	<p style="text-align: center;"><b>MSM19/3</b>  <b>AGULHAS</b>  <b>Weekly Report No. 3</b>  <b>(15.12. – 21.12.2012)</b></p>	 <p style="text-align: center;"><b>F.S. MARIA S. MERIAN</b>  34°48,2' S / 16°42,2' E</p>
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During the third and last week of the MARIA S. MERIAN cruise MSM19/3 we focused on mapping and sampling the Discovery Rise. This area extends over ca. 250 x 350 km and consists of several, often very large seamounts that rise up to 4.000m above the surrounding seafloor. Although these seamounts are enormous structures and sometimes reach only a few 100m below sea-level, it took until 1936 before they were discovered. So far only a few rock samples were recovered from five localities along the eastern seamounts of the Discovery Rise. Based on geochemical analyses of these samples, some authors postulate a deep mantle origin (Plume) for the Discovery Rise. Seismic mantle tomography, however, does not provide any evidence for active plume structures. Their absence rather indicates that the seamounts are remnants of a fossil intraplate volcanic event or hotspot track. In order to reconstruct the origin of the Discovery Rise and to evaluate its role for geodynamic processes in the South Atlantic it was the ultimate goal of MSM19/3 to sample this region with near complete aerial coverage for the first time.

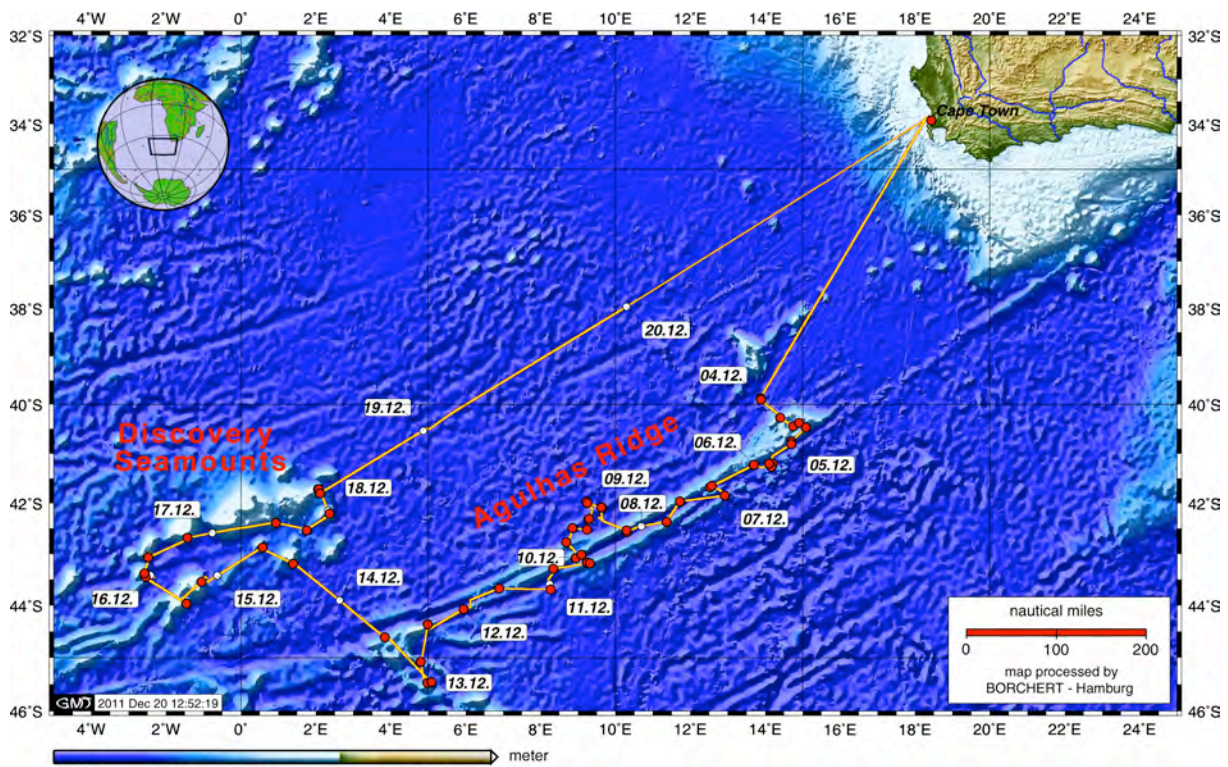


*The MSM19/3 Science Crew.*

From almost the entire Discovery Rise, a total of 11 seamounts were partially mapped and sampled by dredging. All seamounts possess a guyot type morphology with steep flanks and an erosional plateau on top. Guyots are former ocean island volcanoes that were eroded to sea-level and submerged to the deep sea as a result of lithospheric cooling. Today's water depth of the plateau edges at the seamounts of our survey shows that they sunk 900 - 1400 m below sea-level since their erosion. This relative uniform submergence level implies that the seamounts are similar in age and have analogous submergence rates. Ten seamounts were successfully sampled by dredging which mostly delivered porphyric lava with large olivines, feldspar and clinopyroxenes along with volcanic breccias and conglomerates.

In the evening of 18<sup>th</sup> December our station work ended with a last dredge haul in the northeastern area of the Discovery Rise under stormy weather conditions. Thereafter MARIA

S. MERIAN began the 900nm transit to Cape Town (South Africa). The transit was used to continue multibeam mapping and running the sediment echosounder but also to celebrate the success of the expedition with a BBQ in the evening of 20<sup>th</sup> Dec. The scientific work ended Wednesday morning 21<sup>st</sup> Dec by turning off the multibeam echosounder shortly before entering the South African Exclusive Economic Zone.



Cruise plot (yellow line) and dredge stations (red dots) of the MARIA S. MERIAN Expedition MSM19/3.

With the finishing work during the last week MSM19/3 has reached its main scientific goals. In only 15 work days at sea besides ca. 2.500 nm multibeam mapping and ca. 1.500 nm sediment echosounder profiling, a total of 57 dredge hauls in an average water depth of 3.300 m were carried out. Of these, 41 delivered *in situ* samples of which 31 obtained magmatic rocks, 16 volcanoclastics, 7 sedimentary rocks, and 23 Mn-Fe-Oxide crusts. Furthermore 45 of 57 dredges provided sediment samples for the biologists. Qualitative and quantitative determination of the meiofauna, however, can be made earliest after preparation in the lab. Twenty-five dredges recovered macro fauna which mainly comprise the taxa Porifera, Bryozoa, Bivalvia and Brachiopoda. The high variety of the different taxa require further investigation but will provide interesting information about distribution and genetic relation between the different species.

The scientists would especially like to thank Captain von Staa and the crew of MARIA S. MERIAN. Their hard work, high level of experience, and willingness to help, as well as the pleasant working atmosphere on board, contributed directly to the success of the MSM19/3 expedition. We are also grateful to the German Federal Ministry of Education and Research and the German Science Foundation for continuing support of marine research. Lastly I would like to thank "my" team for their excellent work on board and their high level of motivation that significantly contributed to the good atmosphere on board throughout this expedition.

Tomorrow morning we will arrive in Cape Town where the majority of MSM19/3 scientists will spent Christmas and New Year. We wish everyone at home pleasant Christmas holidays and all the best for the new year!

For all cruise participants  
Reinhard Werner