

FS Meteor Expedition M169 (GPF 20-3_091) 11.12.2020 (Emden) - 29.12.2020 Emden



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After leaving the Elbe on 20 December, we continued salinity transects and sampling in the northeastern and central part of the German EEZ and further towards Helgoland from 21 December. Gaps from previous salinity mapping were filled and CTD and Go-Flo bottle stations continued. Around Christmas we reached Helgoland and sampled a relatively deep site of 56 m in several water depths as well as a site to the southeast, possibly influenced by the island's input. The meanwhile almost completed salinity recording by means of the ship's thermosalinograph shows very nicely on the figure below that we can still identify the river plume of the Rhine on the basis of reduced salinity besides the river plumes of the Elbe, the Weser and the Ems also in the northwestern region of the study area.



On 25 and 26 December, the Weser was the last of the three rivers to be navigated and sampled for the salinity gradient from the river to the North Sea. After taking the river pilot at Bremerhaven, we sailed in sunshine and very calm weather to Elsfleth, where we took the river end-member samples at low water under the eyes of some onlookers (also from our own working group). In the evening of 25.12. the salinity increased measurably again from Brake with rising water and further samples were taken up to the roadstead near Bremerhaven, where we then remained on site for the 12-hour tidal cycle. This recorded a relatively wide range from about 6.5 PSU at low water to 17.5 PSU at high water. That not only salinity varies with the tidal cycle, but also other parameters such as nitrate, pH, and particle content in the water column are shown in the figure below. At low tide, the higher river water content brings more nitrate and a significantly higher particle load than at high tide, where the higher seawater content is reflected in significantly lower particle density.



While we were lucky with the weather at this time of year most of the time, we only had to weather off at the end of the trip on 26/27 December after sampling the Weser near Bremerhaven, as a hurricane depression gripped the entire North Sea region up to the coasts with wind forces of 9 to gusts of 11 and interrupted the remaining work, which could, however, still be successfully completed afterwards on 28 December.

The catering, the choice and quality of food (including vegetarian dishes) and the service by the stewards were excellent throughout the voyage and during Christmas we enjoyed an excellent menu program in a tastefully decorated Christmas mess. On Christmas Eve, we were able to have a small social program with some cultural programming and gift distribution during a less staff-intensive mapping program with EM710 at Figge Maar west of Helgoland. We very consciously took advantage of the special luxury of being able to enjoy these days together without the restrictions of a lockdown ashore.

In summary, the voyage was very enjoyable and successful, thanks in considerable part to the friendly atmosphere and the very cooperative and pleasant working relationship between scientists and ship's crew. We would like to express our sincere thanks to Captain Rainer Hammacher and his entire team, as well as to the German Research Fleet Coordination Centre, the shipping company Briese and the Expert Panel on Research Vessels (GPF) for making this expedition under pandemic conditions possible and thus opening up an exciting new research project for us. Many hundreds of water and particle samples are now waiting to be analyzed in detail in the home laboratories for novel critical trace metal compounds as well as microbiological communities.

We bid farewell after 1900 nautical miles of salinity mapping and 191 sampling stations aboard RV Meteor with best wishes to all for a healthy and hopefully easier 2021!

Andrea Koschinsky (Chief scientist M169, Jacobs University Bremen) and the team of M169