

106 Ageta, Y. Characteristics of mass balance of the summer-accumulation type glacier in the Nepal Himalayas. (Japanese language) *Seppyo*, Vol. 45, 1982, 81-90p.

Loc: ICIMOD, DOM

107 Ageta, Y.; Higuchi, K. Estimation of mass balance components of a summer-accumulation type glacier in the Nepal Himalayas. *Geografika Analei* 66A, 1984, 249-255p.

108 Ageta, Y.; Kadota, T. Predictions of changes of glacier mass balance in the Nepal Himalaya and Tibetan plateau. *Annals of Glaciology*, 16, 1992, 89-94p.

109 Ageta, Y.; Ohata, T.; Tanaka, Y.; Ikegami, K.; Higuchi, K. Mass balance of glacier AX010 in Shorong Himal during the summer monsoon season, east Nepal. *Seppyo*, Vol. 41, Special Issue, 1980, 24-42p.

Loc: ICIMOD, DOM

The study is based upon the observation of mass balance of glacier AX010 at the southern front of the Nepal Himalayas from June to September of 1975. The paper discusses the method of observation, meteorological conditions during the observation period, and the relationship between precipitation and surface temperature. Details of the mass balance of the glacier during the summer season is presented and discussed.

110 Ageta, Y.; Satow, K. Study of the mass balance of small glaciers in Khumbu Himal during the summer monsoon season. *Seppyo*, Vol. 40, Special Issue, 1978, 4-11p.

Loc: ICIMOD, DOM

With the aid of glaciological observations, carried out in 1978 in the Nepal Himalayas in Khumbu, there was a considerable amount of snow in places due to the summer upwelling. The mass balance from July to September is presented. It is concluded that the summer

temperature. It is concluded that the mass balance for the whole area is positive and this is attributed mainly to the accumulation in late summer.

111 Bahadur, J. The Himalayas: A third polar region. In: Young, G.J. (ed.), *Snow and Glacier Hydrology*, Proceedings of the Kathmandu Symposium (Nov. 1992), IAHS Publ. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 181-190p.

Loc: DHM, CDOM, ICIMOD

The 1983 American Scientific Expedition to Everest suggested that the Himalayas are effectively a third pole. In this article, some salient aspects of the Himalayas and polar environments are dealt with and similarities between the Himalayas and the Arctic and the Antarctic are investigated.

112 Budhathoki, K.P. Determination of snow cover from landsat imagery. Kathmandu, HAKI, National Remote Sensing Centre, 1983, 186-191p.

Loc: DHM

In this paper, a method of determining the change in snow cover from 1972 to 1975 and from 1975 to 1977 is presented. The Tamor watershed is taken as a case study.

113 Durr, D.N.; Kulkarni, A.K.; Mandal, J.K. Snow survey experiments in the upper Tamor basin, east Nepal. In: Joshi, S.C.; Naigh, M.; Prasad, Y.P.S.; Gaur, D.D. (ed.), *Nepal Himalaya: Geo-ecological Perspectives*, Kathmandu Himalayan Research Group, 1981, 412-431p.

Loc: ICIMOD

This paper deals with the snow survey experiments in the upper Tamor basin (eastern Nepal). Data of the snow survey observation from 1975-77 are also given.

202 Ageta, Y. **Characteristics of mass balance of the summer-accumulation type glacier in the Nepal Himalayas.** (Japanese language) *Seppyo*, Vol. 45, 1982, 81-90p.

Loc: ICIMOD, DOM

203 Ageta, Y.; Higuchi, K. **Estimation of mass balance components of a summer-accumulation type glacier in the Nepal Himalayas.** *Geografika Annaler*, 66A, 1984, 249-255p.

204 Ageta, Y.; Kadota, T. **Predictions of changes of glacier mass balance in the Nepal Himalaya and Tibetan plateau.** *Annals of Glaciology*, 16, 1992, 89-94p.

205 Ageta, Y.; Ohata, T.; Tanaka, Y.; Ikegami, K.; Higuchi, K. **Mass balance of glacier AX010 in Shorong Himal during the summer monsoon season, east Nepal.** *Seppyo*, Vol. 41, Special Issue, 1980, 34-41p.

Loc: ICIMOD, DOM

The study is based upon the observation of mass balance of glacier AX010 at the southern front of the Nepal Himalayas from June to September of 1978. The paper discusses the method of observation, meteorological conditions during the observation period, and the relationship between precipitation and surface temperature. Finally the mass balance of the glacier during the summer season is presented and discussed.

206 Ageta, Y.; Satow, K. **Study of the mass balance of small glaciers in Khumbu Himal during the summer monsoon season.** *Seppyo*, Vol. 40, Special Issue, 1978, 4-11p.

Loc: ICIMOD, DOM

With the aid of glaciological observations, glacier mass balance in the Nepal Himalayas is studied. There was a considerable amount of deposit of snow due to the summer snowfall. The mass balance from July to September is calculated by considering the ice amount to be superimposed on the glacier ice of sub-zero

temperature. It is concluded that the mass balance for the whole area is positive and this is attributed mainly to the accumulation in late summer.

