

SO270 MASCARA

Weekly Report 7 – 13th to 19th Oct. 2019

During this report period, we have continued our research in working area WA-4 at the western margin of the Saya de Malha carbonate platform. Subsequently, we have made our way towards the east through the entire platform. Now, at the end of the week, we are heading towards the remaining stations of the CTD and Multi Closing Net (MCN) transect located along 65° E. Our time here on board draws to a close and on the morning of October 21st, the SONNE will start her transit towards the harbour of Port Louis (Mauritius). Port call will be on October 23rd.

At the beginning of this report period, we have finished our hydroacoustic program along the western platform margin. Multibeam (EM122, EM710) and PARASOUND data revealed a slope deeply incised by canyons (Fig. 1). Based on this data, the current rate of material export from the platform towards the west seems to be very low. We expect to gain more detailed information on this from the sediment cores and the surface samples that we obtained from the sediment fans in front of the mouth of one of these canyons and from the canyon course. Hydroacoustic data also show how the canyons are connected to the shallow water areas of the carbonate platform. Here and during this cruise in general, hydroacoustic data were instrumental for the selection of distinct sampling sites. They not only allow studying the sediment geometries of the selected sedimentary archive, but also provide information on the sediment type, highly valuable for the selection of the sampling tool.

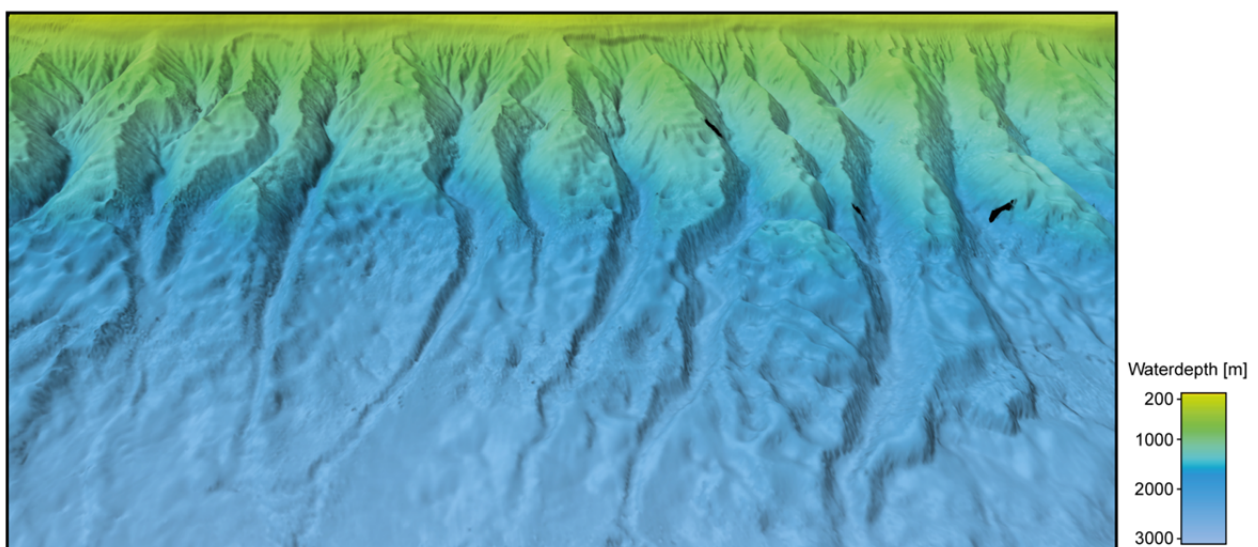


Fig. 1: Multibeam imagery of the western slope of Saya de Malha Bank (view towards east). Colours indicate waterdepth.

