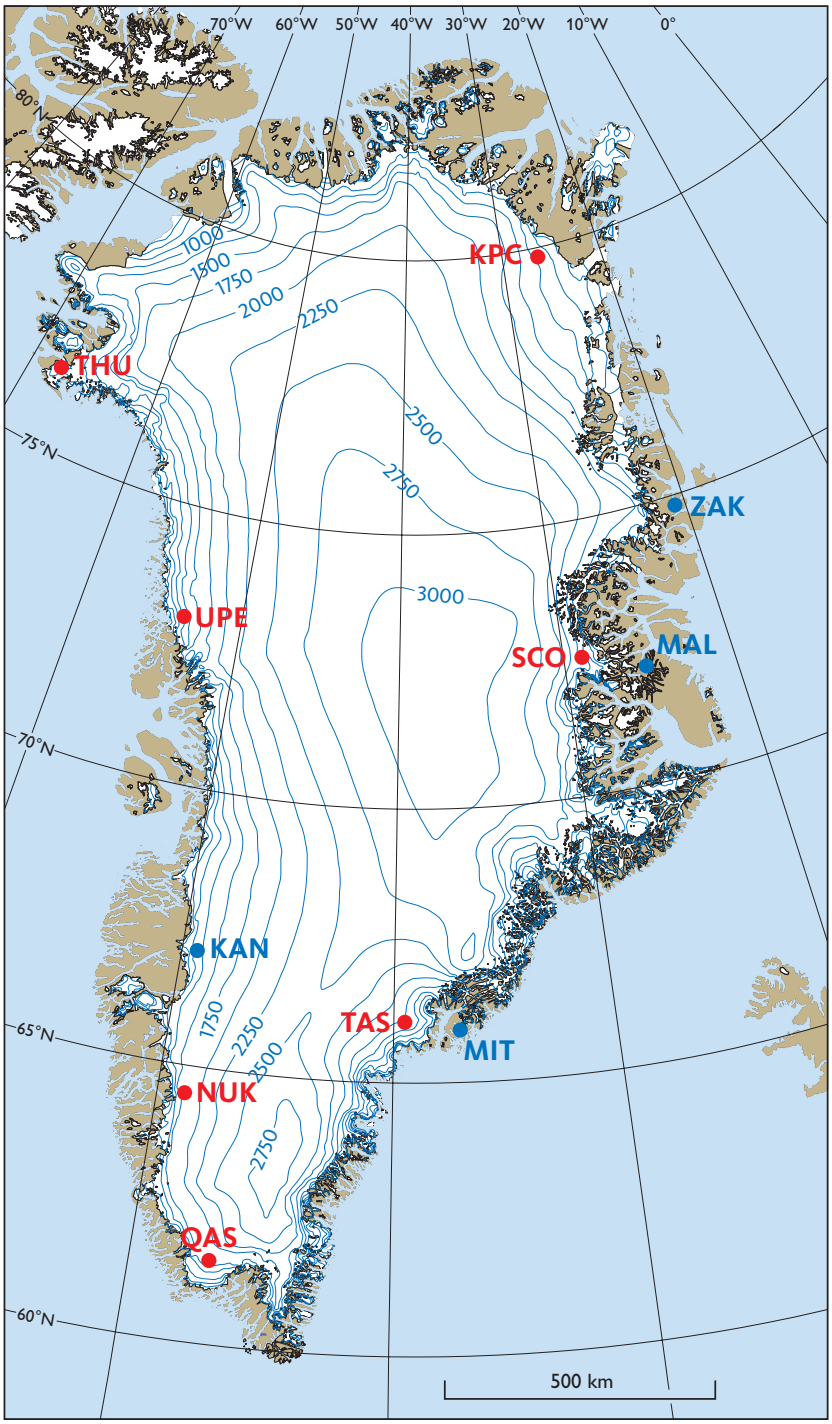
PROMICE NEWSLETTER
Programme for Monitoring of the Greenland Ice Sheet No 5 • 2013

ICE MELT CLOSER TO NORMAL

2013 ice melt recorded by PROMICE network of automatic weather stations was below the record year 2010 and 2012 values.

