

FS METEOR Expedition M151 ROV Test und ATHENA

(Ponta Delgada, 06.10.2018 – Funchal, 31.10.2018)

Ein Web-Logbuch zu dieser Expedition gibt es auf
<https://www.marum.de/Entdecken/Logbuch-METEOR-151.html>
<http://planeterde.de>



3. Weekly Report (15.10.2018 – 21.10.2018)

The third week of our cruise is still influenced by weather conditions and technical challenges. Despite these misfortunes, the week is marked by outstanding observations. Since the start of the cruise, we have not yet left the area around the Azores and still work in the permitted north-western escape areas Acor-Bank, Albatroz Seamount and the region south of Sao Miguel with the local name Mar da Prata. At the beginning of the week, we were able to recover fossil corals of the species *Eguchipsammia cornucopia* and some fossil corals of the framework-forming species *Lophelia pertusa* and *Madrepora oculata*, when deploying grab sampler and box corer near the Acor-Bank. In a topographical basin of the Acor-Bank and within the adjacent basin to the west, we obtained sediment cores for paleoceanographic studies and multicorer samples for analysis of pore water geochemistry as well as of environmental DNA. When the long-awaited spare parts for the ROV arrived in Ponta Delgada, we returned to the Mar da Prata region once again to receive the package and ultimately complete our research.

With two targeted dives, we were able to prove that corals of the species *E. cornucopia* form a fascinating reef on the eastern slope of the submarine volcano José Gaspard at about 300m depth. On the west side of the volcano, a garden of octocorals awaited us at a similar depth. In addition to these discoveries, numerous species that colonize the coral reef were documented and a sea urchin of the species *Echinus acutus*, about 30 cm in diameter, was recovered.



The ROV SQUID is deployed by the MARUM Team.



ROV pilot in the control room onboard Meteor diving in the José Gaspar Seamount area.

Bathymetric studies in the region showed a surprising wavy sediment structure several meters high in the parasound profile. The sandy soil, however, prevented sampling with the gravity corer. Attentive eyes of PhD student Marleen Lausecker and our hydroacoustic expert Stefanie Gaide led to a surprise. At a small topographical offshoot of a volcano further to the west, we were able to show with numerous grab sampler deployments that the structures in the parasound profile reflects the presence of fossil coral reefs of the species *Lophelia pertusa*. Another small topographical high nearby also provided numerous fossil corals in exactly the same water depth of 600 m. With several hours of video recording and a large amount of grab sampler deployments, we have thus answered our biological and sedimentological questions on today's and past coral occurrences at this location. Our laboratories and boxes are filled with fossil coral samples where we can conduct climate reconstructions and the description of the regional fauna is making great progress.

Ultimately, the study of the structure of the water masses and their geochemistry is of great importance for the success of the scientific program. For this we measured the flows with the ADCP, used a YoYo - CTD several times and sampled the different water levels to analyze the samples at home. A first evaluation shows a correlation between water masses, currents and the accumulation of coral observations. In the region of Mar da Prata and near the volcano José Gaspard, tidal cycles are of great importance, as are local eddies around the volcanic cones. Special attention deserves a detailed evaluation of the Mediterranean-outflow water, which we locate clearly in 700 to 1300 m. By the end of the week, and after a successful investigation and more than 80 stations, we were finally able to leave the Azores and set sail for the Atlantis Seamount. In the Atlantis Basin we investigated the stratification of the water masses up to 3600 m depth as well as the sediment - water interface. Last night, the multibeam-echosounder mapped the southeast flank of the largest deep-sea mountain in the Atlantis Seamount Chain.



The scientist prepare the CTD.



Fossil Lophelia pertusa from the grab sample GeoB23176-1.



Living Eguchipsammia cornucopia corals with sea-urchin Echinus acutus.

All cruise members are well and excited to continue our search for living and fossil cold-water coral deposits. In the name of everyone I am sending our best regards from the subtropical Atlantic.

Norbert Frank, Chiefscientist