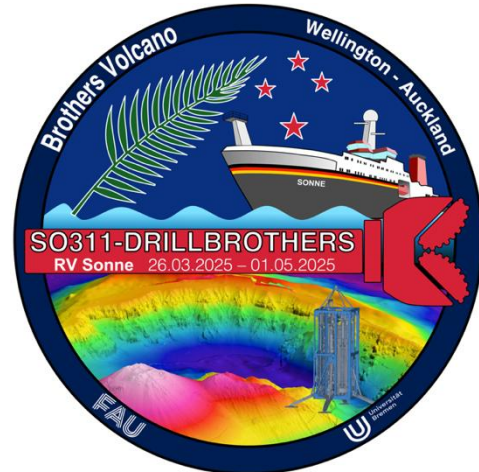


RV SONNE cruise SO311

5th Weekly Report (21. – 27.04.2025)

Back at the Brothers volcano, we were able to continue sampling rocks with the video-guided grab at the beginning of the week. After lengthy and extensive repair work, the grab could actually be upgraded again with the resources available on board. A big thank you at this point to all those involved, especially Bernd Schleifer and Lothar Münch as well as Matthias Grossmann and Thorsten Schott!



The hydrothermally very strongly influenced water body in the Brothers caldera was also sampled repeatedly. A MeBo hole was drilled at the northern edge of the caldera. Again, based on a highly detailed map from our US colleagues, we were able to identify a drilling location directly above a massive sulfide field and place MeBo200 there with pinpoint accuracy. However, the borehole did not reach the hoped-for hydrothermal stockwork zone. Instead, the core liners were filled with loose volcanic material, as we discovered after the drilling was aborted.



Getting to grips is required when the TV grab with samples from a hydrothermal source is brought on board.

Photo: Fabian Hampel

Last week we were able to report on initial exploration work at Ngatoroirangi volcano, which provided evidence of hydrothermal activity. Encouraged by these exciting observations, we moved our working area to this volcano, eight hours northeast of Brothers, on Wednesday night. This time, targeted survey work using SONNE's multibeam echo sounder enabled us to precisely locate the sources of rising

gas bubbles. On the coordinates determined, we were able to detect the emergence of hydrothermal waters and gas bubbles directly on the ground during the subsequent deployment of the TV grab. We had discovered a previously unknown hydrothermal vent at a water depth of 350 m and the joy on board was correspondingly great. We named the hydrothermal field *Kearoa* in honor of Ngatoroirangi's wife, who was involved in his voyages of discovery.



*Getting to grips is required when the TV grab with samples from a hydrothermal source is brought on board.
Photo: Fabian Hampel*

In the course of several deployments of the TV grab, information on the spatial extent (considerable) and composition (diverse) of the Kearoa hydrothermal field was collected and samples taken. One highlight was the recovery of vent structures that exhibit a broad color spectrum and are coated with a layer of elemental sulfur. The diverse colors indicate a wide range of sulfide and oxide compounds of metals and metalloids that make up these structures.

The CTD was able to locate the presumed center of the hydrothermal field, above which a cloud of dark sulfide particles spreads out. Valuable samples for mineralogical and microbiological investigations could be taken from this cloud of particles, known as a *plume* in technical jargon, using the rosette water sampler.

Back at the Brothers volcano, we started our last MeBo drilling on Friday. The target was the southeastern part of the caldera floor, where we were able to core hydrothermally altered basement already in the second week. After the recovery of MeBo, we have planned some final TV grabs and two CTD stations before we start the transit to Auckland on Tuesday evening. It is already clear that, despite various challenges, the SO311 cruise was a success.

I would like to take this opportunity to express my special thanks to the MeBo team for their determined and persevering commitment to the challenging tasks. The FAU team from Erlangen handled the deployment of the TV grab in an exemplary manner. And the expert use of the CTD by Fanny and Aaron Röhler yielded high-quality samples with high hydrothermal signals, which are very valuable for upcoming microbiological and biogeochemical investigations. The expert use of the echo sounders by Paul Berndt proved crucial in the discovery of Kearoa.

Everyone on board was irreplaceable in one way or another during the cruise. The atmosphere in the entire research group was always very good. The unwavering and absolute support from the crew of the SONNE was crucial. The ship's engineers and engine attendants worked tirelessly to keep the ship ready for our demanding station work. The captain and bridge were always ready to provide maximum support for our research work. From day one, the galley and service made every trip to the mess an event that everyone looked forward to.



The group photo is not deceptive! Towards the end of SO311, the research group is happy with the results of their work. (Photo: Jannes Focken)

Although the station work has not yet been fully completed, it is already clear that the SO311 research cruise will remain a very positive memory for everyone.

Best regards, also on behalf of all participants,

Wolfgang Bach