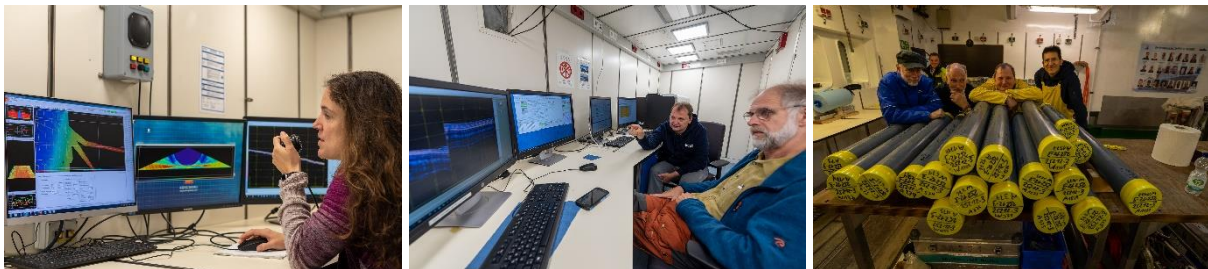


RV MARIA S MERIAN  
MSM111 "BAFFDEEP"  
02.09. - 04.10.2022



3<sup>rd</sup> Weekly Report  
12 – 18.09.2022

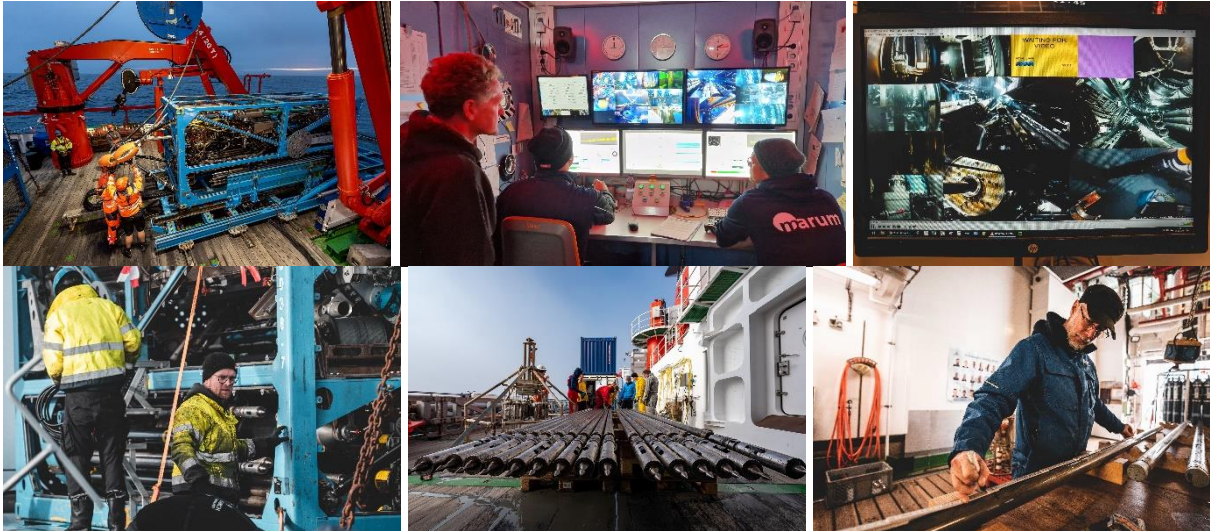
We spent most of the third week of the expedition on the continental slope in Baffin Bay. Here, after extensive investigation of the geology, we found a suitable position for the first MeBo borehole and reached 52 m drilling depth during the first deployment of the instrument. On Monday, the weather was still unfavorable, so the bathymetric survey of the continental slope at 69°N was extended until Tuesday morning. Thanks to excellent PARASOUND profiles, we recognized that the slope sediments of the uppermost 100 m are composed of two units separated by an erosional contact. The deeper unit is characterized by predominantly parallel bedding with prominent topography with structures perpendicular to the slope. The younger unit shows a regionally consistent sequence of strata, with evidence of slope instability, sliding, and liquefaction of sediment at the base.



