

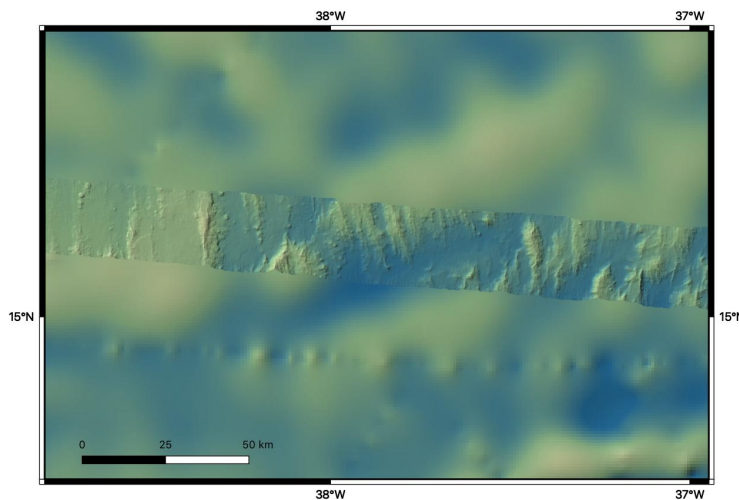
MSM88-1 "German Mapping"

02.12.19 - 08.12.19



Doing something like mapping the seafloor really give a feeling for how vast the oceans are. This week we travelled 1150 nautical miles (around 2100 km) straight west, mapping all the time. It took us almost 5 days to complete this profile and we were still 500

nautical miles (around 800 km) short of the EEZs belonging to the Caribbean islands when we turned round for the profile back eastward. Above water there was not much to see - just a few ocean sailors using the favourable winter trade winds to take their boats from Europe over to the Caribbean. Under water it was a different story though, with the multibeam sonar revealing a fascinating and sometimes puzzling world.

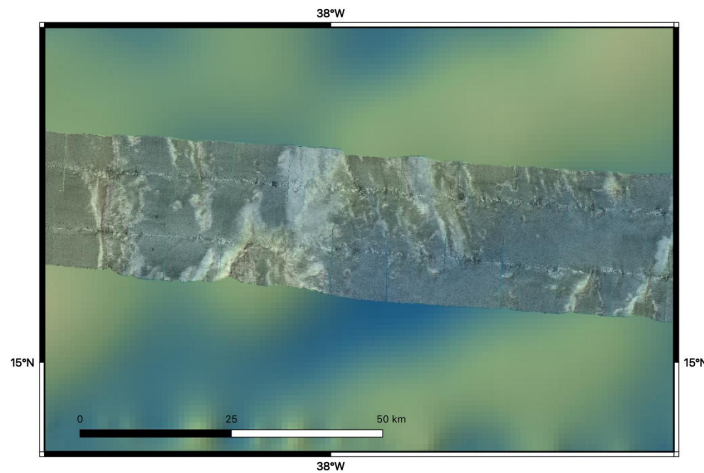


Before and after mapping: The "lumpy" structures vaguely seen in the satellite image turn out to be rocky ridges in 5000m of water!

Over most of the oceans we only have satellite measurements to give us an

idea of what lies under the waves. But the satellites do not measure seafloor structures themselves, but instead the height of the sea surface. If there is a mountain under water, its rocks have replaced the water which otherwise would be there and, because rocks are denser than water, gravity is slightly higher there and pulls the surrounding water to the seamount - the ocean surface gets a bulge! These bulges are not huge - just several centimetres high but several kilometers across - but are easily measured from space. It is physically impossible to tell the exact shape of the seafloor from such bulges - a bit like looking at piled up bedclothes and trying to decide what is underneath - a teddy bear? pyjamas? or the family cat? Only sonar measurements of the type we are making during this cruise can show us the true structure of the seafloor.

But we are not just measuring water depth, we are also recording the strength of the returning echo signal (known as "Backscatter"). A strong echo means that the seafloor is hard, rough and probably stony and so reflects and scatters sound well, sending lots of sound energy back to the ship. Soft, smooth, sedimented seafloor, on the other hand, absorbs a lot of the sonar energy and reflects much of the rest away from the ship - the returning signal is weak.



A backscatter map of the seafloor (zoomed in area from the centre of the first map), strong backscatter is shown in whiter shades. Some sediment-free slopes scatter strongly but also some large areas like around 38°W. We will have to come back again to determine their cause.

pictures from the seafloor. We will have to come back with deep sea robots, more personnel and more equipment!

At the end of the second week at sea we are back on a westerly course towards the Caribbean, the trade winds are behind us and the ship's movements are minimal. All are working well in the relaxed and friendly atmosphere on board.

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