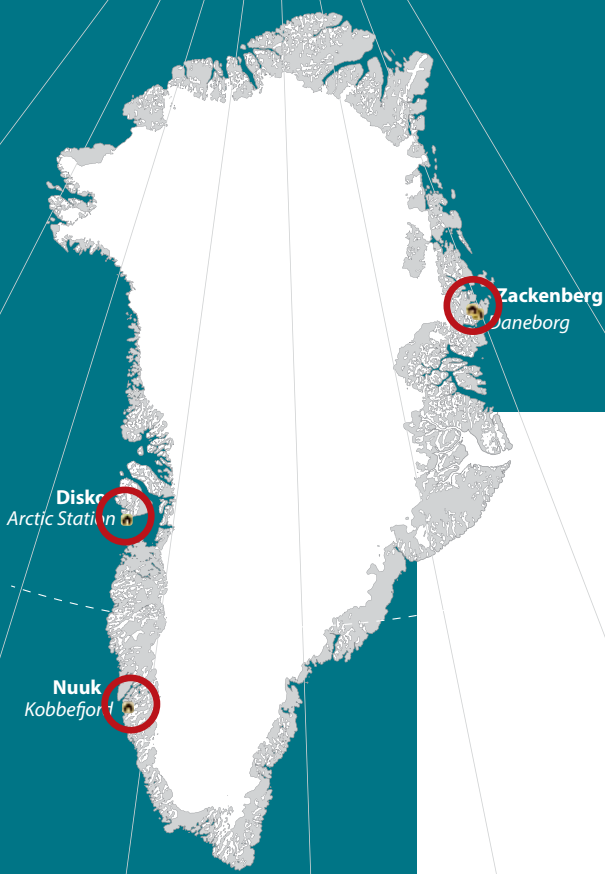


GEM GLACIOBASIS



The GlacioBasis programme monitors the surface mass balance and the surface energy budget of glaciers at Zackenberg, Kobbefjord and Disko to quantitatively understand the climatic drivers of glacier change. Currently, glaciers and ice caps distinct from the Ice Sheet account for 14-20 % of Greenland's total contribution to sea level rise and are therefore of global policy relevance. At the river catchment scale, glacier runoff is a key component of the hydrological balance and contributes to the freshwater input to the sea. GlacioBasis activities started with the 2007/2008 mass balance year at the A.P. Olsen ice cap in Zackenberg, followed by Qasigiannuit glacier in Kobbefjord (since 2012/2013) and Chamberlin glacier, a sector of Lyngmarksbræen ice cap on Disko Island (since 2015/2016).



The LYN-1 automatic weather station during maintenance, on the tongue of Chamberlin glacier. Photo: Laura H. Rasmussen, KU.



Photo: Daniel Binder, GEUS.

Monitored parameters:

- Glacier surface mass balance
- Glacier weather and surface energy budget
- Glacier surface elevation
- Glacier surface velocity
- Snow depth and density
- Glacial lake outburst floods

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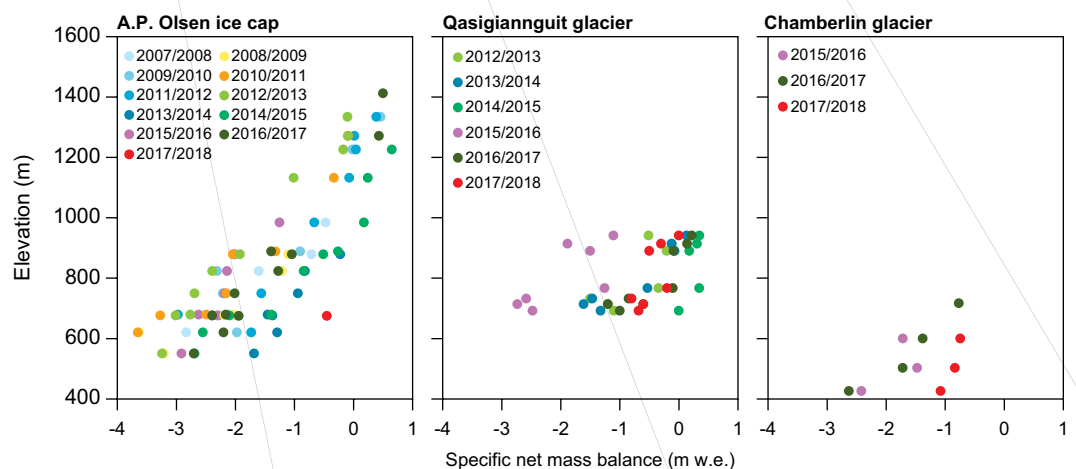


Figure 1. Specific surface net balance vs. elevation at the stakes on A.P. Olsen ice cap (Zackenberg, 14 stakes), Qasigiannuit glacier (Kobbefjord, 9 stakes) and Chamberlin Glacier (Disko, 5 stakes with 2 more added in 2018 and first remeasured in 2019). For A.P. Olsen the stake readings will become available after the 2019 spring field campaign; the black dot shown for 2018 is from an automatic sensor.