207 Bahadur, J. **The Himalayas: A third polar region.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium (Nov. 1992)*, IAHS Publ. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 181-190p.

Loc: DHM, CDOM, ICIMOD

The 1963 American Scientific Expedition to Everest suggested that the Himalayas are effectively a third pole. In this article, some salient aspects of the Himalayas and polar environments are dealt with and similarities between the Himalayas and the Arctic and the Antarctic are investigated.

208 Budhathoki, K.P. **Determination of snow cover from landsat imagery.** Kathmandu, HMG, National Remote Sensing Centre, 1983, 186-191p.

Loc: DHM

In this paper, a method of determining the change in snow cover from 1972 to 1975 and from 1975 to 1977 is presented. The Tamor watershed is taken as a case study.

209 Dhar, O.N.; Kulkarni, A.K.; Mandal, B.N. **Snow survey experiments in the upper Tamur basin, East Nepal.** In: Joshi, S.C.; Haigh, M.J.; Pangtey, Y.P.S.; Dani, D.D. (ed.), *Nepal Himalaya Geo-ecological Perspectives*, Nainital, Himalayan Research Group, 1986, 422-431p.

Loc: ICIMOD

This paper deals with the snow survey experiments in the upper Tamur basin (eastern Nepal). Data of the snow survey observation from 1947 to 1949 are also given.

210 Fujii, Y. **Field experiment on glacier ablation under a layer of debris cover.**

Seppyo, Vol. 39, Special Issue, 1977, 20-21p.

Loc: ICIMOD, DOM

In order to examine the role of supraglacial debris during ablation, a field experiment was carried out on a snowpatch beside the Rikha Samba glacier. The paper provides some results from this field experiment

211 *Fujii, Y.; Higuchi, K. Statistical analyses of the forms of the glaciers in the Khumbu Region. Seppyo*, Vol. 39, Special Issue, 1977, 7-14p.

Loc: ICIMOD, DOM

In this paper, statistical analyses are carried out on the relationship between the glacier forms and their relation to basin morphology. The paper mainly deals with the preliminary statistics of the glacier inventory, correlation coefficients between the dimensions of glaciers and their basins, and multiple regression analysis of glacier forms.

212 *Fujii, Y.; Nakawo, M.; Shrestha, M.L. Mass balance studies of the glaciers in hidden valley, Mukut Himal. Seppyo*, Vol. 38, Special Issue, 1976, 17-21p.

Loc: ICIMOD, DOM

As a part of the Glaciological Expedition in the summer of 1974, measurements of glacier accumulation and ablation were carried out using the stake method. Mass balance study of the Rikha Samba glacier and glacier G3 in the hidden valley showed that the summer balance over the whole area of the Rikha Samba glacier is slightly positive. The winter snow layer observed as a dirt layer in a pit is so thin that the summer balance approximates the net balance. The total amount of precipitation over the area above the firn line in the glacier basin is very close to the summer balance over the accumulation area.

213 *Fushimi, H. Stratigraphic studies of the Gyajo glacier, Khumbu Himal. Seppyo*, Vol. 40, Special Issue, 1978, 17-20p.

Loc: ICIMOD, DOM

Stratigraphic studies were carried out on the Gyajo glacier in Khumbu Himal, east Nepal, from June to December 1970. The formation of superimposed ice was observed and the stratigraphic studies showed the monthly change in snow deposit. Remarkable additions occurred at the end of the summer season with simultaneous formation of superimposed ice.

214 *Fushimi, H. Structural studies of glaciers in the Khumbu Himal. Seppyo*, Vol. 39, Special Issue, 1977, 30-39p.

Loc: ICIMOD, DOM

Glaciers in the Nepal Himalayas are different from other regions of the world. They are composed of immense quantities of rock debris, sand, and clays, and the flow is controlled by unique geological structures which have a great influence on the topography and climate of the Nepal Himalayas. In this paper, the authors have classified the glacier in the Khumbu region according to structural characteristics.

215 *Fushimi, H.; Ohata, T. Fluctuations of glaciers from 1970 to 1978 in the Khumbu Himal, east Nepal. Seppyo*, Vol. 41, Special Issue, 1980, 71-81p.

Loc: ICIMOD, DOM

In this paper, the fluctuation rate of 15 glaciers in the Dudh Koshi region, east Nepal, is determined from 1970 to 1980. The glaciers are classified into retreating, stationary, advancing, and irregular categories. The classifications is mainly related to the slope of the glaciers.

216 *Fushimi, H.; Ohata, T.; Higuchi, K. Recent fluctuations of glaciers in the eastern part of the Nepal Himalayas. In: Proceedings of the Canberra Symposium (Dec. 1979), IAHS Publ. No. 131, United Kingdom, Oxfordshire, Institute of Hydrology, 21-29p.*

217 *Fushimi, H.; Yoshida, M.; Watanabe, O. Distributions and grain sizes of supraglacial debris in the Khumbu glacier, Khumbu region. Seppyo*, Vol. 41, Special Issue, 1980, 18-27p.

