Research Vessel METEOR

M214: 25.10. – 13.12.2025
Las Palmas – Malaga - Iraklion - Iraklion

2. Weekly Report: 27 Oct – 02 Nov 2025

After Sunday blessed us with wonderfully calm weather and bright sunshine, it became somewhat cloudier during our transit from the Canary Islands northwards, and a slight swell caused the ship, and consequently us, to rock a little. On Tuesday morning at approximately 5:00 a.m., we crossed Spain's Exclusive Economic Zone (EEZ) into Morocco and were able to begin the hydroacoustic recordings (Fig. 1), as we had obtained official permission from Morocco and intended to use the transit route to collect scientific data. The hydroacoustic instruments, or echo sounders, of the METEOR provide us geoscientists with clear indications of structures on the seabed, the formation of which sheds light on important processes in the upper part of the marine crust. Following the survey line northward, we first crossed the Agadir Canyon, an underwater gorge carved deep into the continental margin by east-west sediment transport from the Moroccan continent. Suspended currents flow through the canyon far into the deep-sea plains. After the METEOR crossed the canyon, we traversed a broad ridge interpreted as an extension of Morocco's High Atlas Mountains into the marine environment. We then encountered several round to elliptical elevations, rising approximately 100-200 meters above the seabed. A review of published literature reveals that these are isolated salt domes in the subsurface, causing localized uplift of the seabed. Eighty nautical miles before entering the Strait of Gibraltar, we surveyed the Meknes mud volcano using a cross-section. In contrast to the salt dome structures, no deposits were detected on the summit of the mud volcano (Fig. 2) using sediment echo sounding, whereas these were clearly present at the salt domes. Of particular interest are the inclusions of former cold-water coral mounds embedded in the sediments of the western, steeper flank of the mud volcano (Fig. 2). These significantly more solid structures, composed of coral limestone, extend down to the seabed, and the individual limestone mounds are also visible in the multibeam echosounder bathymetry of the seabed. Unfortunately, the hope of encountering further mud volcanoes was not realized, but the four-day transit to the next port was generally used for continuous data acquisition (Fig. 3).

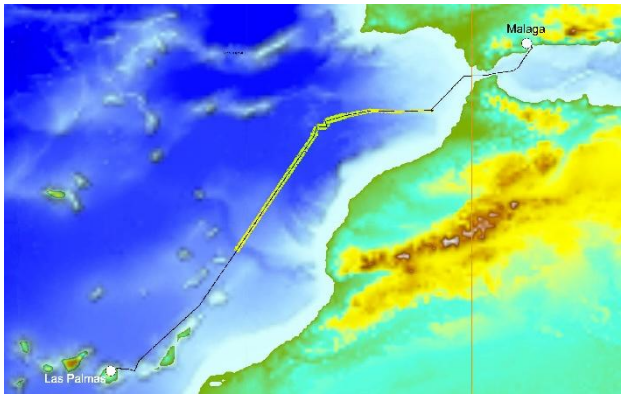

Figure 1: Route of the first part of the M214 expedition from Las Palmas, the port city of Gran Canaria, through the Strait of Gibraltar to Malaga in Spain. The colored part of the route marks the survey section in Moroccan waters.

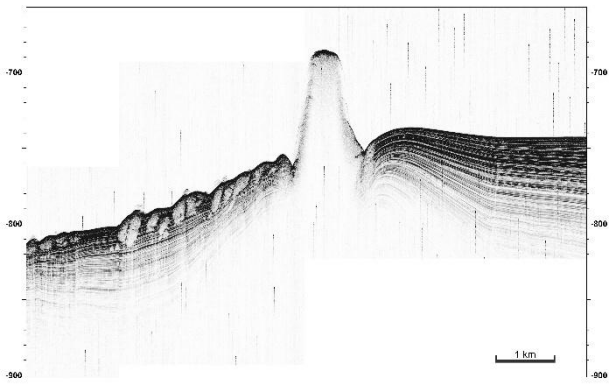

Figure 2: Parasound survey in the area of the Meknes mud volcano, which rises approximately 80 m above the seabed. On its western side, numerous cold-water coral mounds are embedded in the sediments, their morphology mirrored at the seabed surface.

As we passed through the Strait of Gibraltar on Wednesday, 29 October, we enjoyed glorious sunshine and could clearly see both coastlines in Morocco and Spain, albeit somewhat hazy. A group of dolphins moved about playfully and energetically above and below the water around our ship. The presence of seven different species of dolphins and whales is frequently reported in the Strait of Gibraltar. Unfortunately, the sky clouded over in the afternoon, and it even started to rain when we entered the port of Malta around 7:00 p.m. Unlike the rain we experienced at the end of October in Germany, this was warm rain. Once the METEOR docked at the pier in the port of Malaga, the first leg of the M214 was complete.

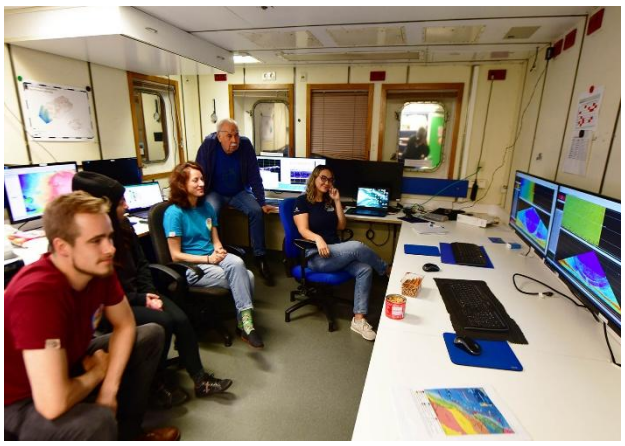

Figure 3: The latest survey of the seabed can always be observed in the hydroacoustics laboratory on the research vessel METEOR. Passing over special structures on the seabed is often exciting, so the scientists want to be there live (© Elmar Schreiber).

Figure 4: Port time is used for loading and unloading equipment. Three containers from Bremen were also brought on board, placed on the ship using a heavy-duty land crane (© Elmar Schreiber).

On Thursday, 30 October, under a bright blue sky, our three containers, transported from Bremen, were unloaded from the ship (Fig. 4), and the crew and scientists distributed the contents of the containers among the laboratories and on the working deck. Three of the eight scientists from the first leg disembarked, and on Friday, 31 November, 15 newly arrived scientists from Germany, Spain, Switzerland, and Greece boarded. Friday was used to set up most of the laboratories and to discuss the use of the scientific equipment. Many of us enjoyed the late summer evening in the historic old town of Malaga, which, with its magnificent architecture and superb cuisine, perfectly embodies Mediterranean life. The ubiquitous and sometimes quite imaginative costumes of the Spaniards strolling through the old town's narrow streets on this Halloween evening were reminiscent of many a carnival parade. The last day before the METEOR's departure, Saturday, 1 October, was entirely dedicated to further preparations for the upcoming scientific work. On Sunday, 2 November, the METEOR left the port of Malaga punctually at 08:30 a.m. and embarked on the six-day transit from the Alboran Sea of the western Mediterranean via the Tyrrhenian and Ionian Seas to our destination area south of Crete.

All participants are healthy!

Best regards also on behalf of the cruise participants,

Gerhard Bohrmann R/V METEOR, Sunday 2 November, 2025

We will be reporting on our expedition M214 at regular intervals in a weblog:

https://www.marum.de/FringeII.html