

Geospatial observations over the western Himalaya for Glacier retreat and Glacial Hazards

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Rising global temperature and variability in the precipitation have significant impact over the Himalayan glaciers. Recent findings have reported the low altitude glaciers are retreating fast compared to high altitude glaciers. Himalayan glaciers have a large spatial variation in glacial retreat and mass loss due to their unique climate setting, altitude, topography etc. Accelerated melting has generated various glacial ponds (glacial lakes) over the Himalayan region, which has become upcoming threat for the region. The remote sensing have provided a better mean for the analysing the glacier retreat and glacial hazards in a vast and unapproachable glaciated terrain. Chandra, Bhaga and Miyar sub basins of Chenab basin, cover a major glacierized zone of Lahul and Spiti region of western Himalaya. The basins have more than 400 glaciers and >1400 km² glacierized area. Recent and historical satellites data were used for the monitoring of glacier retreat and glacial hazards over the selected region. The glaciers of this region are retreating with the alarming rate (13-20 ma⁻¹) and have lost significant glacier area. Due to this accelerated retreat, some new lakes have been formed and some of them have expanded up to a hazardous situation. The proglacial lakes of Chandra basin like Samudra tapu and Gepang gath have also been expanded. the volume of Samudra Tapu and Gepang Gath lakes of the Chandra basin from 3.4 million m³ to 67.7 million m³ and 1.5 million m³ to 27.5 million m³ respectively during the last 43 years (1971-2014). It is also observed that the expansion is significantly high during 2009-2014. Thus it is observed that the geospatial techniques are helpful to monitor the glaciers health and preventing options for the upcoming hazards.

Keywords: Geospatial techniques, glaciers retreat, glacial hazards, western Himalaya.