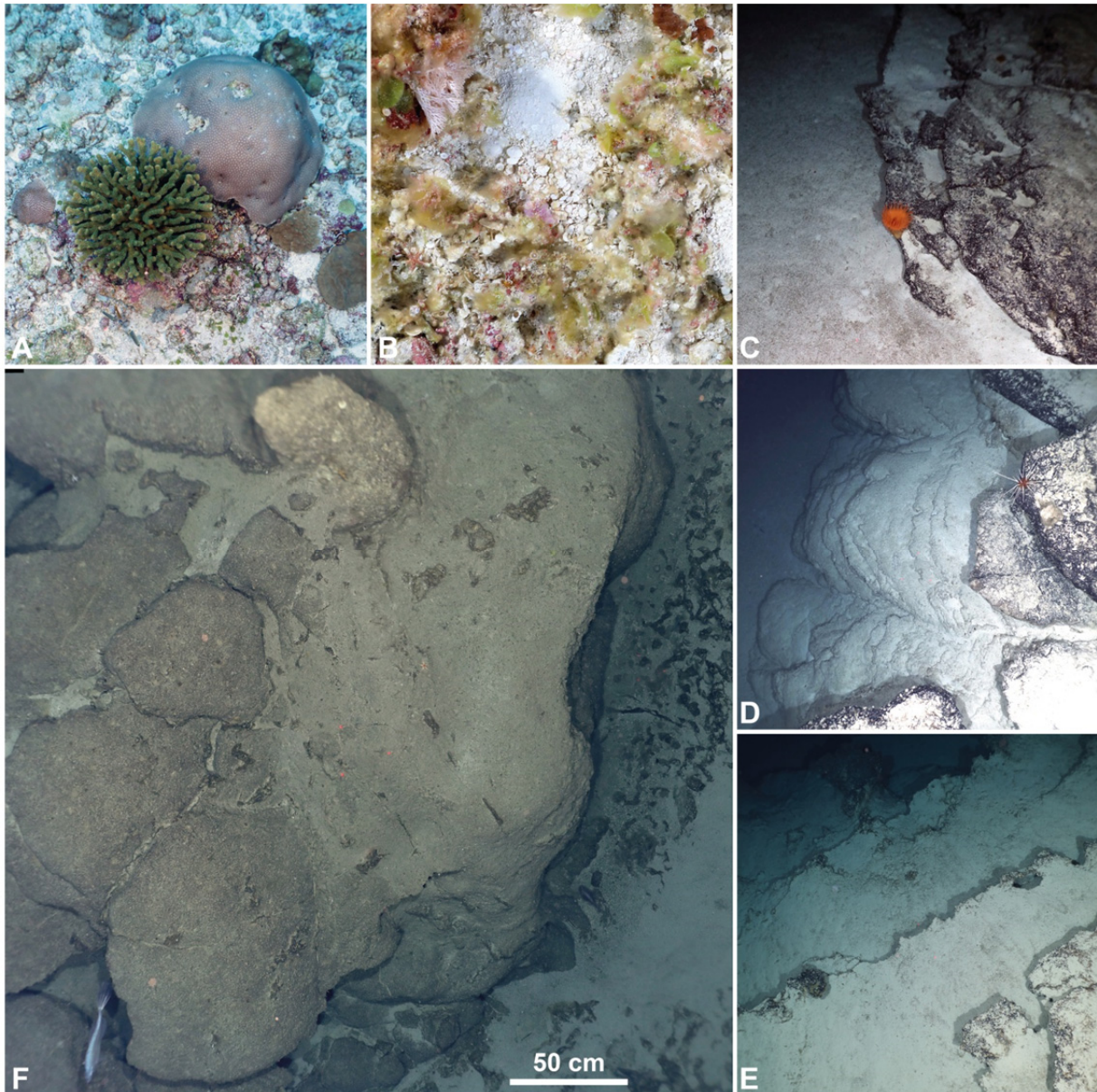


Fig. 2: OFOS (Ocean Floor Observation System) Images of the Saya de Malha carbonate platform. **A)** colonizing corals (waterdepth 30 m); **B)** Close-up of sea floor with large benthic foraminifera and green algae (30 m); **C)** Solitary coral on block (730 m); **D)** Eroded slump at the eastern margin (740 m); **E)** Outcropping beds in the upper eastern slope (320 m); **F)** Panorama (15 images; image Oliver Eisermann, UHH) of a block embedded into slump deposits (730 m)

After sampling the canyon, we started a two day seismic survey along the western platform flank. This survey aimed not only on the sedimentary system of the slope but also on a better understanding of the architecture of the Saya de Malha platform margin. Sea state was rough during the survey but nevertheless data were of good quality.

