Ocean-fjord-glacier interaction in Hornsund
NPIs contribution to WP3

Arild Sundfjord, Norwegian Polar Institute
Sopot, 29 September 2014

Polish-Norwegian Research Fund

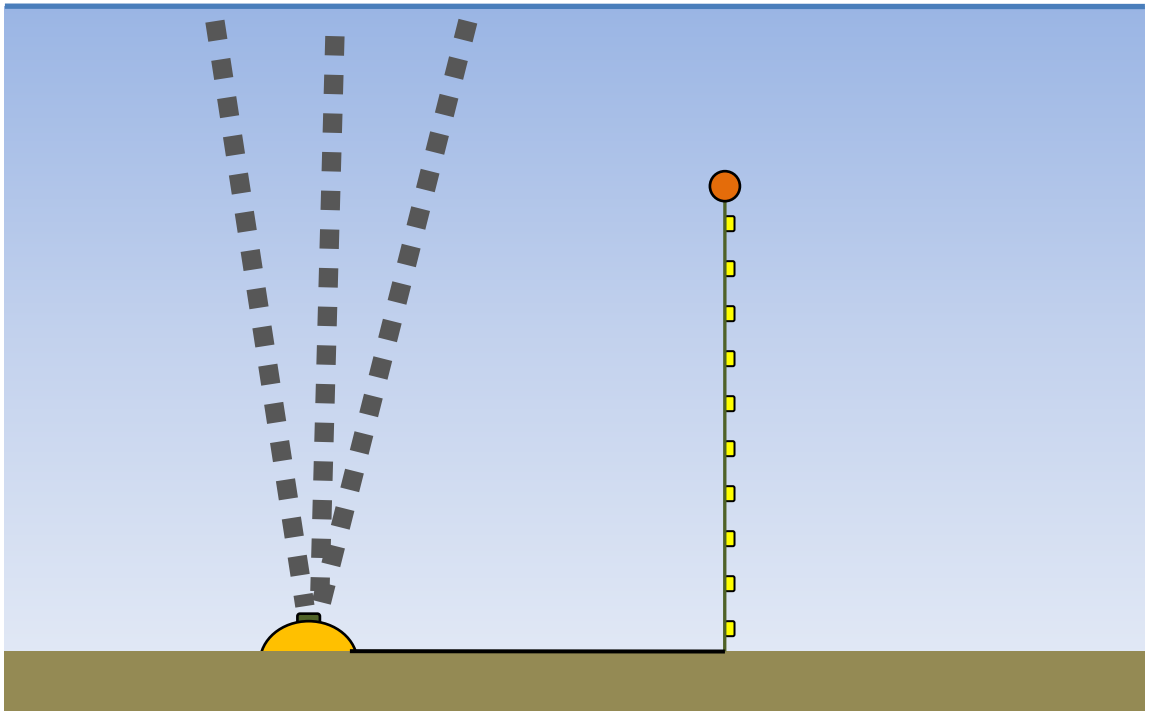
Question: what is the oceanic contribution to glacier melting

AW: warm, saline

Coastal Water: cold, low salinity

Tools: data collection (mooring 2013-2015)
+ numerical circulation model (ROMS)

NPI mooring: ADCP w/CTD + thermistor string



Data collection 2013-2014:

- plan for deployment in July 2013 (IOPAS/Oceania)
  - ADCP malfunctioned, needed repair
- succesfully deployed by UNIS in September 2013
- recovered and redeployed as planned by IOPAS/Oceania in July 2014; all sensors worked well!

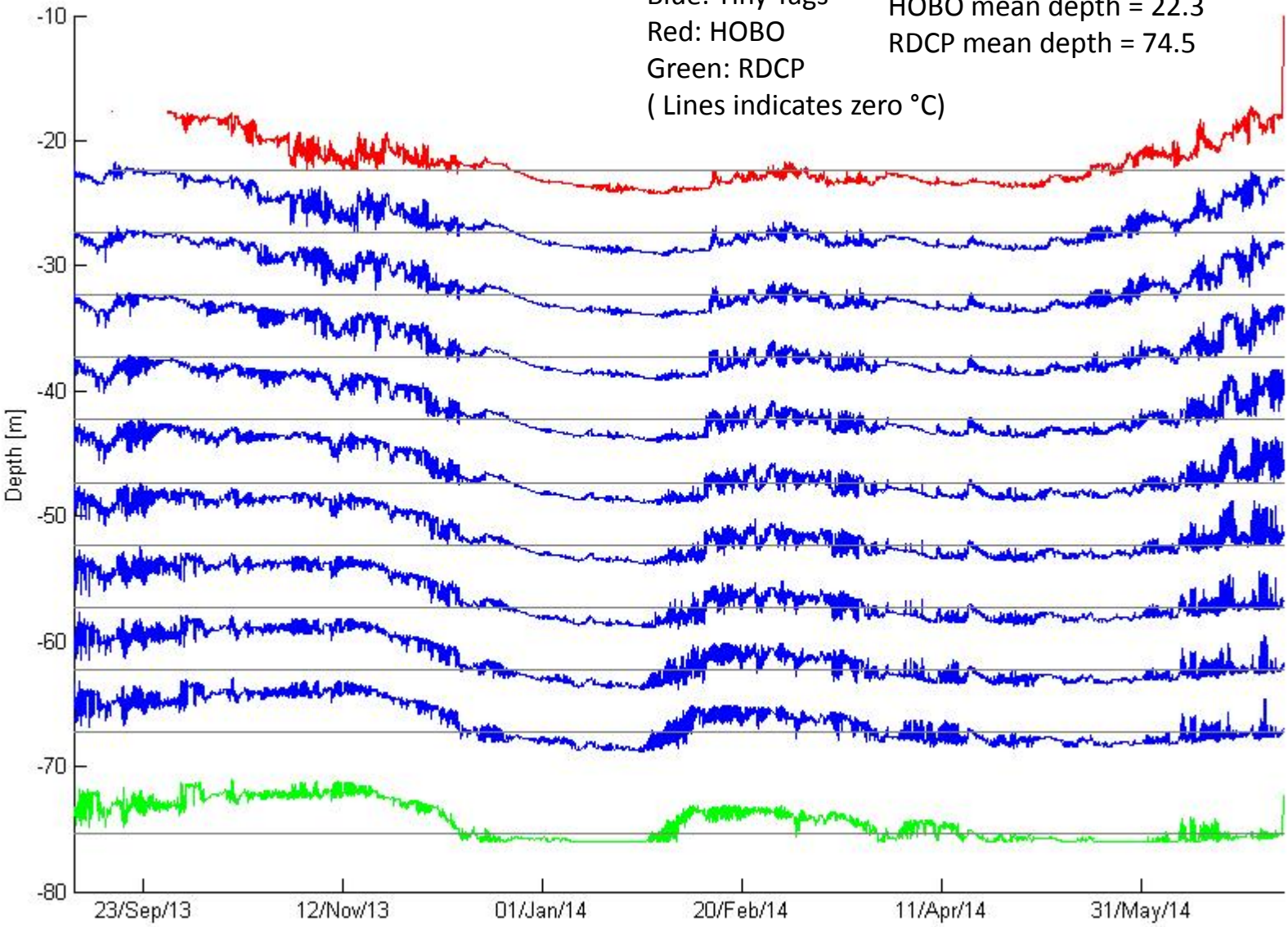
Planned field work on fast ice in April 2014 was cancelled; no ice in the fjord!

