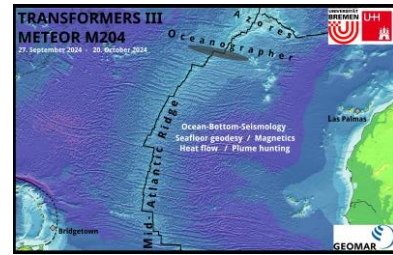


# METEOR M204

Bridgetown – Las Palmas

27. September bis 20. Oktober 2024



## 2. Weekly Report (28.09.- 06.10.2024)

In the second week of the expedition, METEOR steamed mostly northward to reach its working area to the southwest of the Azores. On the transit, we generated so called underway data, including meteorological and oceanographic data as well as continuous bathymetric mapping of the seafloor. In addition, on 3<sup>rd</sup> of October we stopped for a first dedicated scientific station near 29°45.2'N / 42°48.0'W to search for hydrothermal activity. Roughly at that locations a seismic swarm was located on the Mid-Atlantic Ridge using global seismological data. The largest shock was an unusual magnitude  $M_w=6.2$  earthquake on 14<sup>th</sup> March 2024. If the swarm was triggered by tectonic or magmatic processes is a matter of debate. However, if the earthquakes were indeed forced by magmatic activity, it seems reasonable to assume that it would led to hydrothermal activity, affecting the water mass above the seafloor. To detect sleuths of hydrothermalism, we deployed „Miniature Autonomous Plume Recorders“ (MAPR) from the US American NOAA and found a weak plume showing unusual properties about 200-300 m above the seabed.

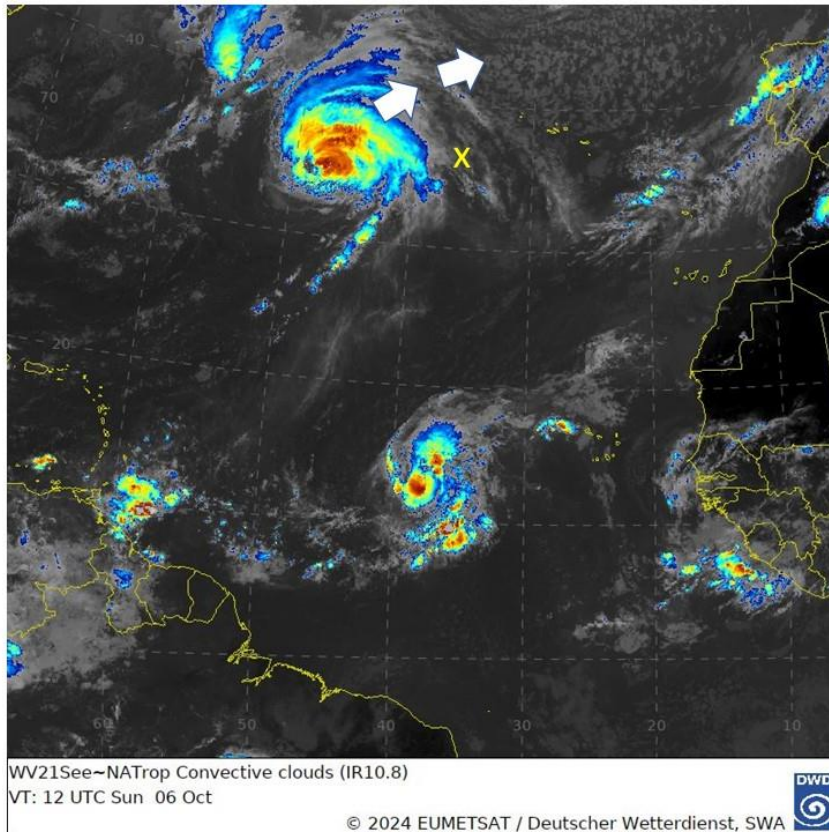


*Ocean-Boden-Seismometer surfaced for recovery*

By chance, the transit from Barbados into the working area led us roughly along the axis of the Mid-Atlantic Ridge where new seafloor is continuously formed. We used this chance to deviate the transit track from its great circle path, following the ridge axis which allows us to map volcanic and tectonic features along the “seam” between the North American Plate in the west and African Plate in the east. This effort provides high-resolution bathymetric data to study the ridge crest segmentation of the Mid-Atlantic Ridge between ~29°N and 35°N.

Today on Sunday, we reach after 9 days of transit at 5 a.m. local time the working area. During the day, our activity was focused on the recovery of the first nine ocean-bottom-seismometers (OBS) from the western part of the Oceanographer. These OBS were deployed in November 2023 to register local earthquakes (see also Weekly Report No. 1). In the night to Monday, we need to suspend recovery operations for about one day as the hurricane Kirk (category 3), which issued near the Cape Verdian Islands, has over taken us. Since last week-end, it has followed us and turned first from a north-westerly track to northward motion and now turning north-eastward to run north of the Azores towards the Bay of Biscay. Unfortunately, on Monday and Tuesday it is bringing us strong wind and waves, which may hinder operations in the working area. We therefore have decided to run a magnetic line to the north of the Oceanographer, adding a new line to a set of profiles acquired last year during the cruise MSM122 of the MARIA S. MERIAN. The magnetic data will allow us to

constrain the age of the seabed, which provides as a benefit the long-term and hence geological slip rates of the Oceanographer transform fault.



*Satellite image of the Deutschen Wetterdiensts (So. 6.10.24 um 12 h UTC); yellow cross mark the position of RV METEOR and arrows approximate the track of hurricane Kirk.*

We expect that we can return on Tuesday into the working area, tackling the recovery of the remaining OBS, recover the geodetic stations, and measure the heat loss over the Oceanographer. In addition, if the sea state is improving – we are going to obtain video footage of the seafloor morphology across the transform fault.

In the name of all cruise participants, best regards from 35°15'N / 35°50'W,

Ingo Grevemeyer  
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