Loc: ICIMOD, DOM

The Khumbu glacier, east Nepal, is a typical debris-covered glacier on the south side of the great Himalayas. Results obtained from the occurrences, distributions, and grain size measurements of the supraglacial debris are presented and discussed in this paper.

218 *Glaciological Expedition of Nepal. Glaciological data of the Khumbu glacier in 1978 (with 5 separate sheets).* Seppyo, Vol. 41, Special Issue, 1980, 107-110p.

Loc: ICIMOD, DOM

The glaciological data include: maps of topography and surface conditions of the ablation area; map of the ablation area; topographic maps of the detailed research area of flow observations; data of ablation measurements; and large boulder distribution in the research area.

219 *Glaciological Expedition of Nepal. Outline of glaciological expedition of Nepal : Langtang Himal project, 1987 - 88.* In: *Glacial studies in Langtang Valley: A report of the Glaciological Expedition of the Nepal Himalayas, 1987-88*, Japan, Sapporo, Glaciological Expedition of Nepal Project, 1989, 1-3p.

Loc: ICIMOD

An outline of the glaciological expedition of the Nepal Himalayas by Japanese scientists is presented in this paper.

220 *Higuchi, K. Glacial studies in Langtang valley.* Data Centre for Glacial Research, 1984, Publ No. 2, 136p.

221 *Higuchi, K. Nepal-Japan cooperation in research on glaciers and climates of the Nepal Himalayas.* In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium (Nov. 1992)*, IAHS Publ. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 29-36p.

Loc: DHM, CDOM, ICIMOD

Glaciological expeditions in Nepal (GEN) have been undertaken by Japanese scientists since 1973 with cooperation from HMG of Nepal. In this paper, the expeditions are divided into three phases and each phase is discussed.

222 *Higuchi, K. Outline of the glaciological expedition to Nepal (1).* Seppyo, Vol. 38, Special Issue, 1976, 1-5p.

Loc: ICIMOD, DOM

An outline of the glaciological expedition of Nepal during 1973 and 1974 is given in this paper.

223 *Higuchi, K. Outline of the glaciological expedition to Nepal (2).* Seppyo, Vol. 39, Special Issue, 1977, 1-2p.

Loc: ICIMOD, DOM

An outline of the glaciological expedition of Nepal during 1975 is given in this paper.

224 *Higuchi, K. Outline of the glaciological expedition to Nepal, (3).* Seppyo, Vol. 40, Special Issue, 1978, 1-3p.

Loc: ICIMOD, DOM

An outline of the glaciological expedition of Nepal during 1976 is given in this paper.

225 *Higuchi, K. Outline of the glaciological expedition to Nepal, (4).* Seppyo, Vol. 41, Special Issue, 1980, 1-4p.

Loc: ICIMOD, DOM

An outline of the glaciological expedition of Nepal during 1978 is given in this paper.

226 *Higuchi, K. Snow crystals observed at Lhajung station in Khumbu region.* Seppyo, Vol. 38, Special Issue, 1976, 93-101p.

Loc: ICIMOD, DOM

The shape and size of snow crystals that fell during January 1-2, 1975, are discussed in this paper.

227 Higuchi, K.; Ageta, Y.; Inoue, J. **Snow crystals observations at Mt. Yalung Kang, Kangchenjunga region, east Nepal.** *Seppyo*, Vol. 40, Special Issue, 1978, 45-49p.

Loc: ICIMOD, DOM

In this paper, a study of the shape and size of snow crystals on April 23 and May 17, 1973, is presented. The snow crystals were observed by making plastic replicas at 6470m altitude on Mt. Yalung Kang. The temporal variation of the shape and size of the snow crystals is analysed in this paper and the altitudes of the tops of the precipitating clouds and their thickness are also estimated.

228 Higuchi, K.; Fujii, Y.; Nakawo, M.; Shrestha, M.L. **Observation of snow particles at hidden valley, Mukut Himal.** *Seppyo*, Vol. 40, Special Issue, 1978, 42-44p.

Loc: ICIMOD, DOM

Snow particles observed during the monsoon season in the Base Camp (5,055m) and Camp III (5,610m) are presented. The observed snow particles were of single snow crystals, snow flakes, and graupels. Finally, the altitudes of the tops of the precipitating clouds are estimated on the basis of observations of steller crystals.

229 Higuchi, K.; Fushimi, H.; Ohata, T.; Iwata, S.; Iowaza, T.; Yokoyama, K.; Higuchi, H.; Nagoshi, A. **Preliminary report on the glacier inventory in the Dudh Koshi region.** *Seppyo*, Vol. 40, Special Issue, 1978, 78-79p.

Loc: ICIMOD, DOM

This paper discusses the glacier inventory compiled for 664 glaciers in all parts of the Dudh Koshi region of eastern Nepal on the basis of field observations and aerial photographs. Numbering and mapping of all glaciers are also discussed.