Additional CTD transects were made in early April (with UNIS, RV Lance) and late May (University of Tromsø, RV Helmer Hanssen).

Temperatures from mooring

Blue: Tiny Tags
Red: HOBO
Green: RDCP
(Lines indicates zero °C)

TinyTags depth = 27.3:5:67.3;
HOBO mean depth = 22.3
RDCP mean depth = 74.5



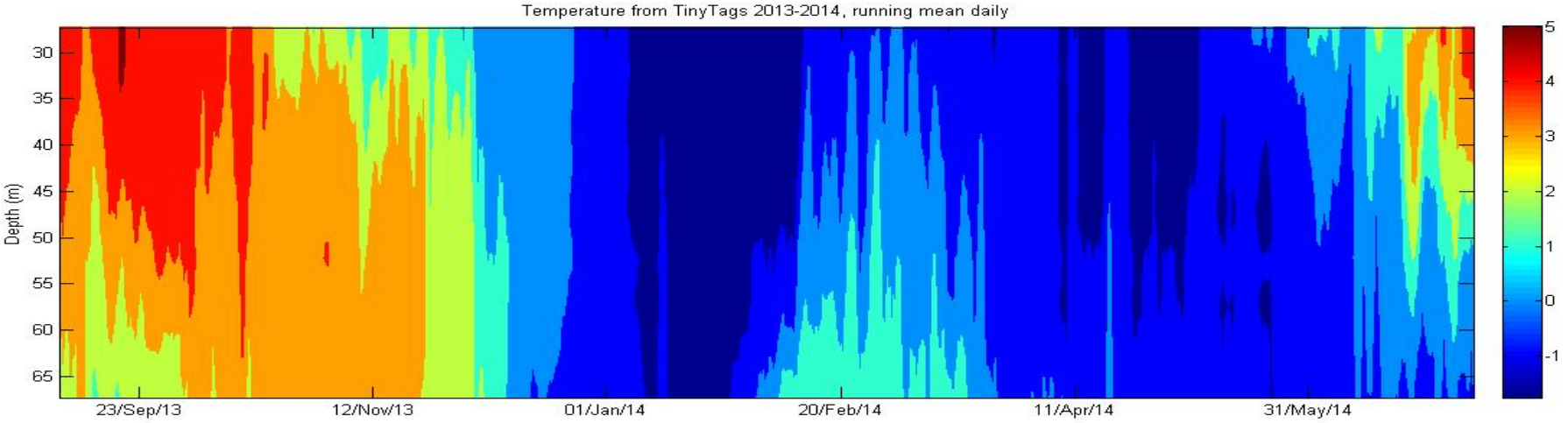
Warm summer

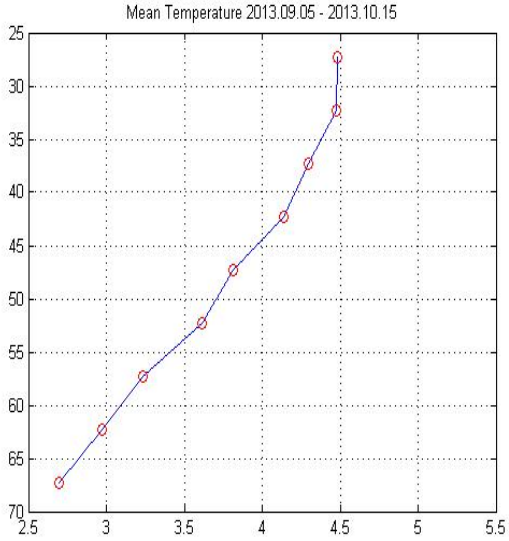
Winter cooling

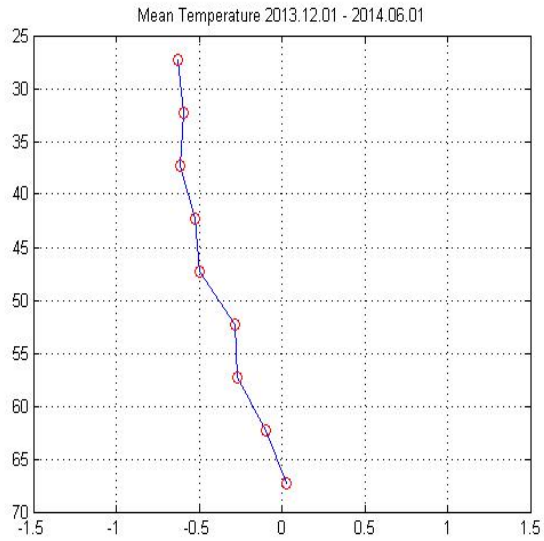
Warm inflow!

