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Multi-disciplinary monitoring of seamounts in the southwestern Pacific

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Due to their elevation above the sea floor, seamounts are **unique underwater structures**. An important number of these structures can be found in the Pacific and may have a key **role** in the ocean. They host a variety of energetic flow-topography interactions, which lead to strong levels of turbulent transport and mixing. These are believed to shape, or at least strongly impact, benthic communities. Seamounts feature diverse environmental conditions and faunal communities and some have been qualified as **hotspots of diversity and biomass**, and they can attract fish and marine mammals. Seamounts are therefore often subject to fishing effort that impacts benthic habitats when targeting demersal species using bottom trawls. They are also potential targets for mineral exploitation as these environments favour the development of cobalt-rich crusts.

Because of their extension along the bathymetric gradient, seamounts are also key systems for studying the coupling between benthic and pelagic compartments and the **effects of climate change on deep-sea ecosystems**. The Natural Park of the Coral Sea in New Caledonia where the seamounts are not stressed by any resource exploitation is a good case study to improve knowledge on their functioning and dynamics by long term monitoring.

The ScInObs-New Caledonia observatory project aims at acquiring multi-disciplinary data on two different seamounts contrasting by their faunal (benthic and mesopelagic) water masses, and geological characteristics in order to better understand the role of environmental drivers of the biodiversity, and the impact of seamounts on the hydrodynamics and turbulent mixing. The data acquisition started with the KASEAOPE-1 cruise in 2023 when a 800 m long mooring was deployed to monitor over a period of 18 months and at very high resolution, a set of parameters on a seamount slope, together with a Edokko type lander to observe the seafloor. In 2024, a benthic station also observing simultaneously the upward water column was deployed on top of the same seamount. The technologies developed for observation, such as the benthic station, aim at reducing environmental impact. Three additional cruises are planned until 2028.