Assesment of Glacial lake Hazards through remote sensing in Sikkim

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Recent studies on several glaciers in Himalayas have reported changes in their mass balance and the glacial retreat has been put down to as a change in global climate. The glacial lakes located in the region, being situated on high elevation and surrounded by unconsolidated rock masses, are sites of potential glacial lake hazards. An extreme rainfall event coupled with them having vulnerable lithology and slopes could trigger a flash flood event in the area. In our research work, Sikkim was chosen due to, having vast amount of glacial lakes and considerably hig precipitation rates. A dataset of the area was prepared using Remote Sensing and GIS software, using field data, Aster Gdem,landsat, Aphrodite and Trmm (http://www.gdem.aster.ersdac.or.jp/feature.jsp, http://www.landcover.org/data/landsat/,Rain-gauge based 0.25 degree daily grid precipitation product developed by the Asian Precipitation-Highly Resolved Observational Data Integration Towards Evaluation of water resources http://www.chikyu.ac.jp/precip,http://disc2.nascom.nasa.gov/Giovanni/tovas/). 190 glacial lakes, clustering in three zones, were identified and the relationship of glacial lakes in terms of its regional orography, geomorphology and geology was analysed using the inventory. Ultimately, glacial lake hazard zonation map of the area was created using these specified parameters, from which sites of potential flash floods were determined. The glacial lakes, which lay in the heavy monsoon reaches areas of Kanchenjunga along with the area have higher potential capability of creating hazardous event through flash floods and landslides. The area around Gangtok was found to have the highest density of glacial lakes and largest settlement which puts this region under high risk category. These studies were done, in order to provide authorities with necessary information to take preemptive measures.

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