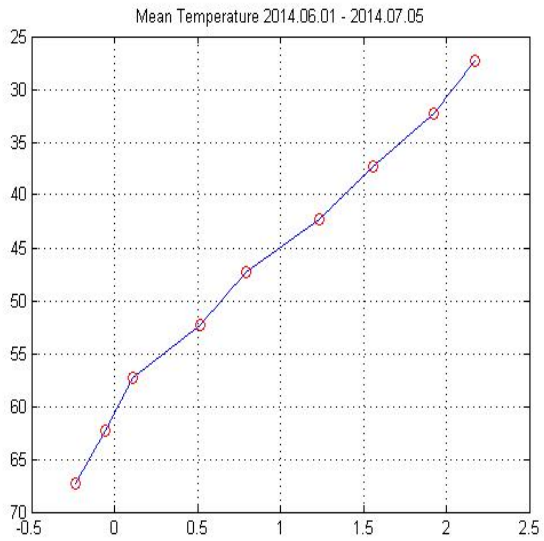
Winter cooling

Summer heating

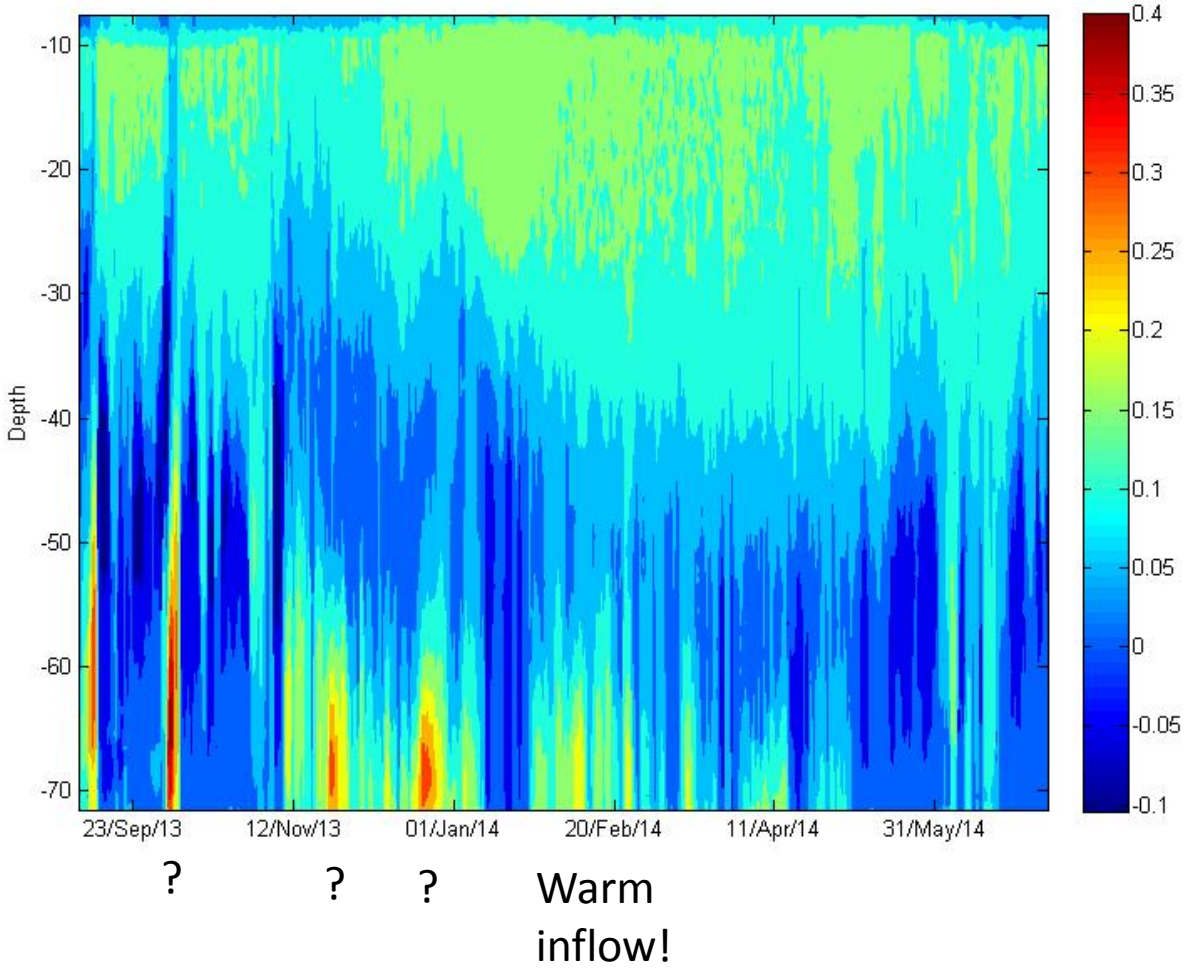








Currents into and out of Brepollen



