



Surface mass balance at A.P. Olsen Ice Cap, NE Greenland

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A.P. Olsen Ice Cap is located in Northeast Greenland (74.6°N, 21.5°W), close to the Zackenberg Research Station. Since 2008 the GlacioBasis project has been running a monitoring programme on the SE outlet of A.P. Olsen Ice Cap, the sector draining into the Zackenberg River. The remote location of A.P. Olsen ice cap makes field work limited to the period allowing snow scooter access and the ice cap is therefore visited once per year at the end of the accumulation season. The monitoring consists of a network of 14 ablation and accumulation stakes along with 3 automatic weather stations and annual snow depth profiles using snow radar. Monitoring shows a complex inter-annual and spatial variability in SMB and special care needs to be taken when extrapolating stake measurements to the entire ice cap. We use the distributed energy balance model by Hock and Holmgren (2005) calibrated to the large amount of data that exist for the ice cap, to obtain a SMB record (2008-2014) for the ice cap. We compare our modelling and observation results against river discharge at the mouth of Zackenberg River, and evaluate their relevance at the regional scale in the light of a sensitivity analysis to temperature and snow depth in the model.