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PATHWAYS OF WARM WATER TO THE NORTHEAST GREENLAND OUTLET GLACIERS

Janin Schaffer (*Alfred Wegener Institute for Polar and Marine Research, Germany*)

Ralph Timmermann (*Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany*)

Torsten Kanzow (*Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany*)

Jan Erik Arndt (*Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany*)

Ursula Schauer (*Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany*)

janin.schaffer@awi.de

Mass loss from the Greenland Ice Sheet presently accounts for about 12% of the global mean sea-level rise. The ocean plays an important role in modulating the mass balance of the Greenland Ice Sheet by delivering heat to the marine-terminating outlet glaciers around Greenland. The warming and accumulation of Atlantic Water in the subpolar North Atlantic has been suggested to be the driver of the glaciers' retreat around the coast of Greenland.

A key region for the mass balance of the Greenland Ice Sheet is the Northeast Greenland Ice Stream. This large ice stream drains the second-largest basin of the Greenland Ice Sheet and feeds three outlet glaciers. The largest one is Nioghalvfjærdsfjorden (79°N- Glacier) featuring an 80 km long floating ice tongue. Both the ocean circulation on the continental shelf off Northeast Greenland and the circulation in the cavity below the ice tongue are poorly understood so far.

In order to study the relevant processes of glacier-ocean interaction we combine observations and model work. Here we focus on historic and recent hydrographic observations and the bathymetry in the Northeast Greenland shelf region. The complex bathymetry is thought to steer the flux of warm water of Atlantic origin from the open ocean onto the continental shelf and into the sub-glacial cavity of the 79°N-Glacier. We present a new global topography data set, RTopo-2, which includes the most recent surveys on the Northeast Greenland shelf and provides a detailed bathymetry for all around Greenland. In addition, RTopo-2 contains ice and surface topographies for Greenland and Antarctica.

Based on the updated ocean bathymetry and a variety of hydrographic observations we show the water mass distribution on the shelf off Northeast Greenland. These maps enable us to discuss subsurface supply pathways of warm modified Atlantic waters on the continental shelf and thus possible ways of heat transport towards the base of the 79°N-Glacier.