



Evaluating geological and geomorphological control on glacier changes in Higher Himalayan Range, Jammu and Kashmir, India

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(Received: September 29, 2010; in final form June 3, 2011)

Abstract: To account for the variable response of the Himalayan glaciers towards climatic warming during the recent past, an attempt has been made to investigate the control of relief (hypsometry), slope and geology on glacier area change and glacier snout fluctuation in part of the Higher Himalayan Range, Jammu and Kashmir, India. Satellite images of 1975 and 2001 were used for mapping 34 major glaciers where a large number of glaciers in the area exhibited a minor glacier area change and snout retreat indicating a slow response to the climatic fluctuations during 1975 to 2001. Loss in area was less in the glaciers located at higher altitudes (above 5200 metres) whereas higher sloping (greater than 16°) glaciers were more vulnerable to glacier area change. Underlying rock type had no direct control on glacier snout retreat and area loss solely because glaciers possessing same lithological formations behave in a contrasting way both in terms of retreat and area loss. Glaciers having a very low retreat rate possess lesser percentage of area (less than 40%) in low altitudes (below 5200 metres) and vice versa. Development of crevasses over the ablation zone induces retreat of snout in those glaciers having a high slope in the ablation zone.

Key words: Geology, Slope, Altitude, Glacier area change and retreat, Himalaya