

Investigating Glacial Dynamics in North Pakistan: A Landsat Perspective on the Karakoram Region

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The ongoing collision of Indian and Eurasian plates in north Pakistan is reflected by the development of mountain belts including Pamir, Karakoram, and the western Himalayas. These mountains are evolving with the development of tectonic geomorphology and crustal deformation with earthquake and seismicity. Karakoram is the most dynamic region on earth in terms of active high mountains and tectonic geomorphology with a remarkable fluvial and glacial system. The second largest glaciers outside the Polar region are accumulated in Karakoram, such as Baltoro, Hispar, and Batura glaciers. The present study is carried out to understand the Karakoram anomaly in active mountain ranges such as Karakoram in this climate change era. GIS data (Satellite images and DEM data) with field validation were analyzed to conduct this study. Glaciers are generally oriented in NW-SE direction, similar to structural trends. The results demonstrate that snow accumulation has reduced from 44.02% in 2002 to 27.75 % in 2017. In general, glaciation is reported in the Karakoram ranges however, the Shimshal Valley and other parts of the study area indicate retreating of glaciers. From the results of satellite imagery, the Hispar and Baltoro glaciers appear in an equilibrium state. Additional research could involve the integration of high-resolution satellite imagery and ground-based data to enhance the monitoring and understanding of glacier dynamics within the study area.