FS SONNE

Expedition SO307: MADAGASCAR, MADAGASCAR-BIO & INDICOM

12.09. – 28.10.2024, Durban – Durban

5. Weekly Report (07.10. – 13.10.2024)

This week we completed our work in the southern working area between the two tectonic fracture zones Indomed and Discovery and returned to the Madagascar Ridge in the north. Thanks to our captain's skillful weather forecast, we found the optimal time for the trip south and encountered mostly good weather conditions in these high latitudes near the notorious Roaring Forties and only had a few work restrictions. A total of 30 dredges were carried out in the southern working area, 15 of which successfully recovered volcanic rocks, which were generally of sufficient quality for geochemical analysis and some even contain fresh volcanic glass. None of these dredges recovered ultramafic rock from the Earth's mantle (peridotite) or serpentinite (mantle rock, altered by water absorption). This means we can already answer one of the scientific questions posed by SO307: “Does the area between the fault zones or even large parts of the Madagascar Ridge consist of exhumed mantle rock?”

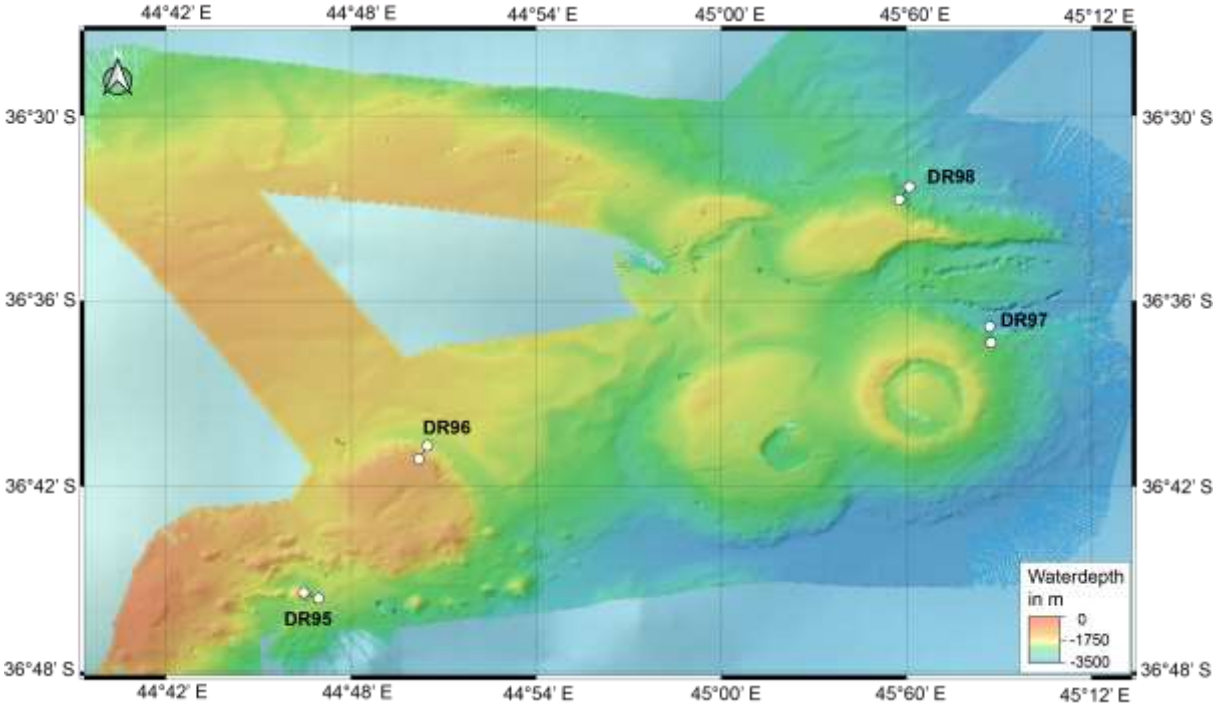

Fig. 1: Bathymetric map of a group of volcanic cones in 2 to 3 km water depth in the transition area from the Discovery fracture zone (in the southwest) to the Madagascar Ridge (just north of the map section), created with the ship's multibeam echo sounder. The cones at the right edge of the image show clear depressions (craters or calderas) at the summit (diameter of the craters is 2 km (left cone) and 3.4 km (right cone)). The small white dots mark the start and end points of the dredge hauls DR95 to DR98.

In this week we have also discovered an interesting cluster of several volcanic structures in the transition area of the two working areas. They are located at the intersection of the northeast-trending Discovery fracture zone and the east-west striking growth stripes of the

newly formed ocean crust at the spreading center (“abyssal hills”). Several larger volcanic edifices are surrounded by smaller satellite cones (Fig. 1). In this area alone, 4 dredge hauls were carried out (white markers in Fig. 1) and volcanic rocks were recovered from all of them. The dredge track at the pancake-shaped structure in the left section of the image sampled the shallowest area (from 2000 to 1900 m water depth) and delivered well-rounded volcanic boulders (Fig. 2) that were cemented with limestone and manganese crusts. Such boulders can be formed by wave erosion in shallow water and in the beach area and could indicate that this knoll once formed an island, of which the erosion products can be found in the former shallow shore area.

Fig. 2: One of the rounded, basaltic volcanic rocks (beach pebbles?) recovered from within limestone-manganese crust delivered by dredge haul DR 96. The sample on the photo is already cut through. Photo: SO307 Geology Team.

Fig. 3: A humpback whale “waves” goodbye from the southern working area (Photo: J.G.)

As if saying goodbye to the southern working area, a group of humpback whales circled us on Wednesday morning (Fig. 3). At the end of the week, we arrived back in the northern working area and started sampling work along the southern edge of the Madagascar Ridge.

Best wishes from on board to all those who stayed at home,

Jörg Geldmacher
(GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel)

Blog posts on this expedition can be found at: https://www.oceanblogs.org/so307/