

Calibration and evaluation of glacier surface elevation change in accumulation area using ICESat laser altimeter

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In general, remote sensing derived digital elevation model (DEM) accompany bias and/or error, specific measurement method (photogrammetry, radar and laser). For example, photogrammetry derived DEM could contain large error in low contrasted accumulation area. Therefore, cross validation using other measurement method is necessary to evaluate photogrammetry derived DEM in accumulation area. We evaluated bias and error of grid DEM (2000–2012) using ICESat laser derived point DEM (2003–2008).

At first, glacier surface elevation change between 2000 and 2012 has been calculated by grid DEM using linear regression (Nuimura et al. 2011). Meanwhile, ICESat laser measurement has been carried out 30 times between 2003 and 2008 in this region (Z_{ICESat}). Hence, we extracted surface elevation of each date from linear regression from grid DEM (Z_{eval}). And those difference has been evaluated altitudinally for on/off-glacier.

Altitudinal distribution of the difference is near from zero line off glacier. On the other hand, Z_{eval} shows over estimation of altitude upper than 5300 m a.s.l. on glacier.

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