

#### 4th weekly report (13.02.17 – 19.02.17

SO-254 „PoriBacNewZ“ 26.01.2017 (Auckland, Neuseeland) – 27.02.2017 (Auckland, Neuseeland)

The last week first brought us further south. We were able to sample the station at 50°S at rough weather and wind conditions as planned by CTD and MUC in the water column and sediment. The operation of the ROV was impossible at the strongly shaking ship going up and down. The wind proceeded to fresh up to Beaufort scale 8-9 and wave heights above 5 m such that steaming went slower as expected. As in the region between 53° and 56°S waves were expected with



photos: M. Simon

similar height the ship stopped at appr. 52°S to wait for better weather. This region of the fifties gave real credit to its name. We stayed at this position for 24 hours and intensely debated on how to proceed. After diverse considerations we decided to sample a station there and steam north again thereafter. Continuing to steam south appeared to be too risky for the time schedule and the remaining ROV stations in view of the weather and the two days lost at the beginning of the cruise.

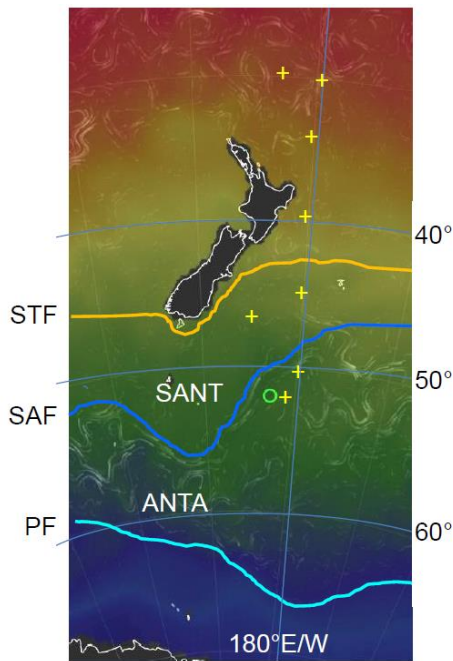


photo: M. Simon

Hence we did not reach one of the aims of this cruise, to sample a transect in the water column and surface sediment from 30° to 60°S for the composition of the bacterial communities and the geomatobolome. On the way back up north towards the coast of the south island of New Zealand we hoped to reach calmer waters in the wind shade of the south island for further ROV dives. En route we sampled another station at 45° 43' S, 174° 44' in the water column and sediment by CTD and MUC. We had anticipated operating again the ROV but

the weather situation had changed fundamentally. A stable high pressure system east of New Zealand brought strong wind from north east and unexpected high waves such that instead of the ROV the Agazzis trawl needed to be used, unfortunately without success.

The rationale for sampling this transect was to investigate the bacterial communities of all biogeographic provinces and water masses from the surface to the deep sea and the surface sediment of the southwestern Pacific from the subtropical gyre (SPSG) to the polar frontal region (ANTA) of the Southern Ocean. Together with the preceding cruise SO248 the overarching goal of both cruises was to investigate a transect from the subarctic province (Bering Sea) to the polar frontal region of the Southern Ocean south of the subantarctic province (SANT) with respect to the biodiversity and biogeography of the bacterial communities under special emphasis of the *Roseobacter* group and of the chemodiversity of the geomatobolome. After a careful examination of the current situation of the subtropical (STF) and subantarctic front (SAF), on the basis of the continuously recorded ship-based data on salinity and temperature, fortunately we realized that of the totally eight stations with water column and sediment work two were situated each in the polar frontal and the subantarctic region. Hence at least the principal goal of the cruise was reached, even though not with stations as far south as originally planned. South of New Zealand the polar frontal



region is particularly broad because of the Campbell Plateau and diverges further south as in other regions. The polar front (PF) thus is bended very much to the south.

Preliminary data evaluation surprisingly shows that the productivity and growth of the bacterial communities in the various biogeographic provinces do not principally differ. Considerable differences do exist within a given province, but no fundamental differences among distinct provinces, despite large differences in temperature and nutrient conditions. However, bacterial cell numbers and the turnover rates of amino acids, glucose and acetate seem to increase from the subtropics to the polar frontal region, pointing to some differences among these provinces. The plankton net tows gave some indications of a generally higher productivity in the subantarctic and polar frontal regions. The net in these regions was markedly more filled with plankton than further north and in addition quite a few salps were caught, a good sign of

higher phytoplankton stocks and primary production rates. The exciting question how the composition of the bacterial communities differs among the studied provinces will only be answered after return and analyses of the respective samples.

At the last day of this report we finally were able to launch the ROV again. We chose a position at the continental slope at 43° 25' S, 173° 35' E. This dive was exceptionally successful and brought back on board a rich harvest with many different animals, in particular sponges and hard corals. A column-like carbonate structure, presumably an old black smoker, not active any more, was colonized particularly densely and rich. Thus the researchers of the benthos and sponge groups on board had a long evening for processing the specimen, which they did happily accept after having no samples for more than a week. Moreover, this dive was a very unique one: the 250<sup>th</sup> dive of the ROV after its first launch ten years ago.



The remaining days of the cruise we will again dedicate primarily to the sponge research.

Best regards on behalf of the scientific party and crew,

Meinhard Simon