Wochenbericht Nr. 2

SO260/1

15.01.2018 – 21.01.2018

After an extended seismic survey along the continental slope during the first two days of our expedition, we started to collect water column samples and to core seabed sediments. The main geographic target were contouritic drift bodies, and associated terraces and channels around the Mar del Plata Canyon. Our scientific aim was to understand how the interaction between water masses, bottom current regimes and seabed topography controls the sediment dynamics inside and outside this canyon system.

We focused on a major morphological terrace on Jan 16 which is located inside the canyon's lower reach. Thick packages of accumulated sediment suggest that this location will provide us with a high-resolution sediment archive. The successful sampling program resulted in two 9-m long sediment cores which seem to cover 5 to 6 meters of Holocene within the uppermost part of the core.

On Jan 17 we proceeded to our up to now deepest sampling station located at about 3.600 m water depth in the South of the Argentine working area. The objective was to recover sediment cores at sites where we had indication from previous expedition M78/3 that intense iron reduction occurs in the deeper sediments. As yet it is not known which biogeochemical process is responsible for the observed liberation of reduced iron into the pore water of these deep subsurface sediments and how this process is controlled by the particular sedimentation conditions. There is evidence that iron oxides can be reduced by methane, which is present in these sediment layers in dissolved form. There may thus exists a strong coupling between the biogeochemical cycles of iron and methane. By means of joint sampling of the pore water and the sediments by the Inorganic and Organic Geochemistry groups as well as the Microbiologists we seek to elucidate by which biogeochemical process, based on which organic substrates and by which microbial organisms this process is mediated (Fig. 1).

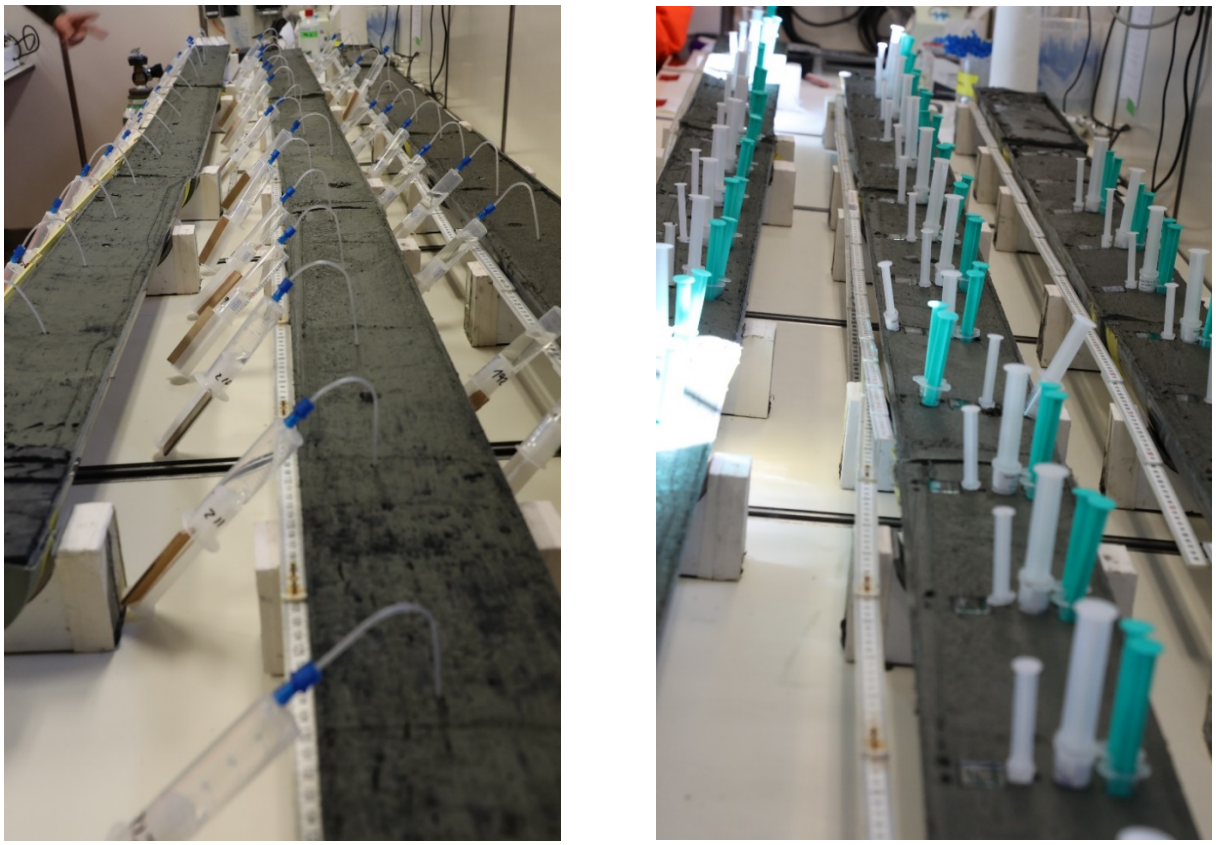

Fig. 1: Sampling of pore water (left) and sediments (right) by the Geochemistry and Microbiology working groups. (Photos: Natascha Riedinger)

Based on Parasound and Airgun data, which we collected during a previous cruise in 2009, we found hints on assumedly deep water coral mounds in association with a slope-parallel contouritic channel. A combined echosounder-seismic survey illustrates now that these mounds are very common in the region. Coring brought confirmation that these mounds represent an ancient deep sea coral habitat (Fig. 2).

Fig. 2: Side view into an opened giant box corer with plenty of deep sea coral fragments (photo: Janina Bösche).

The today's (Sunday) research activity focused on the sampling of various contouritic channels with giant box corer and grab sampler. We received large amounts of gravel and rock fragments which indicates that the channel floors are very much influenced by strong bottom currents. These currents probably transport a lot of finer material but do not allow for a permanent deposition.

After the first two days with overcast and moderate temperatures, we enjoy a summerly weather with temperatures in the higher 70th, a slight breeze, and a calm sea. Besides the outstanding support from the captain and whole crew of the RV SONNE these conditions are excellent for the deployment of all of our instruments for water and sediment sampling, and seafloor and subbottom mapping.

When long days and nights of great team work close, peaceful sun rises and spectacular sun sets more than reward us for all our efforts.

All members of the crew and scientific team are healthy and in best mood and salute aboard of RV SONNE.

Sabine Kasten

Chief Scientist