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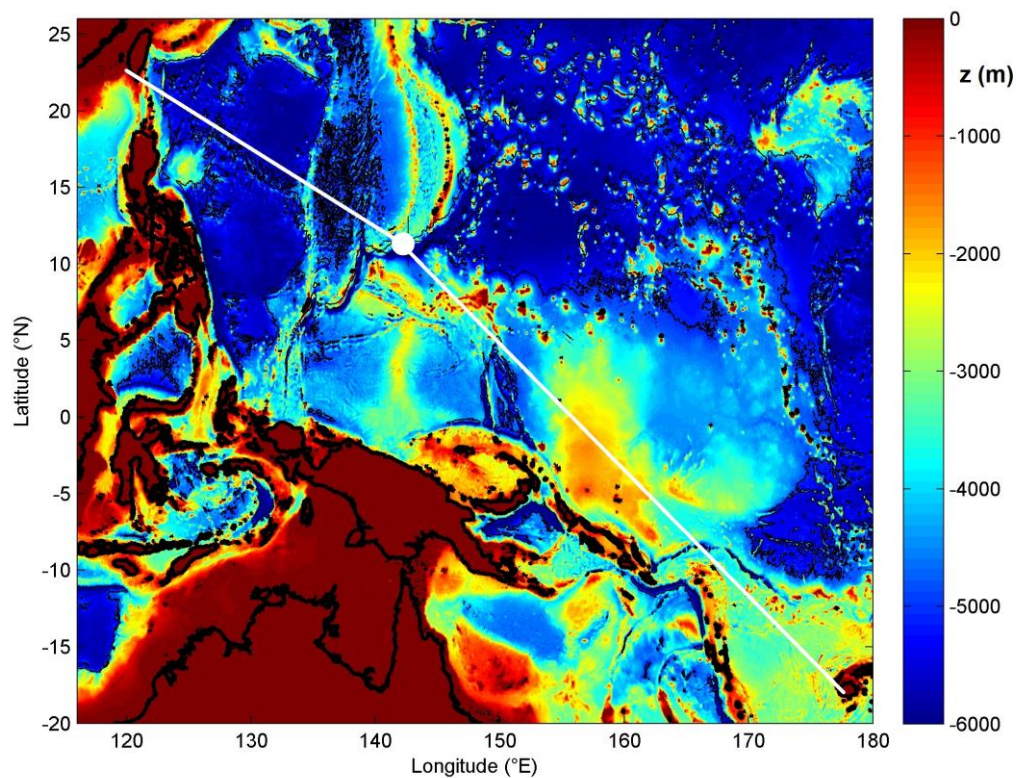
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Short Cruise Report RV Sonne SO266-2

Kaohsiung (ROC Taiwan) – Suva (Fiji)
22 November 2018 – 08 December 2018

Chief Scientist: Hans van Haren

Captain: Oliver Meyer



Objectives

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) 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

R/V SONNE left Kaohsiung on Wednesday 22 November 2018, as scheduled. The monsoon winds along the east-coast of Taiwan, up to Beaufort 9, made for a slightly bumpy. The following days R/V SONNE had to change to a more southerly course, because of the developing typhoon Man-Yi, which was right over the Mariana Trench R/V SONNE left Taiwan, and thus precisely on the planned route. On Tuesday 27 November the ship arrived in the working area at noon. Preparations for recovering the moorings from the bottom of the Mariana Trench were undertaken. However, after extensive pinging using hydrophones no acoustic response could be established with the releases just above the anchor weight. No surfacing of the mooring top-buoy was observed, neither visually, nor via its radio beacon or satellite beacon. Also exhaustive attempts that continued the following morning using two different deck-units were not successful.

Possible reasons for that we could not establish acoustic contact could be a.) that the mooring is entirely at the bottom, which would require the flooding of all glass spheres, for example, b.) that the releases were out of reach, i.e. 11 km is too far away, or c.) that the strong underwater density layering is hampering deep sound penetration. Eventually, we did not recover the 7 km long mooring from $11^{\circ} 19.752' \text{ N}$, $142^{\circ} 11.277' \text{ E}$, $H = 10,905 \text{ m}$ water depth. 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. Pressure information was collected from the ship's winch-rope-length data.

Acknowledgements

I would like to thank captain and crew of the FS Sonne for their great cooperation during this short cruise. I wished I could have shown them first some high-resolution temperature data of the great deep, which remain unknown for now.

Teilnehmerliste

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|----------------------|--------------------------------------|-----------------|
| 1. Hans van Haren | Fahrtleiter / <i>Chief Scientist</i> | NIOZ |
| 2. Martin Laan | Electro-technician | NIOZ |
| 3. Kim Chu-Fang Yang | Scientist | Academia Sinica |

Stationsliste

1. Mooring recovery (failed)
2. CTD 11° 20.39' N, 142° 12.11' E, H = 10,700 m water depth, max D = 9900 m
3. Mooring recovery (failed)