

Recovery of the IOW profiling mooring

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The second trial of the profiling mooring for the Gotland Deep GODESS (GOTland Deep Environmental Sampling Station) started on 3. July when the mooring was deployed from the research vessel Alkor less than 50 m from the nominal mooring position at 57° 20' N, 20° 8' E. The bottom weight was

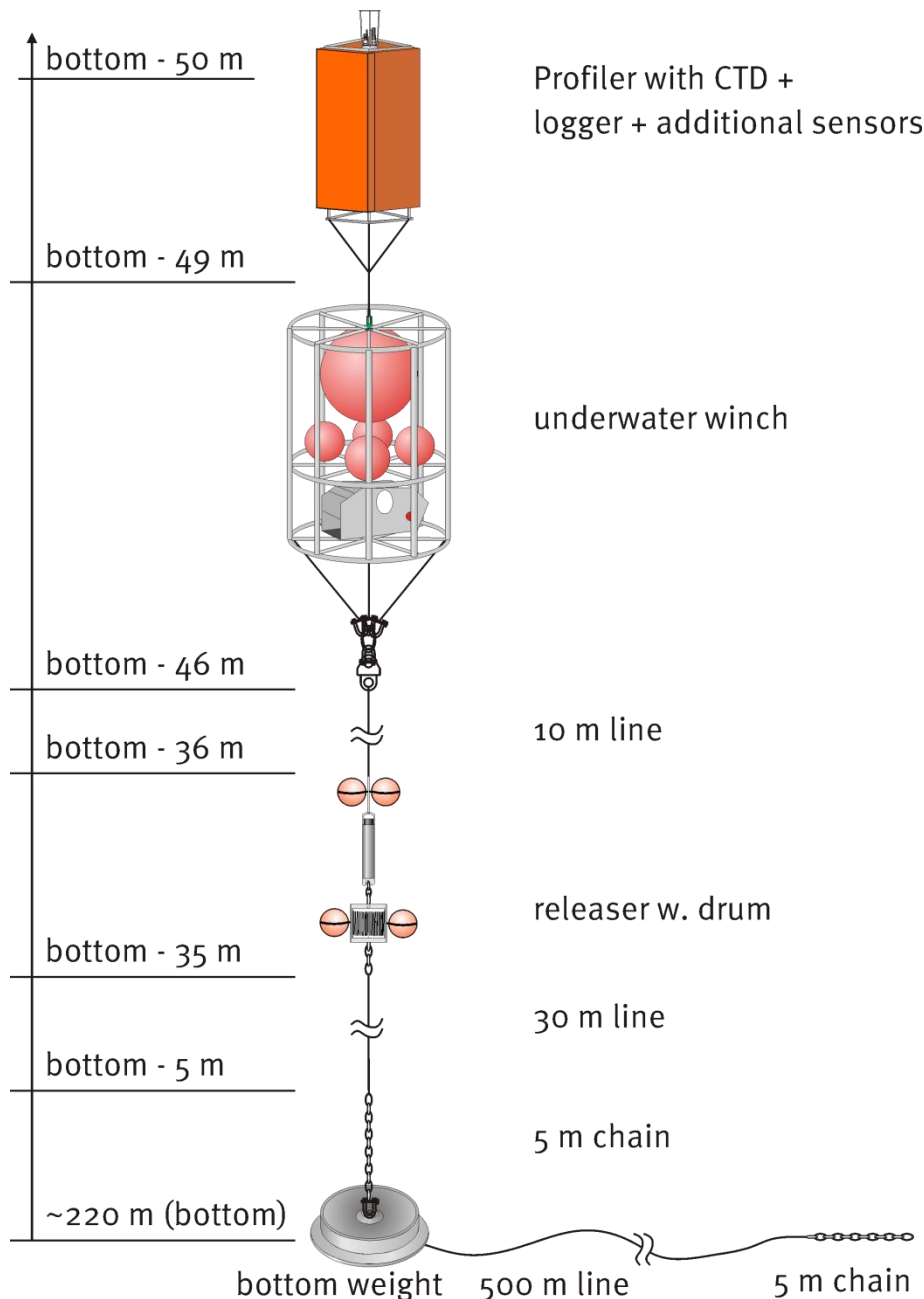


Figure 1: Simplified sketch of the profiling mooring layout.

slipped at 12:51 UTC. Figure 1 shows a simplified sketch of the mooring layout.

The mooring consisted of the bottom weight with attached ground line, a chain with two buoyancy balls, 30 m of Meteor-line, the drum with 350 m of line, the releaser, 10 m of Meteor-line, the underwater winch and the profiling body with Sea & Sun Technology CTD 90M (S/N 468) and the Rinko oxygen optode (S/N 006).

Figure 2 shows the mooring components laid out on deck of the Alkor before the deployment.

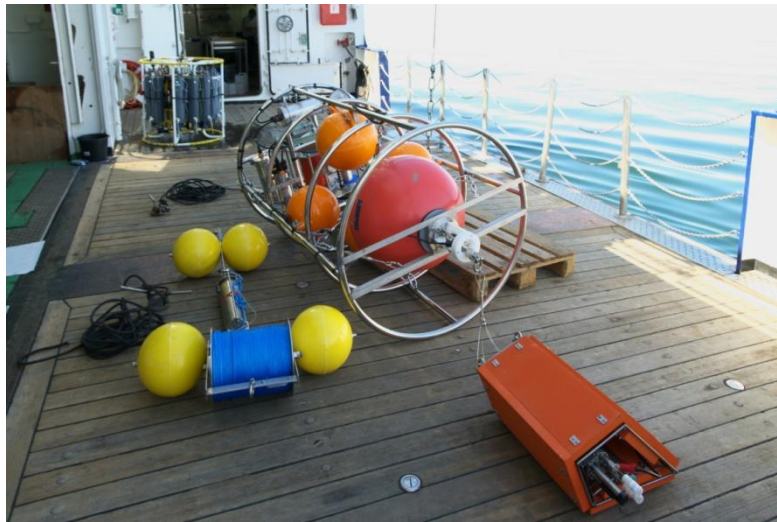


Figure 2: The underwater winch, profiling body and releaser shortly before deployment.

The underwater winch was programmed to release 150 m of line every four hours, beginning at 14:00:00 UTC, stop for 10 seconds and then spool the line back in.

The CTD was programmed to start logging at 13:57:00 UTC for 12 minutes and to repeat this regime every 4 hours. (Since the first deployment had shown that the internal clocks of winch and CTD drift against each other the CTD operation time was chosen so that the ascend of the profiling body would be completely within the CTD operation interval for all profiles.)

On 6. August, almost 34 days after the deployment, the research vessel Maria S. Merian reached the mooring position for the recovery at around 11:30 UTC in extremely calm conditions. The releaser immediately answered the pings from the hydrophone and the distance from the ship to the releaser was ranged at around 750 m. The mooring was released and surfaced about three minutes later. The ship closed in on the mooring and a line was attached to the upper winch frame.

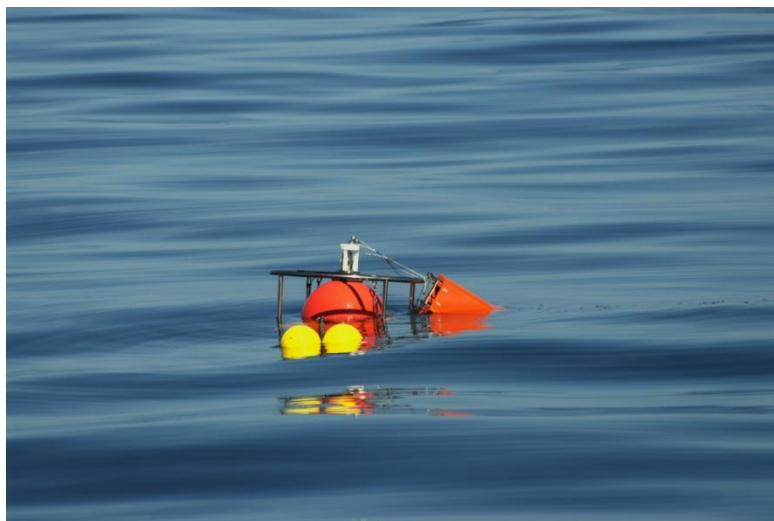


Figure 3: The underwater winch and profiling body shortly before recovery.

