

Altitudinal Variation of Glaciers in Langtang of Nepal Himalayas

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ABSTRACT

In this study, glaciers of Langtang area are mapped using multi-spectral images of different years. The glaciers obtained from satellites data are classified into different altitudinal classes using Digital Elevation Model (DEM) made from the digital contour of existing topographic map series of 1:50,000. Satellite images are carefully selected to analyze the glacier fluctuation in order to minimize the bias caused by seasonal snow which varies significantly. Clean type glaciers are mapped using different image processing techniques where as debris covered glaciers are mapped by visual interpretation. Images are geometrically rectified and analyzed to see the clean-type glacier fluctuation from the years of 1988, 1990 and 2000 where as another set of images from the years 1976, 1988 and 2000 are also used to verify the results. It is found that 4105.3 ha of clean type glacier is decreased, which is 27.4 % of total glacier cover, from October 1988 to November 2000. The rate of decrease of glacier shrinkage is 2.3% per year in the study period. Clean type glacier found at the elevation zone of 4200 m to 4400 m in 1988 is no longer available at the same elevation zone in year 2000. To see the same amount of glacier at the lowest elevation zone one has to climb up to 4400 m to 4600 m elevation zone. Glaciers in the elevation zone from 4400 m to 5400 m are more affected by climate change. Those glaciers which were never exposed to bare land at the end of ablation period are observed as bare land in the same period which clearly indicates the impact of climate change in Nepal Himalayas.

Keywords: glacier, altitudinal variation, remote sensing, climate change, Langtang
