Research Vessel SONNE Voyage SO246 Project CHATHAM RISE

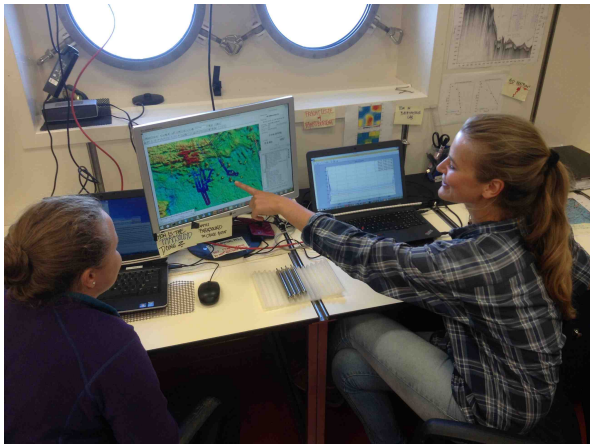
Weekly Letter No. 6 of 13 March 2016

How much had we enjoyed the wonderful weather of the first weeks of this cruise, but now we experienced that weather can also behave quite differently in this region. “Pay back” Bryan says and means the long-lasting storm that accompanied us last week and affected our work. Our second-last profile with 21 ocean-bottom seismometers (OBS) deployed could still be shot along with the airguns and recorded by the streamer at the same time without any trouble. But to pocket the more important data from the OBS systems, we had to collect all OBS along the profile. This collection turned out to be difficult again. While going well for the first OBS, the increasing storm made it more and more difficult to recover the other instruments. For the night, we had to interrupt the collection, because it became too dangerous for the crew to bring these instruments on board safely. During the daylight hours of Thursday, the last 7 OBS systems were finally collected. Excitement grew again at the second-last OBS, because the OBS prototype by KUM was deployed at more than 5300 m water-depth at this station, which is about 3000 m deeper than at the previous profile. Do the instrument components survive a pressure of 530 bars? Or will the floats be deformed under this pressure so that there may not be enough buoyancy to rise to the seafloor? Indeed, the OBS did not release from its anchor at the seafloor at first attempt, which was likely due to the difficult acoustic signal transmission at this rough sea-state. Everybody was relieved when the return signals confirmed the upward rising of the OBS. 1.5 hours later, the instrument appeared at the surface. Brought on deck, it turned out to be completely intact. This deep-sea test has been passed!

Bringing the OBS’s back on board turns out to be quite a challenge for the crew on the bridge and deck. In this case, the enter-hook caught the float-line of the OBS with the first throw by the crew-man (photo: T.N. Gades).

All OBS systems recorded excellent data also from this profile. We had planned this profile in the hope that we would be able to identify and characterise the transition of the easternmost Chatham Rise continental crust to the oceanic crust of the Pacific. The seismic reflection data of this profile already shows unambiguously oceanic crust with a relatively sharp transition to continental crust. When we compare this observation to the other OBS profiles farther west, we notice that the change-over from one crustal type to the other varies quite extreme along the margin of the south-eastern Chatham Rise. This is an indication that the continental breakup between New Zealand and Antarctica during Cretaceous times did not occur in a simple "zipper"-type manner, but rather in a fragmented fashion by different processes of the Earth's mantle and crust in this region. A more detailed analysis of the OBS data in conjunction with work on the other geophysical and petrological-geochemical data will reveal a clearer picture on this development.

Bastian, Lukas and Florian P. of the OBS team prepare an instrument in the hangar for its next deployment.



Ricarda is planning the deployment of the temperature probe for geothermal heat-flow measurments. Next to her, Rachel is processing the data of one of the seismic reflection profiles.

The rest of the week, we had to ride out the storm (nobody gets seasick anymore) and started the planned rock sampling using the dredge at the seamounts of this sub-region with a delay on Saturday night. More of this will be in next week's letter …

With best wishes from all

Karsten Gohl
(Chief Scientist)