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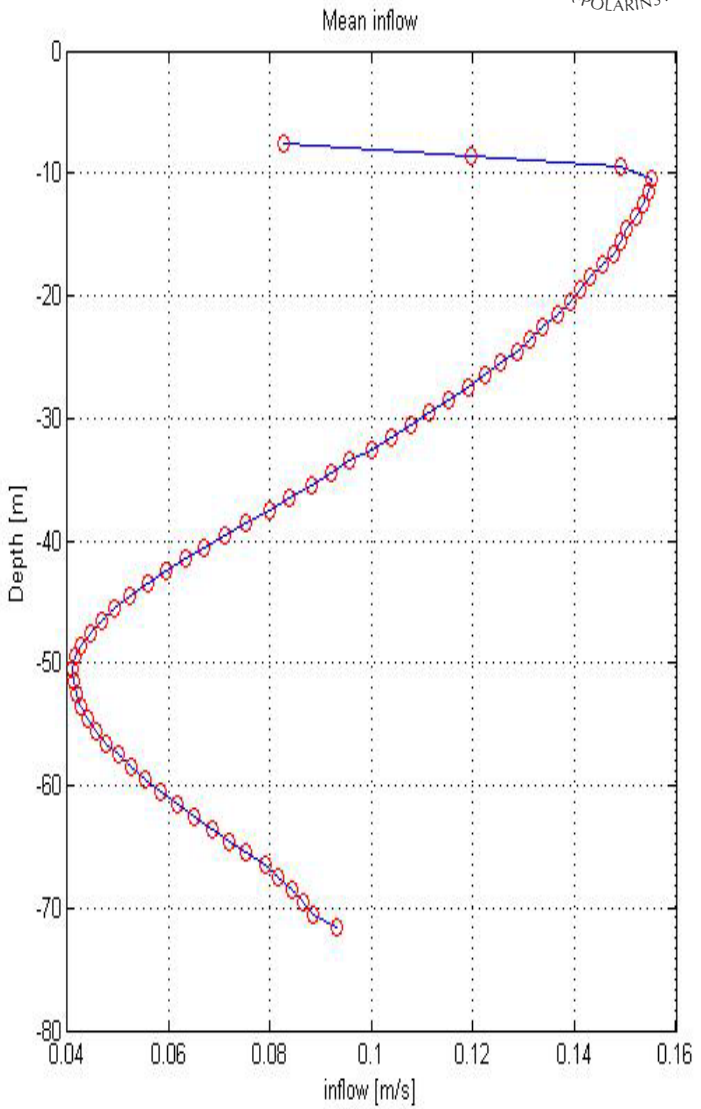
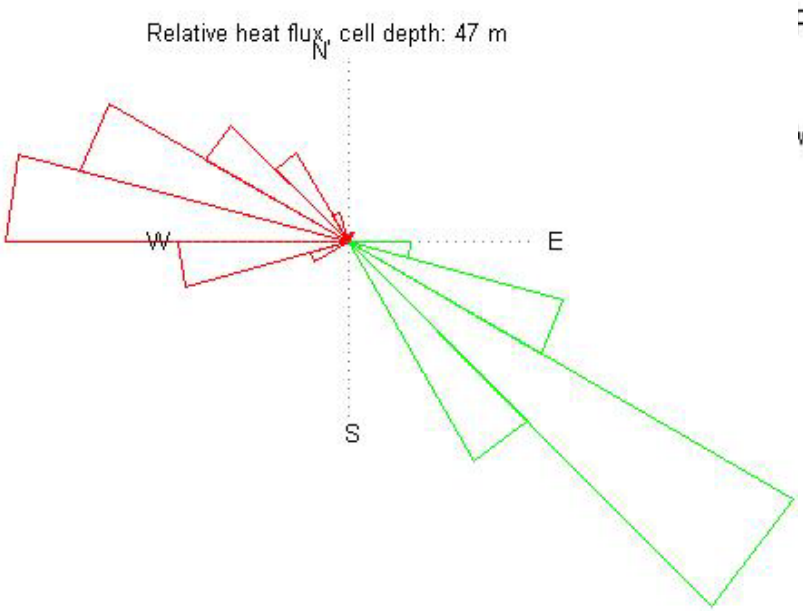
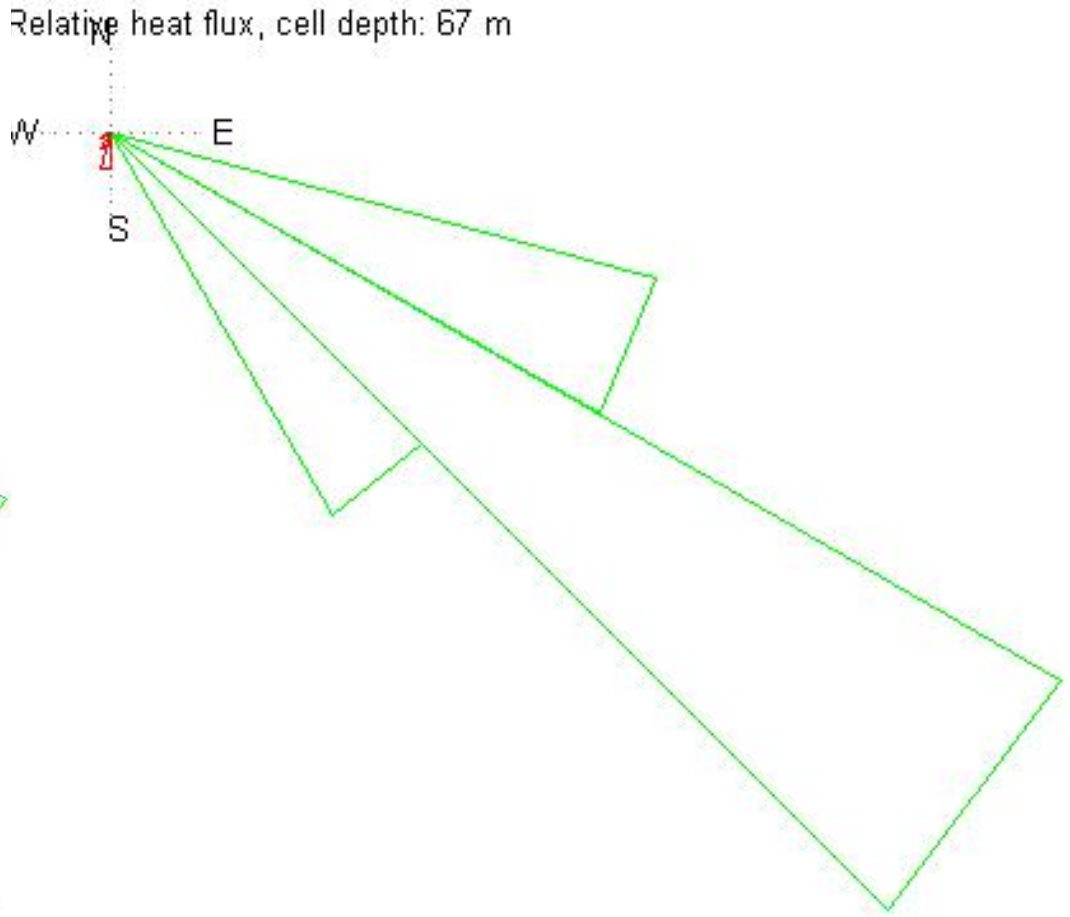
Warm inflow!

