

7th Weekly Report SO259 (INDEX 2017)



08.10.2017

Since our last stations for petrological reconnaissance studies of the Southeast Indian Ridge spreading center during the night from last Sunday to Monday morning, we finished our working program in the license area and left for the 5300km transit to Cape Town, South Africa. During transit onto the EEZ of South Africa we continue with bathymetric, magnetic and gravity measurements.

Cruise SO259 (INDEX 2017) was very successful. Sea conditions were generally good with only one day of limited operational capability. There were no problems with the ship operation. A total of 109 stations with survey, observation and sampling operations were completed in the license clusters #1, #3, #4, #7, #10, #11, and #12. A total of 14 different operational tools were used for diverse and extensive exploration and environmental studies during this cruise in transit to/from and within the license area, including

- 17 vertical CTD rosette casts for environmental, water masses and sedimentary studies,
- 7 multicorer and 5 gravity corer stations for paleoceanographic and biogeochemical studies,
- 4 heat flow probe measurements for crustal temperature regime estimations,
- 27 wax corer and 13 dredge stations for petrological reconnaissance and spreading ridge evolution studies,
- 8 sediment trap and one ADCP mooring operations for biogeochemistry, particle flux and ocean current measurements,
- 6 deep-towed HOMESIDE surveys for high-resolution bathymetric mapping, magnetics and water anomaly surveys (total of 329 km in 147 hours),
- 8 tow-yo stations with the SOPHI sensor sled for plume hunting (125 km, 119 hours),
- 4 STROMER video sled ocean floor observations,
- 3 Golden Eye operations for detailed electromagnetic measurements (4 km, 22 hours),
- 2 TV-guided grab survey and sampling operations,

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- 4 bathymetric, magnetic and gravity surveys (total of 783 km and 60 hours for 14 profiles).

Additionally, two transit profiles in the license area (450km, 24 hours) for bathymetry and magnetics, a total of 9,430 km of swath bathymetric mapping (776 hours) and 9,955km (1,005 hours) of scientific echosounder measurements for water column imaging were carried out during the cruise. The biodiversity was studied and sampled at 51 stations with 630 samples and 3,232 individuals, and 5:29 hours of video material and 4522 photos were collected. Molecular work was carried out for the first time during a cruise in the license area and led to a number of 422 cell extractions and 305 PCR DNA products from species sampled during our cruise.

Four plumes were detected during eight tows with the plume sled SOPHI (125 km) and a new site of hydrothermal venting was localized by HOMESIDE and STROMER surveys on the eastern graben flank of cluster #11 and named “New SONNE” field. The site is located at the eroding upper slope of a 300m wide fault bound plateau. It shows diffuse discharge at small mounds with well-developed characteristic vent fauna and the venting of clear, probably phase-separated hydrothermal fluids. Secondary copper mineral phases in an area of eroded stockwork mineralization indicate high fluid temperatures in the subsurface. Features prospective for active and inactive sulfide sites have been identified in all three clusters, both on the eastern and western graben valleys. Our findings attest to the high potential for sulfide mineralization in all three clusters.

The cruise participants are busy with the reporting of the work during our cruise but also with the demobilization of all scientific tools and laboratory equipment. The arrival in Cape Town is scheduled for coming Friday, October 13th.

Best regards from TFS SONNE,

Dr. Ulrich Schwarz-Schampera, Chief Scientist

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