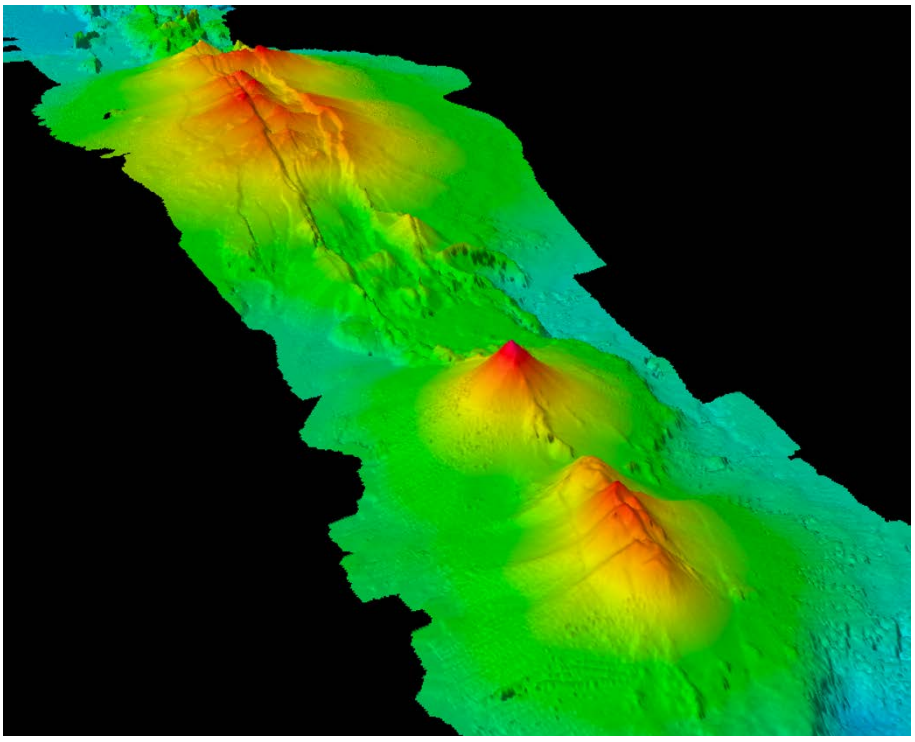
RV METEOR

Expedition M194 HEXPLORES

10.10. – 07.11.2023 | Jeddah, SA – Piraeus, GR

3. Weekly Report (23.10. – 29.10.2023)

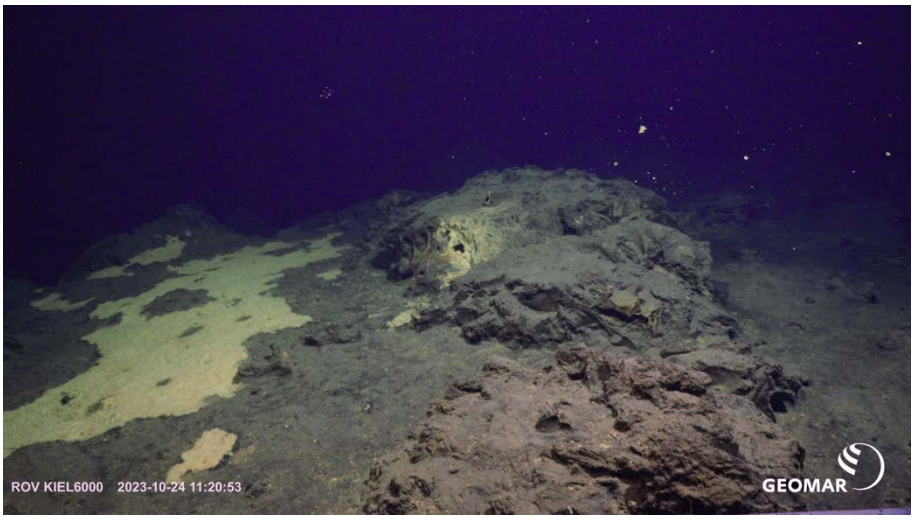
In the third week of our expedition, we started with a longer phase of multibeam mapping of the seafloor in working area 15. Here, we first mapped the summit of Ramad Seamount – the largest submarine structure in the southern Red Sea – with a different shape than the ones seen in the northern and central Red Sea. We continued with a CTD and MAPR Tow-Yo over two cone-shaped volcanoes south of Ramad Seamount, as they look younger than Ramad Seamount. To our excitement, we found turbidity anomalies accompanied by a few anomalies in the redox potential of the water column. A combination of these signals is a possible hint for hydrothermal venting, and therefore, we did an ROV dive at this position to explore the source of these signals.