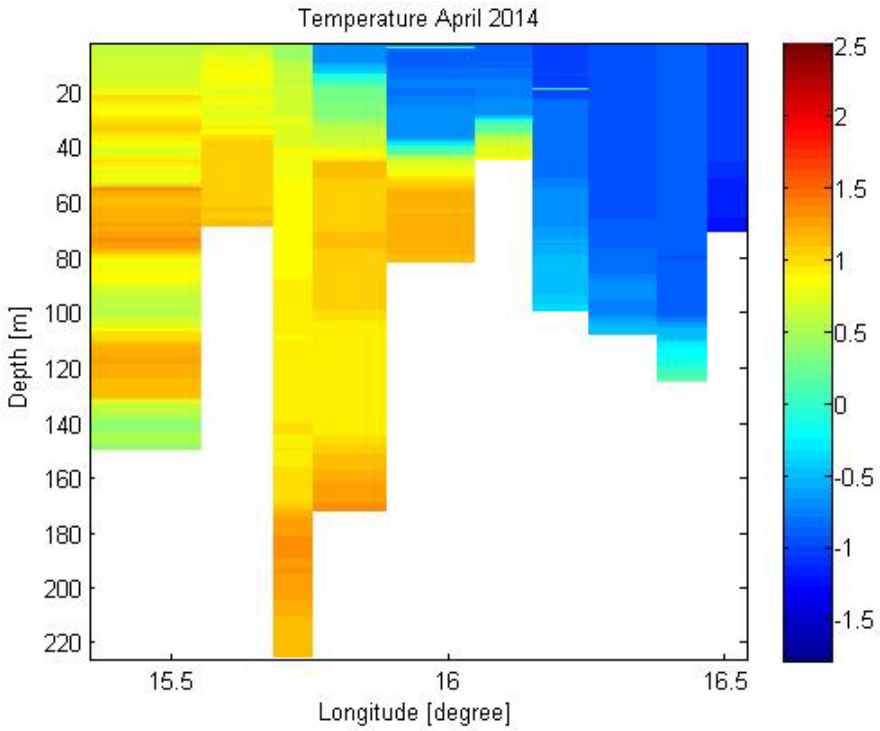


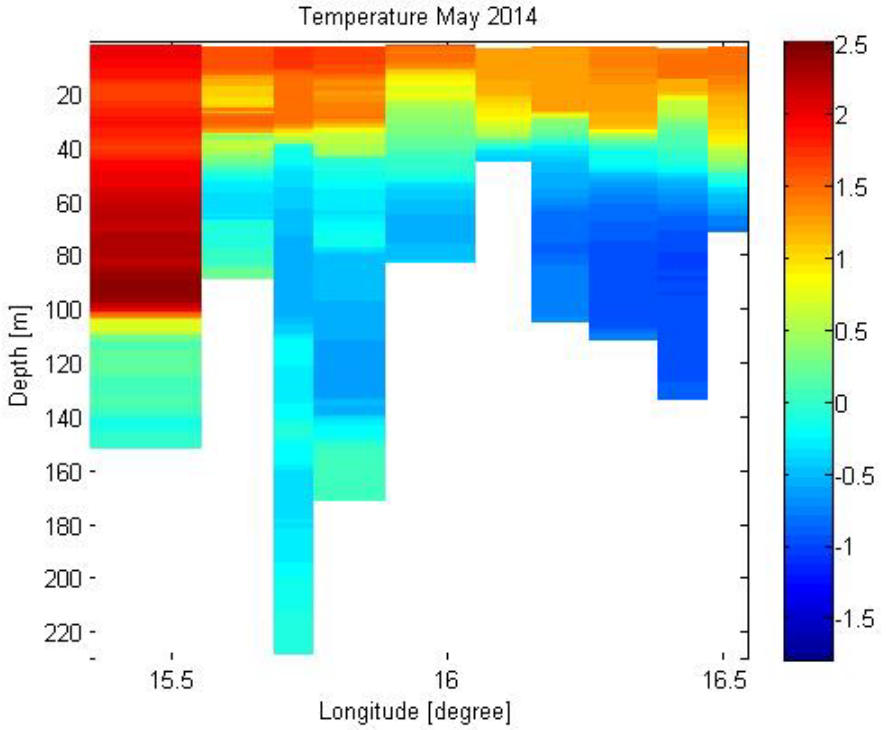
Heat flux into and out of Brepollen





CTD transects - temperature

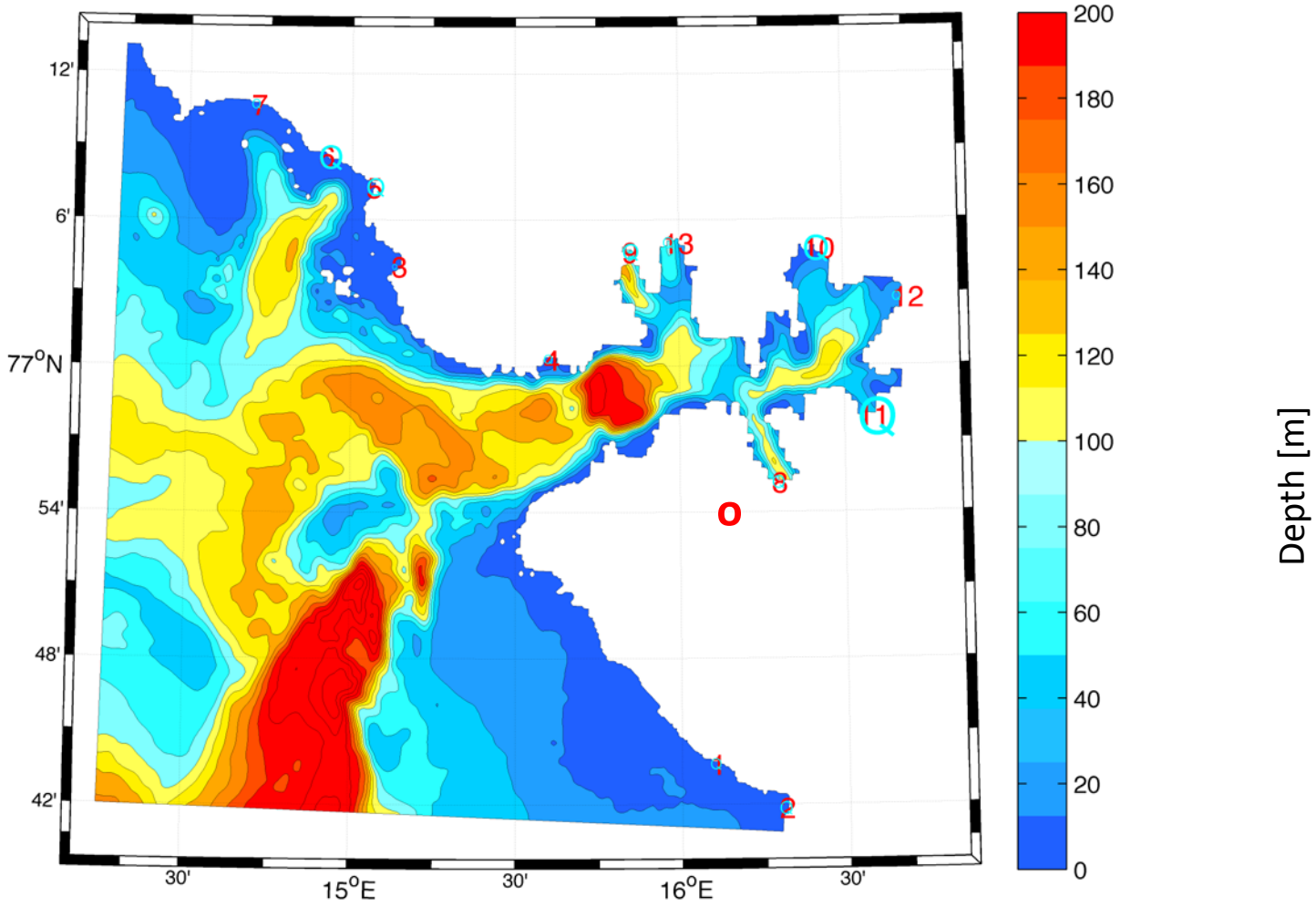




