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, 5. Weekly Report: 08.09.-14.09.2025**

In the morning of the 7th September the measurements for the extension of the seismic profile in easterly direction started and were finalized in the morning of the 8th. The high resolution refraction seismic results are of high quality and highly promising as a consequence of the large amount of ocean bottom seismometers (OBS) for the short distance of the profile and the slow speed of the ship during the acquisition of the profile data. They allow unprecedentedly detailed insights into the structure of the crust and the mantle near the ridge (Fig. 1).

Subsequently the ship returned to the starting point of the profile doing measurements with the magnetometer. Starting in the evening of the 8th the OBS were released again and brought back on board successfully. After another short bathymetric survey until the morning of the 9th the camera sledge OFOS was prepared and deployed to recover one OBS that despite several attempts could not be released and did not return to the surface. During this unusual recovery operation the OFOS sledge was equipped with 4 grapnels on ropes (Fig. 2) and then sent down to the exactly determined position of the OBS. The camera of the OFOS quickly found the OBS at 3000 m water depth, which underlines the impressive precision of the triangulation used for localisation. The OBS was then softly pushed with the OFOS in order to activate the release mechanism, which was possible due to the exact positioning system of SONNE. Unfortunately this did not work. Impressively, thereafter a grapnel was introduced successfully into the frame of the OBS several times, was lifted up and started driving to the surface together with the OFOS thanks to the driving skills of the boatswain and the helmsman of SONNE. Unfortunately, the grapnel slipped out several times and the OBS was sinking back to the seafloor. Given that we will spend another two weeks in the same area, it was decided to stop the recovery operation and to return for a further recovery attempt with a modified grapnel system and improved weather conditions next week.

After the stop of the recovery operation a new high resolution sampling campaign of the sediments on the eastern side of the ridge using the multicorer and gravity corer was started, which ended in the night of the 14th and which at most stations delivered complete sediment cores down to the basaltic basement (Fig. 3). In the early morning of the 14th the deployment of the OBS for the last section of the refraction seismic profile at its easterly end started.

Greetings from Martin Frank (Chief Scientist SO 314), Heidrun Kopp (Co-Chief Scientist SO 314) and the entire team and crew of SO 314.

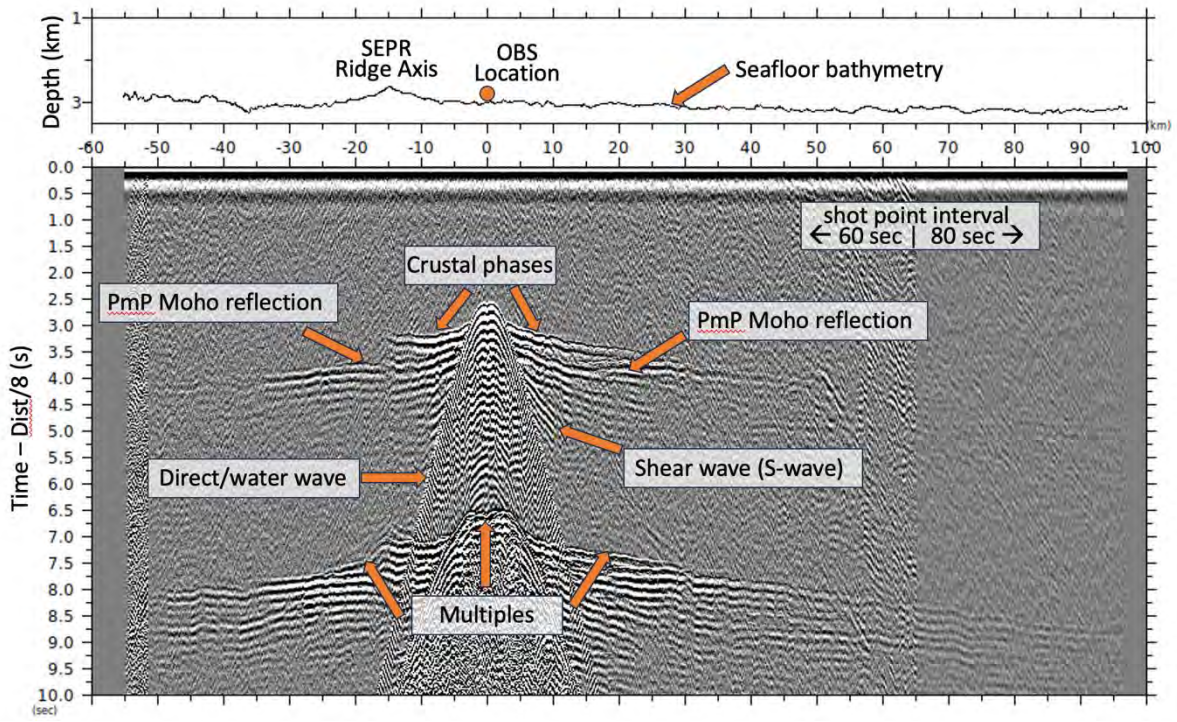


**Fig. 1: New refraction seismic data of the area near the SEPR allow insights into the crustal and mantle structures near the ridge.**

**Fig. 2: View of the four grapnels underneath the camera sledge OFOS, which were used for the recovery of the OBS that could not be released (to the right of the picture).**

**Fig. 3: Sediment core containing a large basaltic glass fragment in the Core Catcher, which proved that the core pierced the sediment cover completely and reached the basaltic oceanic crust.**