

Subproject: Under-ice dynamics and coastal polynya interaction in Young Sund Fjord

Actual field dates: April 30 - June 10, 2014

Field site: Daneborg Young Sound Fjord, Northeast Greenland

Number of man-days in the field: 111

Summary:

We conducted temperature, salinity, dissolved oxygen and current velocities measurements along the Young Sound fjord. This data, supplemented with measurements from 3 ice-tethered moorings, that were deployed in October 2013 and samples of the water column, allowed us to characterize the fjord water dynamics, brine production in the polynya in front of the Young Sound Fjord, ice growth rate, carbon dynamics and ice-ocean heat flux during winter.

A local vertical circulation cell characterized by outflow at the surface and inflow at intermediate depths has been observed. Though this pattern is stable throughout the entire winter, the winds favourable for polynya openings strongly enhanced the circulation cell from December to March pushing salt and oxygen enriched water from the ocean into subsurface layer of the inner fjord. Characterization of the polynyas induced circulation cells is important for our understanding of role of sea ice formation in the carbonate system.

The large amount of solar heat accumulated in the water column impacted the ice growth rate and resulted in sufficient ablation of seasonal landfast ice. The preliminary data obtained with an ITP profiler are helpful for our understanding of the characteristics of salt exchange over the entrance sill with tidal motions and gives us vital information for the design of future experiments in this area.

Photos:

Fig.1: Map showing the location of CTD stations and ice-tethered oceanographic moorings

Credit: Sergei Kirillov (CEOS)

Fig. 2: Sergei Kirillov and Igor Dmitrenko (CEOS) operating the CTD station. Credit: Soren Rysgaard

Fig. 3: Sergei Kirillov (CEOS) retrieving an ice-tethered profiler (ITP) used to take a vertical profile of water properties such as salinity, temperature and fluorescence

Credit: Vlad Petrusovich

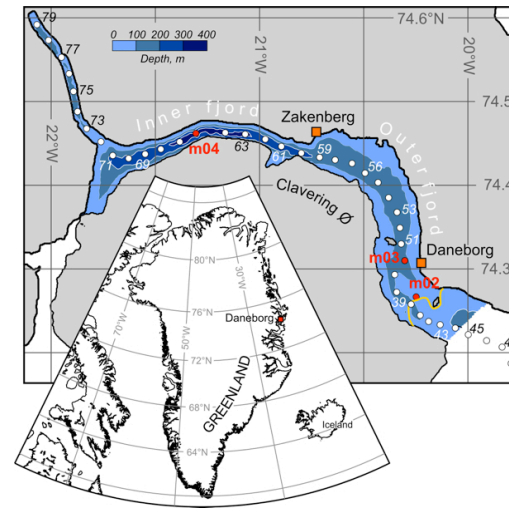


Figure 1

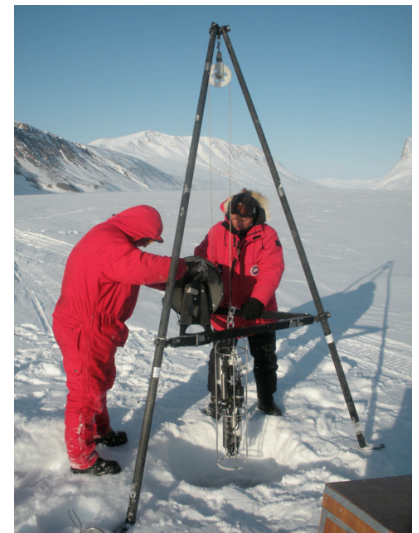


Figure 2

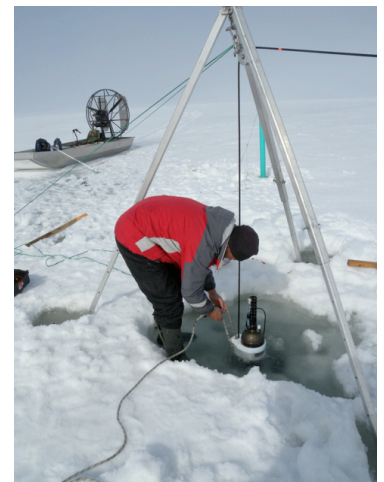


Figure 3

Participants: Igor Dmitrenko, Sergei Kirillov, Wieter Boone, Vlad Petrushevich (CEOS)

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