

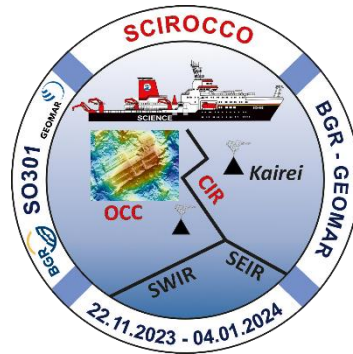
FS SONNE cruise SO301

SCIROCCO & KABA

22 November, 2023 – 4 January, 2024

Port Louis (Mauritius) – Port Louis

At sea 25° 55.5' S, 69° 52.3' E



Weekly Report Nb. 5 (18/12 – 24/12)

On Monday we recovered the airguns, magnetometers, the whale detection system, and the streamer on three winches in 7 hours. Two chains of the airgun suspension were broken and were replaced, the noises of the free chain links were clearly audible in the whale detection system the night before.

The measurement programme of the KABA project then began at the Kairei hydrothermal field over a total of two days and a half this week. From late Monday to Wednesday, we analysed the lateral spread of the hydrothermal plume with three long CTD dives in the so-called "Tow-Yo" mode and with the trace metal rosette. As a comparison to the long-term CTD ("Yo-Yo"), with which we had investigated the temporal changes in the water column directly above the Kairei field at the beginning of the cruise during the tidal maximum, we repeated the same station on Friday and Saturday but at the tidal minimum. Here we were able to sample the hydrothermal plume very close to its source and measure temperature anomalies of up to 13 K. The water samples contained up to 20 micromoles of hydrogen. The black smoke - i.e. the particle load of the hydrothermal vents - was clearly visible in the water samples and on the filter membranes. We used several water samples from these stations to carry out microbiological cultivation experiments. Finally, we used the starting point of the last OBS deployment as a reference station with both CTD rosettes to take important biological, geochemical, and oceanographic comparison samples without hydrothermal influence, including helium and tritium concentrations. We also took a sample profile there for salinity measurements in order to calibrate and validate the CTD sensor data following the cruise.

On Wednesday morning, 5 ocean bottom seismometers (OBS) were recovered, which had already been deployed on an inactive sulphide mound of the Kairei hydrothermal field in September on cruise SO300/1 with a deep towed system under camera control. The data from the broadband seismometers contain both the passive recordings of seismicity over three months and the active shots of the seismic profiles. A polygon around and over the oceanic deep rock complex (OCC) was then run as a refraction profile. This profile track with a shot interval of one minute covers the medium and closer distances to the 3D OBS array over the OCC and thus supplements the greater distances of the curves when changing the reflection profiles (also with a shot interval of one minute). After retrieving the outboard equipment, 19 OBS of the 3D array were successfully recovered on Thursday and Friday. One OBS on the northern edge of the OCC smelled intensely of sulphur for hours after recovery. While the

second KABA mission was underway, 21 OBS were prepared for deployment on Sunday night. At the moment, bathymetric profiles with the multibeam echosounder EM122 are being run for one day to fill in gaps in our seabed map.

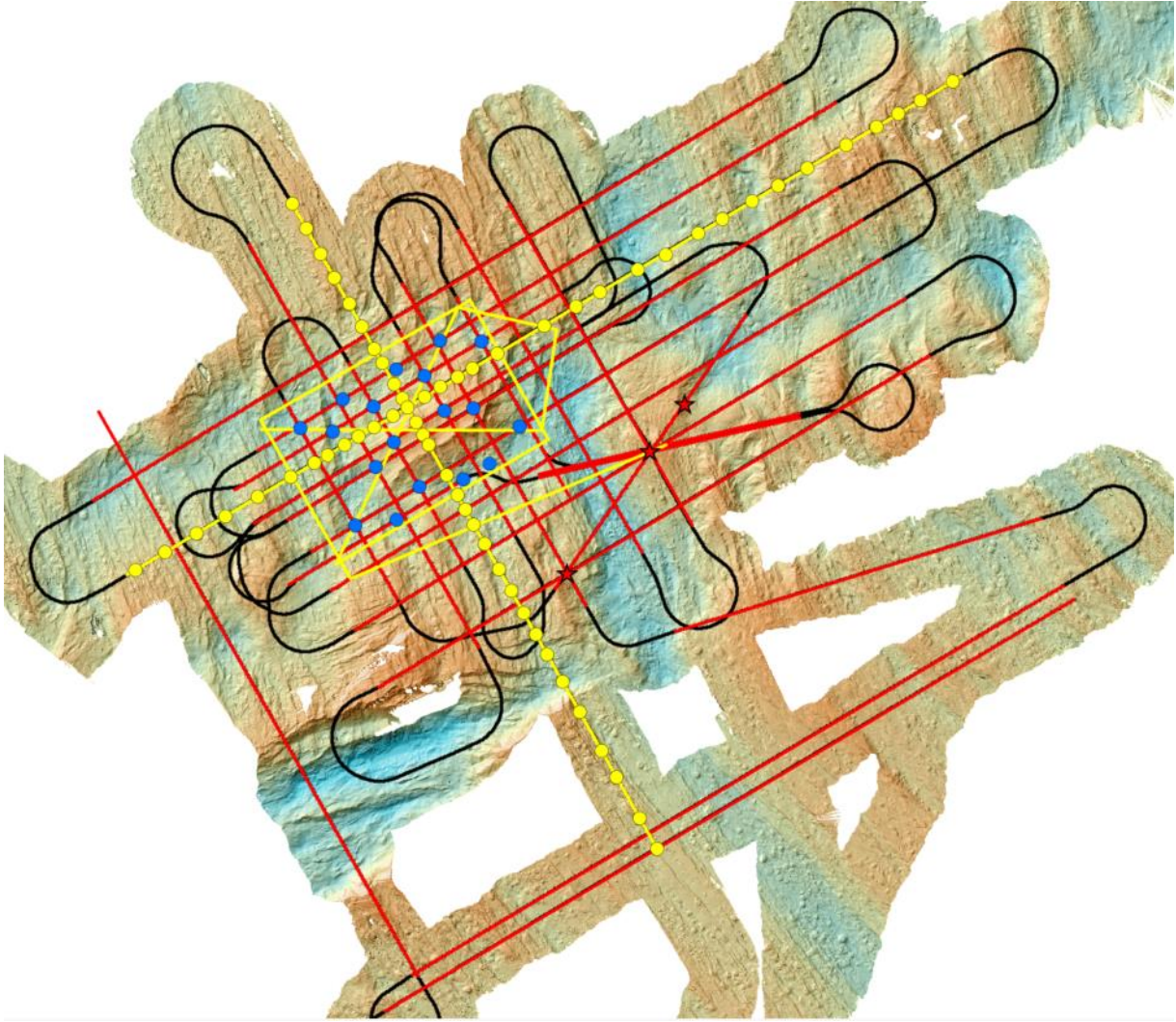
We are delighted with the many Christmas greetings from all over the world and celebrate Christmas on board with Secret Santa in the afternoon and a cosy Christmas party on Christmas Eve. In addition, the excellent chefs on board spoil us with a festive Christmas menu on Christmas Day.

Merry Christmas from the Indian Ocean on behalf of all cruise participants!

Martin Engels, Federal Institute for Geosciences and Natural Resources (BGR)

Chief Scientist





Distribution of OBS along refraction profiles (yellow dots) and around the OCC (blue dots). Airgun shots were taken at minute intervals on the yellow refraction profiles and the black curve segments connecting reflection profiles shown in red (which were shot every 50 metres, approx. 21 s, and can also be used for the OBS).