

RV MARIA S. MERIAN

MSM98 (GPF 20-3_092):
08. - 23.01.2021, Emden - Emden

1. Weekly report: 08. - 10.01.2021



On Friday, 08 January 2021, RV MARIA S. MERIAN left her mooring at the Nordkai in Emden's inland harbor at 08:30 local time to conduct marine geological investigations in the North Sea. Before we were allowed to sail, all crew members and scientific participants spent four days in quarantine in single rooms in a hotel in Leer. In addition, all participants were tested twice for Covid-19 and after all tests were negative, everyone was able to board the ship on January 06, 2021 and begin preparations for departure. Our two containers with the scientific equipment as well as the Golden Eye had already been delivered from Bremen and Hanover on January 04 and 05, so we could quickly start unloading the containers, setting up the labs and preparing the equipment we had brought with us. After the days spent in the hotel, this physical work was very welcome to all of us. On the 7th of January, all the measuring instruments were prepared for operation and lashed down until we set sail. To be prepared at sea, all scientists received a safety briefing and in the afternoon they performed a safety maneuver together with the crew. For the scientific preparation there was also an information meeting in the evening.



Figure 1: RV MARIA S. MERIAN leaves the lock to the outer harbor of Emden on 08 January 2021 at 09:00 with destination Entenschnabel (© Miriam Römer).

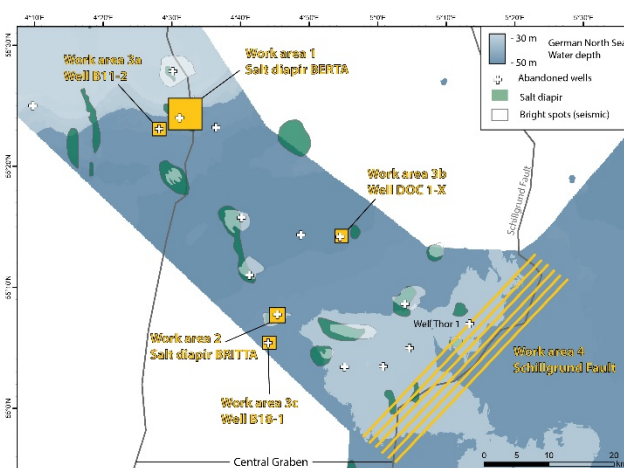


Figure 2: Map of the Entenschnabel at the northwestern end of the German EEZ with planned work areas during MSM98.

We observed the sluice maneuver on deck in the fresh sea air during sunrise (Fig. 1). After the MARIA S. MERIAN had left the sluice gate, our route took us across the Ems estuary past the island of Borkum into the North Sea. At the start of our expedition, we were also very lucky with the weather, so that we were able to reach our working area in the area of the Entenschnabel in relatively calm seas for the time of year on the evening of 08 January 2021 (Fig. 2). We used the first night at sea for a first hydroacoustic mapping in our main study area to get an overview of the current activity of gas seeps.

Data that we have already recorded here in 2019 showed numerous gas bubble seeps that we would like to investigate in more detail during this expedition with MARIA S. MERIAN. We already know that they consist of methane and occur primarily near salt domes located in the subsurface. But now we are interested in the details of how much gas escapes from the seafloor here, how variable these sources are, where and how the gas was formed in the subsurface, and whether it reaches the atmosphere.

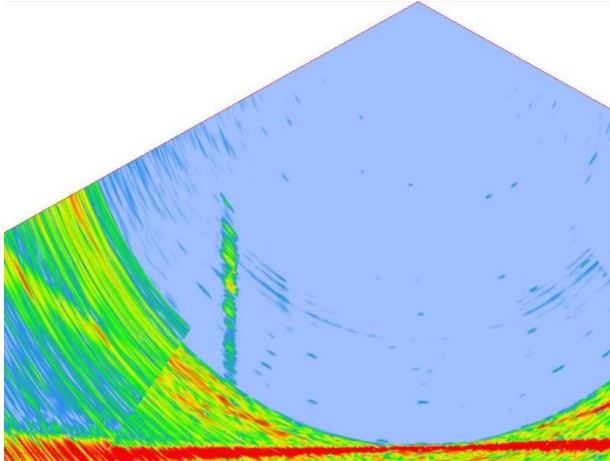


Figure 3: The echogram of the multibeam echo sounder installed on board shows the seafloor as a red horizontal line and the water column in light blue above it. The elongated structure in it shows a gas bubble escape.



Figure 4: The Golden Eye (yellow) being launched to obtain electromagnetic information of the upper sediment layers. On deck is also the sonar lander, which was launched shortly afterwards on the seafloor to observe gas seeps over a period of several days. (© Yann Marcon).

Our initial mapping confirmed the activity of gas bubble seeps in our main study area (Fig. 3) and so we were able to start directly with the planned sampling program on Saturday, 09 January 2021. As the weather continued to be very kind to us, the Golden Eye was first successfully deployed (Fig. 4) to image electromagnetic indications of gases in the upper sediment layers. Subsequently, the use of a small ROV (Remotely Operated Vehicle) gave us our first visual impressions of the gas bubble seeps. It was not yet possible to sample these gas bubbles during the first dive, but this will be a focus for future deployments. First of all, the positions of these gas bubble outlets had to be located in order to place a sonar lander next to them (Fig. 4), which was done successfully in the afternoon. The lander will stay on the seafloor for about five days and observe the temporal variability of the gas bubble seeps. The first working day at sea was completed successfully with a CTD water sampling program and sediment sampling with a multicorer. We used the night of January 10 for more hydroacoustic mapping and checked additional areas for gas bubble seeps. We were also able to complete all of our planned stations on Sunday, January 10, 2021 in excellent weather conditions. An echo sounder brought along was first calibrated in the morning to also quantitatively evaluate gas plumes in the echogram. Further water samples and sediment samples were taken and the ROV was used again to hunt for gas bubbles.

All cruise participants are healthy and happy about the very successful start of this expedition.

Greetings on behalf of all participants
Miriam Römer (MARUM)

RV Maria S. Merian, Sunday, 10th January 2021