

6. Weekly Report SO271 (INDEX 2019)

01. – 08. Dec. 2019



09.12.2019

In the last week, we continued our work in the sulfide clusters along the Southeast Indian Ridge for exploration of polymetallic sulfides and the recovery and redeployment of the sediment trap and current meter moorings in the clusters #07, #10 and #12. First detailed surveys in cluster #07 on a large magmatic morphological hill, likely representing an exhumed inner corner topographic high similar to the KAIMANA setting in cluster #05, led to the identification of a second new vent site during cruise SO271/1. The SOORAJ (Hindi for SONNE) field shows hydrothermal activity, occupies an area of about 100x140m, and forms a flat morphological mound on a gentle slope. Talus beds cover parts of the sulfide area. The SOORAJ field was not explored by ROPOS due to time constraints and the station schedule. Survey and sampling are postponed to the next year. Instead, the sediment trap and current meter moorings were recovered and reinstalled in the clusters #07 and #10 and multinet stations surveyed the distribution of zooplankton at the site of the moorings in both clusters.

With the arrival in cluster #12 and the recovery of the sediment trap, we revisited the HUNA sulfide area, which was identified during cruise INDEX2018 last year. It was, however, only surveyed by a single ROV dive. During this cruise, the size of HUNA could be extended by about 1000m to the NW. It shows 10 sulfide and vent fields of variable sizes and activity in water depths above 2600m, mainly hosted by volcanic talus material. The activity is characterized by phase-separated clear hydrothermal fluids with vent temperatures up to 296°C. Alteration is similar to mineral assemblages from phase-separated settings along island-arc systems. The biodiversity shows the same groups and species that we found during INDEX2018 and that is present in the other INDEX sulfide areas as well. An important finding is the first occurrence of vent fauna tube worms of the type typical for vent fields in the Atlantic and the Pacific Oceans. Ongoing exploration was performed by plume sled water column and high-resolution bathymetry surveys during the night programs. However, no additional sulfide or vent site was identified yet in cluster #12. We conducted a petrological sampling program last night and currently do enhanced gravity corer sampling in high heat flow areas of cluster #12. The last week of cruise SO271/1 focuses on the

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exploration in the southernmost cluster #12 and the identification of polymetallic sulfides before we will leave the working area next Friday 13th of December to Port Louis, Mauritius.

Very best regards from R/V SONNE,

Dr. Ulrich Schwarz-Schampera, Chief Scientist

Bundesanstalt für Geowissenschaften und Rohstoffe/
Federal Institute for Geosciences and Natural Resources

More information about SO271 (INDEX2019) at

https://www.bgr.bund.de/DE/Themen/MarineRohstoffforschung/Meeresforschung/INDEX2019-Logbuch/aktuelles_node.html

<https://www.planeterde.de/logbuecher/fs-sonne-port-louis/metallsulfid-und-schwarze-raucher>

<https://www.youtube.com/watch?v=JFVe-1NqOMI&feature=youtu.be>

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Working on INDEX samples in the biology lab onboard SONNE.