Benthic lander sites (L1, L2, L3) and 'Baseline' sediment trap moorings (2018ST and ST) deployed during the 2019 survey at the 'Butterknife' seafloor feature on the crest of the Chatham Rise in ~ 400 m water depth.

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

Tēnā tātou katoa, whakatōrea te pūtaiao, kia kimihia ai e te rangahau tika!

BY LEE RAUHINA-AUGUST, MALCOLM CLARK, DI TRACEY

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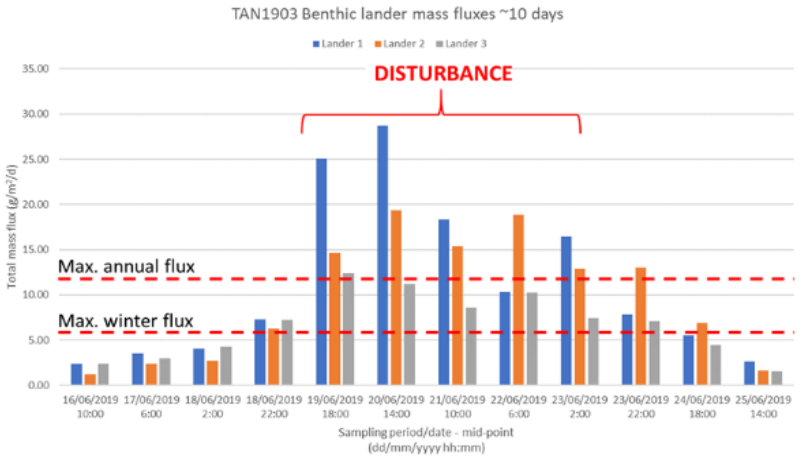
Ngā mihi mahana ki a koutou

With the completion of the ROBES survey series, the team's attention is strongly focused on processing samples and analysing data. Our next series of flyers will provide snapshots of the various aspects of this research. Here we present an update on: **Sediment dynamics**

Prior to the ROBES project, little was known about the dynamics, magnitude and temporal variability of sediment transport processes on the Chatham Rise. The three surveys (see previous Information Flyers #2, #5, #7) have used *in situ* observations to provide information on the concentrations and distances of the impacts of suspended sediment on faunal communities.

Part of the ROBES team, NIWA's Principal Scientist **Dr Scott Nodder** has now analysed the data collected by the Sediment trap moorings deployed on each of the Voyages on *Tangaroa* (see Flyer #7)

Scott holding the current meter that was attached to the sediment trap mooring. The equipment is covered in hydroids which are non-calcified soft and feathery hydrocorals.



Plot of the near-seabed total mass sediment fluxes at the three benthic lander sites in the vicinity of the disturbance experiment conducted at the 'Butterknife' feature.

Note that these fluxes are over approximately one day sampling intervals. The fluxes are compared to the maximum annual and winter values obtained from 'Baseline' sediment traps moored at 15 m above the seafloor in 2018-19 and 2019-20.

When retrieved the moorings, that have been on the seafloor floor for a year, come up festooned with biofouling.

Visual observations of the trap samples indicated a high benthic contribution to the near-bed sediment fluxes, with sponges, coral fragments, and benthic foraminifera commonly seen, although gelatinous organisms (jellyfish) were also abundant.in the traps.

Near-seabed sediment fluxes were measured using sediment traps moored 15 m above the bottom over two years (2018-2020) to determine baseline conditions on the crest of the Chatham Rise as well as traps mounted on the benthic landers at 2 m above the bottom deployed over the course of the disturbance experiments.

During the 2019 disturbance experiment undertaken at the 'Butterknife' , the sediment plume generated by the physical disturbance of the seafloor led to sediment mass fluxes measured by the lander traps that were up to two-times higher than the maximum annual baseline fluxes and significantly more than the fluxes one might expect under winter conditions when fluxes are typically at their lowest during the seasonal cycle.

While the ROBES disturbance experiments reflected an increase in benthic sediment fluxes, over and above baseline environmental conditions, it is expected that these would be substantially less than under deep-sea mining scenarios where modelled suspended sediment concentrations are in the order of 10 to >100 grams per litre, compared to maximum values of 3-5 milligrams per litre measured during ROBES.

Kia whiria te mātauranga o te moana

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