Monitoring of Himalayan Snow and Glaciers Using Remote Sensing Techniques

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Snow and glacier area located in the high altitude region of the Himalaya and conventional methods are difficult to apply due to extreme weather and terrain conditions. Therefore, remote sensing methods can provide information, which is not otherwise available to the scientific communities. In this paper, changes in glacial extent, glacial mass balance and seasonal snow cover have been discussed. Glacial retreat was estimated for 1868 glaciers in eleven basins from 1962. The investigation has shown an overall reduction in glacier area from 6332 sq km to 5329 sq km from 1962 to 2001/2, an overall deglaciation of 16 percent. Snow line at the end of ablation season on the Chhota Shigri glacier was observed using field and satellite methods suggests change in altitude from 4900 m to 5200 from late 1970's to present. Seasonal snow cover was monitored in the 28 river sub-basin using NDSI technique in Central and Western Himalaya. The investigation has shown that in early part of winter, i.e. from October to December, large amount of snow retreat was observed. For many basins located in lower altitude and in south of Pir Panjal range, snow ablation was observed through out the winter season. In addition, average stream runoff of the Baspa basin for the month of December has increased by 75 per cent. This combination of glacial retreat, negative mass balance, early melting of seasonal snow cover and winter time increase in stream runoff suggest an influence of climate change on the Himalayan cryosphere.

Key words: Snow, glacier, Himalaya, remote sensing