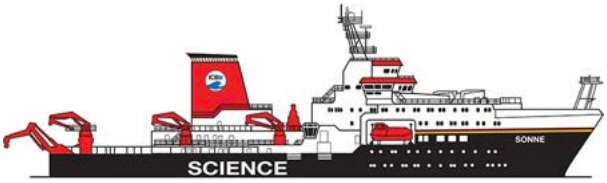
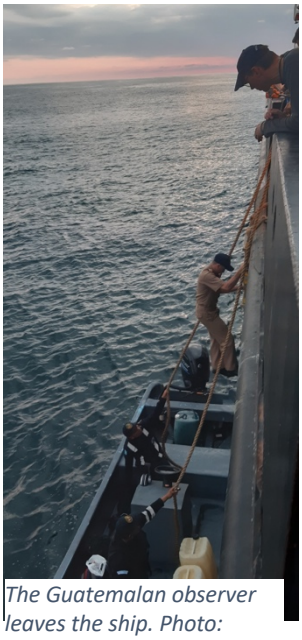



# RV SONNE Expedition SO316
# CAVA Tephras

21.11. – 26.12.2025
Balboa (Panama) – San Diego (USA)

**4. Weekly report (08.-14.12.2025)**

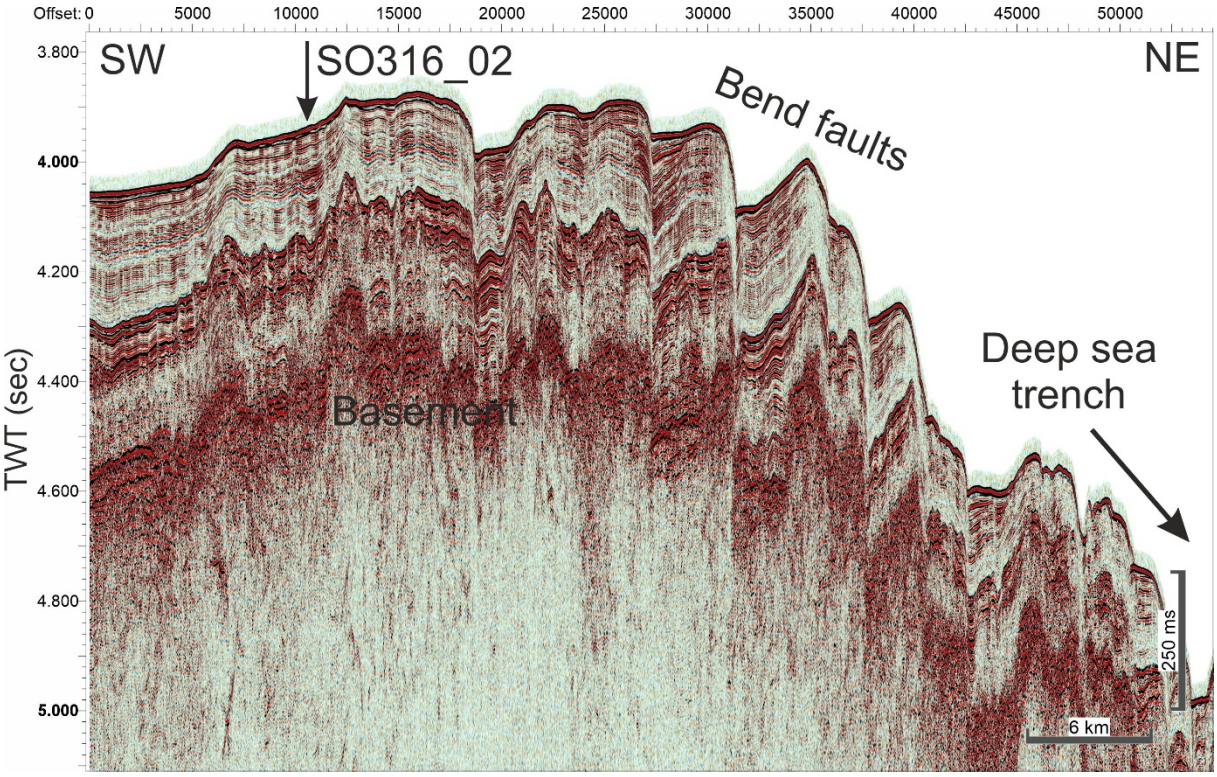


*The Guatemalan observer leaves the ship. Photo: Liseth Pérez*

The fourth week of SO316 was characterized in its first half by logistics. On 9 December 2025, the Guatemalan observer left the vessel close to Puerto Quetzal (Guatemala). Immediately afterwards, the transit of approximately 350 nautical miles to Bahia Santa Cruz (Mexico) began, with the aim of taking the technicians on board for the upcoming work on the winch. During the transit, many of the scientific participants took the good opportunity to join a guided tour of the engine rooms.

Over the course of our transit, we passed through the zone of the so-called Tehuano winds. These occur during the winter months when continental cold air masses from North and Central America advance southward over the Gulf of Mexico, become channelled through the topographic constrictions of the Isthmus of Tehuantepec, and often reach gale force. On the night of December 10, we had gusts of up to 10 on the Beaufort scale.

In the meantime, we had time to process the first seismic profiles. The figure shows a profile in the working area off Nicaragua on the subducting oceanic plate at a water depth of 3000–3800 m. Further to the northeast is the deep-sea trench, which is up to 5500 m deep off Nicaragua. The seismic profile clearly shows the pronounced fault system that extends from the basement to the sea floor. These are normal faults caused by the bending of the subducting plate. These faults, known as bend faults, allow water to penetrate deep into the crust, leading to the hydration of the subducting plate. Above the basement, there are approximately 500 m of sediments, which are undisturbed in many areas and represent promising locations for a future drilling campaign within the framework of IODP3. At these locations, we acquired cross-profiles to map the spatial distribution of subsurface structures. Furthermore, cores have been taken there.




*Processed seismic profile in the working area off Nicaragua. Undisturbed sediments represent promising locations for a future drilling campaign within the framework of IODP3.*

On 10 December 2025, the technicians were taken on board in Bahia Santa Cruz (Mexico) at around 10:00. Immediately thereafter, the scientific work off the coast of Mexico—the final working area of cruise SO316—began. After an additional transit of roughly 16 nautical miles, the starting point of the planned seismic profile was reached, and at around 13:00 on the same day, the 2D seismic profile—approximately 280 nautical miles in length, using a 200-m streamer and a seismic source—was started. Weather conditions in the working area were very stable, and the profile could be completed without interruptions. The preliminary results look very promising.

Following the seismic work, the planned geological operations began on 13 December 2025 around midday. Both the multicorer and the gravity corer were deployed several times. The objective was to obtain a geological profile from the continental shelf, across the continental slope, and the incoming oceanic plate off the coast of Mexico. The profile also included a ~850 cm long core directly from the deep-sea trench at a water depth of ~5500 m and ended with a core location outside the EEZ of Mexico on Sundday the 14$^{th}$ of december to cover the most distal traces of Guatemalan explosive volcanism. Core recovery in general was successful and will yield important samples for subsequent sedimentological, geochemical, and micropaleontological analyses in this region.


*The team of the Marine Geophysics from Kiel University. Photo: Heiko Jähmlich*

Collaboration between the science team and the crew is extremely professional and runs smoothly. We thank everyone for their understanding regarding short-notice changes to the work schedule.

*Gravity corer is back on deck.*

*Photo: Heiko Jähmlich.*

All participants are doing well and the chief scientist sends greetings on behalf of all the scientific participants.

Steffen Kutterolf (GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany)