



SO268/1 2nd weekly report

25.02.-04.03.2019



The 3 day transit to the German contract area with calm and sunny weather was used to prepare the equipment and the laboratories on board. On 26th of February the multibeam was switched on, a swim test of the AUV in multibeam configuration was performed and the obligatory harbor test of the ROV was conducted as a free water test beyond the 200 nm zone. During this test, first erratic problems with the HD camera as well as hydraulic oil leakage at the right manipulator occurred. Part of the problems seemed to disappear during descent to 600 m water depth. At this point, it may be added that the ROV system experienced a complete inspection and overhaul with a successful concluding test in the marine docks at Kiel.



Launch and Recovery System (LARS) for deployment of the AUV ABYSS on the starboard side of RV SONNE.



Right: LARS for deployment of ROV Kiel 6000 attached to the A-frame on the back deck.

After continuation of the transit RV SONNE reached the German contract area on February 27. The working program was started with the deployment of the long baseline transponder network for the underwater navigation of the AUV. A CTD station followed to obtain a sound velocity profile for the calibration of the multibeam, a calibration of turbidity sensors and for sampling bottom water with the water sampler carousel. After this, the calibration of the transponder was performed to obtain an accurate positioning of the AUV. During the night the working area was mapped with the multibeam of SONNE to have a basis for the upcoming investigations.

In the morning of February 28 the AUV was deployed with its launch and recovery system (LARS) to perform a high resolution mapping within a 12 km² section of the working area. After this, the first deployment of the brand new multicorer of the Senckenberg Institute was conducted using the video telemetry system of RV SONNE for video-guided sediment sampling. With 3 successful, consecutive deployments, each providing 20 cores, the whole group of biologists, microbiologists and geochemists received their first samples from 4080 m water depth.



Preparation of the equipment (Elevator-Lander with Launcher, box corer and multicorer) on deck as well as the first video-guided deployment of the new multicorer.

Before the AUV resurfaced after a 12-hr deployment, the remaining time was used to recover a short mooring belonging to BGR, which will be redeployed during this cruise. After this, the AUV arrived at the surface on schedule and was recovered with its LARS. This was the first successful deployment of a new team under remote supervision from colleagues in Kiel.

Now both elevator landers equipped with modules for in situ measurements and experiments were deployed video-guided by a launcher in the immediate surrounding of the 1st ROV dive.



Right: Elevator-Lander with launcher on top.

On 1st of March the ROV was sent to depth, unfortunately additional problems as encountered during the test dive occurred. The HD was functional again, but the two landers were found only by using the acoustic beacons as the sonar of the ROV failed completely. This instrument has a fundamental function for the ROV. Comparable with a radar helping a surface vessel to find objects in fog, the sonar is used to relocate small objects in the sediment cloud the ROV's propeller are creating during deployment of the modules in the surrounding of the elevator landers. Due to this, the landers were not unloaded and a mapping transect for macrofauna occurrence was started. Unfortunately, this had to be terminated soon due to the ongoing leakage of hydraulic oil.

After this, the work program had to be changed to simple mechanic sampling of macrofauna by the box corer. Unfortunately, even this proved to be not successful as the trigger mechanism of the boxcorer was not working well and with two trials only one bad sample was recovered. After re-installation of the video equipment on the OFOS the sled was deployed for an optical survey of the seafloor. Here, during descend close to the seafloor problems occurred with the fiber optic cable and the instrument had to be recovered. Again a change of plan and the CTD with water sampler carousel and 5 in situ pumps installed in different depth on the cable was deployed to sample water for suspended particles and microorganism on filters for a 4 hour in situ incubation.

After recovery of the pumps the sampling with the box corer on the wire and the search for failures on the ROV and the fiber optic cable were continued. In the case of the boxcorer with success as the box penetrated into the sediment but without sample recovery due to the trigger mechanic which refused to work properly even after mechanic treatment. However, the subsequent deployments of gravity corer and multi corer on the wire recovered the desired sediment samples. On the morning of the 3rd of March the ROV was deployed again and we hope that we will be able to perform the central objectives without the sonar.

The encountered problems show again the technical challenges of such work in the deep sea which may jeopardize a well prepared and ambitious working plan easily. At this point, more options for test cruises with dives and deployments for technical tests are needed under real deep-sea conditions. Nevertheless, all members of this cruise are very motivated despite the severe draw backs and are trying to achieve the best in the present situation.

Many greetings in behalf of the scientific party of SO268/1,

Peter Linke