



Reconstructing Late Quaternary retreat of the NE Greenland Ice Stream.

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Today, the NE Greenland Ice Stream (NEGIS) drains $\sim 15\%$ of the Greenland Ice Sheet (GrIS) and has a sea-level equivalent of 1.1-1.4 m. Stabilised downstream by two floating ice shelves, 79N and Zachariae Isstrom, until recently, it has shown little response to increased atmospheric and oceanic warming. However, since 2010 Zachariae Isstrom in particular has experienced an accelerated rate of grounding line retreat (~ 4 km) and significant ice shelf loss. This suggests this sector of the GrIS is now responding to changes in oceanic and/or climatic conditions. To place these observations into context a better understanding of the response of NEGIS to past oceanic and temperature change beyond the instrumental record is necessary.

The project 'NEGIS' led by Durham University, aims to reconstruct the history of the NEGIS from the Last Glacial Maximum (LGM) to present to better understand past ice stream response to a warming climate. This contribution presents results and interpretations from an offshore dataset collected on the RV Polarstern, cruise PS100, in 2016. Swath bathymetry, sub-bottom profile data and 41 sediment cores were collected from across the NE Greenland continental shelf, with data collection concentrated along the Norske Trough and the area directly in front of the 79N floating ice tongue. On the outer shelf streamlined subglacial bedforms, grounding-zone wedges and moraines as well as over-consolidated subglacial tills, record ice sheet advance to the shelf edge. A single radiocarbon date from a shelf edge core indicates that shelf edge deglaciation had begun by 17.9 ka cal BP. Ice shelf presence is captured in 25 cores from the outer shelf to the 79N floating ice tongue at the present day coast. Ice shelf recession is characterised by a switch from laminated sediments containing no ice rafted debris (IRD), to a massive mud containing gravel to pebble sized clasts. Preliminary foraminifera analysis indicates that the sub-ice shelf facies were poor in abundance and dominated by polar glacimarine species. However, before ice-shelf breakup an increase in foraminifera abundance occurs with a species assemblage dominated by the *Cassidulina neoteritis*, an Atlantic Water indicator, which continues to dominate the species assemblage in ice-shelf free conditions. This pattern implies that Atlantic Waters were present prior to ice shelf breakup and had a continued presence after ice shelf disappearance. This suggests that oceanic forcing likely played a significant role in the deglaciation of the NEGIS. Dating this transition in cores from across the NE Greenland continental shelf will provide the first constraint on both ice stream and ice shelf retreat since the LGM.