

Research Vessel METEOR

Expedition M-143: Varna – Heraklion
1st Weekly Report: 12 – 17 December 2017

SLOGARO: Slope failures and active gas expulsion along the Romanian margin – investigation relations to gas hydrate distribution

After the busy expedition M-142 using the seafloor drilling rig MARUM MeBo-200 investigating gas hydrates in the Danube Delta, our mission M-143 started on December 12 with a small crew of only six scientists from GEOMAR and two meteorologists from the German Weather Services. Our science program extending over only 5 days is focused on two main topics: using a 38 kHz single beam echo sounder (EK80) combined with the multibeam EM710 system we aim at imaging and quantifying gas emission sites found during expedition M-142 and extending the bathymetric data across the delta to find sites of submarine slope failures and expressions of gas seepage. Using the weather information provided by our two meteorologists Robert Scholz and Andreas Raeke we determined to start the expedition using the EK80 system while sea state was initially calm and winds were low, thus allowing for optimal data acquisition. The EK80 system had never been installed previously onboard the METEOR, but with the excellent expertise provided by the METEOR's crew we managed a smooth and safe setup of the system (Figure 1). A small metallic calibration sphere only 38 mm in diameter was attached to four fishing rods (Figure 2) and deployed at 8 – 10 meter below the sounder. Only by doing such careful calibration, which was completed in ~4 hours, we are able to quantify the gas emission rates seen in the acoustic data.



Figure 1: Installation of the 38 kHz transducer (EK80, red instrument) at the moonpool (from left to right: Peter Neumann, Olaf Willms, Florian Gausepohl).
[Photo credit: Peter Urban]



Figure 2: Setup during calibration of the EK80. The calibration sphere was deployed through the moon pool using four fishing rods to control its position below the sounder (in photo: Mareike Kampmeier).
[Photo credit: Line Hähnel]

During expedition M-142 several sites of strong gas emissions were mapped which guided us to select three different environments for acquiring new acoustic data. The first data set was collected in water depth ~660 m across a location where a lander was deployed during M-142 that acquired a 4-day long continuous record of gas emissions near the seafloor (also equipped with an EM-80 system). The comparison of the lander data with our records will be made post-expedition. The second data set was acquired in water depths between 350 and 570 m along the eastern channel flank (Figure 3 & 4) and a final data set was acquired in shallow water of ~120 m.

With the prediction of deteriorating weather conditions, we started the second part of our mission on Friday morning. Completing a short transit in only ~ 2 hours to the east, we started a set of survey lines to acquire multibeam bathymetric data with the EM122 and EM710 systems, as well as with the PARASOUND sub bottom profiler. The survey was completed on Sunday evening at 18:00, officially ending the active data acquisition state of expedition M-143.

All scientists now look forward to the transit to Heraklion and we will use the time to analyze the multitude of data, create new bathymetric maps, and detect sites of gas emissions.

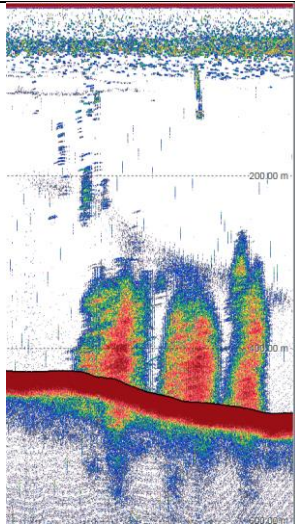


Figure 4: Image of the echogram from the EK80 sounder showing strong acoustic returns of rising gas bubbles.

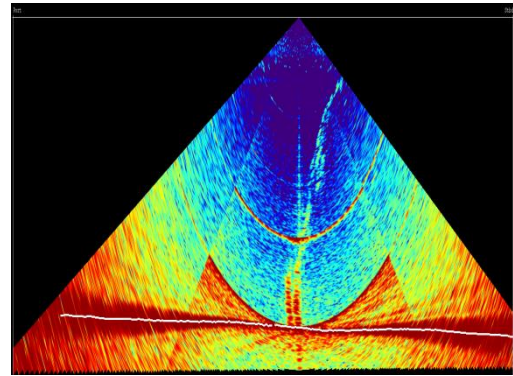


Figure 5: Image of the EM710 multibeam water column view similar in location to echogram shown in Figure 4.

Best regards on behalf of all participants,
Michael Riedel

RV METEOR, Sunday, 17 December 2017