In the further course of the week we continued with sediment sampling and OFOS transects along our way towards the eastern margin of Saya de Malha. Beside numerous surface samples, we were also able to obtain two gravity cores from the region of the platform interior. OFOS data not only revealed the dependency of sediment distribution with depth

and current exposure, but also showed small scale facies changes which underline the sensitivity of these systems against variable framework conditions.

By means of OFOS we also studied the shallowest parts of our working areas, with water depths less than 40 m. Located well in the mesophotic zone, with enough light available, the sea floor in these areas is populated by coralline algae, colony forming corals, and green algae (*Halimeda*); all of them important carbonate producers (Figs. 2, 3).

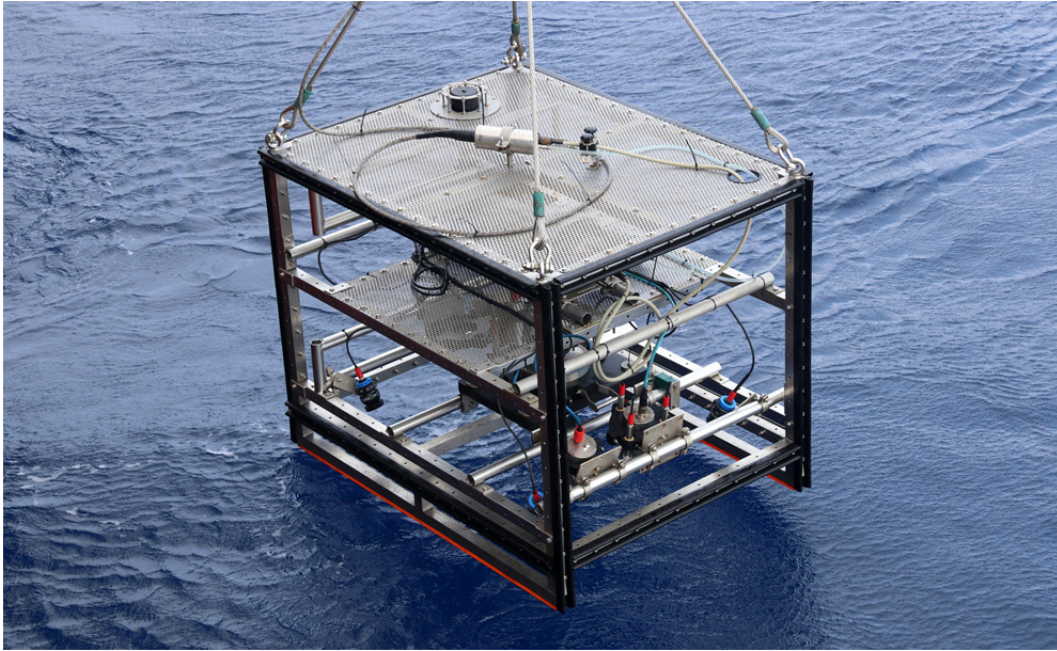


Fig. 3: OFOS (Ocean Floor Observation System) of RV SONNE.

The last OFOS transect was on the eastern slope of Saya de Malha; from 280 to 750 m of water depth. The slope here is comparable steep (up to 40°), which led to slope collapses and slumps in the geological past. The upper part of the slope is formed by outcropping limestone, partly with a black coat; slumps composed of fine grained material and blocks cover the lower slope (Fig. 2).

Our work at Saya de Malha Bank terminated with a last seismic survey of the eastern platform slope. After recovery of the seismic gear, we started our transit to the CTD and MCN stations along 65° E. Work there will start in the evening of October 19th. After 4 weeks of intensive work, we are leaving the Saya de Malha carbonate platform with a very comprehensive data set and are looking forward to start analyses and interpretation.

All onboard are fine.

In the name of all cruise participants

Sebastian Lindhorst, Chief Scientist

Institute for Geology, University of Hamburg