230 Higuchi, K.; Fushimi, H.; Ohata, T.; Takenaka, S.; Iwata, S.; Yokoyama, K.; Higuchi, H.; Nagoshi, A.; Iowaza, T. **Glacier inventory in the Dudh Koshi region, east Nepal.** In: *World Glacier*

Inventory, Proceedings of the Alet Schgentrum workshop (September 1978), IAHS Publ. No. 126, United Kingdom, Oxfordshire, Institute of Hydrology, 1980, 95-103p.

231 Higuchi, K.; Iowaza, T.; Higuchi, H. **Flight observations for the inventory of glaciers in the Nepal Himalayas.** *Seppyo*, Vol. 38, Special Issue, 1976, 6-9p.

Loc: ICIMOD, DOM

Air flights for photographing glaciers in the Nepal Himalayas were undertaken eight times during the period from 1972 to 1975. The oblique aerial photographs of the glaciers in the Khumbu region taken during these flights are yet to be compared with the glacier inventory undertaken by Muller (1970).

232 HMC, Department of Tourism. **The Himalayas of Nepal.** Kathmandu, Department of Tourism, 1974, 20p.

233 Ikegami, K.; Ageta, Y. **Ice flow of glacier AX010 in the Nepal Himalayas.** *Bulletin of Glacier Research* 9, 1991, 17-22p.

Loc: ICIMOD

In this paper observation results of horizontal flow and emergence-submergence flow from May 1978 to September 1979 in east Nepal are described. Finally, the ice thickness is calculated from the ice flow data.

234 Ikegami, K.; Inoue, J. **Mass balance studies on Kongma glacier, Khumbu Himal.** *Seppyo*, Vol. 40, Special Issue, 1978, 12-16p.

Loc: ICIMOD, DOM

Mass balance of the Kongma glacier and Khumbu Himal (a small debris-free type glacier) is presented on the basis of observation from September 1973 to September 1976. The observation showed positive balance during the summer monsoon season due to monsoonal snowfall. In winter, the change is small and during pre-monsoon season negative balance

occurs. A photographic interpretation of the thickness of the Kogma glacier is presented.

235 Inoue, J. **Mass budget of Khumbu glacier.** *Seppyo*, Vol. 39, Special Issue, 1977, 15-19p.

Loc: ICIMOD, DOM

The author estimates the mass budget of the Khumbu glacier on the basis of ablation observed at the lower part of the glacier. The accumulation is calculated assuming that there is uniform precipitation on the glacier surface.

236 Inoue, J.; Nagoshi, A. **A stratigraphic study of the snow cover in Khumbu Himal.** *Seppyo*, Vol. 39, Special Issue, 1977, 26-29p.

Loc: ICIMOD, DOM

Snow pit studies of two glaciers are conducted, namely, Dzonglha glacier and Kongma glacier in the Nepal Himalayas for different seasons. The paper mainly deals with snow stratification for the monsoon and post-monsoon seasons.

237 Inoue, J.; Yoshida, M. **Ablation and heat exchanges over the Khumbu glacier.** *Seppyo*, Vol. 41, Special Issue, 1980, 26-33p.

Loc: ICIMOD, DOM

In this paper, the role of supraglacial debris on the ablation area based upon the observational data of ablation and heat exchange is presented. The glacier is classified into four areas based on the characteristics of supraglacial debris. Different methods suitable for each area are employed while measuring the ablation. The relationship between ablation and solar radiation is also examined for two areas.

238 Iwata, S.; Watanabe, O.; Fushimi, H. **Surface morphology in the ablation area of the Khumbu glacier.** *Seppyo*, Vol. 41, Special Issue, 1980, 9-17p.

Loc: ICIMOD, DOM

The surface morphology of the ablation area of the Khumbu glacier in east Nepal is surveyed

and the details are mapped. The complex surface morphologies, large debris covered cones, large hollows, and irregular uneven surfaces are identified on the map. The irregular uneven surfaces are subdivided into eleven morphological units. The surface morphology is seen to change both in transverse and in longitudinal directions.

239 Kadota, T.; Ageta, Y. **On the relation between climate and retreat of glacier AX010 in the Nepal Himalayas from 1978 to 1989.** *Bulletin Glacier Research* 10, 1992, 1-10p.

Loc: ICIMOD, DOM

From 1978 to 1989, the terminus of glacier AX010 in Shorong region retreated about 30 m. This retreat is equivalent to 12 m thinning of ice thickness around the glacier terminus. This thinning is evaluated by using simple models of glacier mass balance and ice flow. The average climatic condition around the glacier is also estimated.

240 Kadota, T.; Seko, K.; Ageta, Y. **Shrinkage of glacier AX010 since 1978, Shorong Himal, east Nepal.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium* (Nov. 1992), IAHS Publ. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 145-154p.

