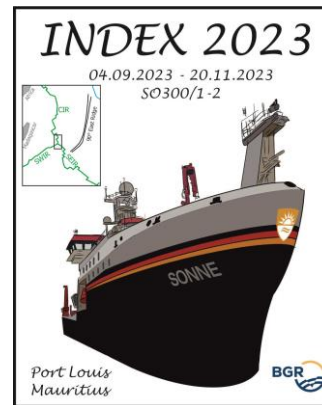


RV SONNE cruise SO300/2

INDEX 2023/2

13 - 19 November 2023

Port Louis (Mauritius)



Weekly report No. 7

From 13 – 15 November the scientific work of this cruise was completed with additional drilling stations using ROV ROPOS and ROCS, two video sled deployments, two HOMESIDE stations and the successful deployment of the last mooring in cluster 05. During the video station a new inactive hydrothermal field was found about 2.5 km south of the KAIMANA hydrothermal field which we call KAIMANA SOUTH. So far this field consists of one big mound with a basal diameter of about 150 m and 20 – 30 m height as well as two small hydrothermal mounds. Sulfidic mineralisations were observed in underwater images and a strong self potential signal indicates the presence of massive sulfides, too. However, we could not sample this new field and this will be done on future cruises. Additionally, clear indications for another, this time active hydrothermal field were found in the near-bottom water column about 5 km to the northwest of KAIMANA during the two HOMESIDE stations. But the hydrothermal field could not be found yet and this will also be reserved for upcoming cruises. These new findings, however, suggest that the KAIMANA area in cluster 05 has a much higher hydrothermal potential than previously known.

Drilling with the ROV module ROCS was successfully completed as well. In total, five cores with 70 – 80 cm length each were recovered. This way we could proof the concept of this drilling system. Whereas massive, outcropping sulfides and rocks could be drilled with high recovery rates, altered and oxidized sulfides with changing lithologies could not. These findings are important for future deeper drill campaigns as they are planned for 2026. Additionally, the retrieved cores exhibit a significant diversity. Over short distances in the KAIMANA field cores were drilled with a dominance from sphalerite (Zn-rich) over chalcopyrite (Cu-rich) to pyrite (Fe-rich).

With the last station #150 of INDEX2023, the sediment trap program was successfully completed. A mooring system with two sediment traps, current meters and passive samplers was deployed in Cluster 05. The mooring procedure was textbook; after less than an hour, the anchor was dropped and a good 30 minutes later reached the designated position at a depth of about 2800 m, where the instruments will collect data and samples for another year.

Since Wednesday lunch time RV SONNE was on her way to Mauritius where she arrived Sunday morning. The transit was used for demobilization of our equipment and cleaning the laboratories. The first results of this cruise were presented and discussed during a science meeting.

The second leg of the INDEX2023 campaign was really successful, all objectives could be achieved. For the environmental studies these achievements include, e.g., the lossless recovery and retrieval of the several mooring systems, the recovery of incubators for microbial

research and the re-colonization experiments. In addition, 29 hydrothermal fluid samples could be taken as well as many samples for biodiversity research. From geological point of view the discovery of the AURORA field in Cluster 12 with its numerous encrusted hydrothermal mounds are of special importance. In the JIM field in Cluster 09, the KAIMANA area in Cluster 05, and ALPHA field in Cluster 04 additional hydrothermal sites were found, too. These findings indicate a much higher hydrothermal potential in these regions than previously thought.

On behalf of the scientific party of INDEX2023/2 I want to thank the crew of RV SONNE for the exceptional cooperation and the pleasant atmosphere on board. RV SONNE enables multidisciplinary research with her technical facilities, the large working deck, and the laboratory capacity as only few research vessels worldwide do – an important pre-requisite for successful modern marine research. Thus, we would like to come back as soon as possible. In the meantime we say goodbye and start our travel home to the various parts of the world.

Best regards on behalf of the entire scientific crew,

Thomas Kuhn, Federal Institute for Geosciences and Natural Resources (BGR)

Chief Scientist



Scientific party of cruise INDEX2023/2 (SO300/2; photo: N. Mönnich).