

FS Maria S. Merian

Reise MSM102 (GPF 20-1-31)

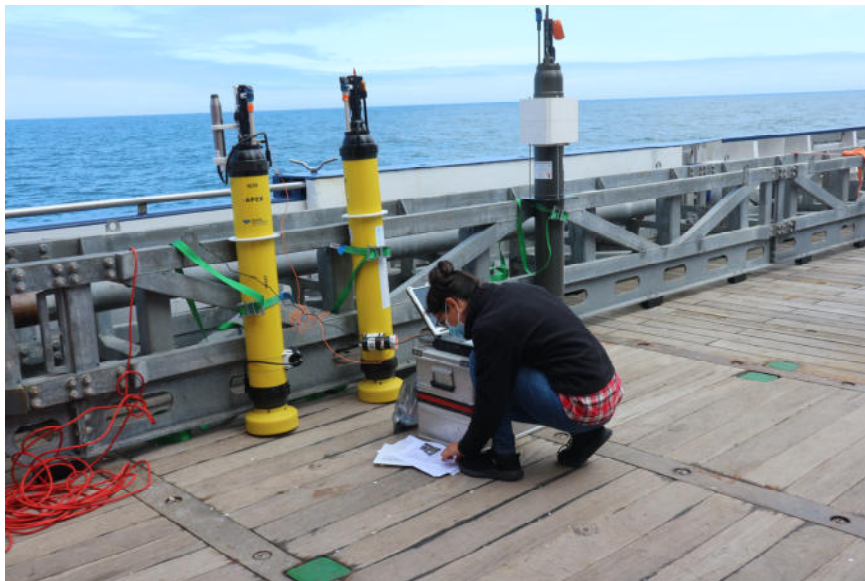
23.07. – 09.09.21, Emden – St. John's - Emden

Weekly Report No.2, 26.07. – 01.08.2021

Sediment Transport in the Northwest Atlantic Mid-Ocean Channel (NAMOC), Labrador Sea



After leaving the exclusive economic zone of Ireland at noon on July 26, we started hydroacoustic profiling by means of ADCP (Acoustic Doppler Current Profiler), multibeam echo sounder and sediment echo sounder during the transit to collect data for the DAM (German Alliance for Marine Research) project "Unterwegs Daten". As the weather was kind to us, the transit continued to go very well. We used the time to continue setting up labs and testing equipment. On July 28 in the morning, we performed a first test of the seismic equipment and recorded a short profile across the Mid-Atlantic Ridge. The test was successful after replacing a streamer segment.

