



Glacial lake changes and outburst flood hazard in Chandra basin, North-Western Indian Himalaya

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Climatic change induced glacier recession has been accompanied by formation and growth of proglacial lakes in the Himalayan region, which pose an emerging significant threat to the downstream communities/settlements in the form of outburst floods. To understand spatiotemporal evolution patterns, sources and driving mechanism of formation and expansion of glacial lakes, a temporal inventory of glacial lakes (area > 2000 m²) in Chandra basin has been developed from 2000 to 2014 using IRS LISS-III images. From 2000 to 2014, the total number of glacial lakes in Chandra basin increased from 28 to 46 and area expanded from 1.91±0.24 km² to 3.26±0.24 km². Accelerated glacier ablation and increased glacier melt runoff due to climate warming led to the formation and expansion of glacial lakes in space vacated by glacier recession. The increase in number and area of ice-dammed lakes at higher elevations confirms the continued glacier retreat in the basin. Lakes in contact or in the proximity of the mother glacier exhibit higher growth and formation rate. The accelerated growth of glacial lakes has resulted in increased hazard and damage potential of GLOFs in Chandra basin. Seven potentially dangerous lakes are identified and analyzed qualitatively for outburst susceptibility.