After pulling it aft the mooring was recovered via the A-frame. On recovery of the winch the profiling body was ripped off the winch cable and started to drift slowly away. After recovery of the remaining mooring (release line drum, releaser, anchor weight and ground line) the fast rescue boat was lowered to recover the profiling body. It was successfully recovered after about 30 minutes so that the mooring recovery was completed at 13:00 UTC with the return of the fast rescue boat.



Figure 4: The fast rescue boat returning after successful recovery of the profiling body.
Photo: Sascha Plewe.

In this second trial the mooring was deployed for 33 days and took profiles from around 185 m to 40 m every four hours, 198 profiles in total.

The multi parameter CTD has sensors for turbidity, Chl a fluorescence, pH and redox potential in addition to conductivity, temperature and pressure. A fast oxygen optode is also connected to the CTD for the measurement of dissolved oxygen. A first glance at the data on board showed that all profiles were taken successfully; the true value of this dataset will only show after careful analysis and validation. Figure 5 and following show some plots of the data and give a good impression of the type of dynamics that can be captured with a profiling mooring like this.

It can be seen that there is a high variability even below the redoxcline. The duration and intensity of such events can only be estimated by longer term and frequent profiling. We hope that this dataset will allow us to find the optimum profiling interval to balance scientific output with the power constraints of the mooring.

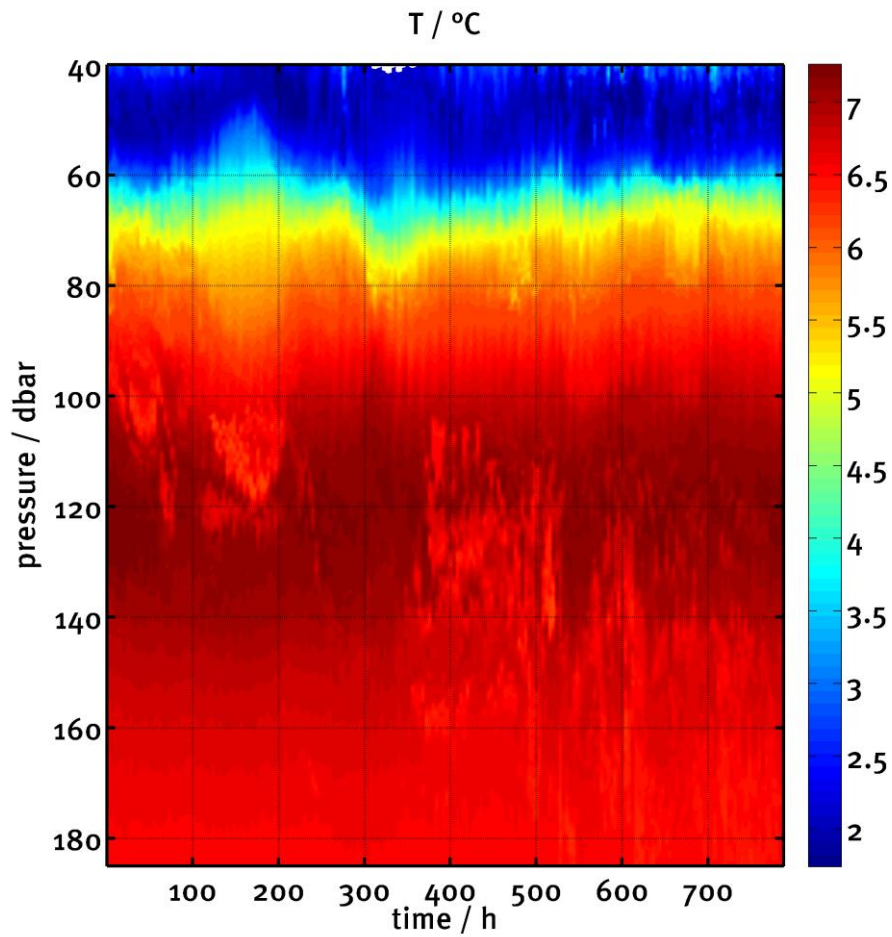


Figure 5: Contour plot of temperature data.

