

FS Meteor M193 “REPLENISH“

Limassol – Jeddah

4. Weekly Report (25.09. - 01.10.23)



Seismic exploration in Block B was completed at 15:00 LT on September 26, covering a total of 535 nm. During the profile acquisition we had an interruption due to a sea turtle swimming close to the ship. After the sighting, the air pulsers were switched off immediately. Following a transition period, the firing frequency and the compressed air were slowly increased again to the initial level. Depending on the nature of the subsurface, the seismic signal penetrates the subsurface for about 1 to 1.5 seconds and thus images structures down to a depth of about 1000 m (Fig. 1). The example profile shown is a typical NE-SW cross section through the Saudi Arabian continental margin. Two uplifts are shown with an NW-SE elongated sedimentary

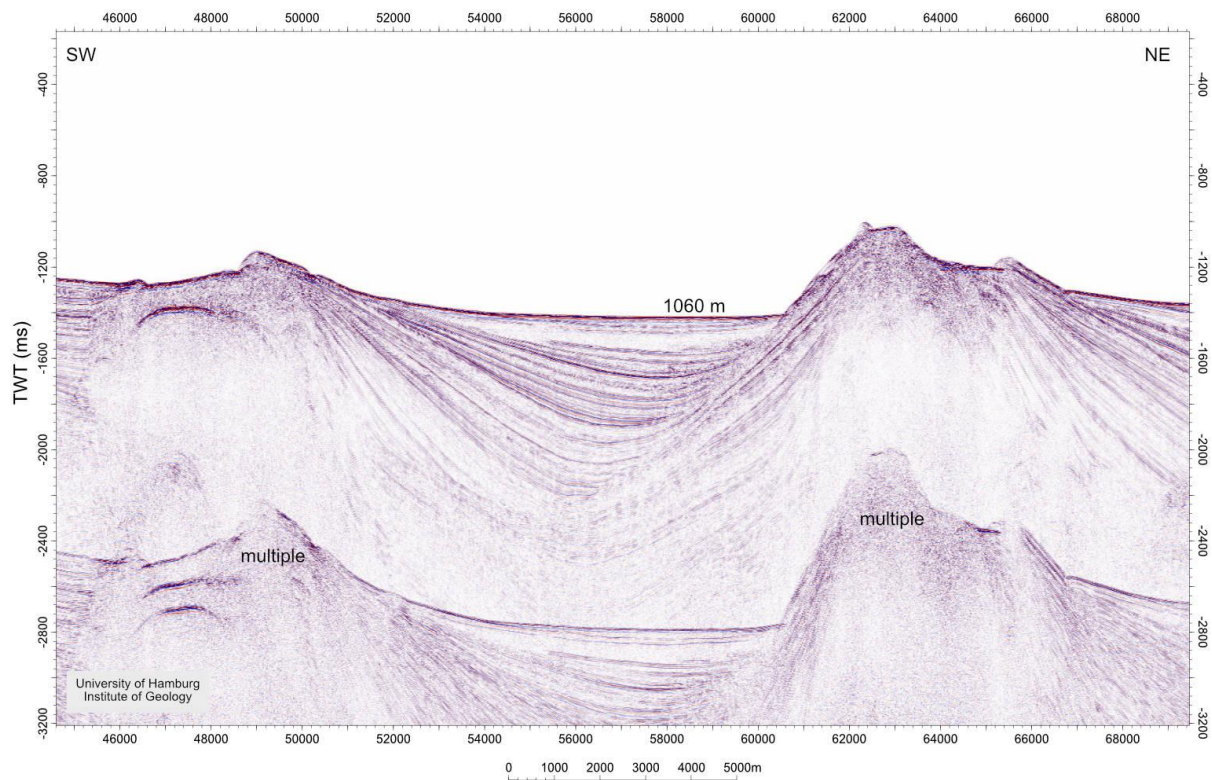


Figure 1: Multi-channel seismic profile perpendicular to the trend of the Red Sea, located about 30 km from the coastline of Saudi-Arabia.

basin inbetween. The basin exhibits an asymmetric fill consisting of several wedge-shaped sedimentary bodies whose internal reflectors diverge in a NE direction. The bodies themselves are delineated by unconformities indicating successive uplift and fill phases. Well visible beneath the two anticlinal structures are two salt diapirs, which show no internal acoustic reflection patterns.



