

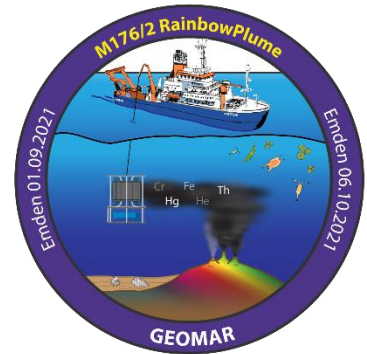
RV METEOR

Cruise M176/2 RainbowPlume

1st September – 6th October 2021

Emden-Emden

2nd Weekly Report (6th -12th September 2021)



Cruise M176/2 is now in the study area (36°15 N, 33°53 W) and we are very busy sampling and surveying the area of the Mid Atlantic Ridge near the Rainbow vent site. The weather is kind to us and hence we have no delays with the deployment of instruments.

The cruise started sampling surface waters from our trace metal clean tow fish for biological variables as soon as we were in international waters south of Ireland (September 4). This sampling activity continued until we reached the EEZ of the Azores and had to be halted then until we reached the Rainbow hydrothermal vent region in international waters southwest of the Azores (September 9). The surface waters are sampled for nitrogen fixation, nutrients and trace elements to establish the rates of nitrogen fixation, types of diazotrophs present (using *nifH* gene analysis) , and the chemical environment of the diazotrophs.



The first station to sample the hydrothermal plume at 2100 m near the Rainbow vent field was conducted on September 9. We had learned a lot from our test stations on September 4 and had fixed some of our problems in the meantime. The first sampling day was therefore very successful, and all equipment and sampling gear worked well. We are deploying 3 different CTDs on a daily basis, and also a set of 6 in situ pumps (Fig. 1) and a multicorer (MUC). The daily sampling routine starts at 0530 h and finishes at about 1700 h.

Fig. 1: In situ pumps on deck after deployment at ca. 2100 m. Photo EA

All the cruise participants are very much involved in the sampling activities and the teams work hard to make all run as smooth as possible. We are now at day 4, and the sampling machine is well-oiled. Our sampling regime is similar each day with the teams finishing their sample handling activities more swiftly each days.

We have now conducted 2 MUC deployments with the second deployment providing very nice sediment cores. The sediment team have sliced a core, and also sampled another core for porewaters (Fig. 2) and investigated the sediments for forams.

Our nights are occupied by Tow-Yo CTD operations through the hydrothermal plume. Over the cruise we will build up a 3 dimensional picture of the plume movement in the study area, which will provide important context to our geochemical results.



Tomorrow we will sample right above the hydrothermal vent field of Rainbow. We hope to collect samples of very recently discharged vent fluids, and during the rest of the cruise we will follow the plume and investigate the processes that stabilise and remove trace elements from the plume. The officers on the METEOR are doing a great job at positioning the vessel above our intended stations. This task is made more difficult due to the loss of our bow thruster, but we are still managing to sample the plume accurately.

Fig. 2: Porewater extraction from sediment core obtained under Rainbow plume (ca. 2300 m). Photo Zhouling Zhang

RV METEOR at sea 36°N/33°W

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