Preliminary processed multibeam echosounder bathymetry of Ramad Seamount with a well visible rift along his axis (in the back) and two younger groups of volcanoes south of it. View direction is North. Waterdepths are from ~300 to 1000 meters.
© M194 Augustin

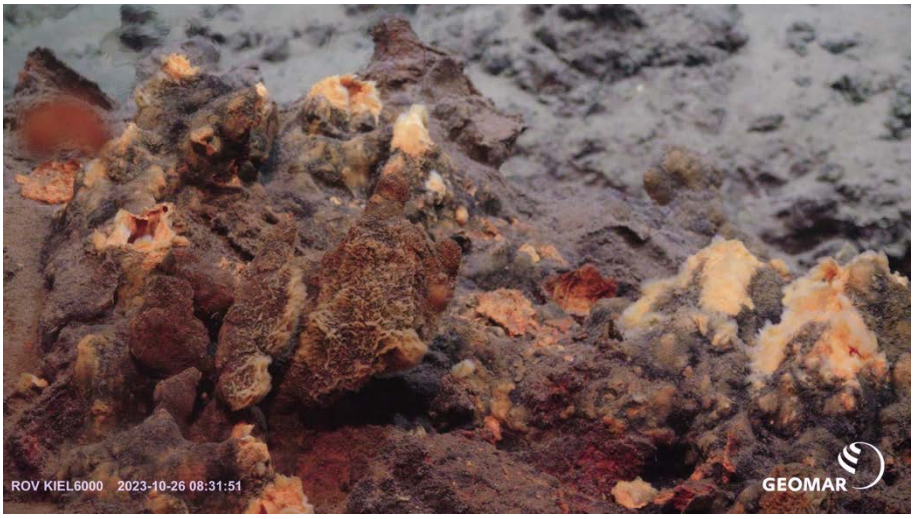
Tuesday morning, the 24 October, we started the shallowest dive of this expedition at one of the cone volcanoes. Although we did not find high-temperature venting, large parts of the volcano were scattered with low-temperature fluid outlets, surrounded by microbes and some large microbial mats. Thus, at our southernmost

target, we found the same style of hydrothermal activity as observed in the central and northern Red Sea rift.



Vent outlets around a rock and large microbial mats on the crest of a large cone volcano in the southern Red Sea. © GEMOAR Kiel

The night of 25 October, we spent with another To-Yow at the southern part of Ramad Seamount. After the Tow-Yo, we continued with a ROV dive at the eastern rift of Ramad Seamount and found very soon the first hydrothermal sites with shimmering water of up to 30°C, bacterial mats and flourishing macrofauna around.
After Ramad Seamount it was time to slowly move back North to investigate the working areas that we postponed during our way to the South. Before we headed to our working area 11, we decided to do a second dive in an area that we now call the "Crescent Moons" volcano. There we found earlier in the expedition numerous smaller vent sites on its eastern boundary fault. After multibeam mapping, we did a second dive at its western fault on 26 October. We found again hydrothermal iron oxide mounds, comparable to those at Hatiba Mons volcano, close to the rift axis and more venting of shimmering water and bacterial mats right at its western boundary fault.



A small patch of microbes and Iron oxide chimneys at the western flank of the "Crescent Moons" volcano. © GEOMAR Kiel

The following night, we spent some time transiting northwards, followed by a CTD and MAPR Tow-Yo in the Red Sea axis at 18°18'N. However, due to thunderstorms with high wind speeds that crossed the Red Sea from Africa towards Arabia, we had to delay our planned station work and started later with the Tow-Yo.
Friday morning, 27 October, we started to dive over a rift oblique fault close to a volcanic active axial high in the same working area. This rift segment was much older than we thought, and we could not find hints of hydrothermal venting, but the extremely faulted underwater scenery was astonishing. A comparable experience was our visit to Poseidon Deep on 28 October; here, the lava fields and tectonic features of interest, identified in hydroacoustic data, were spectacular but older than expected.
After Poseidon Deep, we moved to our last working area, the Aswad Dome volcano at 20°55'N, and began our last CTD and MAPR Tow-Yo and weak Eh anomalies in the MAPR data indicated the possible presence of hydrothermal activity on that dome volcano. The last ROV dive of expedition M194 was at the Aswad Dome volcano on 29 October. After passing some faulted and sedimented volcanic terrain, we found another low-temperature vent site with iron oxide mounds and microbial mats, comparable to Hatiba Mons. We could sample microbial mats and hydrothermal precipitates and then had to leave the area at 15:30 hrs local time. We are now traveling north towards Hatiba Mons volcano for our last station work before we go to KAUST to disembark our colleagues from Saudi Arabia

All participants are doing well, and the atmosphere on board is still excellent.

On behalf of all participants of M194, greetings from aboard the RV METEOR,

Chief Scientist