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## **Observing changes in near-polar glaciers in the northern and southern hemispheres**

Barrand, Nicholas E ; Machguth, Horst ; Hagen, Jon Ove

**Abstract:** Approximately 50 researchers attended the Ice2sea North/South Glacier Workshop at the Geological Survey of Denmark and Greenland (GEUS). The aim of the workshop was to highlight the importance of changes in Northern and Southern Hemisphere near-polar glacier systems, which are subject to rapid climate warming from the atmosphere and ocean. Other goals of the workshop were to identify the observations required to understand the changes in these glacier systems and to determine difficulties and opportunities for making future projections. The meeting also served to bring together a new community of researchers working on similar glaciological problems in distinct geographic regions (e.g., the Arctic, including Alaska; Patagonia; and the Antarctic Peninsula). Full details of the workshop agenda and organizing committee can be found in the workshop report at [http://www.ice2sea.eu/wp-content/uploads/2013/04/Ice2sea\\_NSWorkshop\\_FINALREPORT\\_nosummary.pdf](http://www.ice2sea.eu/wp-content/uploads/2013/04/Ice2sea_NSWorkshop_FINALREPORT_nosummary.pdf).

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# MEETINGS

## Observing Changes in Near-Polar Glaciers in the Northern and Southern Hemispheres

*Ice2sea North/South Glacier Workshop; Copenhagen, Denmark, 14–16 January 2013*

Approximately 50 researchers attended the Ice2sea North/South Glacier Workshop at the Geological Survey of Denmark and Greenland (GEUS). The aim of the workshop was to highlight the importance of changes in Northern and Southern Hemisphere near-polar glacier systems, which are subject to rapid climate warming from the atmosphere and ocean. Other goals of the workshop were to identify the observations required to understand the changes in these glacier systems and to determine difficulties and opportunities for making future projections. The meeting also served to bring together a new community of researchers working on similar glaciological problems in distinct geographic regions (e.g., the Arctic, including Alaska; Patagonia; and the Antarctic Peninsula). Full details of the workshop agenda and organizing committee can be found in the workshop report at [http://www.ice2sea.eu/wp-content/uploads/2013/04/Ice2sea\\_NSWorkshop\\_FINALREPORT\\_nosummary.pdf](http://www.ice2sea.eu/wp-content/uploads/2013/04/Ice2sea_NSWorkshop_FINALREPORT_nosummary.pdf).

The program consisted of three sessions of oral presentations, one on global glaciers and two on regional glaciers; a poster session; and two discussion sessions on observational and modeling needs for improved north/south glacier projections. All presentation abstracts are available in the workshop report.

The session on global glaciers included a presentation on new regionally differentiated consensus estimates of glacier contributions to sea level rise between 2003 and 2009 from Gravity Recovery and Climate Experiment (GRACE) satellite gravimetry and Ice, Cloud, and Land Elevation Satellite (ICESat) laser altimetry. Other presentations focused on recent mass changes in glaciated regions with low-viscosity mantle (Iceland, Patagonia, and the Antarctic Peninsula), a summary of the state of the science of assessing and projecting global-scale glacier mass changes, and two new independent assessments of global glacier volume.

In the sessions on regional glaciers, presentations focused on mapping and mass balance of Antarctic Peninsula glaciers; assessments of recent and present mass

balance of regional glaciers in Iceland, the periphery of Greenland, Svalbard, and the Russian Arctic; and projections of future surface mass balance change and total mass balance in the Patagonia ice fields, the Greenland periphery, and major outlets of the Greenland ice sheet.

During the discussion of observational needs for improved glacier projections, topics included densification and the implication of poor knowledge of variations in snow and ice density for converting measured glacier volume changes to mass changes and thus sea level water equivalent. Researchers also discussed glacier calving; the discharge to the sea or lakes from marine or tidewater-terminating glacier margins, as well as improving gravimetric estimates of glacier mass loss; and extending and improving traditional, field-based assessments of glacier change.

In the session on modeling, participants discussed the role and importance of mass loss by calving and frontal melting, often as a result of ice coming into contact with warm ocean waters; geometric adjustments, model integration, and the importance of downscaling coarse-resolution data; and uncertainty in glacier mass change projection and particular data needs.

The three highest-priority data needs for improving model projections of north/south glacier change were identified as: better information on ice thickness at flux gates and throughout the glacier basin; improved knowledge of snow and ice density variations through space and time; and greater availability of automatic weather station climate data, including in-situ measurements of glacier mass balance and accumulation.

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—NICHOLAS E. BARRAND, University of Birmingham, Birmingham, United Kingdom; E-mail: n.e.barrand@bham.ac.uk; HORST MACHGUTH, Geological Survey of Denmark and Greenland/University of Zurich, Zurich, Switzerland, and JON OVE HAGEN, University of Oslo, Oslo, Norway