

Cruise SO 313 with RV SONNE

Louisville Ridge

At See 31° 37'S, 172° 00'W



5. Weekly Report (30.06. – 06.07.2025)

On Monday, 30 June 2025, we completed our work on Seamount 420 in the northern working area with the recovery of the almost 2500 m long mooring and an L-ADCP/CTD station at great water depth (4200 m). During the subsequent transit to the Burton Seamount in the southern working area, the EM122 mapping was completed on the seamounts along the way. Furthermore, measurement and sampling programmes were carried out with L-ADCP/CTD, the multinet and the trace metal CTD. The data and samples obtained are required for the characterisation of the regional water masses.

On the night of 3 to 4 July, we reached Burton Seamount and continued the investigations with a deep L-ADCP/CTD station (4700 m) on its south-western flank. Subsequently, two TV grab stations were successfully deployed to sample ferromanganese crusts on the previously unsampled western flank of the seamount. The second mooring, which was deployed at the beginning of the cruise, was then recovered which means that 21-day time series of the currents at both seamounts are now available. Burton Seamount and Seamount 420 have very different shapes and dimensions, the latter being a guyot with a large, diamond-shaped plateau, while the former has a truncated cone shape (with a relatively small summit plateau) that promotes closed circulation around the seamount. The moorings were each equipped with two current profilers, upward-, and downward-looking, to record the flow field above and below the summit of the seamounts (Figure 1). Each of these instruments monitor the currents over a range of several hundred meters. The mooring LR1 was positioned on the south-western flank of Seamount 420 in a water depth of approximately 3450 m to additionally cover deeper flow field along the western flank of the seamount chain, while mooring LR2 was positioned on a plateau north-east of the summit of Burton Seamount in a water depth of approximately 1920 m. Both moorings were additionally equipped with trace metal samplers (so-called passive samplers), to connect the observed flow patterns to the availability of trace metals in the water column. Post-cruise, the data from the moorings will be analyzed with regard to mean flow, short term variability, and tidal oscillations, and subsequently used to validate a regional circulation model to study the connectivity between the individual seamount ecosystems.

After recovering the mooring on Burton Seamount, we travelled to Louisville Seamount, which is located approximately 130 km to the north and forms a guyot like Seamount 420, but is somewhat smaller in size, for further connectivity investigations. Since the evening of 4 July, we have been carrying out a biological sampling programme in four areas of the summit plateau, which includes multicorer, epibenthic sled, seamount sled and multinet stations. This programme is supplemented by further L-ADCP/CTD and water sampling stations to the south, north and in the central area of the seamount. In addition, further ferromanganese crusts will be sampled at four locations on the summit plateau and at two locations on the western slope down to a water depth of 4000 metres.

We are now in the final days of the SO313 expedition, next Wednesday, 9 July, the transit to Auckland begins. All participants of SO313 are doing well. Co-operation with the ship's crew continues to be excellent and the atmosphere on board is very good despite occasional low pressure systems passing through the working area.

Best regards,

Thomas Kuhn (Chief Scientist)



Figure 1: Recovery of the top-buoy of mooring LR2 over the rear A-frame of RV Sonne. The buoy consists of the spherical orange flotation device, with an Acoustic Doppler Current Profiler (ADCP) mounted inside the sphere. Photo: J.Mette.



Figure 2: Basalt sample with ferromanganese crust and black corals recovered from 1162 m water depth at Louisville Seamount with the TV grab. Photo: S. Sturm.

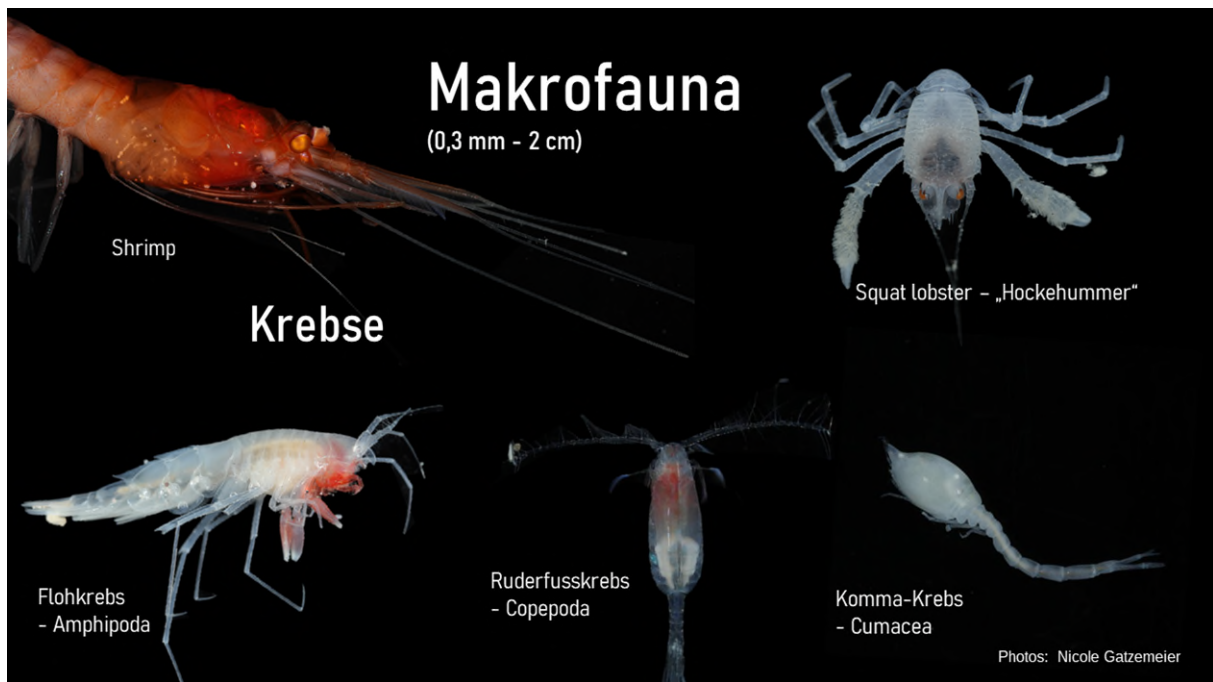


Figure 3: Photographs of macrofauna from various epibenthic sled stations from Seamount 420 in the northern working area.