Status of Glaciers in Afghanistan based on Landsat Data (2005)

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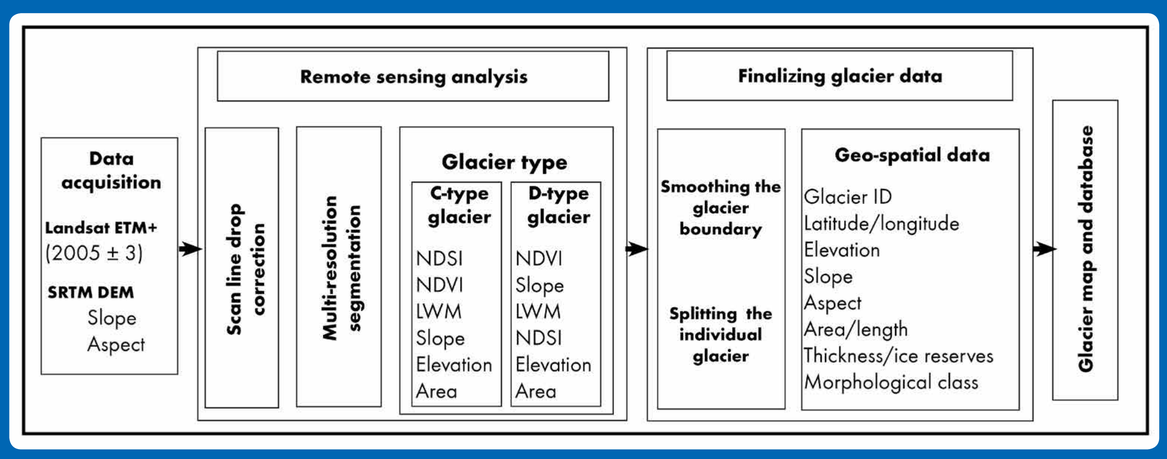
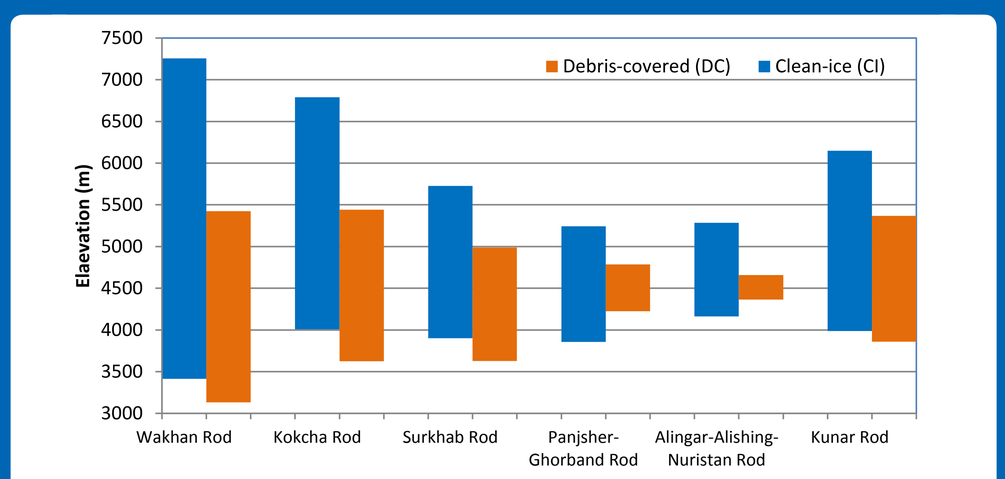
Glaciers in Afghanistan serve as headwaters to the Amu Darya River basin and also contribute to the Indus River basin. Glaciers are concentrated in the central and north eastern parts of Afghanistan. The glaciers were mapped from Landsat Enhanced Thematic Mapper Plus (ETM+) images from 2005 to 2007 using semi-automatic object based image classification method.

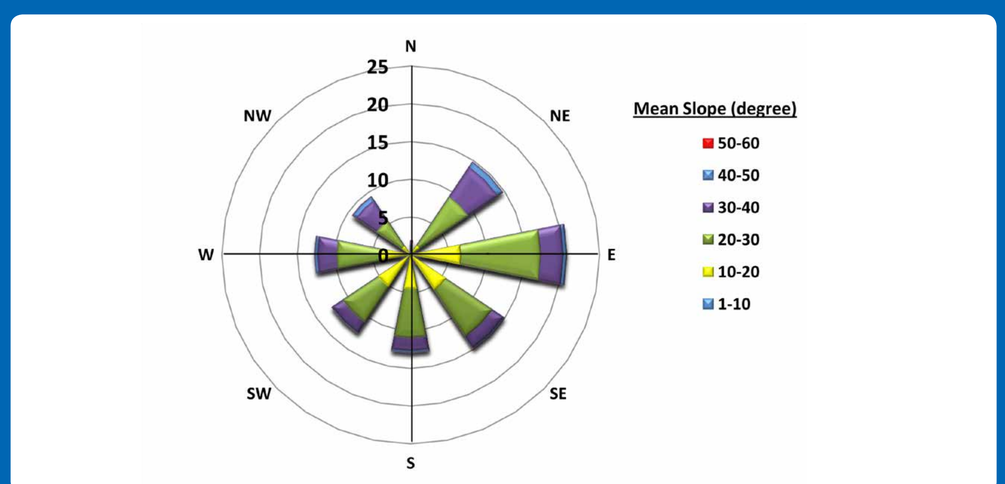
The inventory of glaciers includes all the perennial ice masses and debris covered glaciers with areas larger than 0.02 km^2. Altogether 3,622 glaciers were mapped in Afghanistan covering a total areal extent of 2,677 km^2.