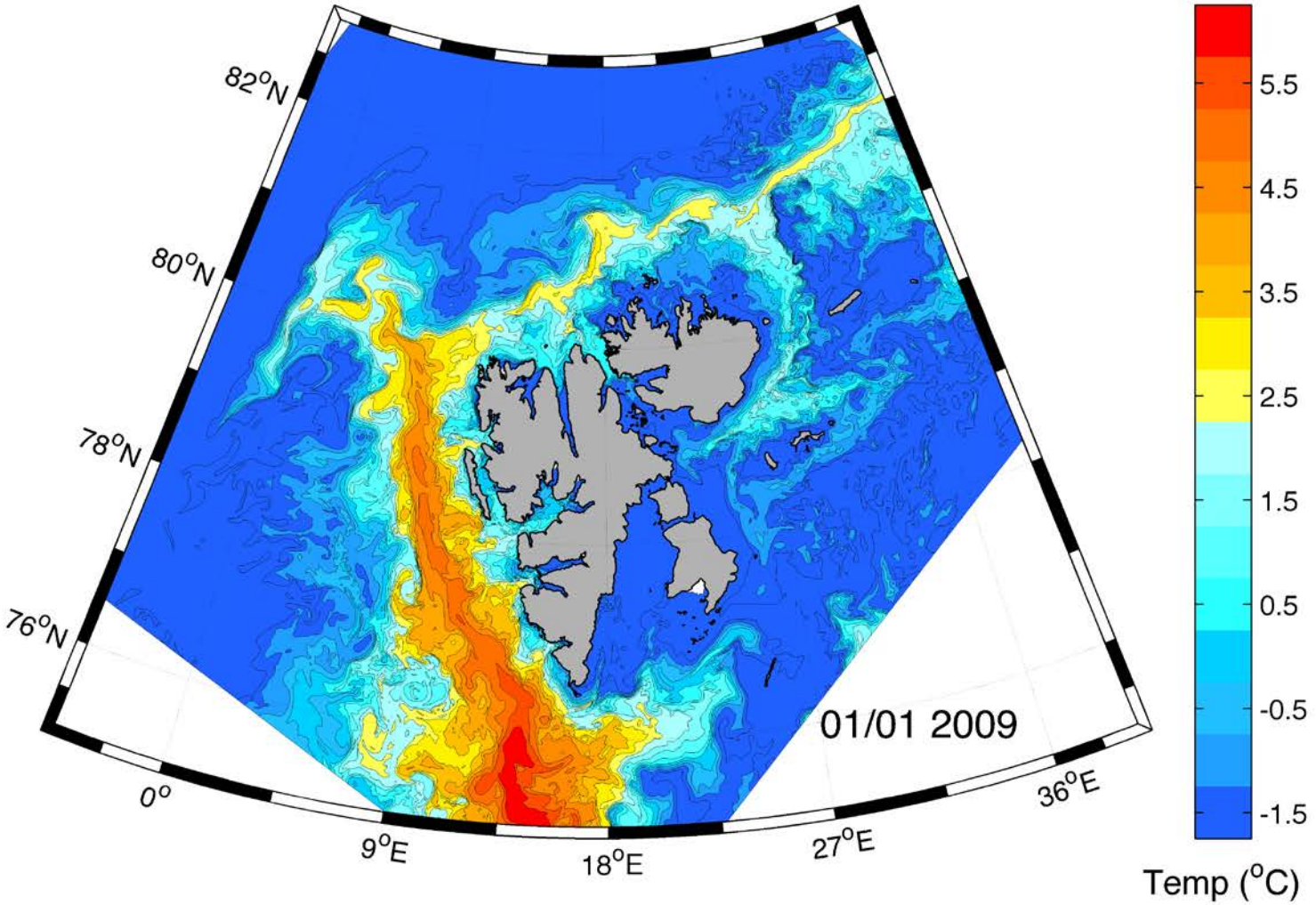
Hornsund modelling

ROMS – Regional Ocean Modeling System.

Model depth grid with 160 x 160 m horizontal resolution and 30 vertical layers.



