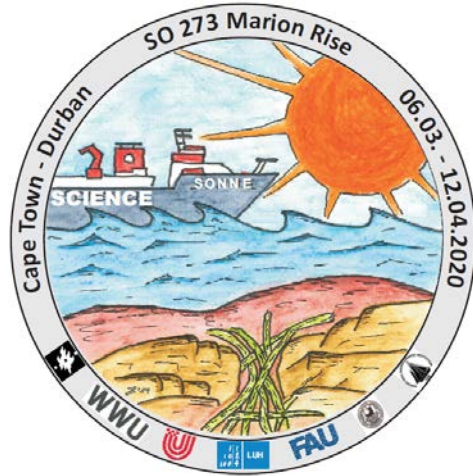


Expedition SO273 – MARION RISE

Cape Town - Durban

Weekly Report No. 3

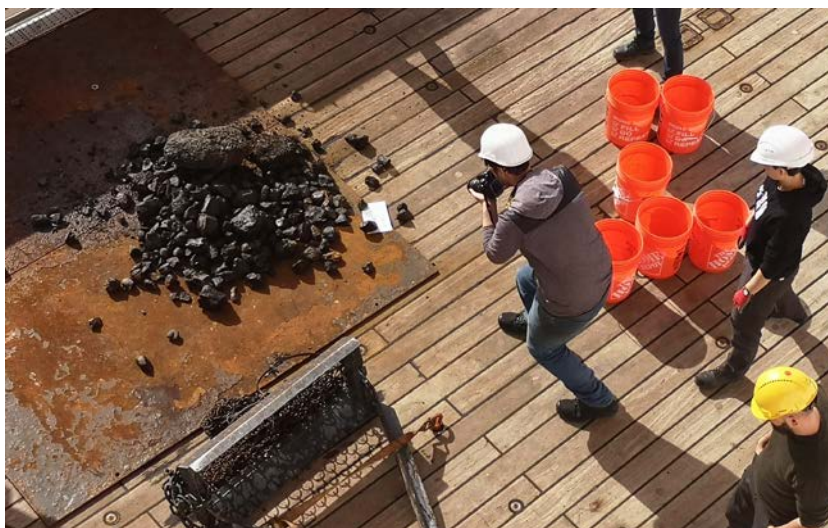
16. – 22. March 2020



In the last week we continued our investigations in the western part of the southern working area of the Southwest Indian Ridge (SWIR) in the vicinity of Marion Island, with different foci: (1) mapping of the ridge system, (2) exploration for hydrothermalism of the volcanic zone North of the axial valley of SWIR, (3) the nature of a ridge within the Eric Simpson Fracture Zone, and (4) sampling of a seamount in the Northern hill slope off the volcanic zone of the SWIR.

Mapping program: Besides the mapping of the transit areas between the sites, we mapped a longer transect to the South with turning point ca. 20 km Northern of Marion Island (bathymetry using ship's multibeam, geomagnetics, gravity). The turning point closest to the island, however, was at night, so we did not gather sight of the island. The map acquired clearly shows that one of our previous working hypotheses which was based on the lower resolution satellite bathymetry indicating a seamount chain between the active ridge volcanism and the Marion island, could not be confirmed.

Hard rock sampling using dredges: In the last week we recovered 7 dredges which were containing mostly of volcanic samples (basalts, basaltic breccias). Two dredges were designated to a seamount located on the northern flank of the axial valley. Typical rocks recovered are basalts showing a texture indicative for explosive volcanism (large amount of vesicles, porphyroclastic deposits, volcanic bombs).



The curator of expedition SO273, A. Engelhardt (Univ. Hannover) is documenting the content of a dredge. A. Achten (Univ. Hannover, right) and F. Genske (Univ. Muenster, bottom) are ready to put the samples into the buckets to transport them into the rock lab, where the rocks will be cut and characterized (Foto. J. Koepke).

Dives with the ROV "Quest": We successfully performed two dives using the ROV (Remotely Operated Vehicle) "Quest" from MARUM in Bremen. These dives were aimed to characterize the "Brunelli ridge": a transpression ridge within the Eric Simpson Fracture Zone. For the first time, we could recover structurally oriented samples from the Southern SWIR seafloor in order to understand the structural geology of this structure. The dives have been successfully broadcasted via internet in HD quality: off-shore scientists were involved in the dives, and a stream was made available for the community via youtube (link: <https://www.youtube.com/user/marumTV>).



Nocturnal activity on the fantail of the RV Sonne: Successful recovery of the ROV after a dive by the Sonne Crew and the ROV group from the MARUM (Univ. Bremen) (Foto. C. Beier).

CTD / Tow-yo /MAPR: In the central area of the SWIR characterized by strong volcanic activity we performed a CTD Tow-yo, in order to explore for hydrothermal activity. A MAPR (Miniature Autonomous Plume Recorders) fixed at the dredges to sample the northern, yet unnamed seamount showed temperature anomalies, implying that this seamount with a characteristic explosive volcanism is still active.

At the end of the week it became clear that due to the Corona crisis, South Africa closed all ports, so that the termination of expedition SO273 according to the schedule, with disembarkation in Durban, is no longer possible. After an intensive discussion the ship's master, officer and co-chiefs decided to abandon expedition SO273. We all are deeply concerned about the situation at home, and send you all best wishes for a good health.

From the Southern Indian Ocean, 22. March 2020, 41° S / 33° E

Jürgen Koepke, chief scientist

Institute for Mineralogy, Leibniz University Hannover

<https://www.geo.uni-hannover.de/de/expedition-marion/>