

Glacier change analysis in Tien Shan using digital camera images

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In mountainous regions of Central Asia, benchmark glaciers which mass balance has been observed for a long time period are Abramov, Golubin, Karabatkak, Tuyuksu, and Urumqi No.1 Glaciers (UNEP, 2007). Because of collapse of the former Soviet Union, some glaciers had been stopped to observe in the late 1990s. Observation of glacier mass balance has some problems such as optimal glacier to the survey, approach, greater burden budget and effort for observation. Although there are reports of mass balance changes using digital elevation model (DEM) generated from satellite data, it is difficult to calculate the annual variation of glacier surface in arid or semi arid region using DEM for small scale glaciers. In this study, we researched glacier mass change of small glaciers in Tien Shan, using SfM (Structure from Motion) and digital camera images from aerial. Average annual mass balance of small scale glacier (0.129km²) was -1042mm/a⁻¹ between ALOS/PRISM DEM (2006) and Camera DEM (2014). We found that it is effective to use digital images taken from the aerial for glacier research.

Keywords: mall-scale glacier, mass balance, Tien Shan, digital camera image, DEM