



SO277 (GPF 19-2\_012)



## 6. Weekly report, 14.9.-20.9.2020

This week we completed our work in the SMART study area off Malta with several controlled source electromagnetic profiles, video-CTD casts, AUV dives, and gravity core sampling.

On Monday, we recovered the CSEM system from 06:00 to 08:00. Although the preceding Parasound profile had suggested that there was sufficient sediment cover along the track, there were numerous signs of wear and tear on the CSEM system that indicated the presence of several hard rock outcrops along the track and one receiver was damaged. From 08:00 to 10:30 we collected more Parasound data off the eastern tip of Malta to find out if another CSEM profile was possible in that region. Unfortunately, there the seafloor also turned out to be too rough. However, we discovered several water column anomalies in this area that indicate gas emissions from the seafloor. From 11:00 onwards we conducted three Video-CTD casts at sites off eastern Malta where water column anomalies were reported previously. The first site turned out to be a wreck. The other two sites did not show signs of fluid seepage either. From 19:00 onwards, we collected multi-beam bathymetry data off Comino in extension of Marcan CSEM profile 2 as a pre-survey for the final CSEM line.

On Tuesday morning at 08:00, we deployed the AUV at the northern water column anomaly off Comino Island in spite of a fresh breeze (force 6-7). From 10:00 to 14:30 we collected three gravity cores further north before recovering the AUV at 15:30. The gravity cores showed mainly hemi-pelagic mud, but also evidence for methane in the sediments and authigenic carbonates as well as fragments of limestone. Afterwards we deployed the EM system in MMR mode (vertical dipole). This setup allows to tow the system also in rocky areas, but without a receiver. Instead, these signals were recorded by the OBEM.

The CSEM transmitter worked splendidly throughout the night and we recovered the system in the morning. On Wednesday morning at 08:00 we deployed the AUV at a gas flare off the shelf edge off Gozo. Afterwards we took three gravity cores at the northern water column anomaly off Comino. Core recovery was limited but it showed that our interpretation of the AUV imagery is correct. We then collected the AUV, before commencing with another CTD station at the same site where we took the gravity corers and collecting multi-beam bathymetry data during the night.

On Thursday, we conducted a Video-CTD cast at an enigmatic mound NE off Malta that consists of carbonate rocks above the post-Messinian soft sediments and a second one at the flare site investigated with the AUV on the day before. With force 7 it was not possible to use the AUV. In the afternoon, we took one more gravity core

from a box canyon NE of Gozo, before we deployed the CSEM system to acquire a final resistivity data set further offshore.

The wind did not abate during the night and on Friday morning we recovered the CSEM system.

Afterwards we collected the twelve OBEM receivers.

This was completed by 16:00. All

instruments were safely retrieved and found to have recorded data, although one of the twelve data loggers had stopped after four days. In the evening, we conducted a final video-CTD cast at the southern water column anomaly off Comino before we left the study area to sail back to Sicily.

We arrived off Mt. Etna in the early morning of Saturday and set up communication with the seafloor geodesy stations. After we had downloaded the data that were collected since their deployment four weeks ago, and after we had ascertained that the stations were working correctly, we conducted a Video-CTD cast near the geodesy array to see if there are obvious signs of flank deformation across the fault system, but apart from some elongate seafloor discolorations we could not find any anomalies. At 13:00 we started to deploy six ocean bottom seismometers which will stay in the area for one year to measure seismicity in the vicinity of the seafloor geodesy stations. Afterwards, we carried out a second video-CTD cast further down the slope along the fault system in about 2000 m water depth.

Now we are on transit to our last study area off Stromboli where we will map the deposits of the recent eruptions before sailing back home tomorrow night.

Every body onboard is well.

On behalf of all on board,

Christian Berndt, Chief scientist

GEOMAR Helmholtz Centre for Ocean Research Kiel



*Pore water sampling from a sediment core. Left to right: Timo Spiegel, Lea Rohde, Thomas Müller, Mark Schmidt.  
Photographer: Jonas Liebsch.*