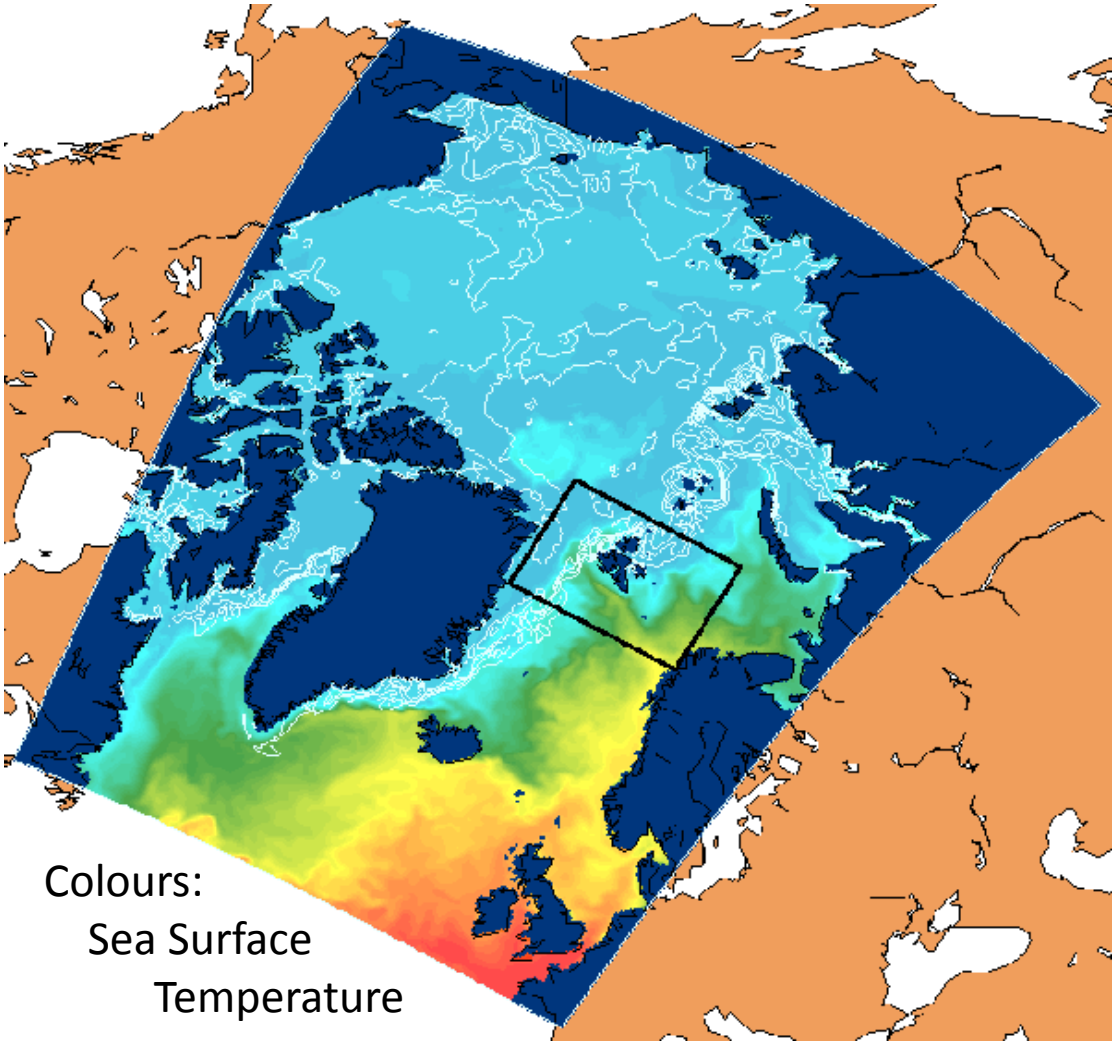
Mesoscale modeling of Ice, Ocean and Ecology of the Arctic Ocean (ModOIE): model of Fram Strait and Svalbard area, 160 m hor. resolution (Fram Centre project)