Loc: CDOM, DHM, ICIMOD

The glacier AX010 retreated by 30m during 1978 to 1989 and 28m from 1989 to 1991, resulting in a volume loss of about 3 million cubic metres. Using an empirical mass balance model and flow model, the relationship between retreat and climatic conditions during the period from 1978 to 1989 is discussed. The authors also claim that, in the Nepal Himalayas, no other study relating to change of glacier volume has been done so far and the results presented will form the basic data for further study on the relationship between climate and glaciers in the Himalayas.

241 Kamiyama, K.; Kitoaka, K.; Watanabe, O. **Characteristics of Yala glacier from the**

viewpoint of Tritium content. *Journal of Geography Res.* 91 (D 11), 1986, 11841-11844p.

242 Kappenberger, G.; Steinegger, U.; Braun, L.N.; Kostka, R. **Recent changes in glacier tongues in the Langtang Khola basin, Nepal, determined by terrestrial photogrammetry.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology: Proceedings of the Kathmandu Symposium* (Nov. 1992), IAHS Pub. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 95-101p.

Loc: DHM, CDOM, ICIMOD

An analysis of aerial and terrestrial photographs by means of digital image processing allows inferences to be made about glacier fluctuations, even in areas where no accurate geodetic surveys are available over longer time periods. An approximate determination of the displacement of five glacier tongues in the Langtang Khola basin has been made for the period between 1980 and 1991. The results show that fluctuations occurred only on south-facing glaciers.

243 Kayastha, R.B. **Sensitivity of glacier mass balance to meteorological conditions in the Himalayas.** M.Sc. Thesis, Japan, Nagoya, Nagoya University, 1994, 90p.

Loc: CDOM,

In this thesis, a model is developed to study the mass balance of glaciers in the Himalayas, with emphasis on the sensitivity to input parameters and climatic variables. The model is based on the energy balance at the surface taking into consideration the areal distribution of the meteorological elements and the topographic effect. The model is tested against observation results on glacier AX010 in the Nepal Himalayas for the summer of 1978. Sensitivity tests of the mass balance to the meteorological elements are also carried out.

244 Kodama, H.; Mae, S. **The Flow of glaciers in the Khumbu region.** *Seppyo*, Vol. 38, Special Issue, 1976, 31-36p.

Loc: ICIMOD, DOM

In this paper, the results of the measurements of surface velocity of the glacier in the Khumbu region during different seasons are discussed. The surface of the Kongma glacier is found to have moved upwards and this strange motion of the ice is also discussed.

245 Kohshima, S. **Formation of dirt layers and surface dust by micro-plant growth in Yala glacier, Nepal Himalayas.** *Bulletin of Glacier Research* 5, 1987, 63-68p.

Loc: ICIMOD

This paper discusses the process of dirt layer formation in the Yala glacier from biological observations and analysis of surface dust and dirt layer dust particles in glacial strata.

246 Kohshima, S.; Seko, K.; Yoshimura, Y. **Biotic acceleration of glacier melting in Yala glacier, Langtang region, Nepal Himalayas.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium* (Nov. 1992), IAHS Publ. No. 218, United Kingdom, Oxfordshire, Institute of Hydrology, 1993, 309-316p.

Loc: DHM, CDOM, ICIMOD

The microbial production on the glacier surface is so large during the monsoon season that the surface of the ablation area is covered with a dark coloured mud-like material which mainly consists of algae and bacteria. This material reduces the surface albedo of the glacier and accelerates glacier melting. In this paper, the impact of this process on heat balance of the glacier is assessed. The study area is the Yala glacier in Langtang valley during the monsoon season of 1991.

247 *Lanzhou Institute of Glaciology and Geocryology, Chinese Academy of Sciences, Water and Energy Commission Secretariat, and Nepal Electricity Authority. Report on first expedition to glaciers and glacier lakes in the Pumqu (Arun) and Poiqu (Bhote-Sunkosi) river basins, Xizang (Tibet), China, Sino-Nepalese investigation*

of glacier lake outburst floods in the Himalayas. Chaohai, L.; Sharma, C.K.; Mayor-mora, R.; Xing, H. (ed.), Beijing, Science Press, 1988, 192p.

Loc: ICIMOD

The first joint Sino-Nepalese GLOF study expedition to the upper reaches of the Punqu (Arun) and Poiqu (Bhote Koshi) river basins and Xizang (Tibet) took place from April 14 to June 21, 1987. This technical report contains the observations made during the expedition and presents their findings and recommendations.

248 Lida, H.; Endo, Y.; Kohshima, S.; Motoyama, H.; Watanabe, O. **Characteristics of snow cover and formation process of dirt layer in the accumulation area of Yala glacier, Langtang Himal, Nepal.** *Bulletin of Glacier Research* 5, 1987, 55-62p.

Loc: ICIMOD

This paper presents the study on the formation process of the dirt layer on the basis of long-term observations made (summer 1985 to spring 1986) in the accumulation area of the glacier in the Himalayas. The author summarises that distinct dirt layers are formed by dry fallout during the dry period from the post-monsoon season to the pre-monsoon season.