The PROMICE network covers the margin of the Greenland ice sheet which spans 2100 km north-south, and goes as much as 700 km below the Arctic circle where more than 9.3 m of surface ice melt has been observed in a single year (2010). Year 2013 ice melt for South and South-west Greenland ranged from 2.9 to 4.8 m (at TAS_L, QAS_L, NUK_L and KAN_L stations), while ice melt values at the more northerly KPC_L, SCO_L, UPE_L and THU_L stations range between 0.3 and 3 m at the lowest elevations (below 500 m above sea level). The melt values from higher elevation stations (above 500 m) range from 0.0 to 2.5 m in the south and from −0.4 to 2 m in the north.

Quassimiut lower station (QAS_L) is the lowest and southern most station where most melt has been observed. QAS_L is also special given that the melt data from this site extend 7 years earlier than at any other PROMICE site, back to year 2001. The average annual ice loss in the 13 years since 2001 is 6.5 m. This longer record teaches us a lesson. At all PROMICE sites in the shorter measurement interval since 2007, the 2013 melt anomaly seemed large, melt was 96% below average. Yet, considering the lengthier QAS_L record, the year 2013 ice melt was just 9% below the 13 year (2001-2013) average. Year 2013, while seeming 'cold' in recent memory was closer to 'normal' for this century.



The eight areas on the Greenland ice sheet where the PROMICE-operated weather stations are located. Two or three stations are placed in each area at different levels above the sea. In QAS in South Greenland there are three stations. The QAS_L station, mentioned in the text, is placed on the ice at a height of 310 m.

Unlike the previous 6 summers in a row that were characterized by many melt records set, year 2013 was characterized by colder north air inflow along west Greenland. Summer 2013 displayed overall lower atmospheric pressure, more clouds and more highly reflective snow cover despite some intense melt episodes in early June and late July. While melt onset in 2013 began early as in the record melt year 2012, the melt never got much momentum, being retarded by cooler air than of the recent years. 2013 melt was punctuated by snowfall a month earlier than in 2012 on 17 August. The big surprise for 2013, ironically, has been that it was closer to 'normal'.

More perspective comes considering that in this more normal year, still more ice is exiting Greenland than accumulating. The ice sheet is still contributing over 1 mm to global sea level rise. This result is according to our new surface albedo-based total mass balance estimate (see http://polarportal.org/en/greenland-ice-shelf/nbsp/total-mass-change/). So, what is 'normal' is still important for sea level.*dk*.

