

An application of the mass balance model to the Hurlbut Ice Cap, northeastern Greenland

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Many of ice caps and glaciers exist at the margin of the Greenland and their contribution rate to sea level rise by recent temperature warming is large. The northeastern Greenland is one of the the areas which has little of in-situ mass balance observation. Saito et al. (2014) revealed with satellite images that the surface level change of some ice caps in northern Greenland is three times as large as that revealed by Bolch et al. (2013).

We estimated surface mass balance of Hurlbut Ice Cap in northern Greenland by the mass balance model of Hock (1999). The model takes temperature index method. The model shows spatial variation of surface mass balance for the ice cap. The 100m - gridded DEM and surface condition of the ice cap as input of the model were derived from modified ALOS (Advanced Land Observing Satellite) data. The climate data as input of the model was global radiation, air temperature and precipitation at Thule climate station (77.2N, 68.4W), which is one of the long-term running climate stations in Greenland and situates about 100 km south to the Hurlbut ice cap.

The result of the calculation is dependent on the tuning factors for both accumulation and ablation. The result was compared with the change of the surface height by Saito et al (2014). The air temperature at the Thule was increasing after 1990, and this is one of the reasons that mass balance of Hurlbut ice cap was negative.

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