

MSM76
weekly report #3

After leaving the first work area southeast of Denmark Strait we arrived in the evening of 20 August after a one day-long transit across the shelf of East Greenland at the mouth of Scoresby Sound. The latter represents the largest fjord system worldwide, into which many glaciers terminate, thereby continuously injecting icebergs into the fjord. The increase transport of glacier ice into the oceans has led to a marked rise of the global sea level in the last 20 years. It is our scientific aim to study the interaction between the ocean and the marine terminating glaciers. Warm ocean waters may contribute to the melting of glaciers, and the thereby produced meltwater in turn reduces the salinity near the sea surface, thus affecting ocean circulation. Our main target lay on the sub-surface inflow of the approximately 1°C “warm”, so-called Atlantic Water into the Fjord System. This originally more than 20°C warm water mass is carried by the Gulf Stream and the North Atlantic Current from the subtropical North Atlantic toward the eastern Nordic Seas, only to return southward on the Greenland side of the Nordic Seas below the much colder polar water masses. With its remaining heat, the Atlantic Water enters several of the fjords on the East Greenland coast and partly is in direct contact with the marine terminating glaciers.

After one week’s work in Denmark Strait the sighting through the fog of the rocky coastline framing the mouth of Scoresby Sound represented a spectacular moment. Along the mouth, we conducted a survey of the water mass structure and the ocean currents. Over night, the lights of the exposed settlement Ittoqqortoormiit on the northern shore became visible.



Figure 1: View of an iceberg at the transition between Scoresby Sound and Nordvest Fjord. Photo: Dragonfly Ame Leathrum-Simons.

We continued our voyage into Scoresby Sound, and arrived at the transition to the narrow Nordvest Fjord framed by steep cliffs in the afternoon of 21 August. This transition represented a focus of our work, as we expected to find here a concentrated inflow of Atlantic Water. In order to choose meaningful locations for our oceanographic measurements, we began to carry out an echosounder survey of the water depths. The results suggested the existence of two possible passages for the throughflow of Atlantic Water. Based on this, in the midst of a breathtaking scenery of small rocky islands, icebergs extending up to 40 m above the sea surface, and steep cliffs we undertook a survey of the water mass and oceans currents. The analysis proved our assumption right – we found a swift inflow of Atlantic Water into Northvest Fjord near the sea floor.

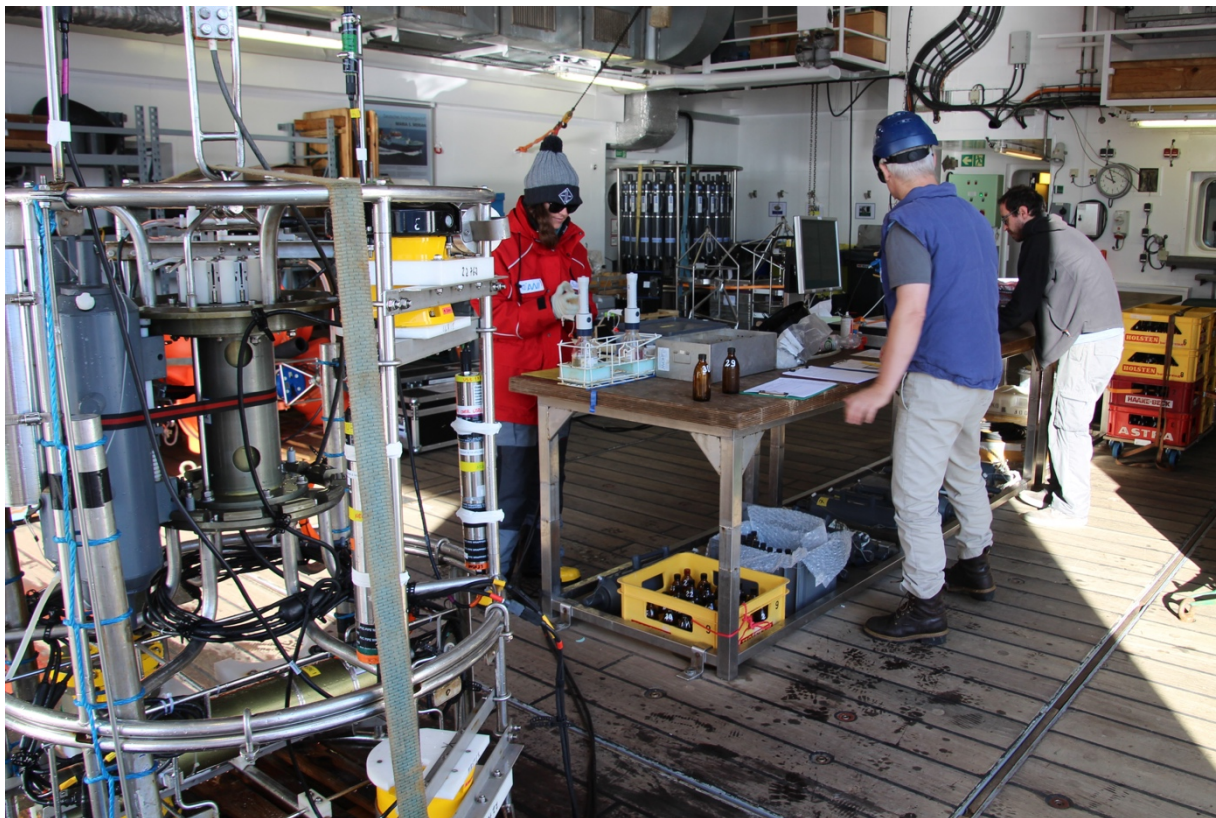


Figure 2: View of the hangar of R/V Maria S. Merian. Scientists download sensor data and take water samples from the CTD / LADCP system used for the water mass and ocean current surveys. Photo: Dragonfly Ame Leathrum-Simons.

In the afternoon of 22 August we deployed two moorings (one in each passage), that will continuously observe the characteristics of the inflow for the duration of one year. Subsequently, we headed back to the mouth of Scoresby Sound, where we deployed a third mooring for the continuous observation of the Atlantic Water circulation. After another one-day transit we returned to Denmark Strait. Here we successfully recovered two moorings deployed on the deep overflow plume one year ago. On August 25 we first failed to recover a third mooring, while later in the afternoon and during the subsequent morning all six moorings deployed during the first days of our expedition were recovered successfully. Our spectacular and successful working week ends with the conduction of continuous water mass and ocean current surveys at an isolated rise located right in the flow path of the overflow plume. Here we expect to find elevated levels of entrainment of warm ambient waters into the cold plume.

The mood on board is excellent, which is certainly also attributable to the varied and tasty food offered by the friendly kitchen staff on board.

Kind greetings on behalf of the expedition team,

Torsten Kanzow