



RV SONNE cruise SO299 DYNAMET

06.06. – 29.07.2023
Townsville (Australia) – Singapore

Weekly Report No. 3
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At sea, 3° 19'S, 152°35'E



On Monday we used the video-guided grab ('TV-grab') of GEOMAR for the first time during the current expedition. The advantage of this device compared to the chain bag dredge is that you can use the grab to take a sample with pinpoint accuracy and make a visual video reconnaissance before deciding on a suitable sample. The target of the grab operations were several morphological elevations south of Tabar Island, whose origin was unclear until now. Previously, there was speculation about a potential mud volcano at this location, but we were able to show that all corresponding structures are of magmatic origin. Since we could not recover a rock sample from one of the hills with the grab, we decided to use the robust dredge and were successful. Afterwards, a first sediment core sample was taken with the gravity corer.



Clams gather around a small fluid vent at 'Mussel Cliff'. Picture: GEOMAR/ROV-Team.

Tuesday was the fourth dive with the ROV Kiel 6000 at the so-called "Mussel Cliff". This is described in the literature as a possible cold seep. Instead of an imposing cliff, we found an edge of the terrain where small mussel fields and at least one discharge of cold fluids could be detected. The carbonate crusts as well as the alkalinity values in the pore waters of a pushcore support the hypothesis of a cold seep. In the evening, two gravity core stations followed at the

locations where we had previously measured the highest and lowest heat flux density with the BGR heat flux probe, respectively. During the night, we transited to the working area around the Weitin fault south of New Ireland.



Low-grade metamorphic volcanic rock with veinlets formed by tectonic deformation. Foto: SO299 Science Party.

Wednesday was spent mainly mapping the crustal block south of New Ireland. The EM122 multibeam echo sounder of the 'Sonne' nicely showed its capabilities and provided a high-resolution digital elevation model of the seafloor, which was between 3 to 8 km deep. On Thursday, two dredges followed at great depths, one in more than 5 km water depth on the eastern edge of the Weitin submarine canyon and one in just under 4 km water depth on the western edge. Both dredges revealed low-grade metamorphic and partly disturbed

volcanic rocks as well as >2 million years old carbonates. We then continued our hydroacoustic surveys and planned the next ROV dives. Friday's mapping was also used for another safety exercise. After two more dredges during Saturday night, a dive with Kiel 6000 was made during the day, starting at a depth of just over 5000 m. On surfacing, a brief moment of shock as a thick anchor or fishing - line several hundred metres long - had wrapped itself around the cable of the ROV. Fortunately, there was no damage to the diving robot. After recovery of the ROV, the crew of 'Sonne' also recovered this line and thus freed the ocean from at least one piece of garbage. Sunday night and during the day, we continued our geological exploration of this tectonized crustal block using a combination of hydroacoustic methods and rock sampling with dredges.

All participants are well and the interaction between science and ship continues to be excellent.

On behalf of all participants, greetings from aboard the RV SONNE,

Philipp Brandl

Chief Scientist