

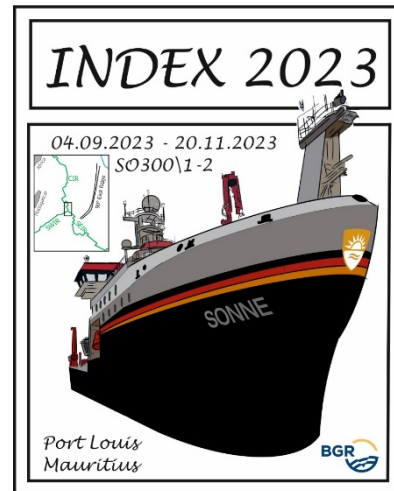
**RV SONNE cruise SO300/1**

**INDEX2023**

4 – 28 September, 2023

Port Louis (Mauritius) – Port Louis

At sea, 23°47'S, 69°32' E



### **Weekly report No. 3 (18/09 – 24/09)**

After several days of very bad weather, the wind had died down enough on Monday morning, 18 September, for the GOLDEN EYE to be taken back on board after a continuous deployment of five days and nights. Thanks to the skilled navigation of the ship's officers and the heave compensation system, which worked without any problems even under these conditions, the cable and the measuring device survived the days of high winds unscathed.

Due to the continuing high sea state, necessary maintenance work on the equipment and the advanced time, the originally planned survey with the dipole-dipole system of the GOLDEN EYE at the JIM field could no longer be carried out. Instead, we went on a 190 km transit to the northwest to the SURYA field, a presumably only small active hydrothermal field discovered four years ago in the framework of the INDEX project, of which only few data were available so far.

The survey of the SURYA field in a nearly 24-hour survey with HOMESIDE and a VULCAN receiver began on 18.09. in the evening and showed no evidence of an extension of the hydrothermal field beyond the already known active areas. During the hoisting of HOMESIDE towards the water surface on the evening of 19.09., probably due to a movement of the ship in the swell, a malfunction occurred at 1650 m cable length when the cable jumped off a guide pulley in the winch room.

The work to fix the immediate problem took several hours and as it was clear that a repair with a new termination of the fibre optic cable would be required afterwards, a bathymetry mapping was carried out at short notice in the area west of the licence area and directly north of the Rodrigues Triplejunction. This allowed gaps in the coverage existing due to numerous transits to be closed. The data, like all bathymetry data from the transits of this cruise, will be made available for the Seabed 2030 project initiative for mapping the world's oceans.

On the evening of 20.09. all repairs were completed and we were able to start deploying a total of five ocean bottom seismometers (OBS) 65 km north of the last station at the KAIREI field. Since in this case it was important to place the OBS very precisely on the hill of an inactive hydrothermal field, a video-guided placement device was used for the first time at

BGR. This enabled a total of four OBS to be placed on the seabed during the night of 20 September, with full control of the position and nature of the placement point. A fifth OBS was placed classically in free fall mode. The instruments will record local seismicity until the end of December and will be recovered during cruise SO301.

After a short transit, the GOLDEN EYE was deployed again on the morning of 21.09. to map out in detail a self potential anomaly with high conductivities in the seabed found last year at the KAIMANA field. During this 24-hour deployment, a previously unknown inactive area of the extensive KAIMANA massive sulphide field was confirmed by the morning of 22 September.

After a further transit of almost 200 km to the north, the last working area of this cruise was reached at the ALPHA field. Here, too, an extension of the hydrothermal field found in recent years with predominantly inactive massive sulphide areas was surveyed in detail with electromagnetic methods using the GOLDEN EYE from the evening of 22 September. The coil system and the dipole-dipole system of the GOLDEN EYE were used successively. In the last section of the survey, the device was also briefly set down a total of 37 times in order to achieve the best possible coupling of the measurements to the seabed.

On the afternoon of Sunday, 24.09. the time for the scientific programme of this cruise had finally expired and the GOLDEN EYE was taken on board for the last time in the early evening. Since then, SONNE has been on its return transit to Port Louis. This transit will also be used for bathymetry mapping, especially in the EEZ of Mauritius, and the observers from Mauritius who are accompanying us are looking forward to the data.

Everyone on board is well.

Many greetings on behalf of all cruise participants

Udo Barckhausen, Federal Institute for Geosciences and Natural Resources (BGR)

Chief scientist



Data example of a self potential anomaly in three components and magnetic anomaly over massive sulphides in the inactive region of the KAIMANA field.