249 Mae, S. **Ice temperature of Khumbu glacier.** *Seppyo*, Vol. 38, Special Issue, 1976, 37-38p.

Loc: ICIMOD, DOM

In this paper, results of the thermal drilling at 5360m above sea level on August 1974 in Khumbu glacier are discussed. It is observed that there are seven layers down to the maximum depth. It is also observed that the temperature at a depth of 2m is - 2° C and at 2.7m depth it is 5.3° C. It also concludes that the ice temperature above the deepest layer is below melting point.

250 Miller, M.M. **Glacio-meteorology on Mt. Everest in 1963; the Khumbu glacier of Chomoloongma in Northeastern Nepal.** *Weatherwise* 17 (4), 1964, 168-189p.

251 Miller, M.M. **Tritium in Mt. Everest ice - Annual glacier accumulation and climatology at great equatorial latitudes.** *Journal of Geophys. Res.* 70, 1965, 3885-3888p.

252 Miller, M.M.; Marston, R.A. **Glacial response to climate change and epeirogeny in the Nepalese Himalayas.** In: Martson, R. A. (ed.), *Environment and Society in the Manaslu - Ganesh Region of the Central Nepal Himalayas*, A final report of the Manaslu-Ganesh expedition, Idaho, University of Idaho and Foundation for Glacier and Environmental Research, USA, 1989, 65-88p.

Loc: ICIMOD

This report contains the characteristics of both ancient and modern glaciers on the southern flank of Manaslu and Ganesh Himal. A comparison of these characteristics with Langtang and Khumbu Himal and also with Alaska-Canada boundary ranges is presented.

253 Moribayashi, S. (Nikko Exploration & Development Co.) **Transverse profiles of Khumbu glacier obtained by gravity observation.** *Seppyo*, Vol. 40, Special Issue, 1978, 21-25p.

Loc: ICIMOD, DOM

In this paper, the transverse profiles of the Khumbu glacier obtained by the gravitational method are provided. The thickness of the ice is estimated at 100m in the middle part and 220m, 1km downstream of the ice fall in the upper part.

254 Moribayashi, S.; Higuchi, K. **Characteristics of glacier in Khumbu region and their recent variations.** *Seppyo*, Vol. 39, Special Issue, 1977, 3-6p.

Loc: ICIMOD, DOM

The Khumbu region glaciers are classified into two types, namely, "debris-covered type glacier" and "clean type glacier". In this paper, the characteristics of both types of glacier are studied.

255 Morinaga, Y.; Seko, K.; Takahashi, S. **Seasonal variation of snowline in Langtang valley, Nepal Himalayas, 1985 - 1986.** Bulletin of Glacier Research 5, 1987, 49-53p.

Loc: ICIMOD, DOM

The seasonal variation of the snowline in Langtang valley is studied on the basis of photographs taken during different seasons. The snowline is compared with the altitude of 0°C air temperature derived from the observational data obtained at the valley station.

256 Motoyama, H.; Ohata, T.; Endo, Y.; Lida, H. **Air temperature and snow depth on Yala glacier of Langtang valley, Nepal Himalayas.** Bulletin of Glacier Research 8, 1990, 55-60p.

Loc: ICIMOD

Observations of air temperature and snow depth were carried out for 9 months on the Yala glacier, Langtang Himal, Nepal. A comparison of air temperatures at Yala glacier (5,250m) and at Kyangchen (3,920 m) is presented in this paper. The authors found that the snow depths on these two places are linearly related.

257 Nakawo, M. **Supraglacial debris of G2 glacier in the hidden valley, Mukut Himal.** Journal of glaciology 22 (87), 1979, 273-283p.

258 Nakawo, M.; Fujii, Y.; Shrestha, M.L. **Flow of glaciers in the hidden valley, Mukut Himal.** Seppyo, Vol. 38, Special Issue, 1976, 39-43p.

Loc: ICIMOD, DOM

The paper presents the observations made of the surface flow of the Rikha Samba and other glaciers. The authors measured the movement of the glaciers for one month and found out that the Rikha Samba glacier moved 1 - 2 m/month and, on the glacier-like ice mass close to Rikha Samba glacier, no movement was observed.

259 Nakawo, M.; Iwata, S.; Watanabe, O.; Yoshida, M. **Process which distribute**

supraglacial debris on the Khumbu glacier, Nepal Himalayas. Annals of Glaciology 8, 1986, 129-131p.

260 Nakawo, M.; Morohoshi, T.; Uehara, S. **Satellite data utilization for estimating ablation of debris covered glaciers.** In: Young, G.J. (ed.), Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium (Nov. 1992), IAHS Publ. No. 218, UK, Oxfordshire, Institute of Hydrology, 1993, 75-83p.

Loc: DHM, CDOM, ICIMOD

By interpreting the MESSR data of MOS - 1 satellite, the areas of snow, bare ice, or debris are identified. The areas of granitic debris and schistose debris are also identified. The TM data of the LANDSAT satellite are used to obtain the surface temperature of the debris. The paper describes briefly an outline for estimating ablation under supraglacial debris with the aid of satellite data.