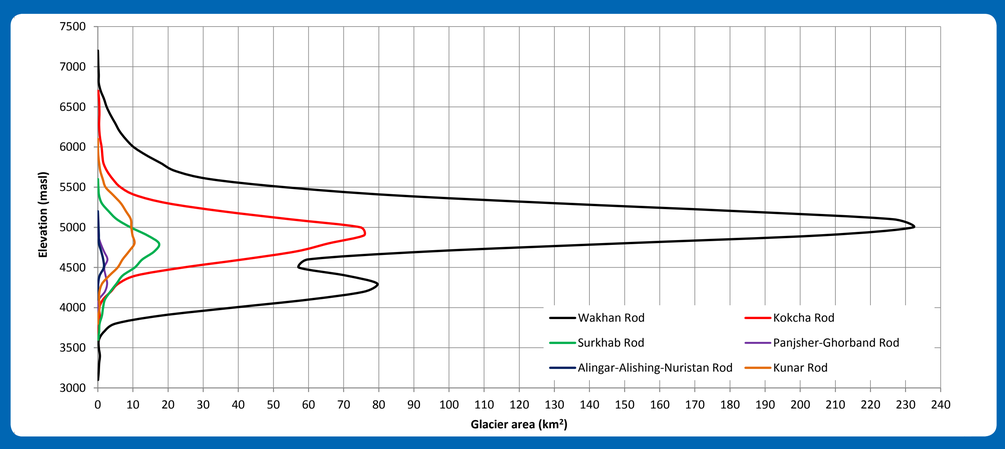
Flow diagram of the methodology used for mapping clean-ice (CI) and debris-covered (DC) glaciers from Landsat ETM+ images



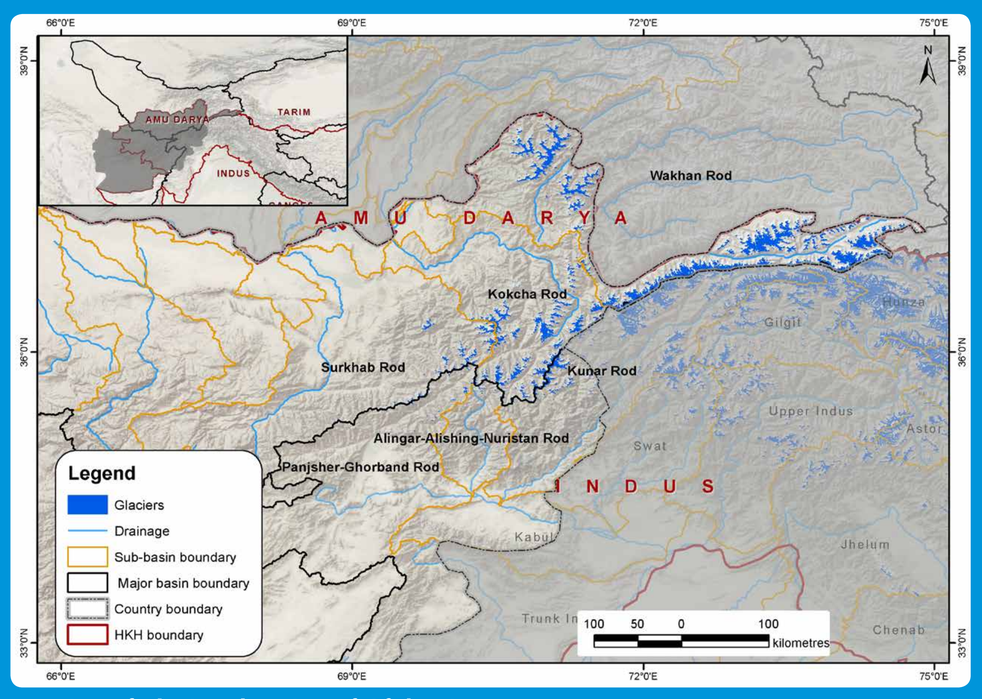
Elevation of Clean-ice (CI) and Debris-covered (DC) glaciers in the sub-basins



