

	<p style="text-align: center;">MSM19/3 AGULHAS</p> <p style="text-align: center;">Weekly Report No. 2 (08.12. – 14.12.2012)</p>	<p style="text-align: center;">F.S. MARIA S. MERIAN 43°11,2' S / 01°23,4' E</p>
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Our studies during the second week of MARIA S. MERIAN cruise MSM19/3 focused on sampling in the area of the Agulhas Ridge, which is formed by two prominent, parallel striking ridge structures. In-between these ridges narrow troughs are up to 6,000 m deep, whereas the abyssal plain north and the south of the Agulhas Ridge is situated in the trough. The geophysical studies conducted by the Alfred Wegener Institute for Polar and High Altitude Research (AWI) on the previous leg MSM19/2 directly on the Agulhas Ridge and appear to be formed after the formation of the Agulhas Fault. The reactivation of this fracture zone. To test this hypothesis we sampled these volcanoes. The dredge hauls at these sites contain pillow and sheet lava fragments, which resemble the Agulhas Ridges. Therefore the vesicularity indicates a younger (?) phase of volcanic activity.

Leg MSM19/2 and a previous AWI cruise on the Agulhas Ridge and the south of the Agulhas Ridge is characterized by a magmatic basement which clearly differs from normal deep sea plain. The magmatic basement frequently penetrates the abyssal plain. The highs which rise up to c. 1,000 m above the

indicate reactivation of the fracture zone. To verify this observation, we made the attempt to sample some of the seamounts north of the ridge. Dredging at these features, however, proved to be a very difficult task most likely due to thick manganese crusts covering the magmatic rocks and most dredges returned empty or contained only manganese. Finally we managed to sample successfully one of the seamounts. This dredge haul yielded among dense, aphyric lavas also metamorphic rocks which suggest intense tectonic movements in this area.

*A rock sample prepared for further analyses
on land.*

Pilot whales visiting MARIA S. MERIAN

After finishing our work at the Agulhas Ridge on December 12th, R/V MARIA S. MERIAN sailed to the northern end of the Meteor Rise, adjacent to the southwestern tip of the Agulhas Ridge. Bathymetric maps based on satellite altimetry ("predicted bathymetry") reveal some large, up to 3,000 m high seamounts in this area which are situated on a huge ridge-like structure. Our bathymetric mapping, however, showed, that these seamounts are large plateaus with steep flanks. Several dredge hauls at the flanks of these plateaus yielded again metamorphic rocks besides lavas, volcanoclastics, sediments and manganese. Furthermore the dredges contained a broad variety of plutonic, metamorphic, and sedimentary rocks which we consider as dropstones. Two varieties dominate among the *in situ* lavas: a vesicular, olivine-feldspar porphyritic lava and a dense, almost aphyric lava. In the early morning of December 14th, we finished our work at the Meteor Rise and R/V MARIA S. MERIAN headed 140 m in northern direction towards the final working area of leg MSM19/3, the Discovery Ridge.

Complementing mapping of the ocean floor and sediment echo sounding, a total of 43 dredges have been carried out during the first two weeks of cruise MSM19/3. Of these, 27 dredges recovered magmatic rocks (without dropstones), 20 Mn-Fe oxides, 34 soft sediments, and 15 biological material (macro fauna).

This week the weather was on our side for most of the time. Apart from two small deeps which caused wind up to 9 Beaufort and high swell for a short time, the sea was relatively calm and did not hinder our studies. At some days it was even possible to enjoy the sun on deck R/V MARIA S. MERIAN. We could frequently observe albatrosses and a particular highlight was the appearance of c. 15 pilot whales which followed the vessel for almost one hour.

All participants are doing well and send greetings to everyone at home.

For all cruise participants
Reinhard Werner