Glacier elevation study using TanDEM-X

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The glaciers are reported to be shrinking in response to an unfavourable climate of increasing temperature and decreasing snowfall. The statuses of Himalayan glaciers are also in agreement with the global scenario. The Himalayan glaciers are important water resources and feed a number of rivers. The study of glaciers is paramount for climatic study as well as for water management. Since glaciers in Himalaya tend to locate at higher altitudes under extreme climatic condition therefore monitoring them by conventional field method is a challenging task. The remote sensing data can be used as a substitute for studying glacier changes. The information about the glacier thickness change and volume change can be obtained by comparing two DEMs of different time i.e. geodetic method. The mass balance determined from the geodetic method has potential to replace the conventional field method. The major aim of the study is to explore the potential of TanDEM-X to extract information about the temporal changes in the glacier surface elevation, volume and mass balance of North-Western Himalayan glaciers by comparing it with DEM from various sources. SRTM (2000) and TanDEM-X (2011) are used to determine the changes in the glacier surface elevation in the last 11 years by subtracting SRTM by TanDEM-X. The comparison of SRTM DEM with TanDEM-X DEM shows very promising results for the western Himalayas. Before determining the elevation change on the glacier surface, the biases have been identified on the non glacier regions of the western Himalayan terrain. The results shows that at every altitude range elevation obtained from both SRTM DEM and TanDEM are comparably close. Elevation profile has been drawn on the non glacier region to see the change in the elevation obtained from both the DEM where the elevation is stable.