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GRIFF 2016 - AN INTERDISCIPLINARY CAMPAIGN TO STUDY THE 79°N GLACIER AND ITS INTERACTION WITH THE OCEAN

Torsten Kanzow *(Alfred-Wegener-Institute, Germany)*
Ursula Schauer *(Alfred-Wegener-Institute, Germany)*
Angelika Humbert *(Alfred-Wegener-Institute, Germany)*
Keith Nicholls *(British Antarctic Survey, United Kingdom)*
Fiamma Straneo *(Woods Hole Oceanographic Institution, United States)*
Andreas Muenchow *(University of Delaware, United States)*
Camilla S. Andresen *(Geological Survey of Denmark and Greenland, Germany)*
Gordon Hamilton *(University of Maine, United States)*
David Roberts *(Durham University, United Kingdom)*
Oliver Huhn *(University of Bremen, Germany)*
Mirko Scheinert *(Technical University Dresden, Germany)*
Michiel Rutgers van der Loeff *(Alfred-Wegener-Institute, Germany)*

torsten.kanzow@awi.de

The loss of mass from the Greenland ice sheet (GIS) has been accelerating in recent years, mostly due to the retreat and acceleration of marine terminating glaciers. The heat supplied by Atlantic Water is thought to be a main driver of the glacier retreat.

One of the largest Greenland ice streams, the North East Greenland Ice Stream (NEGIS) feeds the Nioghalvfjerdsfjorden or '79 North' Glacier (79NG) at the coast of Northeast Greenland. The 79NG exhibits a floating ice shelf that is in contact with warm Atlantic Water recirculating in western Fram Strait and penetrating across the East Greenland shelf to the glacier front. While in the past decades the 79NG remained stable, remote sensing studies revealed first instabilities in the past years. At the same time, the Zachariae Isstrøm (ZIS), draining the NEGIS just 20 nm south of 79NG lost its extensive ice-shelf almost completely. On the other hand, Atlantic water in Fram Strait has been warming considerably during the last decades and climate models propose further warming with possible consequences for destabilization of northeastern Greenland ice shelves.

In 2016, a consortium of glaciologists, geophysicists and oceanographers from 11 institutes in 5 countries will conduct a campaign to jointly investigate the possible impact of the warming Atlantic waters on the 79NG. The study will combine measurements of the ocean circulation, hydrography and microstructure on the shelf of Northeast Greenland and under the ice tongue as well as in Fram Strait; of glacier temperature and strain changes through thermistor strings in bore holes; radar surveys to map the glacier and grounding line structure and topography, bathymetric surveys to map the sea floor from the open ocean into the glacier cavity, seismic recorders for ice quakes. Local weather will be recorded as well as lithosphere deformations. Coring in epishelf lakes and marine sediments will extend the study beyond instrumental time scales. Together the data shall help us to both determine the time-variable melt rate and identify the oceanic and glaciological processes that control the melt rate and its variability.