_gr 414	4956	SE	Cs	M
Khu_gl 324		62K/2	2982_05	148_23,24	29º44.38'	82º14.06'	16547	230	0	Khu_gr 418	4691	N	Cs	S
Khu_gl 325		62K/2	2982_05	148_23,24	29º44.77'	82º13.88'	34669	255	265	Khu_gr 418	4356	NE	Ds	E
Khu_gl 326		62K/2	2982_05	148_23,24	29º44.51'	82º13.72'	13679	105	0	Khu_gr 418	4478	N	Cs	S
Khu_gl 327		62K/2	2982_05	157_29,30	29º44.39'	82º13.70'	17107	150	0	Khu_gr 418	4493	N	Cs	S
Khu_gl 328		62K/2	2982_05	157_29,30	29º42.80'	82º13.05'	31346	255	245	Khu_gr 420	4648	NE	Ds	V
Khu_gl 329		62K/2	2982_05	157_29,30	29º41.56'	82º10.72'	61572	170			4846	NE	Cs	C
Khu_gl 330	Naulotritha Da	62K/2	2982_05	157_29,30	29º41.05'	82º12.37'	14973	355			4353	NW	Ds	V
Khu_gl 331		62K/2	2982_05	157_29,30	29º41.25'	82º10.72'	33445	210			4517	E	Ds	V
Khu_gl 332		62K/2	2982_05	157_29,30	29º41.49'	82º10.41'	22040	185			4295	NW	Ds	V
Khu_gl 333	Dudhya Daha	62K/2	2982_05	157_29,30	29º40.45'	82º11.72'	210849	960			4261	NW	Ds	V
Khu_gl 334		62K/2	2982_05	157_29,30	29º40.97'	82º11.92'	10180	90			4791	SW	Ds	C
Khu_gl 335		62K/2	2982_05	157_29,30	29º40.75'	82º12.46'	92568	260			4566	SW	Cs	C
Khu_gl 336		62K/2	2982_05	157_29,30	29º40.20'	82º12.72'	149907	615	940	Khu_gr 424	4426	W	Ds	V
Khu_gl 337		62K/2	2982_05	157_29,30	29º40.11'	82º13.35'	120695	430			4532	NW	Ds	V
Khu_gl 338	Jigilya Daha	62K/2	2982_05	157_29,30	29º39.98'	82º12.26'	167574	615			4359	NW	Ds	V
Khu_gl 339		62K/2	2982_05	157_29,30	29º40.22'	82º13.81'	48068	445			4624	NW	Ds	C
Khu_gl 340		62K/2	2982_05	157_29,30	29º39.83'	82º13.00'	41036	220			4478	W	Ds	V
Khu_gl 341		62K/2	2982_05	157_29,30	29º39.59'	82º13.04'	15043	220			4554	N	Ds	V
Khu_gl 342		62K/2	2982_05	157_29,30	29º40.39'	82º11.47'	10565	120			4316	NW	Cs	C
Khu_gl 343		62K/2	2982_05	157_29,30	29º40.02'	82º11.70'	94912	405			4328	NW	Ds	C
Khu_gl 344		62K/2	2982_05	157_29,30	29º39.81'	82º11.70'	20990	235			4392	NE	Cs	V
Khu_gl 345		62K/2	2982_05	157_29,30	29º39.42'	82º11.36'	7731	120			4557	SE	Cs	E

Glacial Lake Inventory of Kawari Basin

Total Number : 44 Total Area : 1.57 (km^2)

