Weekly Report FS Sonne cruise SO266-2 (BARTER CRUISE)

Introduction

In the Micronesia waters, a 7 km long deep-ocean mooring is planned to be recovered from the deepest point of earth (Challenger Deep, Mariana Trench, 10,925 m water depth) to study the evolution of turbulence generated by slow internal waves in deep trenches. The hypothesis is that the water is not stagnant, but provides sufficient turbulent overturning for deep-sea life, also in the hadal (very deep-sea) zones. The mooring was deployed from RV Sonne during cruise SO252 in November 2016. The line holds 400 high-resolution temperature sensors (in two groups) and two current meters. In addition, a single deep CTD-cast will be made for calibration purposes including the necessary correction for salinity.

Narrative

We left Kaohsiung (ROC Taiwan) on a windy morning of Wednesday 22 November, as scheduled. The monsoon winds along the east-coast of Taiwan, up to Beaufort 9, made for a slightly bumpy. But the Sonne is a sturdy ship and coped well with the wind and sea-state. The following days we had to change to a more southerly course, because of the developing typhoon Man-Yi, which was right over the Mariana Trench when we left Taiwan, and thus precisely on our route.

On Tuesday 27 November we arrived in the working area shortly after lunch. We prepared to recover the mooring from the bottom of the Mariana Trench. However, after extensive pinging using hydrophones no acoustic response was established with the releases just above the anchor weight. No surfacing of the mooring top-buoy was observed, not visually, not via its radio beacon or satellite beacon. After exhaustive attempts that continued the following morning also using two different deck-units the conclusion was that the mooring is still under water.

As we did not establish acoustic contact we can only hypothesize what went wrong. Possibly the mooring is entirely at the bottom, which would require the flooding of all glass spheres, for example. Or, the releases were out of reach, i.e. 11 km is too far away. Or, the strong underwater density layering is hampering deep sound penetration. We don’t know.

Meanwhile, during the night we successfully lowered a CTD without water sampling bottles and any additional sensors to 9900 m. Deeper was not possible due to cable length constraints.

Hans van Haren, chief scientist