Partners: Norsk Polarinstitutt, Akvaplan-niva, Havforskningsinstituttet, Met.no, SINTEF.

Fram Centre

Mesoscale modeling of Ice, Ocean and Ecology of the Arctic Ocean (ModOIE): model of Arctic Ocean + N-Atl in 4 km horizontal resolution (Fram Centre project)



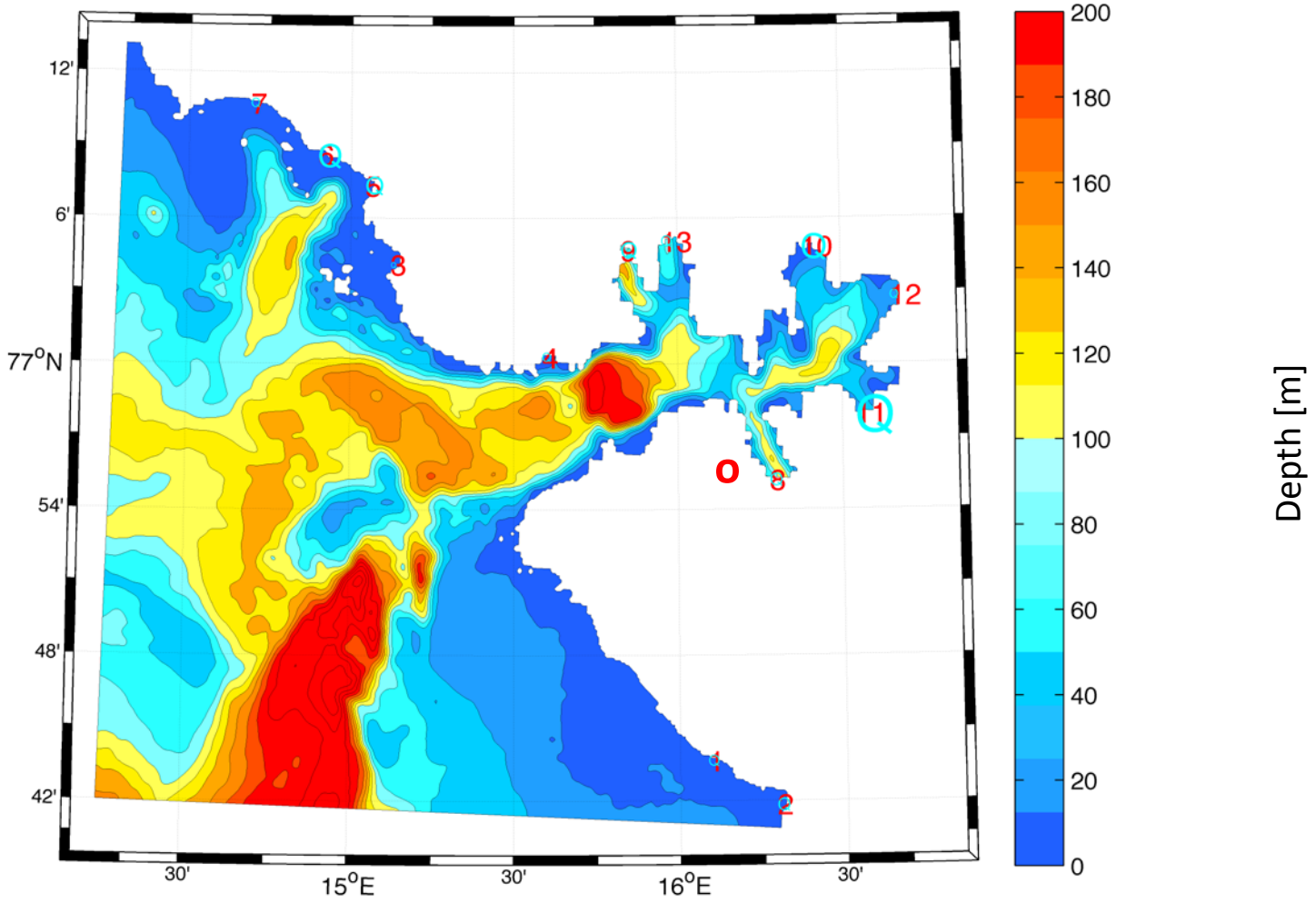
Partners: Norsk Polarinstitutt, Akvaplan-niva, Havforskningsinstituttet, Met.no, SINTEF.

Fram Centre

Hornsund modelling

A4 and S800 models just finished running until July 2010. Hornsund ready to go, with new glacier runoff based on DEM and «general» Svalbard seasonal cycle.

Plan to start Hornsund model by the end of the year. Analysis and publication 2015.



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