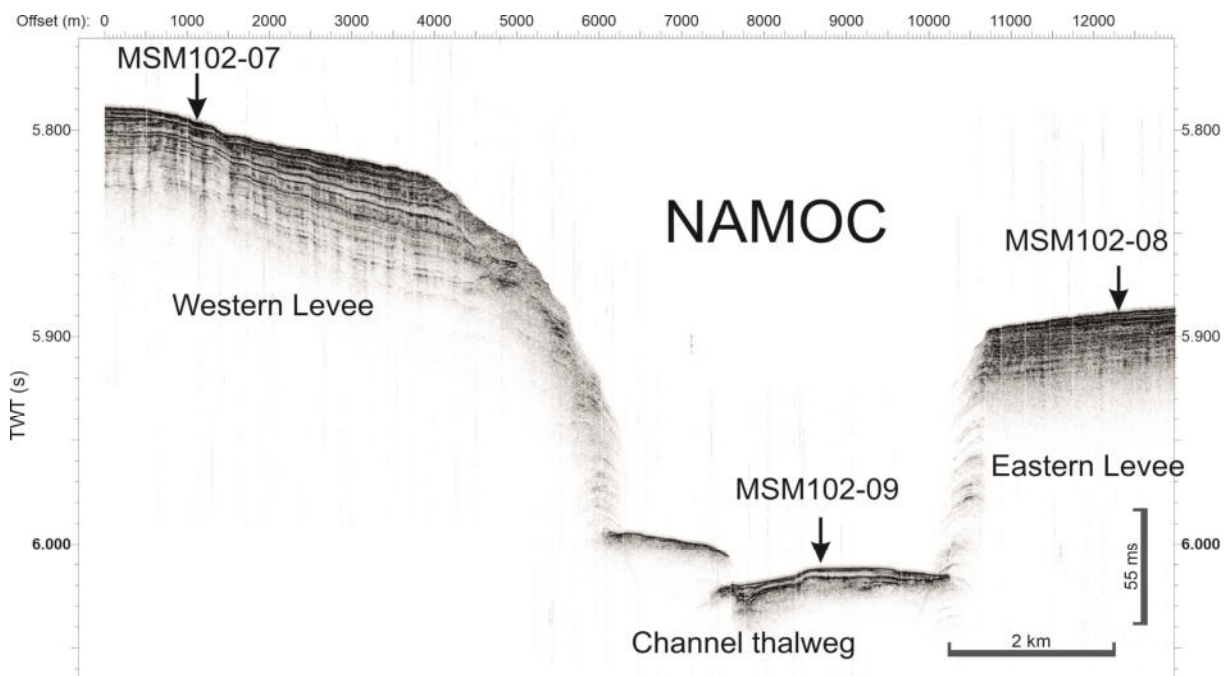


*Preparation of Floats
(Photo: S. Krastel)*

We arrived at the first launch position of a float in the morning of July 29. In total, we deployed five floats from the BMBF joint project DArgo2025 on the transit towards the Labrador Sea. Another four floats will be deployed in the Labrador Sea later during the cruise. The goal of the DArgo2025 project is to support the expansion of the Argo monitoring network into a multi-disciplinary observing system. At the same time, technical and scientific issues related to sensor technology for Argo Floats will be investigated. All nine floats that will be deployed on this cruise carry additional BGC (BioGeoChemical) sensors. The joint project DArgo2025 involves the BSH, GEOMAR, ICBM at the University of Oldenburg and IOW. We were happy to comply with the request of these colleagues to deploy the floats. Three of the floats deployed this week carry sensors for measuring pH and O₂ concentration in addition to the regular temperature and salinity sensors of a standard Argo float. The science questions in DArgo2025 and the associated C-SCOPE project aim to link the floats' pH measurements in the water column with ship-based surface measurements of carbon flux from the Ship of Opportunity Program (SOOP) in the subpolar North Atlantic. To date, float-

based pH measurements were only done in the Labrador Sea. The three deployments along the transit route of MSM102 therefore extend the spatial extent in the subpolar Atlantic. However, C-SCOPE also investigates the social dimension of carbon measurement, the interfaces with policy, political decision-making processes, and civil society understandings. Therefore, we also have a PhD student from the German Development Institute on board during the cruise. Two other floats hosted by the ICBM carry sensors for underwater light measurements. The two floats have different spectral sensors and should allow a comparison of the sensor technology. The goal of the paired deployments is a combined analysis of the data from the two different bio-optical sensors and, based on that, the development of enhanced quality assurance mechanisms.

We crossed the Northwest Atlantic Mid-Ocean Channel (NAMOC) for the first time with our hydroacoustic systems at approximately 49°N and 41°W in the early morning of July 30. At this position, the NAMOC is about 100 m deep, and 5 km wide. It runs relatively straight and shows distinct terrace structures. Based on the hydroacoustic data, we took gravity cores at three stations. Core recovery on the higher western levee was ~ 8 m, while the two cores in the channel and on the eastern levee yielded about 4 m of core recovery each. The cores are currently being opened.



Sediment echo sounder profile crossing the NAMOC. Coring locations are marked.

During the night of July 31, we started a hydroacoustic survey of the NAMOC to the northwest. We used the day for initial seismic surveys over the NAMOC to image the deeper structures that are believed to control the NAMOC's path. Over the next few weeks, we will track NAMOC for nearly 2000 km to the northwest to investigate its importance in transporting sediments and nutrients from land to the deep ocean in relation to the evolution of the North American and Greenland Ice Sheets.

We started our transit to St. John's on July 31 in the evening after recovering the seismic system. We are facing quite strong winds during the transit. We will arrive in St. John's tomorrow morning for bunkering. Everyone on board has settled in well and we are excited to see what results the next few weeks will bring.

With best regards from RV Maria S. Merian

Sebastian Krastel

(Kiel University)

At sea, 48°30'N, 049°15'W



First core on deck (Photo: G. von Rönn)