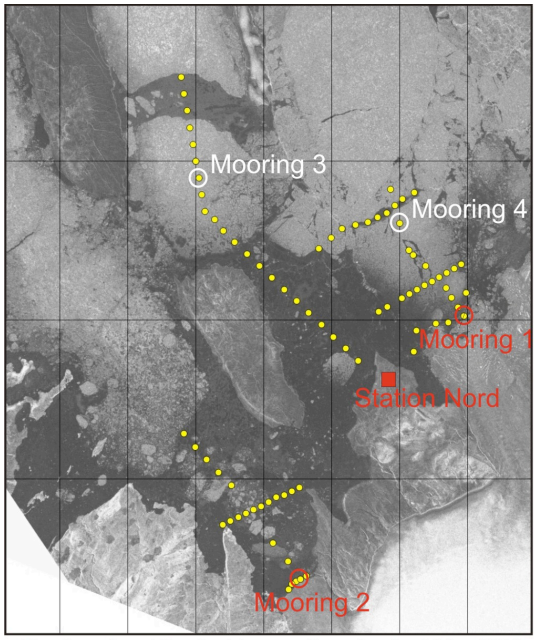
PROJECT SUMMARY REPORT - 2015 STATION NORD CAMPAIGN

Subproject: The physical oceanography at STN: an impact of ocean heat on landfast ice and tidewater glaciers.

Actual field dates: April 17 – May 15, 2015
Field site: Landfast ice cover within 50km radius around Station Nord
Number of man-days in the field: 30

Summary:
The oceanographic data on water temperature, salinity and optical properties were collected at 86 oceanographic stations taken in the Station North region from the one-year old and multiyear land-fast ice of up to 3.7 m thick. All data shows temperature increasing with depth below about 60 m that is due to interaction with relatively warm intermediate North Atlantic water with temperatures above 0 deg. C observed at intermediate depths below ~140 m. This water was recorded penetrating along the submarine glacier troughs and valleys from the NE Greenland continental slope where the Atlantic water boundary current seems to be comprised by the Atlantic water originated from the Beaufort Sea.

Two short-term land-fast ice-tethered oceanographic moorings deployed for about 3 weeks in the vicinity of the glacier-ocean contact zone recorded tidal variability of temperature and salinity suggesting interaction between the subsurface Atlantic-modified warm and saline water with water at the front of the glacier impacted by sub-glacier fresh water discharge and heat flux at the water-glacier interface. The impact of the Atlantic water upward heat flux on the sea-ice thermodynamic growth, brine rejection and buoyancy-driven mixing is studied using the oceanographic and sea-ice data from an array of two long-term moorings equipped with ADCP/CTD/ITP and mass balance buoys. These moorings were deployed for one year starting in May 2015 one between the Prinsesse Margrethe island and Prinsesse Thyra island and another one in the 180 m deep submarine glacier trough in about 10 km from the tidewater glacier termination. In addition, the water sampling below the land-fast ice was conducted to trace the origin of the cold halocline layer observed on top of the Atlantic-modified sub-surface water.



Moorings 1 and 2 - short-term, ~ 3 weeks, April-May 2015
Moorings 3 and 4 - long-term, ~ 1 year, May 2015 - May 2016

Figure 1

Figure 2

Figure 3

Photos:
Fig.1: Location of the CTD and mooring stations.
Credit: Sergey Kirillov
Fig. 2: Station work at the front of the tidewater glacier.
Credit: Igor Dmitrenko
Fig. 3: Deployment of the short-term mooring 2.
Credit: Igor Dmitrenko

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