



Glacier Decline Pace in the Central Tien Shan Slows Down After Entering 21st Century

Jia Li, Zhiwei Li, and Lixin Wu

Central South University, School of Geosciences and Info-Physics, Department of Geomatics, China
(lijia20050710@mail.csu.edu.cn)

In terms of high mountain glacier mass balance study, geodetic measurement can achieve more detailed and less biased results relative to the Gravimetry and Laser Altimetry measurement. However, until the operation of TanDEM-X, the former was often limited by the scarcity of useful images. Here we estimated the early 21st century region-wide Central Tien Shan (CTS) mass balance using TanDEM-X images and SRTM DEM. The overall CTS glacier mass budget between 2000 and 2012 is -1.54 ± 1.43 Gt/a, corresponding to a mass balance of -0.21 ± 0.20 m/a water equivalent (w.e.). Regarding the error bar, our CTS thickness change rate (-0.24 ± 0.22 m/a) generally agrees with the ICESat/GLAS observations (-0.31 ± 0.41 m/a) reported earlier, and therefore reduces the uncertainty on early 21st century glacier changes in the CTS. In combination with previous geodetic mass balance measurement, we found that the CTS glacier decline pace has slowed down after entering the 21st century. Both the runoff changes of glacier meltwater fed rivers and temperature changes of CTS strongly supported our finding.