PROGRAMME DESCRIPTION

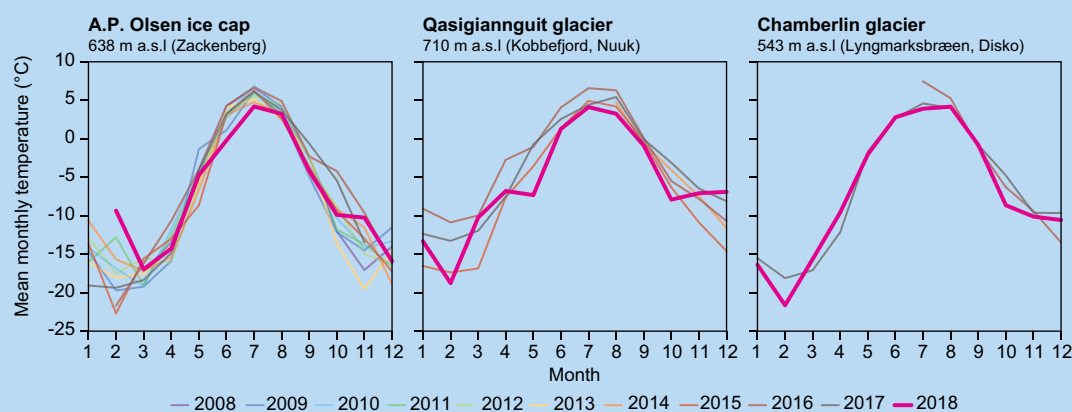


Figure 2. Mean monthly air temperatures from automatic weather stations in the ablation zone of the monitored glaciers at the three GEM sites.

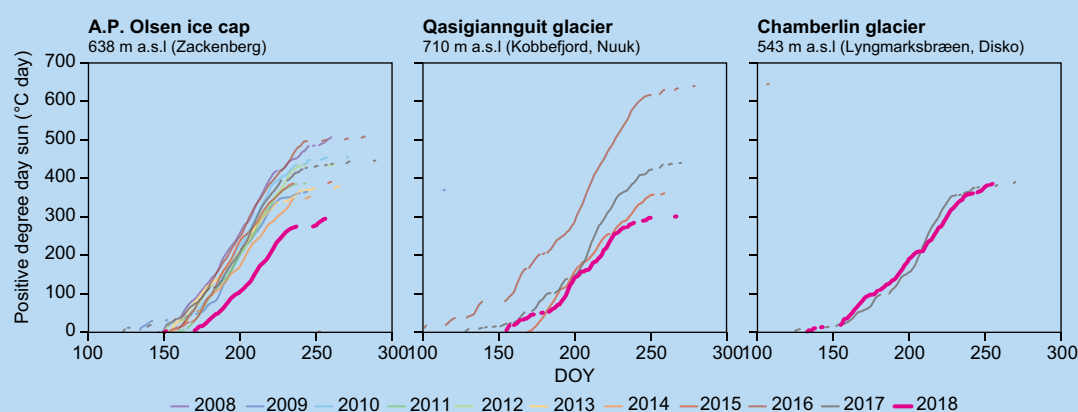


Figure 3. Positive degree day (PDD) sums from GlacioBasis automatic weather stations in the ablation zone of the monitored glaciers at the three GEM sites. Only seasons with complete data coverage are shown, gaps visible in the plots indicate sub-freezing daily mean temperatures.

GlacioBasis manual and automatic *in situ* observations implement internationally standardized protocols and best practices from WMO GCW (World Meteorological Organization's Global Cryosphere Watch) and WGMS (World Glacier Monitoring Service). All sites use the same automatic weather stations used by GEUS for PROMICE, the Programme for the Monitoring of the Greenland Ice Sheet, simplifying technical support. The GlacioBasis activities and instruments provide *in situ* calibration and validation data for the GEM Remote Sensing Initiative and function as support platform for external projects like EU-H2020 INTAROS. GlacioBasis is operated by GEUS (Zackenberg and Disko) and Asiaq – Greenland Survey (Kobbefjord). In addition to closely collaborating with the other GEM Programmes, with PROMICE, and with DMI, GlacioBasis has a strong collaboration with ZAMG (Vienna) and is represented in the Steering Group of WMO GCW.



The LYN-2 automatic weather station newly installed in May 2018 at the summit of Lyngmarksbræen ice cap, of which Chamberlin glacier is part. Photo: Michele Citterio, GEUS.