



Water loss in Indian Himalayas over the past 14 years

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Glacier mass balance is a crucial parameter to understand the health of a glacier. The Indian Himalayas being one of the largest mountain glacier systems of the world, draws attention not only in terms of future water potential, but also the effect it shall have on people living downstream upon accelerated melting. With the continuous deglaciation and retreat in most parts of this glaciated terrain, our study focusses on the changes in mass balance over the Indian Himalayas from 2000-2014. We use geodetic method, utilizing the latest global digital elevation model (DEM) of TanDEM-X mission and SRTM dataset to analyze these changes. Ground observations being sparse, has been used only for validation purpose. The coefficient of correlation between in-situ data and our estimates is 0.93. It is observed that the mass balance largely varies, as we proceed from the extreme end of the Karakoram Himalayas (in the west) towards the east in Arunachal Pradesh. This has been attributed to the variability in the regional climatic conditions and changing geomorphology of the glaciers. The total mass balance change in the Indian Himalayas has been estimated to be $-4.7 \pm 1.2 \text{ Gt yr}^{-1}$.

This study not only highlights the water lost in the Indian Himalayas which potentially increases our dependence on the seasonal precipitated water, but also portrays the potential of the newly released TanDEM-X DEM to monitor such dynamic systems like the mountain glaciers.