

# MSM130

RV Maria S. Merian

Cruise MSM130 POLAR BEAST

9<sup>th</sup> July – 14<sup>th</sup> August 2024

Reykjavik (Iceland) – Reykjavik (Iceland)

5. Weekly Report

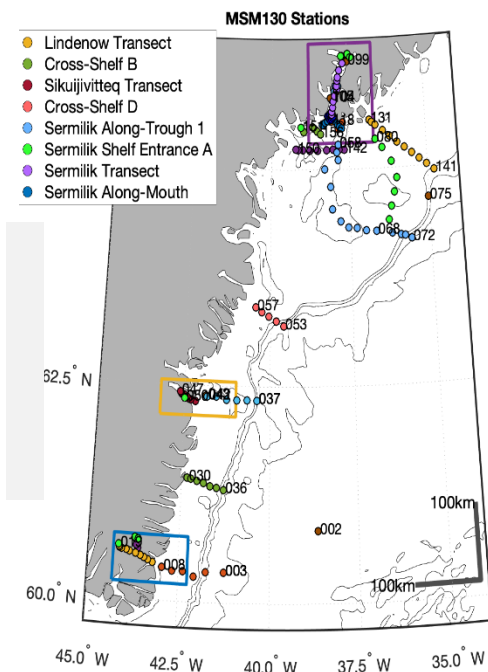
Reporting Period: 5<sup>th</sup> August – 11<sup>th</sup> August 2024



## Shelf region near Sermilik Fjord in east Greenland

**Progress:** We are 5 weeks into our cruise programme (Fig. 1), and made excellent progress with our sample and data collection in the shelf region outside the Sermilik Fjord. We are currently sailing at 64°38 N, 37°20 W. We had a very successful week on the shelf and conducted in-depth surveys on the waters flowing in and out of Sermilik Fjord through different channel systems (Fig. 2). The work involved detailed measurements of physics, particle transport and biogeochemistry. We had clear weather most of the week, but also periods with dense fog and moving ice fields, which made movements between the stations more difficult.

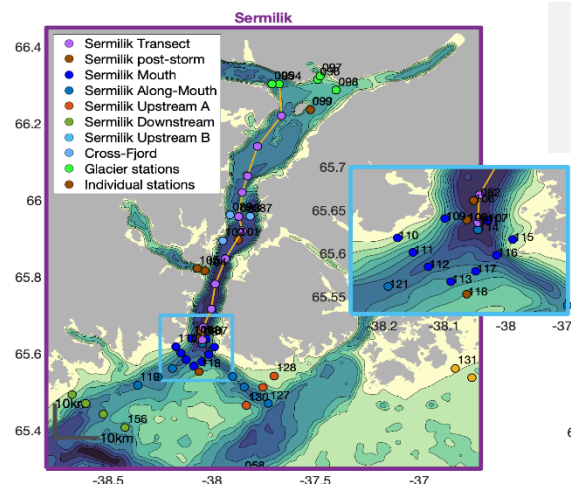
Yesterday a strong storm developed (windforce 8 and above) which moved the ice and iceberg at great speeds (more than 2 knots) and made our sampling challenging. We are now following a deep channel in an off shelf direction and will be in the deep waters of the open North Atlantic



**Figure 1.** Overview of progress with sampling on MSM130

on Monday afternoon (August 12). We will finalise our last station Monday morning and transit to Reykjavik to arrive in port on Wednesday morning at 0800 h (August 14). The cruise has been very successful, and we have been able to achieve the majority of our objectives, despite challenging ice, fog and wind conditions. The crew and captain of RV Maria S Merian have been wonderful in facilitating our work. Excellent. The multi-national and multi-disciplinary science team

**Figure 2.** Station on shelf off Sermilik Fjord.



(Fig. 4) has also done a wonderful job on this cruise. We managed to occupy 172 station and take about 3500 samples for nutrients and a range of other variables. This is strongly changing the data paucity for the waters off southeast Greenland.



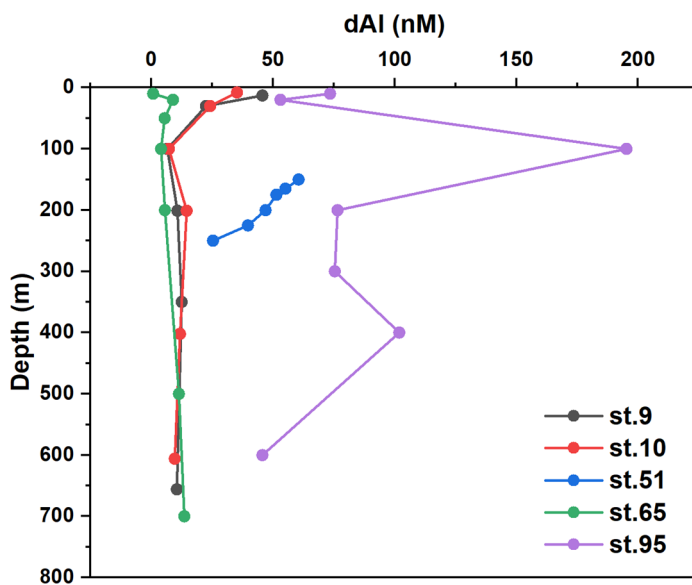
**Figure 3.** Sampling in fog and ice on the shelf near Sermilik Fjord (photo Eric Achterberg)

***Dissolved aluminium in seawater:*** On board of Maria S. Merian, GEOMAR/Zhejiang University PhD student Yuping Guo is conducting measurements of dissolved aluminium in the water column. Dissolved Al concentrations are analyzed in acidified samples taken from Niskin bottles on a wire and the tow fish. A modified analytical method based on the aluminum-lumogallion complex detection was adopted, and the fluorescence signal of the complex was measured using a fluorimeter.

