

FS SONNE

**Expedition SO307: MADAGASCAR,
MADAGASCAR-BIO & INDICOM**

12.09. – 28.10.2024, Durban – Durban



7. Weekly Report (21.10. – 27.10.2024)

This week we continued our work on the western edge of the Madagascar Ridge and the seamounts nearby. It turned out that many of the slopes that appear to be steep in the satellite altimetry actually rise to just over a 20 degrees slope angle, which is generally too flat for our dredges to reach bedrock under the sediments. Consequently, several dredge hauls came back empty or contained only sedimentary crusts. However, our perseverance paid off and volcanic material was finally recovered. A particularly deep step at a water depth of over 3,500 m at the outermost slope potentially yielded the stratigraphically oldest samples that we obtained from the Madagascar Ridge on this expedition. These were well-preserved, so-called pillow lava, which is formed when molten lava solidifies under water and forms elongated tubes, often with a glassy crust due to rapid quenching (Fig. 1).



Fig: 1: Pie-shaped fragment of a pillow lava. The center of the pillow would be at the bottom right. The lava cools more slowly there, so that the minerals have a larger grain size. This often results in radially arranged trails of gas bubbles, because the gases dissolved in the magma form bubbles due to the pressure release, which then migrate outwards. The lava has then often cooled down and become so viscous that the track behind the bubble can no longer collapse again. In the sample in the picture, these elongated bubble cavities were later filled with light-colored secondary material (e.g. carbonate). In this sample, the quenched, very fine-grained outer edge has oxidized to a reddish color and the glass crust that used to be on top has flaked off. Volcanic glass is formed

when lava is quenched so quickly that crystals have no time to form at all and the material remains amorphous. (Photo: J.G.)

On Wednesday, October 23, the last dredge of this expedition came on deck at 23:15 (ships time) and the vessel began its transit back to Durban, South Africa. Shortly before reaching the Exclusive Economic Zone of South Africa, the ship's echo sounder systems were switched off. The scientists spent the days of the transit doing final research, but above all cleaning the laboratories and the equipment used, as well as packing and stowing it properly in the transport containers. There are also various documentation duties and writing the cruise report.

During this expedition, we carried out a total of 114 dredge hauls (in water depths of up to 4,600 m), with 61 of them (54%) returning igneous rocks, a very good success rate for an ancient volcanic plateau. Approximately 7,700 km of seabed were mapped in high resolution with the multibeam echo sounder. 15 CTD- (conductivity, temperature, depth) stations with 34 individual deployments were carried out with the attached Underwater Vision Profiler (UVP) and ROSETTE water sampler. In total, 8,000 liters of seawater were sampled and processed in the ships laboratories. In addition, 15 multi-corer (MUC) deployments were carried out, three of them with video monitoring (TV-MUC). Outreach activities included 6 blog publications and two live broadcasts from the ship to GEOMAR and to schools throughout Germany (initiated and moderated on the ship by Dr. Christian Timm and organized by Dr. Joachim Deng on the GEOMAR side). No fewer than 72 schools from all over Germany joined in, meaning that the broadcast was seen by around 1,400 pupils from 5th to 13th grade.

Our two excellent chefs took care of the physical well-being by using 400 kilos of flour, 300 kilos of onions and 7,000 eggs. We all (see Fig. 2) felt very comfortable on board. Our thanks go to Captain Birnbaum, his officers and the entire crew of the SONNE, on whose competent help and unlimited support we could always count on.

Jörg Geldmacher
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Blogbeiträge zu dieser Expedition finden sich unter:
<https://www.oceanblogs.org/so307/>



Fig. 2: The scientific crew of expedition SO307 (Photo: Niklas Mönnich)