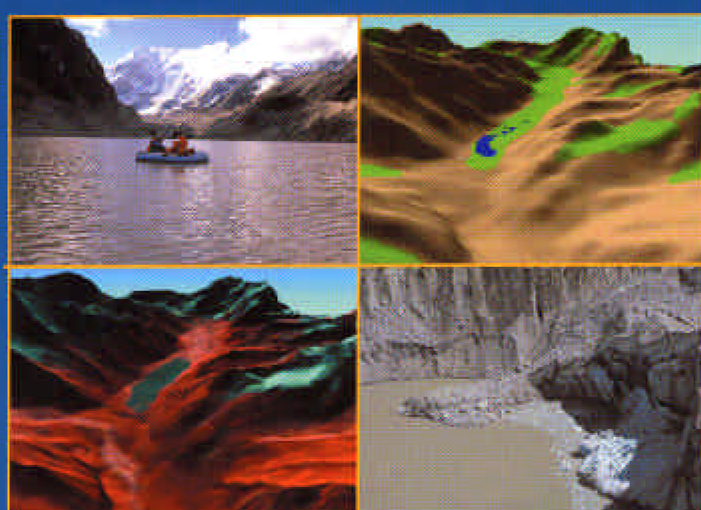
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kka_gl 1		62G/10	2981_07	130_20,21	Longitude	Latitude	19589	265			3780	E	Ds	V
Kka_gl 2		62G/10	2981_07	130_20,21	29°35.72'	81°34.03'	30875	240			4161	NE	Ds	E
Kka_gl 3		62G/10	2981_07	147_43,44	29°35.31'	81°33.03'	114364	475			4648	NE	Ds	C
Kka_gl 4		62G/10	2981_07	147_43,44	29°36.61'	81°32.71'	48293	315			4435	NE	Ds	E
Kka_gl 5		62G/10	2981_07	147_43,44	29°37.26'	81°32.92'	25049	130			4505	SE	Ds	V
Kka_gl 6		62G/10	2981_07	147_43,44	29°38.41'	81°33.13'	94852	505			4566	S	Ds	E
Kka_gl 7		62G/10	2981_07	147_43,44	29°38.93'	81°33.41'	5884	120			4526	W	Ds	V
Kka_gl 8		62G/10	2981_07	147_43,44	29°37.95'	81°34.48'	5171	85			4194	SW	Ds	V
Kka_gl 9		62G/10	2981_07	147_43,44	29°36.90'	81°34.90'	76562	165			3917	SE	Cs	E
Kka_gl 10		62G/9	2981_07	147_43,44	29°33.04'	81°39.51'	93191	300			2158	SE	Ds	V
Kka_gl 11		62G/10	2981_07	147_43,44	29°33.34'	81°42.52'	6625	100			4191	E	Cs	E
Kka_gl 12		62G/9	2981_07	147_43,44	29°37.50'	81°36.02'	16852	190			4130	NE	Ds	E
Kka_gl 13		62G/9	2981_03	149_30,31	29°38.97'	81°34.28'	112440	480			4459	NE	Cs	S
Kka_gl 14		62G/9	2981_07	148_38,39	29°46.46'	81°38.21'	103303	425	0	Kka_gr 13	4999	NE	Cs	E
Kka_gl 15		62G/9	2981_03	149_30,31	29°44.57'	81°34.83'	61550	215	0	Kka_gr 14	*	N	Cs	M
Kka_gl 16		62G/9	2981_03	168_3,4	29°45.62'	81°35.01'	9256	150			3734	NW	Ds	V
Kka_gl 17		62G/9	2981_03	168_3,4	29°52.31'	81°39.66'	55900	375			4130	NW	Ds	V
Kka_gl 18		62G/9	2981_03	168_3,4	29°51.60'	81°38.52'	11232	155			4139	NW	Ds	V
Kka_gl 19		62G/9	2981_03	168_3,4	29°51.39'	81°38.66'	24799	255			4481	NE	Ds	V
Kka_gl 20		62G/9	2981_03	168_3,4	29°51.26'	81°37.49'	26961	270			4520	NE	Ds	V
Kka_gl 21		62G/9	2981_03	168_3,4	29°51.07'	81°37.44'	14400	230	835	Kka_gr 24	4566	NE	Cs	V
Kka_gl 22		62G/9	2981_03	168_3,4	29°51.03'	81°37.18'	9796	165	615	Kka_gr 25	4599	NE	Cs	V
Kka_gl 23		62G/9	2981_03	168_4,5	29°51.19'	81°37.15'	11952	190	0	Kka_gr 28	4596	E	Cs	S
Kka_gl 24		62G/9	2981_03	168_4,5	29°53.70'	81°35.16'	7366	110	0	Kka_gr 28	4630	SE	Cs	S
Kka_gl 25		62G/9	2981_03	168_4,5	29°53.72'	81°34.78'	42274	270	215	Kka_gr 28	3749	SE	Ds	B
Kka_gl 26		62G/9	2981_03	151_1,2	29°53.59'	81°33.87'	33272	305			4529	SW	Ds	V
Kka_gl 27		62G/9	2981_03	151_1,2	29°55.52'	81°34.57'	39642	405			4490	S	Ds	V
Kka_gl 28		62G/9	2981_03	151_1,2	29°55.06'	81°36.13'	5174	55			4599	SE	Ds	E
Kka_gl 29		62G/9	2981_03	151_1,2	29°55.13'	81°36.97'	5812	135			4570	SE	Cs	E