*An investigation of the subsurface geology of the continental slope of Greenland involves precise surveying of the topography of the seafloor with echosounder, as well as mapping of subsurface structures with PARASOUND. Such findings are the prerequisite for the precise positioning of the sediment cores (here the "perfect" gravity core with 17 m core recovery). Photos: Volker Diekamp, and Raphael Morard.*

On Tuesday, due to a short window of better weather, we were able to continue geological sampling of the slope sediments with multicorer and gravity corer. At the selected MeBo position, we tried to obtain the longest possible sediment record, with the help of which the stratigraphy of the planned borehole can be better traced to the surface. In doing so, we hit a bull's eye - with another deployment of the 18-m gravity corer, we pulled the perfect core, recovering a continuous sequence of 17.02 m of sediment. With increasingly rough seas, we continued the bathymetric survey from Tuesday evening until Wednesday.

Then it was finally time for the MeBo's first deployment in Baffin Bay to begin. The instrument gently goes overboard at 9pm and after a short test in the water starts its slow dive to the seafloor. Thanks to the transmission of telemetry from the device to the ship's network, the deployment could be followed on the monitors in each lab. The device's cameras show the most wondrous inhabitants of the deep, small and large fish and jellyfish, squid and shrimp attracted by the device's illumination. At midnight to Thursday, we landed in the right position on the seafloor at the second attempt and the drilling process can begin. Remote control of the drilling operation requires maximum concentration; the pilots take turns in two-hour shifts. We watch spellbound on the cameras as pipes are screwed together on the seafloor at a depth of 1500 m below us and the individual core segments fill the magazines of the rig. By evening we have drilled through 52 m and must now be close to the base of the first unit. Then, unfortunately, the drilling comes to a halt. The last core cannot be caught and the problem cannot be solved during the whole night. There is nothing left to do but stop the drilling operation and return the drill pipe to the unit.



*From top left: The MeBo is launched, the drilling process is remotely controlled from the control center (shown here at the moment of touchdown on the seafloor) and tracked on monitors in the labs before the rig is recovered back on deck, the cores are taken out of the MeBo's magazines, then brought up to the lab on deck to be pulled out of the core tubes and processed in the lab. Photos: Volker Diekamp, Michal Kucera and Raphael Morard.*

Thus, after two days underwater, the MeBo reached the surface again at noon on Friday and we were able to recover and process the 15 cores in a well-organized and practiced chain of teams. The initial evaluation of the core recovery shows that the borehole penetrated through three horizons with low core recovery of sandy and water-saturated sediments, with mud entering the borehole in the third horizon and literally burying the last core in the drill pipe. This was probably the reason why the last core could not be captured by the core grabber. The recovery of the rig was just in time - the weather had changed again and strong northerly winds led to uncomfortable seas. To make the MeBo operational again, and to analyze the first mission, we will need at least two days.



*Top: Icebergs in the mouth of the Ilulissat Icefjord. Bottom: Sediment sampling near Ilulissat (Jakobshavn). Photos: Volker Diekamp, Michal Kucera and Tilo von Dobeneck.*

The bad weather had become unfavorable for further geological sampling in central Baffin Bay and we therefore moved to a secondary area of the expedition in Disko Bay, one of the most densely populated regions on Greenland. It is also home to Greenland's most active glacier - Jakobshavn Isbrae, which flows into Ilulissat Icefjord. To correlate the recent history of environmental conditions with the evolution of the region's marine ecosystems, we took

additional sediment samples in South Disko Bay, outside Ilulissat, and in the Vaigat Strait between Disko Island and Greenland. Deep in our memory remains the dramatic iceberg scenery around Ilulissat Icefjord. Coming from the south, the entrance to the fjord appears like a huge ice-spitting dragon's mouth, from which icebergs of all shapes and sizes begin their journey into Baffin Bay and further south into the Labrador Sea (some even make it to Newfoundland, as the crew of the Titanic would bitterly learn).

Full of new impressions and with a promising 8 m long sediment core we left the Vaigat Strait on Saturday evening and after a short break to survey the seafloor we set off again for Baffin Bay to the position of the second MeBo borehole, selected after an intensive review of the bathymetric data. We continue to enjoy the friendly atmosphere on board and appreciate the professionalism of the crew, thanks to which the station work runs extremely efficiently and smoothly. All cruise participants are still well and greet their families, friends and colleagues at home.

For all participants

Michal Kucera, 18.9.2022  
(MARUM / University of Bremen)

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<https://www.marum.de/en/Discover/MARIA-S.-merian-on-course-for-baffin-bay.html>

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<https://twitter.com/HenriekaD>

<https://twitter.com/VolkerDiekamp>

<https://twitter.com/drjofaust>

<https://www.instagram.com/jopst>



*Sunset in the Vaigat Strait. Photo: Tilo von Dobeneck.*