

Subproject: Glacier melting rates, sea ice variability and ocean circulation in the Danmarks Fjord area, Northeast Greenland

Actual field dates: 11 April – 2 May 2015

Field site: Villum Research Station – Station Nord

Number of man-days in the field: 44

Summary:

During Leg 1 from 11th April to 2nd May 2015, fieldwork for retrieval of marine sediment cores took place from the ice covered fjord area off Station Nord. The campaign was an initiative of the Arctic Science Partnership (ASP) and the Arctic Research Centre (ARC) at Aarhus University (AU). The Geological Survey of Denmark and Greenland (GEUS) was partner in the planning and execution of the geoscience fieldwork. Research Fellow Sofia Ribeiro and Senior Scientist Niels Nørgaard-Pedersen from GEUS conducted the fieldwork while based at the Villum Research Station. Prof. Marit-Solveig Seidenkrantz from AU was the campaign PI. Sampling sites were selected based on high-resolution radar satellite images (Sentinel-1 SAR) revealing areas of 1st and multiyear ice, as well as the scattered existing knowledge on sea bottom bathymetry for the area. A total of 37 sediment cores were retrieved from 17 sites ranging up to ca. 30 km of distance from Station Nord (Figure 1). Sediment cores were retrieved using both a Rumohr lot and Kayak corer by gravity coring, deployed through holes drilled in the ice (1-3 m thickness). Sampling was complicated through very thick snow cover on top of the sea ice.

The project is aimed at reconstructing past sea ice variability (hundreds to thousands of years) in this High Arctic region, and its impact on primary productivity, with implications for the biogeochemical cycle and ecosystem functioning. The cores will also provide information on water mass variability, local ice sheet dynamics, and glacier melting rates through time. Surface sediment samples as well as sea ice cores were sampled additionally in order to study the modern sea ice and phytoplankton communities both through assemblage composition and DNA analyses.

Photos:

Fig.1: Sediment coring sites (red dots) during 2015 Leg 1, ARC/ASP campaign. Areas of 1st year sea ice were mainly targeted. Credit: Background satellite image from 31.01.2015: L. Toudal Petersen, DMI.

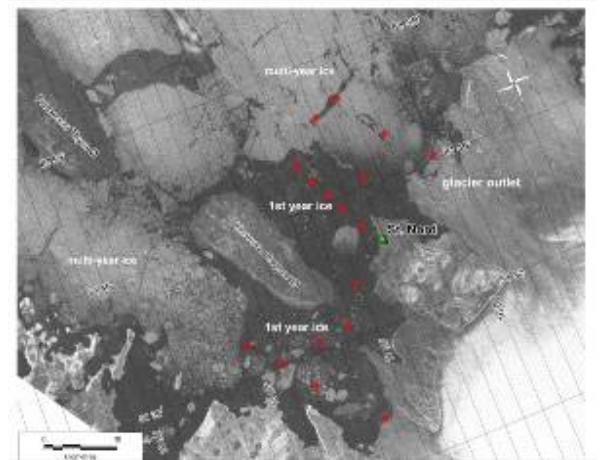


Figure 1



Figure 2



Figure 3

Fig. 2: Retrieval of a kayak sediment core from the sea floor after drilling through the sea ice. Credit: Sofia Ribeiro, GEUS

Fig. 3: Digging through the snow to reach the sea ice. Credit: Niels Nørgaard-Pedersen, GEUS

Fig. 4: Success! A kayak sediment core collected from the sea floor. Credit: Niels Nørgaard-Pedersen, GEUS

Participants:

Project lead: Professor Marit-Solveig Seidenkrantz.

Field participants: Senior researcher Dr. Niels Nørgaard-Pedersen and Research Fellow Dr. Sofia Ribeiro

Acknowledgements:

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Figure 4