Percentage of glaciers within different aspects and slopes in Afghanistan



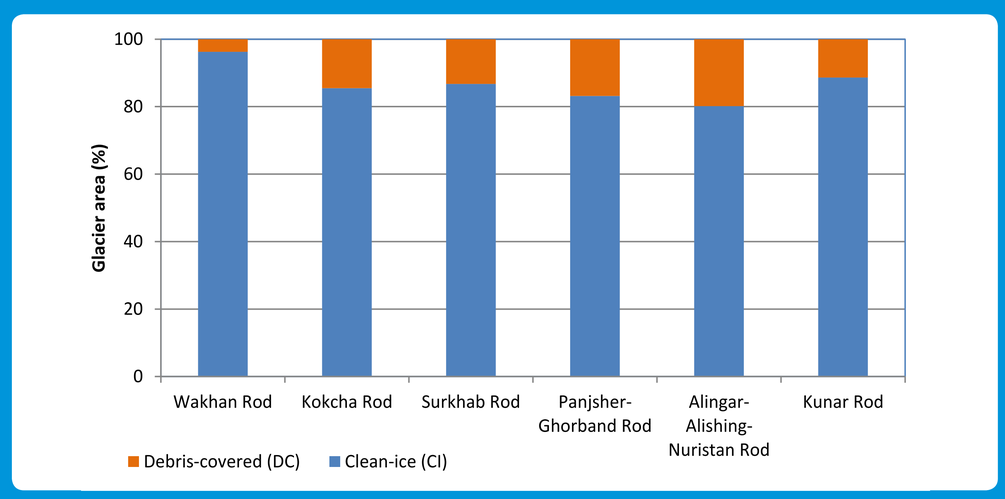
Area-altitude distribution of glaciers in the sub-basins



Location of glaciated region of Afghanistan

Summary of Glacier data

Basin	Sub-basin	Glacier number			Glacier area (km^2)				Highest elevation (masl)		Lowest elevation (masl)		Mean slope (deg)	
	Name	CI	DC	Total	CI	DC	Total	Largest	CI	DC	CI	DC	CI	DC
Amudarya	Wakhan Rod	2047	82	2047	1878.48	72.57	1951.05	39.72	7256	5425	3415	3131	25	10
	Kokcha Rod	913	14 8	913	430.11	72.99	503.10	9.36	6790	5443	4007	3624	27	12
	Surkhab Rod	284	48	284	94.15	14.39	108.54	9.82	5726	4989	3901	3627	27	13
	Sub Total	**3244**	**278**	**3244**	**2402.73**	**159.96**	**2562.69**	**39.72**	**7256**	**5443**	**3415**	**3131**	**26**	**12**
Kabul	Panjsher-Ghorband Rod	85	9	85	11.73	2.37	14.10	2.50	5242	4786	3857	4224	24	10
	Alingar-Alishing-Nuristan Rod	37	4	37	4.67	1.15	5.82	1.45	5284	4658	4162	4363	27	9
	Kunar Rod	219	24	220	80.40	10.31	90.72	9.36	6150	5368	3988	3860	24	14
	Sub Total	**341**	**37**	**342**	**96.80**	**13.84**	**110.64**	**9.36**	**6150**	**5368**	**3857**	**3860**	**25**	**11**
Total		**3585**	**315**	**3586**	**2499.53**	**173.79**	**2673.32**	**39.72**	**7256**	**5443**	**3415**	**3131**	**26**	**11**



Area percentage distribution of Clean-ice (CI) and Debris-covered (DC) glaciers in the sub-basins

Facts and Figures

- The glaciers in Afghanistan are mostly concentrated in the north eastern part of the country in the Wakhan corridor.
- Almost 90% of Afghanistan's glaciers are in the Amu Darya basin; only 10% are in the Indus basin.
- Afghanistan's largest glacier occupies an area of 39.72 km^2, and lies in the Wakhan Rod sub-basin of the Amu Darya basin.
- Almost 91% of the glaciers are clean-ice (CI) type; the remaining 9% are debris-covered (DC) glaciers.
- The CI glaciers are distributed from 3,415 masl to 7,256 masl elevation, whereas the DC glaciers are found from 3,131 masl to 5,443 masl.
- The average slope in CI glaciers is 26°, whereas the average slope in DC glaciers is about 11°.
- Morphologically, about 75% of glaciers are mountain basin type and contribute to about 42% of the total glaciated area; there are a few valley glaciers (>6%), but contribute to almost 42% of the total glaciated area.
- The maximum glaciated area in the Amu Darya basin is 316.29 km^2 (12.33% of the total area), occurring at an elevation zone of 5,000–5,100 masl. In the Indus basin (Kabul), the maximum glaciated area stands 11.58 km^2 (10.43 % of the total area), occurring at an elevation of 4,700–4,800 masl.

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HKH Database - apps.geoportal.icimod.org/HKHglacier

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