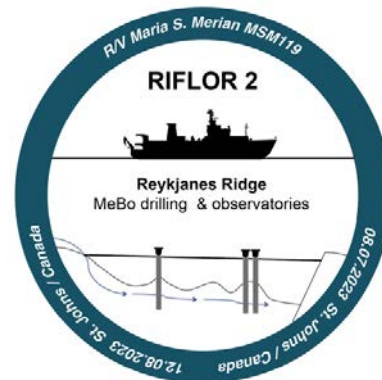


R/V Maria S. Merian

Expedition MSM119 “RIFLOR2”

08.07.2023 – 12.08.2023

St. John’s – St. John’s



### Weekly report #3

In the week from 17.-23.07. we successfully continued the multi-methodological research program on the Reykjanes Ridge with consistently good weather conditions. The deployment of equipment included hydroacoustic data acquisition with Multibeam and Parasound, gravity coring, measurements with an in-situ temperature lance, drilling with MARUM MeBo70, and deployment and recovery of a dredge.

Our second drilling with MeBo aimed to completely core the sediments of the Squid Pond near the spreading axis, to take in-situ temperature measurements at intervals of about 5 meters, and then to log the complete sediment sequence with an acoustic borehole tool. The borehole reached into the oceanic crust and cored very solid, cemented sandstones at the transition to the sediment filling, which were probably formed by precipitated solutions from the upper crust. The next boreholes then aim for deeper penetration into the basalts.



**Figure 1** Left: Inner core barrels from the second, more than 25m deep MeBo-hole, which also underwent downhole logging. Right: The core recovery spanned from the seafloor through Squid Pond to the crust.

The periods between the MeBo missions are used to connect the spreading axis with the Squid Pond with a transect of heavy corers and temperature measurements and to better characterize the ridge flank processes. In the considered time slice of the earth's history, i.e. the last 3 million years, we see thermal variability in the data, differently consolidated and altered sediments, variable pore water compositions, and different proportions of magmatic components. However, only analyzes in the home laboratories will allow conclusions to be drawn as to the extent to which this material comes from the dorsal axis or, for example, from Iceland. In order to trace different magma compositions or changes in the rock-physical properties of the oceanic crustal basalts, complementary short dredge trains are run parallel to crustal age isolines (Fig. 2). Initial response shows that fresh or superficially altered basalts are dominant, and more rarely blistered varieties are found. Occasionally, other lithologies were found and are interpreted to represent glacial dropstones.



*Figure 2 Left: Recovered dredge, which had been deployed close to the ridge axis in a hostile environment without benthic fauna. Right: Numerous basalt clasts with different porosity and degree of alteration await their scientific description.*

The MARUM MeBo70 rig is currently drilling its third well about 1500 m below the RV *MERIAN*, this time again in crustal bedrock. The weather window for this is favorable. We will next try to install a borehole observatory with another dive with seafloor drill rig in the upcoming days.

Kind regards on behalf of the entire MSM119 team

*Achim Kopf (Chief scientist)*