Results for stations in the fjord and shelf regions along east Greenland are shown in Figure 5, and show enhanced concentrations in surface waters associated with supply of lithogenic material to the fresher polar waters. The highest concentrations are towards 200 nM. The profiles also show decreased concentrations with depth in the Atlantic derived waters.

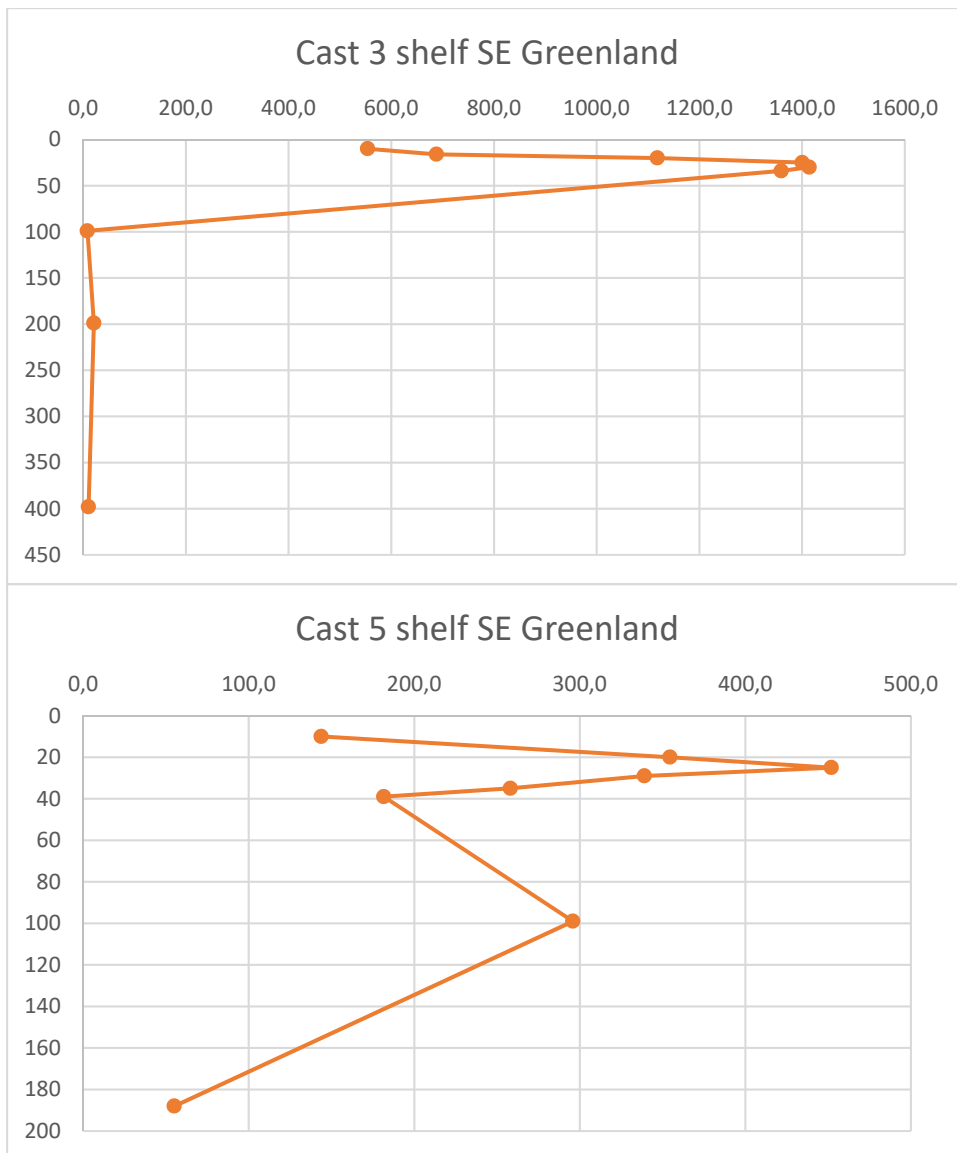


**Figure 4.** Science team on MSM130 (photo Eric Achterberg)



**Ammonium in the water column:** Ammonium was measured on board in more than 1500 samples using the fluorescent OPA method. We present here 2 profiles from the shelf region off southeast Greenland. Lower levels were observed in surface water due to biological uptake, and levels were enhanced in subsurface waters (over  $1 \mu\text{M}$ ) due to remineralization of organic matter, and decreased with depth to levels below the detection limit of about 5 nM.

**Figure 5.** Dissolved aluminum (dAl) concentrations in the Lindenow fjord (station 9 and station 10), near Sikujivitteq fjord (station 51), shelf break (station 65) and Sermilik fjord (station 95 with particle plume) in the East Greenland. Data by Yuping Guo.



**Figure 6.** Ammonium profiles for casts 3 ( $60^{\circ}21.11$  N  $41^{\circ}15.39$  W) and 5 ( $60^{\circ}17.83$  N  $42^{\circ}4.25$  W) in the SE Greenland shelf

This is our last weekly report. We thank the captain and crew of Maria S. Merian for their outstanding support on this cruise. The support on deck, kitchen and bridge was outstanding. We also thank the DFG and GEOMAR for supporting this cruise MSM130. The samples and data will support a great number of early career researchers.

RV Maria S. Merian at sea  $64^{\circ}38$  N,  $37^{\circ}20$  W

Eric Achterberg, GEOMAR Helmholtz Centre for Ocean Research Kiel/University of Kiel  
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