

Weekly Letter No. 5 of 3 March 2016

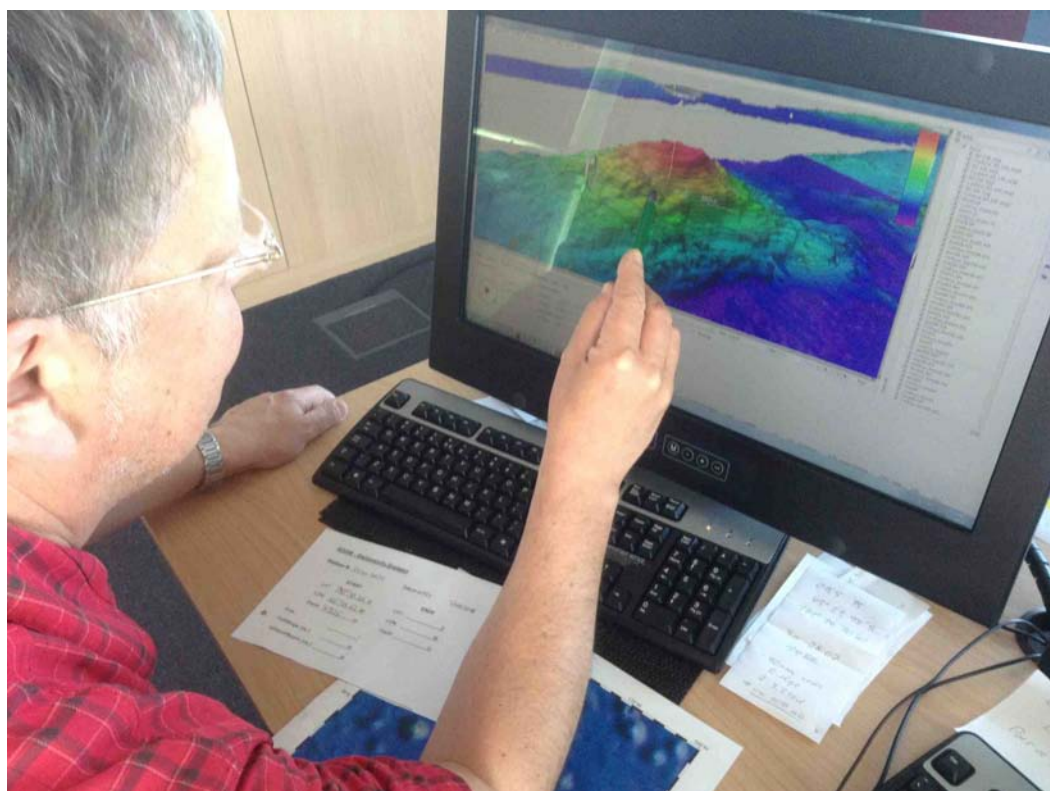
Another eventful week has passed. The 35 ocean-bottom seismometers (OBS) of our second long profile across the entire Chatham Rise had to be collected again. Right at the beginning at the first instrument, nothing was to hear and to see after it was supposed to return to the sea surface after one week at the seafloor. No radio beacon sent a signal to the receiver on the bridge; no OBS was to be seen because the sea had become rougher with increasing winds. If not even the direction of the OBS can be ranged, then finding it in the waves becomes very difficult. Thanks to Gesine's good eyesight we eventually found it, and we saw – after the instrument was lifted onto the deck – that the radio beacon leaked water. Another OBS was found after a search of many hours, and only because Captain Oliver Meyer's eagle-sharp eyes suddenly saw a little white float on the water a few meters from the ship. This OBS somehow developed insufficient buoyancy to fully appear at the water surface, so that only the little float attached to a thin rope (for lifting purposes), with the OBS hanging below, made it to the surface. Thus, the radio beacon did not transmit. The OBS collection proceeded with even more unexpected obstacles while the storm increased its power. The joy (and exhaustion) was great when finally after 50 hours – and against the odds – all 35 instruments made it back to the ship. Many thanks to the volunteers of the other groups and the crew who helped watch out on the bridge and the observation deck.



Five types of instruments are being towed by SONNE. From left to right: Passive acoustic monitoring device (PAM), starboard airguns, seismic hydrophone-streamer, portside airguns, magnetometer. Thanks to the wide stern, this tow configuration is possible without the danger of cable tangling.