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Kka_gl 30		62G/9	2981_03	151_1,2	29°55.25'	81°37.10'	23526	270			4481	SE	Ds	V
Kka_gl 31		62G/9	2981_03	151_3,4	29°55.77'	81°37.15'	8749	120			4648	SE	Ds	E
Kka_gl 32		62G/9	2981_03	151_3,4	29°56.49'	81°38.90'	116559	630	335	Kka_gr 33	4584	SW	Ds	V
Kka_gl 33		62G/13	2981_03	151_3,4	29°56.12'	81°40.50'	39460	240	785	Kka_gr 38	4688	SW	Ds	V
Kka_gl 34		62G/13	2981_03	151_5,6	29°54.39'	81°42.14'	77171	685			4566	SW	Ds	V
Kka_gl 35		62G/13	2981_03	151_5,6	29°53.56'	81°44.26'	112761	570			4720	SW	Ds	V
Kka_gl 36		62G/13	2981_04	151_6,7	29°53.91'	81°44.85'	7170	125			4441	S	Ds	V
Kka_gl 37		62G/13	2981_04	151_6,7	29°53.64'	81°45.91'	5612	110			4441	SW	Ds	V
Kka_gl 38		62G/13	2981_04	151_6,7	29°53.71'	81°45.95'	36073	310			4377	E	Ds	V
Kka_gl 39		62G/13	2981_04	151_6,7	29°54.06'	81°46.72'	9407	135			4831	SE	Cs	E
Kka_gl 40		62G/13	2981_04	151_6,7	29°54.53'	81°46.61'	8386	145			4511	SE	Ds	V
Kka_gl 41		62G/13	2981_04	151_6,7	29°53.96'	81°47.66'	9434	145			4627	SE	Cs	E
Kka_gl 42		62G/13	2981_04	151_6,7	29°54.24'	81°47.62'	3092	75			4618	SE	Ds	E
Kka_gl 43		62G/13	2981_04	151_6,7	29°54.13'	81°47.78'	5921	100			4606	SE	Ds	E
Kka_gl 44		62G/13	2981_04	151_6,7	29°53.96'	81°47.98'	3386	60			4526	W	Ds	V

Glacial Lake Inventory of West Seti Basin

Total Number : 15   Total Area : 0.4 (km^2)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Lake Number	Lake Name	Map Code_60s	Map Code_90s	Aerial Photo Number	Latitude	Longitude	Area (m^2)	Mean Length (m)	Distance to Glacier (m)	Associated Glacier Number	Elevation (m)	Orientation	Drainage Condition	Classification
Kse_gl 1	Chuphu Tal	62G/1	2981_01	149_15,16	29°45.85'	81° 4.73'	16563	235			3694	SE	D	E
Kse_gl 2		62G/1	2981_01	149_15,16	29°45.56'	81° 7.88'	10243	145			4107	SW	Ds	V
Kse_gl 3		62G/1	2981_05	149_17,18	29°46.42'	81°11.13'	57421	325			3734	E	Cs	E
Kse_gl 4		62G/1	2981_05	168_16,17	29°52.42'	81° 4.71'	3953	85	0	Kse_g r20	4688	NE	Cs	S
Kse_gl 5		62G/1	2981_05	169_17,18	29°55.54'	81° 3.21'	21497	165	0	Kse_gr 23	4648	SE	Cs	S
Kse_gl 6		62G/1	2981_01	169_17,18	29°55.62'	81° 2.19'	6781	120	0	Kse_gr 23	4846	NE	Cs	S
Kse_gl 7		62G/1	2981_01	169_17,18	29°55.86'	81° 2.15'	74878	425	100	Kse_gr 23	4874	SE	Cs	B
Kse_gl 8		62G/1	2981_01	169_17,18	29°59.33'	81° 3.65'	5540	85	0	Kse_gr 27	4767	SW	Cs	S
Kse_gl 9		62G/1	2981_01	170_9,10	29°58.57'	81°10.75'	31307	230	265	Kse_gr 40	4353	NE	Cs	E
Kse_gl 10		62G/1	2981_01	170_12,13	29°58.50'	81°10.46'	66019	315	10	Kse_gr 40	4353	NE	Cs	E
Kse_gl 11		62F/4	3081_13	170_12,13	30° 0.09'	81°14.89'	4876	110	225	Kse_gr 45	4791	SW	Ds	V
Kse_gl 12		62F/8	3081_14	168_6,7	30° 1.24'	81°18.98'	16793	175	0	Kse_gr 70	4970	SE	Cs	S
Kse_gl 13		62G/9	2981_03	168_6,7	29°48.97'	81°30.72'	65644	365			4691	NW	Ds	E
Kse_gl 14		62G/6	2981_06	148_41,42	29°44.07'	81°29.42'	16938	140			4535	NW	Ds	V
Kse_gl 15		62G/6	2981_06	148_41,42	29°43.61'	81°29.54'	10561	145			4535	W	Cs	E



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