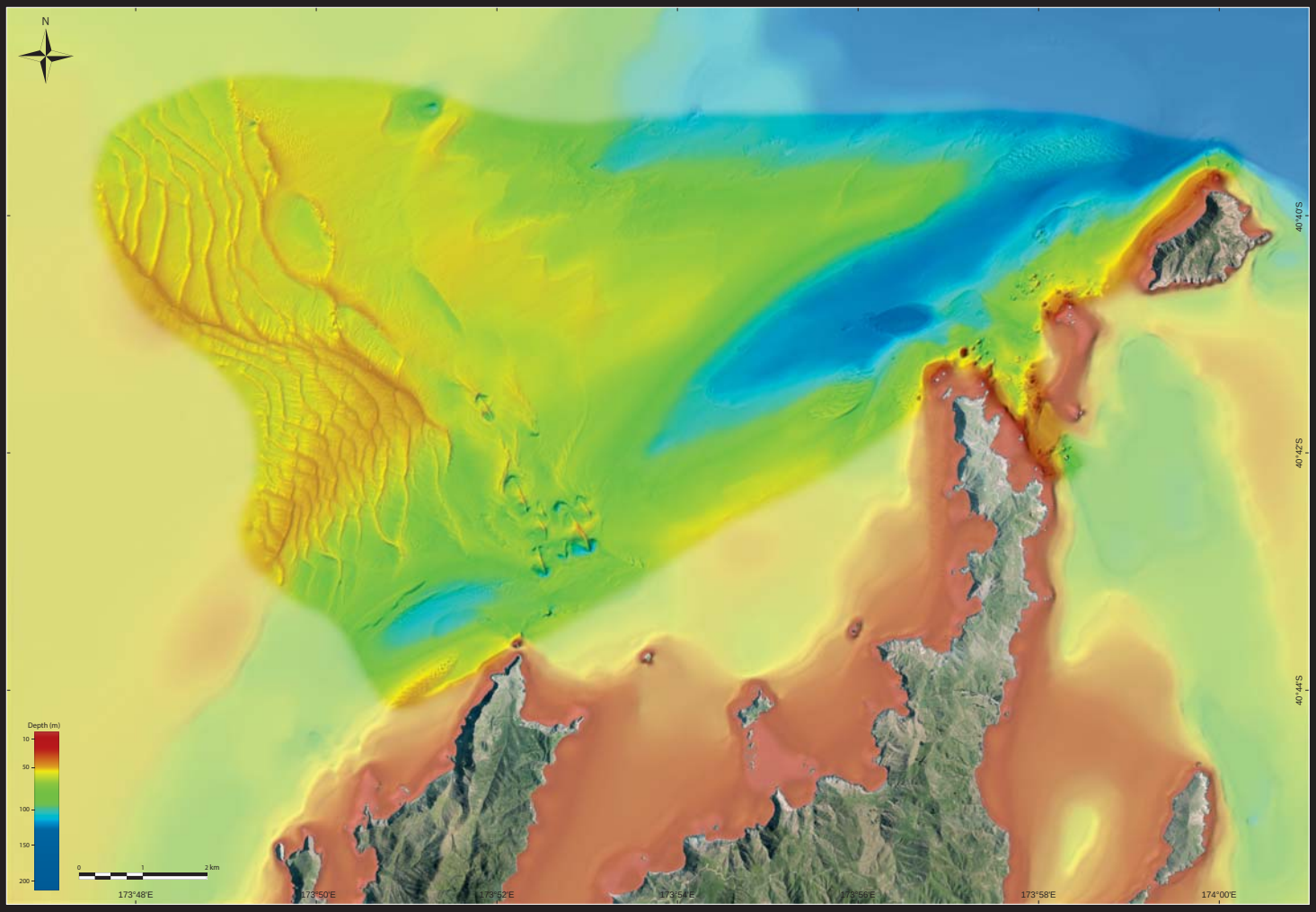
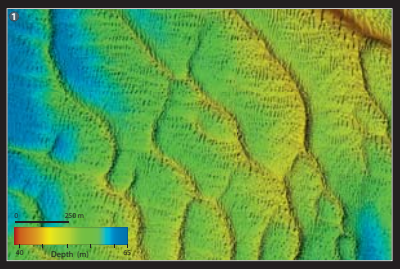
Beneath the waves
Northwest D'Urville