261 Ohata, T.; Fukushima, Y.; Suzuki, M.; Motoyama, H.; Kawashima, K.; Kubota, H. **Suspended sediment yield in a glaciated watershed of Langtang valley, Nepal Himalayas.** Bulletin of Glacier Research 5, 1987, 19-24p.

Loc: ICIMOD

This paper presents the results of investigations of the characteristics of suspended sediments and the annual suspended sediment yield carried out in Langtang Khola, Nepal Himalayas. The authors have found that the particle size in Langtang Khola is finer than in the Tenjin river which does not have glaciers. It is also estimated that almost all the suspended sediments are discharged from June to September.

262 Ohata, T.; Higuchi, K. **Heat balance study on glacier AX010 in Shorong Himal, East Nepal.** Seppyo, Vol. 41, Special Issue, 1980, 42-47p.

Loc: ICIMOD, DOM

The heat balance of the small glacier AX010 in Shorong Himal under weather conditions having an air temperature of 2.3°C (average), low

humidity, low wind speed (1.2 m/s), and high cloud amount is presented in this paper.

263 Ohata, T.; Motoyama, H.; Lida, H. **Snow surveys on the slope facing north of Langtang valley, Nepal Himalayas.** Bulletin of Glacier Research 8, 1990, 29-30p.

Loc: ICIMOD

The snow depth and the water equivalent of snow cover were measured by the team of the Glaciological Expedition of Nepal, Langtang project, in the winter and spring seasons of 1987. Distribution of these quantities with altitude are discussed in this paper.

264 Ono, Y. **Recent fluctuations of the Yala glacier, Langtang Himal, reconstructed from annual moraine ridges.** Zeitschrift für Gletscherkunde and Glazialgeologie 21, 1985, 251-258p.

265 Ozawa, H.; Yamada, T. **Contributions of internal accumulation to mass balance & conditions of superimposed ice formation in Yala glacier, Nepal Himalayas.** In: *Glacial studies in Langtang Valley: report of the Glaciological Expedition of Nepal Himalayas, 1987-1988*, Japan, Sapporo, Glaciological Expedition of Nepal Project, 1989, 31-46p.

Loc: ICIMOD

This paper presents the investigations made of the contributions of meltwater freezing in surface snow layers to mass balance as internal accumulation and to the superimposed ice formation in Yala glacier, Nepal Himalayas, on the basis of the field observations conducted in August to October 1987 and the computer simulation using a simple one-dimensional heat conduction model.

266 Shiraiwa, T.; Ueno, K.; Yamada, T. **Distribution of mass input on glaciers in the Langtang valley, Nepal Himalayas.** Bulletin of Glacier Research 10, 1992, 21-30p.

Loc: ICIMOD

In this paper, investigations made of the distribution of glacier mass input, by means of meteorological observations and snow surveys in the Langtang Valley are presented.

267 Shiraiwa, T.; Ueno, K.; Yamada, T. **Spatial variations of glacier mass input in the Langtang valley, Nepal Himalayas.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium (Nov. 1992)*, IAHS Publ. No. 218, UK, Oxfordshire, Institute of Hydrology, 1993, 285-288p.

Loc: DHM, CDOM, ICIMOD

Spatial distribution of the glacier remains uncertain due to insufficient field observation. In order to overcome this problem, observations of air temperature and precipitation were carried out on three glacier fields at about 5,100 masl. The concluding results are presented as an extended abstract of the paper.

268 Shiraiwa, T.; Yamada, T. **Glacier inventory of the Langtang valley, Nepal Himalayas.** Japan, Institute of Low Temperature Science, Data Report, Ser. A, 50, 1991, 47-72p

All glaciers in the Langtang valley are catalogued according to ID number and some of the plates of the glaciers are also presented.

269 Steinegger, U.; Braun, L.N.; Kappenberger, G.; Tartari, C. **Assessment of annual snow accumulation over the past 10 years at high elevations in the Langtang region.** In: Young, G.J. (ed.), *Snow and Glacier Hydrology, Proceedings of the Kathmandu Symposium (Nov. 1992)*, IAHS Publ. No. 218, UK, Oxfordshire, Institute of Hydrology, 1993, 155-165p.

Loc: DHM, CDOM, ICIMOD

Stratigraphic observations made of crevasses and field measurements in snow pits on three glaciers in Langtang valley show two firn layers. A shallow dirty layer is formed during the winter season and a thick clean layer is formed in summer. Melting and runoff occurs from up to 5500m above sea level in the pre-monsoon

season. The variety of contamination that is stored in the snow layers is also analysed for organic, inorganic, and tritium contents.

270 Upadhyay, B.P. **Importance of glacial studies in Nepal.** Presented: Symposium on Studies of Snow and Ice in Asia, Nagoya, Japan, 1979, 5p.

271 Upadhyay, B.P. **Some results of glacier research in the Nepal Himalayas.** Presented at the first National Symposium on Seasonal Snow Cover, New Delhi, Manali, Snow and Avalanche Study Establishment, 1983, 7p.

