

Research Vessel METEOR

M142:

Varna - Varna

2nd Weekly Report: 06 – 12 November 2017



During the first two days aboard R/V METEOR, we run several tests of the new PARASOUND system MK2. Profiles were recorded on the shelf, as well as along the upper continental slope to greater water depth. Various adjustments of the sonar system were tested. Parasound records from previous cruises of R/V MARIA S. MERIAN were available, so that the improvements of the new MK2 PARASOUND could be documented - also during the „sea acceptance tests“. While those tests were done during daytime until late in the evening, we used the night to improve the scientific maps in the transition area between the shelf to the upper continental slope. From MARIA S. MERIAN cruises 34 and 35 on the continental slope up to Danube Fan very good bathymetric data are available, and during our cruise we plan to complete this region in shallower waters. Especially at the upper slope areas, above the methane stability zone in 700m water depth, methane emissions occur. Methane in this area is not stable as hydrate in the sediment anymore, but according to its density gradient can escape from the seafloor into the water column. Furthermore, we can observe headwall scarps from slope slides in this depth, accompanied by methane emissions as the methane is following the pathways along the fault lines in the underground. The 4-day-test cruise was also been used by two colleagues from KONGSBERG in order to install and test the gas lander (Fig. 1), that shall do long-term measurements of several parameters on the gas flow at the seafloor. Beneath a ‚single beam‘-sonar for registration of gas bubble escapes in a surrounding of up to max. 300m, methane and carbon dioxide sensors, a CTD, and an ADCP for measuring the flow conditions are implemented on the lander.



Figure 1: The gas lander during launching procedure from the ship. Before its operation it has to undergo a floating test.

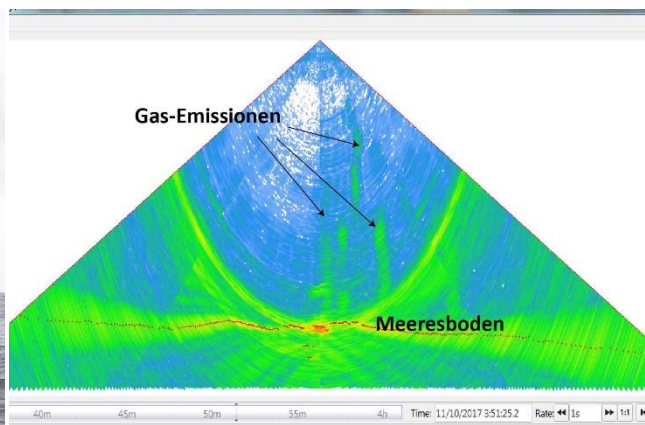


Figure 2: Recording of the EM710-multibeam sonar in the area of the lander position. The area at the seafloor is characterized by numerous gas-emission sites.

Until Tuesday, 7 November until about 8 p. m. we were busy doing station work. Afterwards we had to start in order to arrive at Varna in the morning of 8 November. This worked well due to good weather conditions, so that METEOR could berth punctually at 9 a. m. at the pier of the Odessos Shipyard. We could change the personnel for the forthcoming research cruise M142. Six technicians, engineers and scientists left the ship, and 13 scientists embarked - the majority of them had arrived the day before already. They used the time in the port to arrange the labs and to prepare for the first station work. On Thursday, 9 November, R/V METEOR left Varna again with a free view on the city (Fig. 4), whom Rostock in Mecklenburg-West Pomerania has a city-partnership.

As before, we sailed across the Bulgarian shelf to a location west of Danube deep-sea channel in 1400m water depth, where the ship's scientific-technical service WTD did some calibration of the submarine navigation system POSIDONIA. After this, we easily went to the selected lander station in 665m water depth. This location shows many gas emissions (Fig. 2) in a narrow spaced-area, which was intended to become investigated within several days by means of the gas lander. First, the CTD with water sampler was deployed. The hydro-casts from 22 different water depths showed a methane profile that is typical for Black Sea, e. g. 10-20 nmol/l in the upper 100m of the water column, and below an increase of methane concentration to a value of 10,000 nmol/l, that is existent at this level up to the deepest basins of Black Sea. However, at our CTD station we measured higher values in the depth, between 12,000 and 15,000 nmol/l, showing the direct influence of methane emissions at the seafloor.



Figure 3: Two flying guests accompanied us during the 4-day-test cruise back to Varna and taught us that owls may also be active during daytime (© C. Rohleder).



Figure 4: View from our berth at Odessos Shipyard to the city of Varna submontane and hillside of Franga-Plateau. Urban Centre is Mother of God Cathedral (© C. Rohleder)

After having lashed the CTD aboard R/V METEOR, and the water sampler had been sampled and drained for further analyses, the gas lander was launched. It was lead down at a ship's wire, and 20m above sea floor it was released from an acoustic signal, so that the lander for the remaining distance was in free fall. Expecting that the resuspension caused by the falling lander would have disappeared 24 hours later, the data recording started one day later.

Friday night, 10 November, it was time to launch MeBo200 about two nautical miles further south, and it started its drilling action. This was more difficult than initially calculated due to the strong suspension caused by MeBo and its action. Consequently, the MeBo team had to act even more thoroughly as not all of the cameras in MeBo allowed for the usually visible video-controlled functions. With a drill in 860m water depth at a plateau east of the so-called S2-Canyon, we wanted to reach seismic reflectors in 100-150m sediment depth, which might contain gas hydrates.

Today, on Sunday afternoon, we have drilled until a depth of 81m and hope to reach the desired depth until tomorrow, if possible even deeper. If we could manage the drilling activity, we will report next week.

We have constant good weather conditions in the Black Sea. All of us are safe and healthy.

Best regards, on behalf of the cruise participants,

Gerhard Bohrmann, RV METEOR, Sunday, 12 November 2017