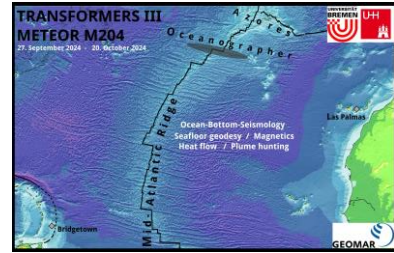


METEOR M204

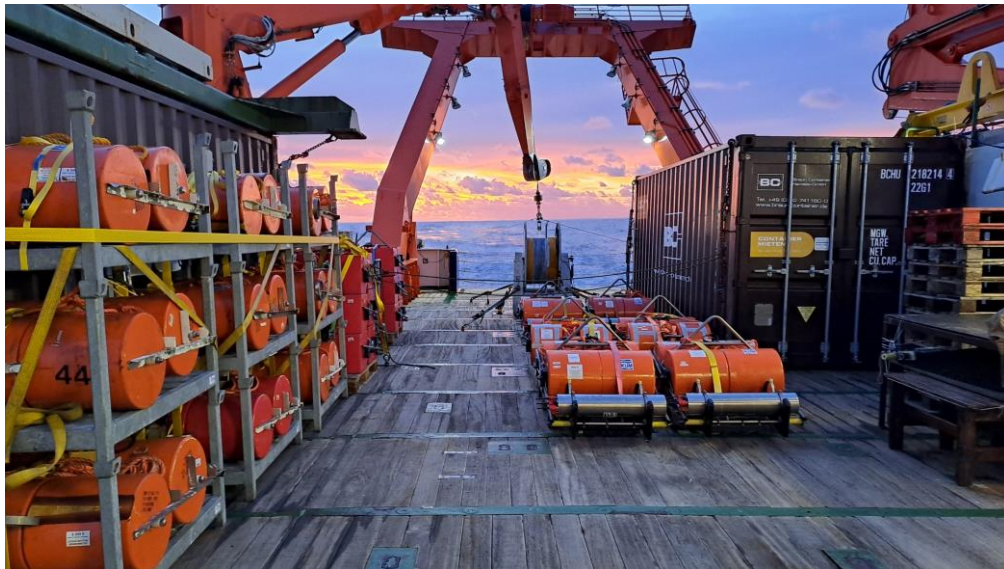
Bridgetown – Las Palmas

27. September bis 20. Oktober 2024



3. Weekly Report (07.10.- 13.10.2024)

On Monday of the third week at sea, the research activities were governed by the formed hurricane Kirk, which ran north of the Azores past our working area and brought too rough conditions (wind of ~7 Bft; gusts 8-9 Bft, waves 4-5 m). We therefore focused our efforts on recording the magnetic field in the vicinity of the Oceanographer transform fault. Magnetic profiling was concluded at sunrise on Tuesday, and after that, the daily rhythm until Friday remained the same. During day time, we collected either ocean-bottom-seismometers or seafloor geodesy stations, and at night, we collected crustal heat flow over the Oceanographer. However, we broke the schedule on Thursday night, running for the third time a magnetic survey extending the line terminated on Tuesday in the morning to the west, thereby crossing the axis of the Mid-Atlantic Ridge. On Thursday evening all stations deployed last year during the cruise MSM122 were safely recovered, comprising 21 ocean-bottom-seismometers and six geodetic stations. Most importantly, all stations recorded data, and we are now able to use the new and excellent data to study the tectonics of the Oceanographer transform fault, fulfilling some of the key goals of the expedition.



Unmounted ocean-bottom-seismometer and seafloor geodesy stations on deck of METEOR

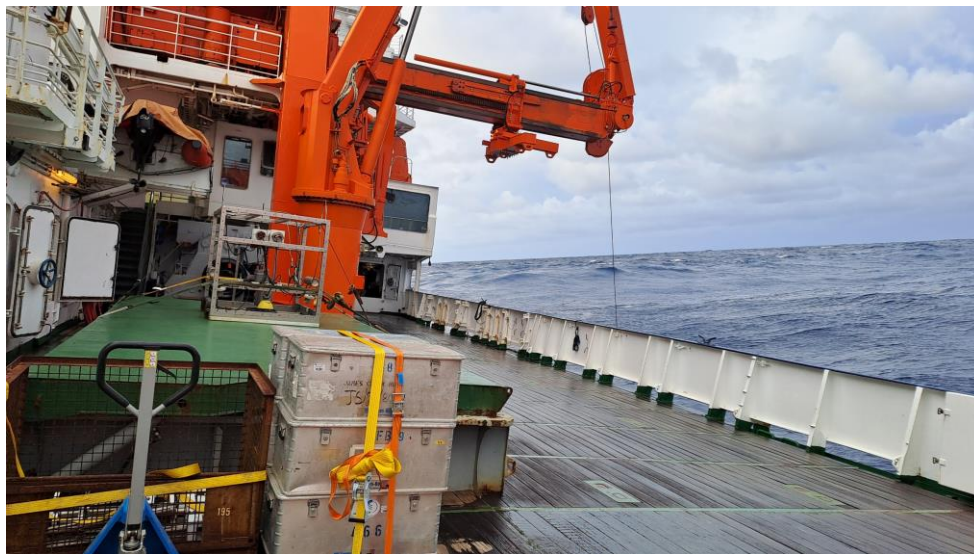
On Friday 11th and Saturday 12th of October 2024 activities focused on collecting heat flow data, characterizing the regional heat flow pattern along the entire transform fault system at three sites, one at the western end of the transform, one station in the western and one station in the eastern segment.

On Sunday, the weather forecast predicted that another former hurricane with the name “Leslie” would hit the working area, bringing waves of over 5 m and wind of 8-10 bft well into Monday; such

conditions make station work hard and hence the Captain, chief scientist and the metrological service decided to abandon operation in the working area to sail farther to the southeast, running away from the fierce low-pressure system. Unfortunately, this decision also resulted in the fact that we could not use the deep-tow video system OFOS, which requires calm conditions for safe operation.

The last scientific station was dedicated to search for hydrothermal activity in the transform fault system. During the week, we had already attached twice two Miniature Autonomous Plume Recorders" (MAPR) to the deep sea cable used to obtain heat flow. Unfortunately, we did not find any evidence for hydrothermal plumes. The station on Saturday afternoon used five MAPRs and the same procedure again as on October 3rd at the Atlantis transform, where we used so-called tow-yos (running a zickzack pattern survey above the seabed) to study the properties of seawater some hundreds of meters above the seafloor. The survey focused on the so-called inside corner of the eastern ridge-transform intersection. Preliminary results show evidence for a weak plume at ~1600 m near the western shoulder of the valley close to the transform fault.

METEOR is now running towards the southeast. We still suffer from the depression "Leslie," facing a strong wind of about 7 Bft. On our way to Las Palmas, we modified our strategy of underway bathymetric mapping. Thus, while heading toward the working area, we deviated the transit to cross suspected small seamounts identified in satellite data. On this transit, we are going to map the Great Meteor Tablemount and, hence, a tall guyot, which was found in 1938 by the METEOR-I near 30°N/28°30'W.



Heat flow station – the heat probe is tethered to the deep-sea winch; at this station, the probe was lowered to 4200 m water depth, penetrating ~3 m into the seabed to measure the thermal gradient in the sediment and, thereby, heat flow. The sea state and wind caused the vessel to roll during station work, making life unpleasant for some on board.

In the name of all cruise participants, best regards from 32°50'N / 31°55'W,

Ingo Grevemeyer

GEOMAR Helmholtz Zentrum für Ozeanforschung Kiel