



The resilience of deep-sea benthic communities to the effects of sedimentation

Tēnā koutou katoa, nau mai hoki māi ki tō tātou pānui. Ma te waka eke noa, kia mahitahi ai!



The Voyage

The ROBES programme has two components, a field survey experiment with in situ observations of a sediment plume, and laboratory-based experiments. Here we describe some key results from the benthic impact survey carried out in May-June 2018 on the Chatham Rise using NIWA's research vessel *Tangaroa*.

Initial survey results

Baseline data were collected on bathymetry, topography, water column characteristics, sediment composition, and faunal community structure and abundance prior to disturbance, and then up to twice post-disturbance. There were 254 discrete sampling events. Key elements included:

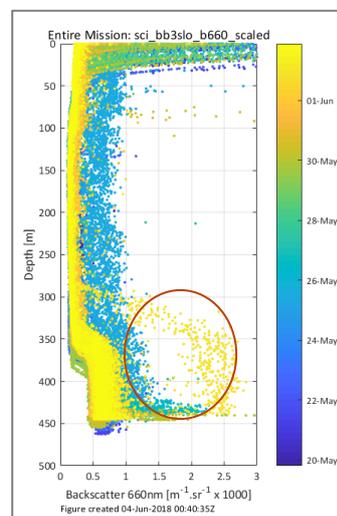
- A "Benthic Disturber" was used to create a sediment plume on 3 occasions with towing periods between 12 and 30 hours.



- Current flow was assessed using the vessel, moored current profilers, and NIWA's underwater glider.
- Water column data were collected from a conductivity temperature depth (CTD)-rosette, multibeam echo-sounder, and fisheries acoustics sounders.
- Several sounder transect surveys were run to map the area of disturbance pre- and post-disturbance, and a CTD grid was completed immediately after disturbance events to sample the plume.



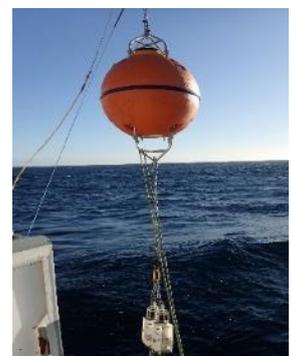
- Three new benthic landers were deployed downstream of the disturbance site with an array of sensors, including sediment traps.
- Detailed sediment sampling with a multicorer (supporting onboard respiration experiments as well as sediment profile data), and extensive deep towed imaging system (DTIS) towed camera stations were completed.
- The Disturber produced less extensive sediment plumes than expected as it did not stir up the heavier sandy component of sediments in the area.
- There was little immediate visual impact on the seabed as the fine sediments appeared to disperse rapidly in the relatively fast bottom current conditions.
- However, a plot of optical backscatter data collected by the glider, shows a plume extending from the seafloor at 450 m to 300 m (circled)



- Live deep-sea sponges were also collected for sedimentation experiments back at the laboratory.



- Three mooring arrays were re-deployed at the end of the survey for a further 12 months to monitor current and sediment dynamics.



Next steps

The survey collected a large amount of oceanographic, sedimentological, and biological data that provided significant insights into plume effects and will support a wide variety of analyses in the coming months.