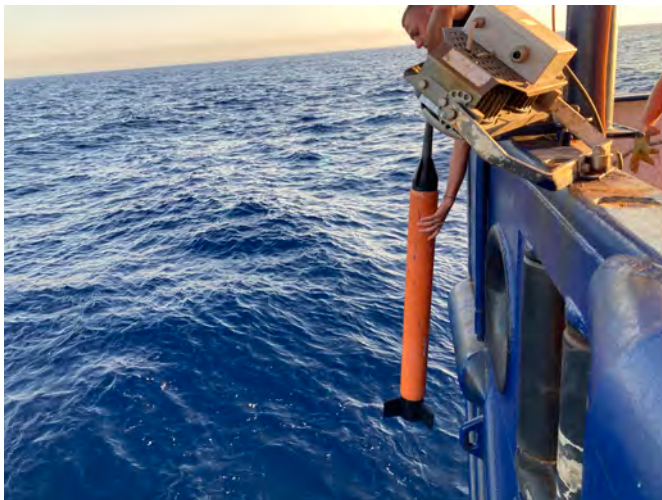


#### 4. Weekly Report (31.07- 05.08. 2023)

The last days in the main working area of the Sicilian Channel were spent between the Malta Graben and the Sicilian coast. Like in the previous weeks, multibeam/magnetometer surveys alternated with targeted dredge deployments. After the final recovery of the magnetometer on Aug. 2 (Fig. 1), the last sound velocity profile concluded our research in the main working area. Underway multibeam mapping, however, continued until the vessel left the Italian EEZ on Aug. 3. While most scientists spend the 2.5 days transit time with cleaning the labs, packing the equipment and report writing, surface water sampling for nanoplankton research continued until we reached the port of Piraeus. At 08:35 on Aug. 5 the first line was fixed to the pier and Exp. M191 officially ended. In the afternoon all scientists disembarked the vessel.



*Fig. 1: After reeling in its 300 m long cable, the magnetometer “fish” is recovered for the last time during Exp. 191. The magnitude and shape of recorded magnetic anomalies provide information on the depths and composition of magnetic sources (i.e. igneous bodies) in the crust. Photo: J.G.*

In total, 18 dedicated multibeam/magnetometer surveys, covering 2886 km, were conducted to record high-resolution bathymetric data, backscatter, water column profile data and the total magnetic field intensity. We have carried out 68 dredge stations, only 11 of them returned empty or contained just unconsolidated mud. All others delivered carbonate crust/coralline material, consolidated limestone (most likely continental bedrock) and, at 24 dredge stations, igneous rocks. The obtained igneous material includes a range of lithologies, mostly mafic lavas. A particular interesting lava fragment was identified as peperite (Fig. 2), which can form when submarine lava advances over soft (unconsolidated) seafloor sediment, resulting in various lava-sediment interactions and intermingling creating fragmented and deformed margins.



*Fig. 2: Volcanologist Alastair Hodgetts, is happy about the recovery of an excellently preserved piece of peperitic lava, which forms when extruding lava flows over unconsolidated sediment. Photo: Jacqueline Greech Licari.*

Collectively, the obtained samples and data will allow us to update our view on volcanism in the Sicily Channel and to develop a more comprehensive tectonic and magmatic framework for the region. For instance, many features shown in the predicted (satellite) bathymetry as seamount-like elevations, and which were previously interpreted as presumably volcanic edifices/cones, turned out to be neither not existent or no evidence for an igneous nature (magnetometer data/dredging results) could be established. On the other hand, three previously unknown volcanic centers were discovered and partially sampled. Flares in the water column data, indicative of active venting/seepage, were observed at a number of locations.

In addition, 82 surface water samples for nanoplankton research were taken along our track between Algeciras and Piraeus. Considering the current heat wave (higher than normal surface water temperatures) their species assemblages could provide particular valuable data.

At this point, we would like to thank Captain Derk Apetz and the entire crew of the METEOR for their outstanding commitment and tireless support. The Leitstelle Deutsche Forschungsschiffe and Briese Research is also thanked for their great support during the entire expedition.

On behalf of the entire M191 science team,

Jörg Geldmacher  
(GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel)