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Rock glaciers of the Karakoram Himalaya and surrounding mountains, Inner Asia

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The transHimalayan upper Indus Basin contains thousands of rock glaciers. An exceptional diversity of forms and sizes exist, hitherto largely unresearched. They are in a well-defined elevation band across the mountains, usually less than 1400 m vertically, although total relief exceeds 7000 m. The zone varies from north to south, west to east, and with slope orientation. Interfluve elevations are primary constraints. Rock glaciers are absent below the lowest and the highest interfluves. They are uncommon in the highest Mustagh Karakoram, Nanga Parbat, and Hindu Kush where glacier ice blankets the elevations where they could develop. The heaviest concentrations occur in sub-ranges of intermediate elevation. A full spectrum of generative conditions is found; related to periglacial, talus, glacial, avalanche, wind-blown snow, and rock avalanche processes. Forms vary between north and south slopes; arid, rainshadowed and more snowy, humid valleys. Rock glacier complexes, where two or more join to create extensive lobes, may have tributaries with different source conditions. The larger examples are several kilometres in length,usually glacier-derived, evidently affected by Holocene glacial history, trans-glacial processes, and paraglacial instabilities. In lesser ranges, many smaller rock glaciers are associated with glacier-free cirques, glacially sculpted valley walls, and floors with abundant glacial deposits. In general, they are transitional in genesis, process, and spatially relative to glacierization, to the vertical cascade of moisture and debris, and climate change in the vertical. Their landscape roles include extensive fragmentation of drainage systems. Countless inactive rock glaciers occur, typically continuing below active ones.