272 Watanabe, O.; Fushimi, H.; Inoue, J.; Iwata, S.; Ikegami, K.; Tanaka, Y.; Yoshida, M.; Upadhyay, B.P. **Outline of studies on supraglacial debris of the Khumbu glacier, Khumbu region.** *Seppyo*, Vol. 41, Special Issue, 1980, 5-8p.

Loc: ICIMOD, DOM

This paper describes the morphologic features of the Khumbu glacier.

273 Watanabe, O.; Higuchi, K. **Glaciological studies in Asiatic highland region during 1985-1986.** *Bulletin of Glacier Research* 5, 1987, 1-10p.

Loc: ICIMOD

Glacio-hydrological, glacio-meteorological, and glaciological observations in the Nepal Himalayas were carried out during 1985 - 86 as part of a project to study the glaciology of the Asiatic highland region. This paper summarises the activities undertaken and the observations made by the expedition.

274 Watanabe, O.; Iwata, S.; Fushimi, H. **Topographic characteristics in the ablation area of the Khumbu glacier, Nepal Himalaya.** *Annals of Glaciology* 8, 1986, 177-180p.

275 Watanabe, O. ; Shiraiwa, T. ; Ono, Y. **Distribution of periglacial landforms in the Langtang valley, Nepal Himalayas.** *Bulletin of Glacier Research* 7, 1989, 209-220p.

Loc: ICIMOD

The spatial and altitudinal distribution of the active periglacial landforms are mapped in the Langtang valley, central Nepal Himalayas. Several inactive landforms are also mapped. In this paper, the periglacial belt of the Langtang valley, which spreads between the timberline and the equilibrium line, is subdivided into 4 belts and discussed.

276 Wushiki, H. **Altitude effect on the deuterium content of the local rains and snows in the Himalayas.** *Seppyo*, Vol. 39, Special Issue, 1977, 57-59p.

Loc: ICIMOD, DOM

An attempt has been made to study the altitude effect of precipitation on the deuterium content. To do so, two sampling projects were undertaken to collect precipitation waters. One, a long-term sampling, by simple rain gauges installed along the mountain slopes, and the other, simultaneous daily precipitation sampling at two different altitudes at about 1000 masl.

277 Wushiki, H. **Deuterium content in the Himalayan precipitation at Khumbu district observed in 1974/1975.** *Seppyo*, Vol. 39, Special Issue, 1977, 50-56p.

Loc: ICIMOD, DOM

The study is based upon the 129 water samples collected at Lhajung (4420m) from April 1974 to March 1975. The deuterium content of each sample measured by spectrometer showed high deuterium content during pre-monsoon and the lowest in mid-monsoon. The author attributes this to the direct transport of water vapour from the Indian Ocean to the Himalayas without much rainfall on the way.

278 Wushiki, H. **Ice cliffs and exposed stratigraphy of Kongma glacier, Khumbu.** *Seppyo*, Vol. 39, Special Issue, 1977, 22-25p.

Loc: ICIMOD, DOM

Glaciology

The ice cliffs in Kongma glacier are sketched in this paper. These sketches are arranged numerically for easy comparison.

279 Yamada, T. **Outline of glaciological studies in the Nepal Himalayas, 1989.** Bulletin of Glacier Research 9, 1991, 51-54p.

Loc: ICIMOD

Some Japanese scientists carried out research work through the Glaciological Expedition of Nepal, 1989, as part of their project called 'Glaciological Studies in Asian Highland Regions'. The hydrological and meteorological station in Langtang Himal has been continuously maintained since 1985. Glacier fluctuations for over ten years have also been observed in the Khumbu, Shorong, and Langtang regions.

280 Yamada, T., Shiraiwa, T.; Lida, H.; Kadota, T.; Watanabe, O.; Rana, B.; Ageta, Y.; Fushimi, H. **Fluctuations of the glaciers from the 1970s to 1989 in Khumbu, Shorong and Langtang regions, Nepal Himalayas.** Bulletin of Glacier Research 10, 1992, 11-19p.

Loc: ICIMOD

As a part of the Geological Expedition of Nepal, fluctuations of glaciers were investigated by means of ground surveys in the Khumbu, Shorong, and Langtang regions. According to surveys conducted from 1970s to 1989, almost all glaciers have shrunk a great deal.

IAHS International Association of Hydrological Sciences
IAHS Press, Institute of Hydrology, Dordrecht,
United Kingdom

ICIMOD International Centre for Integrated Mountain Development
P.O.Box # 3266, Kathmandu

LRMP Land Resources Mapping Project
Babar Mahal, Kathmandu

Loc Location

NEA Nepal Electricity Authority
Rajai Park, Kathmandu

NGS Nepal Geographical Society
Department of Geography
Trichandra Campus, Ghantaghar, Kathmandu

NRSC National Remote Sensing Centre
Babar Mahal, Kathmandu

SEPPYO Journal of the Japanese Society of Snow and Ice
Nagoya University, Nagoya, Japan

WEC Water and Energy Commission Secretariat
NMG/NEPAL, Singha Durbar, Kathmandu