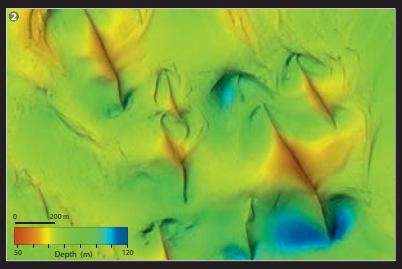
Marlborough District Council
Significant Marine Sites Programme





Sediment Waves

Energetic tidal currents coupled with abundant coarse-grained sediment have produced distinctive patterns on the seafloor. Here, a field of sediment waves range in height from 5 to 10 m and have wavelengths (crest to crest) of 200 to 400 m. Megaripples on top of the sediment waves have heights of 1 m and wavelengths of 10 m.



Strike Ridges

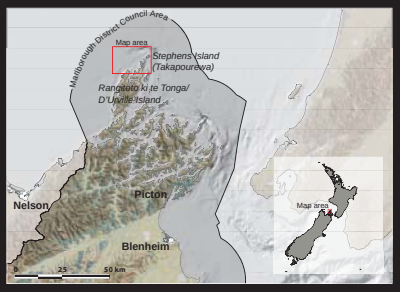
Layers of rock that crop out perpendicular to the direction of powerful Cook Strait tidal currents are more resistant to erosion. This results in the formation of strike ridges that protrude up to 30 m above the surrounding seafloor. Depressions at their ends are a consequence of scour of less resistant sands and gravels.

Macroalgae

A rich diversity of macroalgae (seaweed) grows around New Zealand's rocky coast providing food, habitat and shelter for many marine organisms. A genus and species of macroalgae, *Marginariella boryana*, found only in New Zealand, ranges from Cook Strait to the subantarctic islands in the south. These macroalgae grow on subtidally exposed coasts and also in deep calm water.

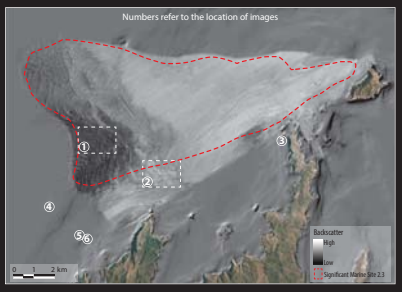
Sand Ripples

Bottom sediments in Cook Strait are highly mobile and are moved about over daily to yearly time scales by tidal currents and storm events, often stacking bedforms. Smaller sand ripples frequently overlay larger sediment waves and megaripples. Here, a starfish (*Astropecten polyacanthus*) and a hermit crab (in a gastropod shell) sit upon a sandy seafloor with ripple wavelengths of 10 to 20 cm.



Overview

The Marlborough District Council recently identified a number of significant marine sites including 60 km^2 of seafloor northwest of Rangitoto ki te Tonga/D'Urville Island and Stephens Island (Takapourewa). In May 2015 a high-resolution multibeam echosounder was used to reveal the shape and depth of the seafloor off D'Urville Island. The echosounder transmits a fan of 800 beams of sound and collected 200 million soundings over the survey area of close to 100 km^2.



Seafloor Sediment

As well as water depth, a secondary signal of reflected sound intensity (backscatter) is recorded. Backscatter intensity can help identify the type of seafloor substrate; whether it is hard or soft, or sediments are coarse- or fine-grained. This provides valuable information about the physical benthic habitats. This region is predominately reflective seafloor (white to grey), indicative of coarse-grained sediments.

Seafloor Gravels

Tidal flows are accelerated around the headlands of Stephens and D'Urville islands, eroding the seafloor and forming depressions or holes. Gravel covering the seafloor is common where these strong currents scour and winnow the underlying seabed, transporting finer sediment away.

Benthic Communities

Gravels provide substrate for a range of benthic organisms. The two images here show a developing invertebrate landscape of brittle stars, sponges, sea stars, gastropod and bivalve shells, and the orange encrusting form of the bryozoan *Cellaporaria agglutinans*.

MARLBOROUGH DISTRICT COUNCIL

Bibliographic Reference
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www.niwa.co.nz
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NIWA
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