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Initial characterization of cold seep faunal communities on the New Zealand Hikurangi margin

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Abstract

Cold-seep communities have been known from the North Atlantic and North Pacific for more than 20 years, but are only now being explored in the Southern Hemisphere. While fisheries bycatch had suggested the presence of cold seeps on the New Zealand margin, the biodiversity and distribution of these communities remained unknown. Explorations using towed cameras and direct sampling gear revealed that cold seep sites are abundant along the New Zealand Hikurangi margin. Initial characterization of the faunal communities at 8 of these sites indicates a fauna that is associated with particular sub-habitats but which varies in abundance between sites. Community composition is typical, at higher taxonomic levels, of cold seep communities in other regions. The dominant, symbiont-bearing taxa include siboglinid (tube) worms, vesicomid clams and bathymodiolin mussels. At the species level, much of the seep-associated fauna

identified so far appears either to be new to science, or endemic to New Zealand seeps, suggesting the region may represent a new biogeographic province for cold-seep fauna. Some overlap at the species and genus level is also indicated between the sampled seep communities and the fauna of hydrothermal vents on the Kermadec Arc in the region. Further taxonomic and genetic identifications of fauna from this study will allow us to fully test the levels of species overlap with other New Zealand chemosynthetic ecosystems as well as with other cold seep sites worldwide. These apparently novel communities exhibit evidence of disturbance from a deep bottom-trawl fishery and appear to be threatened along the entire New Zealand margin. As bottom fisheries, mining, and fossil-fuel exploitation move into deeper waters, seep communities may be endangered worldwide, necessitating the initiation of conservation efforts even as new seep ecosystems are discovered and explored. Our findings highlight the unique nature of anthropogenic impacts in the deep-sea, in which reservoirs of biodiversity can be impacted long before they are even known.



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Keywords

cold seep; biogeography; chemosynthetic ecosystems; trawling impacts; New Zealand

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