

Maria S. Merian Expedition MSM70: BATHYCHEM - Bathymetrists Seamounts



2. Weekly Report

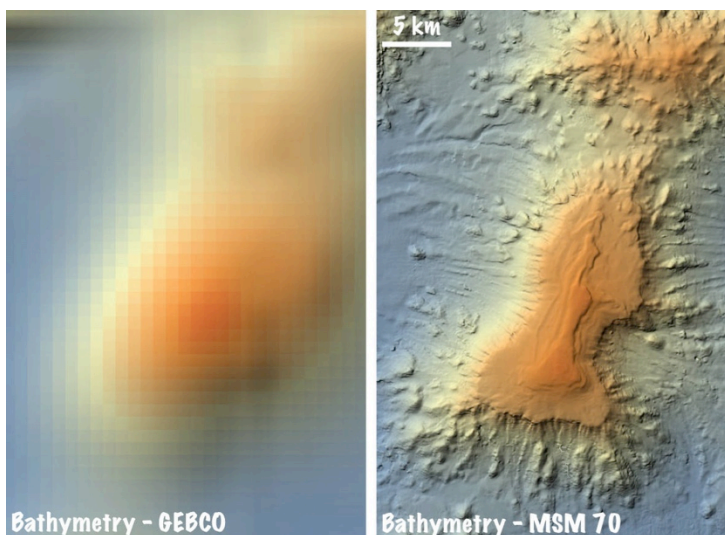
Atlantic 7°59' N/ 21°10' W, 7. January 2018

In the second week of the cruise we mostly finished the mapping and sampling of the northernmost Bathymetrist Seamounts that we started in the first week. After the Seamounts Annan and Carter in the first week, this week we continued mapping with the western Grimaldi Seamounts (Hirondelle, Prince Albert, Princesse Alice and Whitney), as well as the western end of the Guinea Fracture Zone. Due to non-consistent use in Literature of the geographic names of the volcanoes, one of the Bathymetrists first tasks was to find the official nomenclature of the seamounts. After extensive literature search we decided to use the names and coordinates given by the *Intergovernmental Oceanographic Commission* and the *International Hydrographic Organization* (IOC-IHO/GEBCO).

All bathymetric data is directly processes on board, false soundings are cleaned and final bathymetric models are calculated by our team of six bathymetrists. Thanks to this work, we directly have on board the final maps, which are used for both, seafloor sampling purposes and for geological analyses and interpretations of the maps. Our working area is relatively large; in order to cover the complete area in the available time, we need to map the seafloor with a widely opened echo sounder beam-fan and a relatively high speed of 10 kts. Nevertheless, due to the calm weather and precise track planning, the quality of the obtained multibeam data is very good and bathymetric models achieve a spatial resolution of 50 m or better.

The first results show that the northern seamounts all have a flat and wide summit area, probably consisting of old carbonate platforms. Many of the seamount flanks show collapse structures and debris flows. All volcanoes display large areas with a strong multibeam backscatter signal, which indicates hard (non sedimented) seafloor.

We sampled all mapped seamounts of the northern Bathymetrist Seamounts by a total of 15 dredge tows. Sampling of basalt at old volcanoes is a challenge, due to alteration of the rocks and the growth of ferromanganese crusts. Especially the latter turned out to be a difficulty in this area, as ferromanganese crust with a thickness of 10-20 cm were common in many dredges. Therefore, we conclude that most of the strong backscatter signals indicate ferromanganese crusts. In addition, we



The “old” General Bathymetric Chart of the Ocean (GEBCO, left) is mainly based on satellite data with a spatial resolution of at most 800 m. During expedition MSM70 we achieve a constant resolution of 50 m. In the shallower regions, we can even reach 25 m! This is an incredible gain in our knowledge of the seafloor and a detailed interpretation of the new maps will take some time.

found in the shallower areas of the volcanoes that the basalts are partially covered by phosphorites. We found those e.g., on the seamounts Annan and Whitney. Nevertheless, we collected basalts from Annan, Hironnelle, Prince Albert, Princesse Alice and Whitney Seamount. At the flanks of the Guinea Fracture Zone we did not recover basalt, but instead got a full dredge of manganese nodules. All sampled rocks are directly photographed and characterised on board by our six petrologists. Furthermore, we prepare the samples for geochemical analyses that will be performed in the Kiel laboratories. For microscope thin-sections, for mineralogical studies and for isotopes, major and trace element analyses, we saw blocks of different sizes.



A surprising „catch“ from the Guinea Fracture Zone: a Dredge full with manganese nodules.

In the meantime, we are in a steady work flow alternating between mapping and dredging. The teamwork between crew and scientists is smooth and together we make good progress.

Best greetings in name of all expedition participants,

Froukje van der Zwan