

Forschungsfahrt des FS SONNE **SO 314**:

T-SECTOR Southeast Pacific Rise

13.08.2025 (Papeete/Tahiti) –  
05.10.2025 (Antofagasta/Chile)



### **Scientific Cruise SO 314, 3. Weekly Report: 25.08.-31.08.2025**

During the third week of Expedition SO314 that has received funding by the European Union's Horizon Europe ERC Synergy Grant programme under grant agreement No 101071713 – T-SECTOR the preparations for the first part of the seismic work were finalized by the deployment of the OBS and subsequently data were collected along the first Multi Channel Seismics (MCS) profile between the morning of the 25<sup>th</sup> August and the morning of the 26<sup>th</sup>. For this purpose a 360 m long longer Streamer was pulled behind the vessel and acoustic signals were generated with air guns in the water, the reflections of which provide insights into the structure of the Earth's crust.

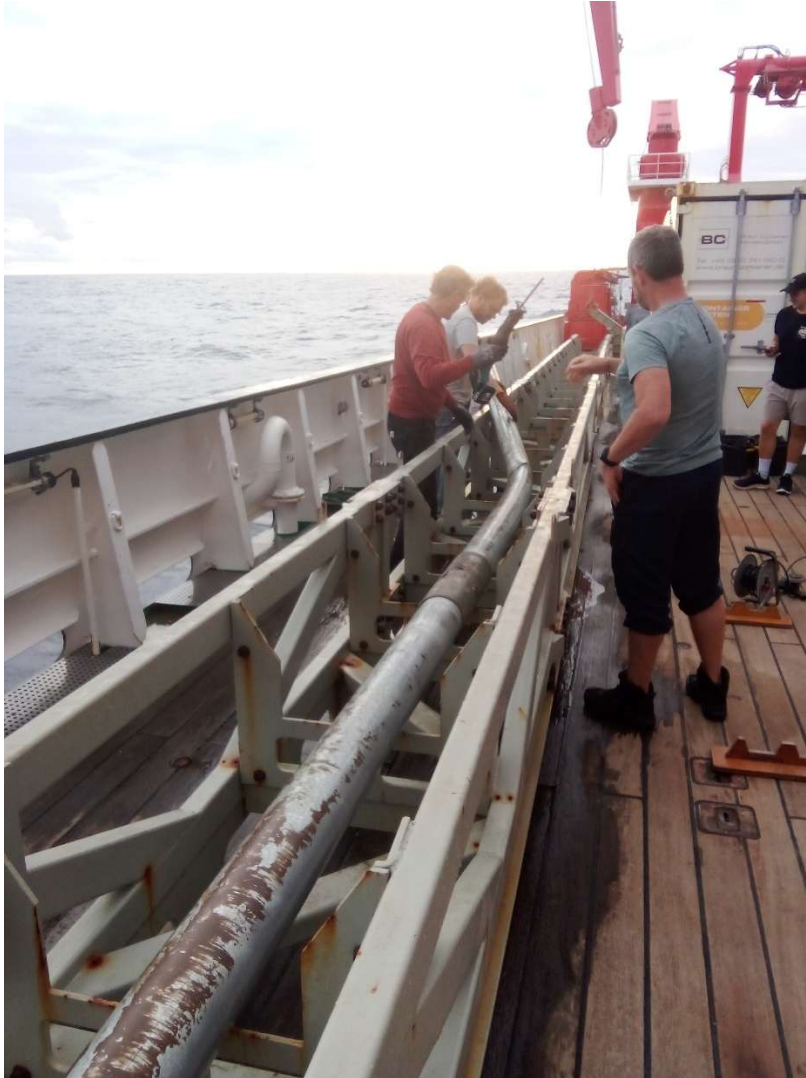
On the 26<sup>th</sup> the sampling of the transect of gravity cores perpendicular to the ridge axis was started on the eastern flank of the Southeast Pacific Rise (SEPR). The Parasound data gained before to map the thickness of the sediment cover along the MCS profile were applied to determine suitable locations for the recovery of sediment cores. Coming from the east the first gravity cores with a length of up to 11 m were taken and several cores pierced the entire sediment cover and reached the basaltic crust below. Some core pipes bent as a consequence (Fig. 1) and had to be replaced. This bending was, however, part of the work program in order to recover undisturbed cores in their lower part of 2 to 3 m length, which will provide valuable information on the evolution of the volcanic activity. These cores are all scanned on board with a Multisensor-Core Logger and variations of parameters such as lightness of the sediments, color and magnetic susceptibility are determined systematically. These data can later be used for correlation of the sedimentary sequences of the cores. In some cores prominent black and dark brown sections were found, which showed differences in magnetic properties during core logging (elevated magnetic susceptibility) and which are likely of hydrothermal origin (Fig. 2).

These layers also contain basaltic fragments and volcanic glasses, that will be separated in the laboratory. At sections of the sea floor that are not covered with sediment, these glasses are sampled with a wax corer. This corer runs punches filled with wax into the seafloor with a high weight and speed. The basalt and glass particles get stuck on the wax and can later be separated and analysed in the laboratory. The reconstruction of the variability in the geochemical composition of these hydrothermal layers and the glasses and their chronological sequence provide information on variations in volcanic activity and their relationship with past sea level changes, which is one of the main goals of the expedition.

Following this coring program the first refraction seismic program was started above the OBS locations on 29<sup>th</sup> August. Due to insufficient signal produced by the air guns the profile was interrupted for maintenance of the geophysical instruments to be continued in the coming week. This time was utilized to carry out a large part of the gravity coring program west of the East Pacific Rise based on the previously gained Parasound-based sediment cover data.

The swell and easterly wind have now gone down significantly and allow station work without any major restrictions.

Everybody on board is doing well and we send greetings from Martin Frank (Chief Scientist SO 314), Heidrun Kopp (Co-Chief Scientist SO 314) and the entire team and crew of SO 314.



**Fig. 1:** Sediment core bent by contact with the basaltic crust, which contains 2-3 m undisturbed sediment in its lower part directly above the basaltic crust.



**Fig. 2:** One meter long section of a sediment core cut into two halves. The core recorded the direct transition between the basaltic crust and the sediments (the white foam prevents slipping of the sediments in the liners).