3. Wochenbericht Meteor Reise M76/1b

Kapstadt (Südafrika) – Walvis Bay (Namibia)

21.-27.04.2008

On Monday, April 21, while waiting for weather conditions to improve for MeBo operations, we returned to the area of the sinkholes just north of 28°S – now nicknamed "Neptune's Golf Course". The recently upgraded dynamic positioning system and increased bow thruster capability on ***Meteor*** allowed us to park directly over a sinkhole (Site GeoB 12804 "Das Loch" : 27° 44.14´ S and 14°14.54´E, water depth 1250 m) and deploy sediment coring devices directly into the middle of the 140 deep by 200 meter wide hole in the sediment surface. Sediment samples obtained with the multi-corer exhibited a large degree of surface sediment patchiness. Unlike the nearby surface sediments that are comprised of a pale green nannofossil ooze, with a significant foraminiferal sand fraction, the sinkhole sediments were darker olive color with black mottling. *Beggiatoa*-like mats were found on the surface of some of the multicorer sediments, and a peak in dissolved sulfide exists at 5 cm. Some sediment cores were also occupied by several very thin (mm) black worms. Some of the cores had a gassy appearance, but no significant quantities of methane were measured. The overlying water was fully oxygenated, and the first chemical analyses also suggest that we are not dealing with a brine intrusion.

Figure 1: „Beggiatoa" mat on surface of multi-core from Station GeoB12804, *Photo: V. Diekamp, MARUM*

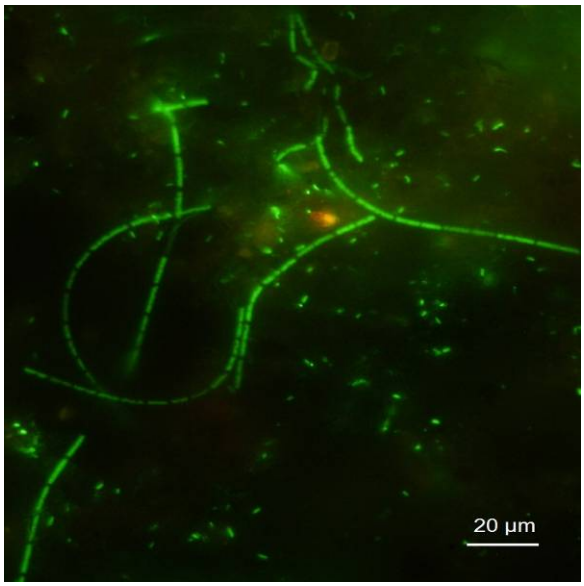

Figure 2: Filamentous bacteria from GeoB12804 mate, stained with Sybr-Green. *Photo: B. Engelen, U. Oldenburg*

With the onset of better weather, we returned to Site GeoB 12802 (25°30'S, 13°27'E). By Tuesday morning we were able to deploy the MeBo drilling rig. Initial problems with the wire-line operation caused us to retrieve MeBo, but it was soon again in the water. The rapidly accumulating MeBo experience paid off and the wire-line operations were successfully set into motion. Drilling and coring re-commenced on Wednesday. After drilling and wire-line coring with 6 sections to approximately 14 mbsf, problems unrelated to the wire-line operation required the retrieval MeBo on Thursday a few short hours before we would have had to break

operations off due to the impending end of Leg 1a. Samples from material retained in the core catchers from the various core barrels retrieved were sub-sampled for geochemical and microbiological analysis. Now that the MeBo team has gained considerable experience with the new wire-line operation, we can concentrate on obtaining high quality cores.

Friday morning found the ***Meteor*** lying just off Walvis Bay. There we exchanged 3 scientists off, and took 2 scientists onboard. T. Ferdelman assumed chief scientist responsibilities at this point from M. Zabel, one of the departing scientists. Due to deteriorating wave and wind conditions (swell at 3 to 3.5 m and wind to Bft. 5-6) further MeBo operations were postponed. In the meantime, we sailed to our proposed shelf site in the well-known Namibian coastal mud-belt. This extremely organic-rich diatomaceous ooze underlies anoxic, often sulfide-rich bottom waters. These sediments are also home to the famous *Thiomargarita namibiensis* – the world's largest bacteria. On Saturday, April 26, Site GeoB12806 (25° 00'S and 14°23'E; 130 meter water depth) in the middle of the southern stretch of the mud-belt was extensively sampled by multi-corer and gravity corer operations. The surface sediment was, as expected, very soupy mud with minor amounts of foramifers and accessory amounts of diatoms, small snails, fish bones and fish scales. On the surface of the cores filaments of *Thiomargarita* were quite easy to see with the naked eye. H_2S odor was present below the surface of the core. After some fine-tuning of the core-catcher, we were successful with our 6 m long gravity core in obtaining two 3 meter long gravity cores.

The selection of an appropriate secondary site for testing MeBo on more consolidated sediments was the object of a PARASOUND survey on Saturday night and Sunday morning. We have identified outcropping strata at the shelfbreak, where through drilling with the MeBo, we can access older sediment layers. A gravity core and surface multi-core samples obtained on Sunday morning suggest that Site GeoB12807 (25°21'S and 13°47'E; 300 meter water depth) is suitable for both meeting MeBo testing and cruise science objectives.

The weather is expected to improve after Wednesday, and we are optimistic about our chances to restart MeBo operations in the middle of the week. Presently, the ship finds itself on course to a deep water site on the lower continental slope.

All is well on board. On behalf of the scientific party and ship's crew, our very best regards,

Timothy G. Ferdelman