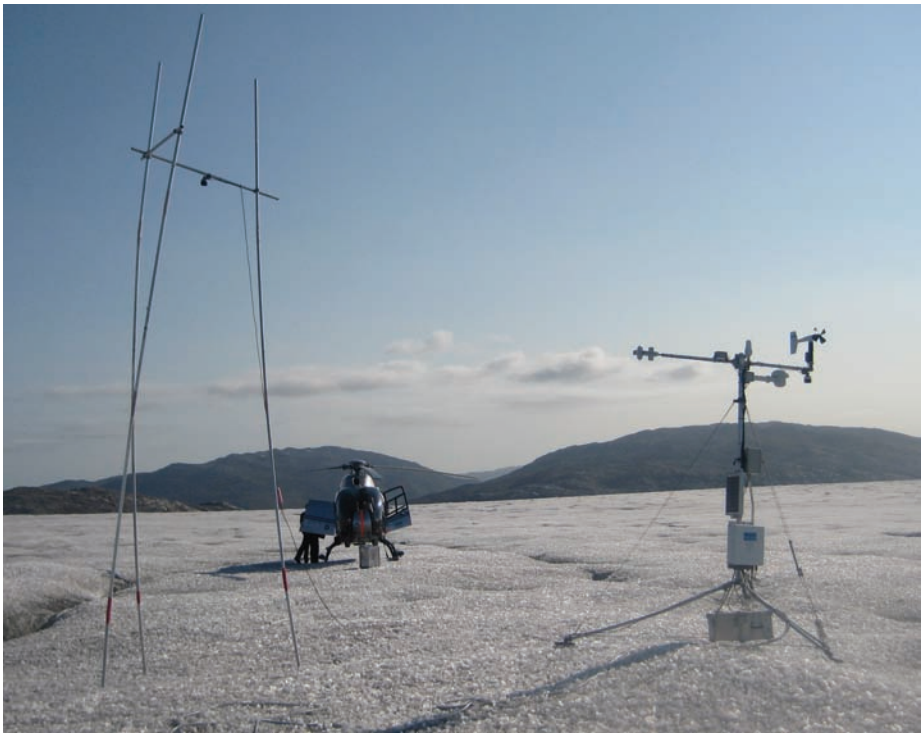


Figure 2. South Greenland PROMICE automatic weather station at the end of the 2013 melt season. From the stakes to the left of the weather station, the amount of melt (approximately 4 m) is directly visible. The melt is also measured with a pressure transducer system drilled into the ice.

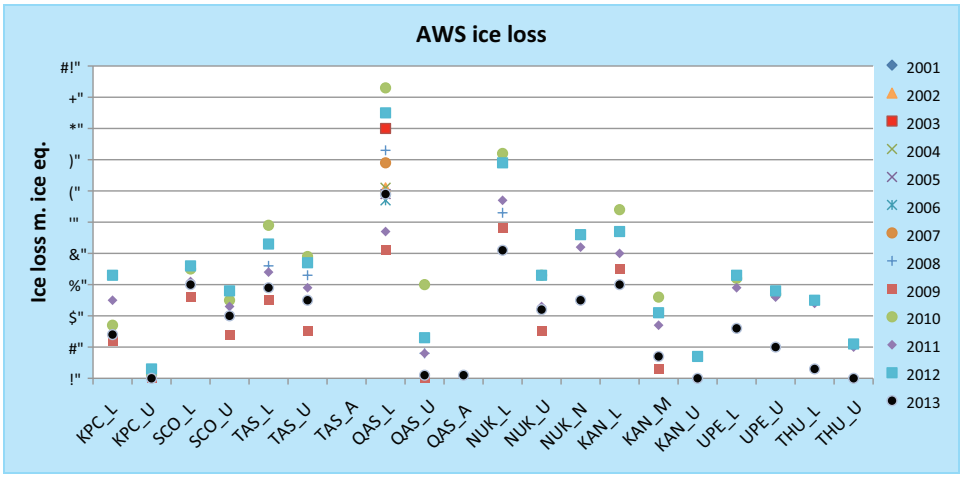


Figure 3. Yearly net ice loss in meters for the PROMICE AWS stations. The symbols indicate the distinct melt years. The ice loss is measured by a pressure transducer system drilled into the ice.

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PROMICE is financed by the Ministry of Climate, Energy and Building through the climate support programme DANCEA (Danish Cooperation for Environment in the Arctic), which is managed by the Danish Energy Agency.

- The purpose of PROMICE is to monitor the mass loss of the Greenland ice sheet, both the melting on the surface and the volume of icebergs calved .
- PROMICE is headed by GEUS in cooperation with DTU Space and Asiaq. Furthermore the programme collaborates with the Danish Meteorological Institute and foreign universities and authorities.
- Read more about PROMICE on **promice.org**, where you can find photos and videos, get direct access to measuring data from the ice sheet and the PROMICE outreach material. On the website you can also subscribe to our newsletter.
- Information can also be found on **polarportal.org** a new website where Danish research institutions display the results of their monitoring of the Greenland ice sheet and the sea ice in the Arctic.

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