Figure 2: Preparation of the 18 m gravity core, comprised of three 6 m segments. (Foto: M. Stuhr).

After the seismic survey, the Mabahiss Deep was approached. The infill of this 2200 m deep basin, is dominated by mass wasting deposits. However, based on the seismic and parasound profiles, we were able to identify a well stratified area within the basin, where we retrieved a full 6 m gravity core on deck at 20:24 LT on September 26. We then decided to extend the core barrel to 18 m (Fig. 2). The barrel penetrated nearly 16 m into the sediment but had only about 12 m of core recovery. We suspect that a dense sediment layer at the head of the tube blocked further sediment entry into the liner. After sediment sampling was completed, hydroacoustics were run until the next morning to close existing gaps in the bathymetry. On 27th September after running a CTD in the Mahabiss Deep the next ROV dive commenced at 09:36 LT, The target of the ROV deployment was the flank of a submarine volcano located at the NW edge of the basin. The dive started at 1360 m and

ended at 1010 m water depth. The focus was to investigate the deep-water benthic communities. Different to other oceans, these deep-water communities are sparse and mostly consist of sponges and rare and tiny solitary corals. Here we were able to observe and sample pioneer fauna on the submarine lava flows. Subsequently, the depth range was sampled using van Veen grabs on the slope of the volcano.



Figure 3: Control center of the ROV with two pilots and two scientists accompanying the dive. During the dive, which lasts about 6 hours in total, they work in shifts. (Foto: M. Taviani).

Our next target was a deeply incised canyon on the northern edge of the Al Wajh platform. At the ROV diving station, the bottom of the canyon is at 1112 m water depth, and the flanks reach up to about 762 m. Here, too, the focus was on the investigation of the deep-water communities. The ROV mission started on September 28th at 09:30 LT at 1082 m and ended at 685 m depth around 16:30 LT. Afterwards, Van Venn grab samples were collected along the ROV route. This was followed with a hydroacoustics mapping run

until the next morning. A CTD profile preceded the next ROV dive, on the flank of the plateau north of Al Wajh Lagoon. The ROV dive started at 09:10 LT on September 29th and included a water depth range from 675 to 125 m. The ROV dive successfully targeted deep-water to deep

mesophotic benthic fauna. The observations were substantiated by Van Veen grab samples which were collected along the ROV route and on the shallow plateau. These samples represent the fauna of the deep mesophotic zone based on them containing rhodoliths, gorgonian corals, and photosymbiotic large benthic foraminifers.



Figure 4.: Typical coarse fraction of deep-marine samples sourced by planktic organisms: pteropod shells dominate (Foto: H. Westphal)

After finishing the work on the northern edge of the Al Wajh platform, we moved to its southern edge in working area C. The first station there was located on the flank of a platform fragment in front of the platform. After a CTD, the ROV was deployed at 09:00 LT on 30th September. The dive range extended from 520 to 125 m water depth. The objective was to investigate the deep water and mesophotic benthic communities and to record the geomorphology and sedimentology of the detached platform

fragment. The vertical flanks of the fragment are covered by fine-grained sediments that locally forms crusts or remind of microbialites. This dive was also successfully completed at 16:30 LT. After a short transit, the streamer and air pulsers were deployed at 18:37 LT and the 12 hours of seismic planned for area C were run. On the 1st October, the profiling were completed at 10:00 LT. After that, an intensive sediment sampling program started in the area of the previous ROV station, followed by two more gravity cores.

A video clip of our Suez Canal passage can be found under the link:

<https://youtu.be/XPTxN07Hqdl>

With best regards on behalf of all participants of the expedition M193,

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