“Look at these cool data!!” Florian shouted from the OBS lab. After the nerve-breaking collection of the instruments, the enthusiasm quickly returned when the fantastic data were retrieved from the recorders. Interesting results for imaging the structure of the Earth’s crust beneath Chatham Rise can now be expected for his PhD project.

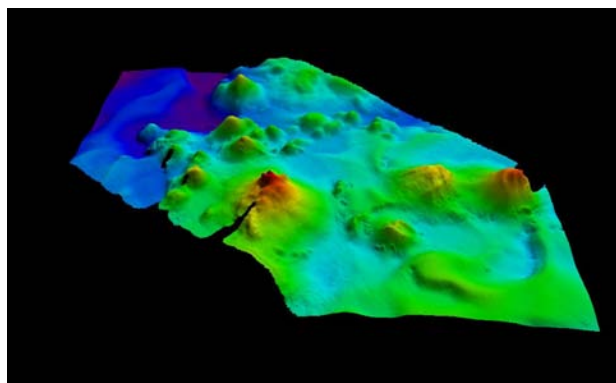
Next, a series of parallel profiles with the towed magnetometer was on the schedule. We planned the profiles on north-westerly direction, so that the tectonic fault zones in the transitional region between the Wishbone Ridge and the former Gondwana plate boundary along the northern margin of Chatham Rise as well as the related magmatic intrusions can be mapped magnetically. But the storm from the southwest did not allow this; therefore had to rearrange the profile direction. After turning from one of the other profile, wind and waves from ahead were too strong to continue, and we were forced to pull the gear and wait a few hours for the storm to calm down. It is good to know the ship is in good hands of the experienced crew.



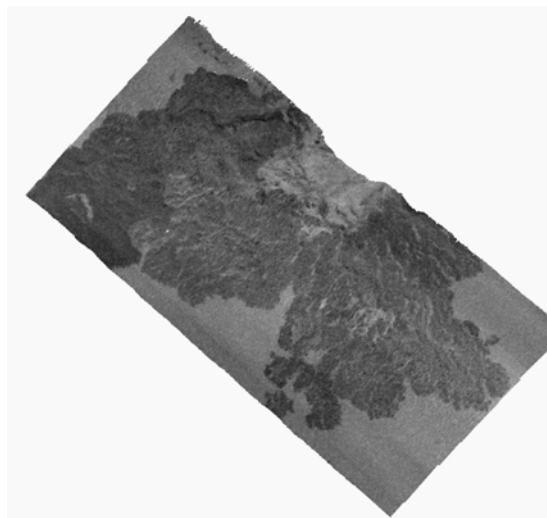
Reinhard uses the sea-floor map of the multi-beam echosounder, prepared by the bathymetry team, to search for suitable sites at the flanks of a seamount to deploy the dredge for rock sampling. This seamount of volcanic origin rises about 1000 m above its 4000 m deep surroundings.

Slowly the sea calmed down and we decided to continue the cruise with seismic reflection profiling across this tectonically exciting region of the north-eastern Chatham Rise. Prior this, the seismic reflection team had already repaired the airgun air-hoses and electrical cables that were damaged at the last profiling. This labour-intensive work was worth it, because all airguns worked continuously at the next three profiles where they shot every 20 seconds. Shot-after-shot, the image of the cross-section through the upper crust grew on the observation monitor over the two days. Large-offset fault zones, thrusts and graben systems characterise this region.

Lava flows of young submarine volcanoes cover the seafloor, which can be clearly seen in the seismic, sediment-echosounder (Parasound) and multi-beam echosounder data.



A field of volcanic cones on the north-eastern Chatham Rise in about 2000 m water-depth.



The back-scatter image of the multi-beam echosounder shows beautiful lava flows of a volcanic seamount in about 1800 m water-depth. Both images were prepared by the bathymetry team.

In the meantime, the table-tennis tournament has gone into its second round. The large hangar of the ship has turned out to be the social meeting location. Everybody enjoys the pleasant day-to-day life and work, not to forget the tasty meals, together with the crew.

With best wishes from all

Karsten Gohl
(Chief Scientist)