Expedition M210 "Dive@MAR 2" – 1. Weekly Report, 27.04.2025



The M210 "Dive@MAR 2" expedition is a research cruise conducted as part of the MARUM Cluster of Excellence "The Ocean Floor – Earth's Uncharted Interface," led by the Max Planck Institute for Marine Microbiology in Bremen. It is the second of two expeditions to the hydrothermal vents on the Mid-Atlantic Ridge near the Azores. It builds on and continues the research of the first expedition, MARUM Dive@MAR (M190) in June/July 2023.

Our research focuses on the differences in the composition of hydrothermal fluids between vent fieldfields that are sometimes close to each other, the geological causes of their variability, and the effects on the genetic and metabolic diversity of the hydrothermal organisms. Other topics include the genetic connection between vent fields, the role of these vents as "steppingstones" for the dispersal of hydrothermal organisms, the transport of hydrothermal plumes from the ridge axis into the open ocean, and the release and transformation of iron and other metals during this process.

Our most important tool is the new remotely operated vehicle (ROV) MARUM QUEST 5000 from the Center for Deep Sea Research (ZfT) at the University of Bremen. It will be used for the first time on this expedition. The new ROV can dive to depths of up to 5000 meters and offers significantly higher payload capacity and more powerful data and hydraulic systems than its predecessor, QUEST 4000, which was in research use for 20 years.

On Thursday morning, April 24, the ROV and scientific equipment were transferred to RV METEOR, and the ROV crew began mobilizing the QUEST 5000. Most of the scientists arrived on board on Saturday, April 26, and immediately set about setting up the laboratories. Teams from MARUM/University of Bremen, the Max Planck Institute for

Marine Microbiology in Bremen, Constructor University Bremen, the University of the Azores, the University of Lyon 1, and EGI LLC are participating in the expedition.

Our originally planned departure on the morning of April 27 had to be postponed: The port tests for the new ROV could not be completed on Saturday. The reason for this was that mobilization took longer than expected and it became apparent late Saturday afternoon that adjustments to the launch frame were necessary to ensure that the ROV could be safely picked up. This meant that the frame had to be dismantled on Sunday morning and reworked on deck. As this report is being written (Sunday), the port tests are still ongoing.

In the meantime, the laboratories are almost completely set up and the scientific teams are preparing for their first missions. Our new departure date has been postponed by about 24 hours – we plan to leave Ponta Delgada tomorrow morning at 10:00 a.m. Our first stop is south of Ponta Delgada, away from the Mid-Atlantic Ridge. There, we will first carry out cable management: The brand-new ROV cable will be carefully unwound to prevent twisting, which could cause damage later during diving operations. To do this, we need sufficient water depth so that the cable can roll freely in the water before being pulled back onto the drum.



Figure 1. ROV MARUM QUEST 5000 during port testing in Ponta Delgada

After cable management, we will set course for the Menez Gwen hydrothermal field on the Mid-Atlantic Ridge. The scientific team and ship's crew are in good spirits – we are looking forward to an exciting and hopefully successful research voyage.

Greetings from the port of Ponta Delgada,

Christian Borowski and the passengers of the M210