Microplastic intake by deep-sea fishes of the Western Indian Ocean

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Deep-sea fishes exhibit diel vertical migrations, moving from the sea surface to deeper depths at dawn. This behavior plays a crucial role in the transport of organic carbon and nutrient recycling in the global ocean, facilitating the release of organic material through faecal deposition, which then sinks from the upper surface to the deep ocean layers. The connection between the epipelagic and mesopelagic layers is vital, as it accelerates the downward flux of carbon and nutrients.

However, the pervasive issue of plastic debris in the marine environment raises concerns about its impact on deep-sea organisms. Despite the prevalence of plastic contamination, particularly in the Indian Ocean, significant knowledge gaps persist. This project aims to address these gaps by investigating microplastic contamination in the digestive tracts of hyper-abundant and widespread deep-sea fishes in the Western Indian Ocean.

Deep-sea fish were collected during previous research cruises at various locations, including the shallow seamounts La Pérouse, MAD- Ridge, Walters Shoal, and around Reunion Island. These underwater topographic features are crucial habitats for a diverse array of micronekton species, including mesopelagic fishes, crustaceans, squids, and benthopelagic fishes.

The general objective of the project involves dissecting 150 deep-sea fishes collected from previous cruises, taxonomically identifying them, and analyzing their gut contents for potential microplastic particles. Specific objectives include:

- Investigating the differences in microplastic intake by deep-sea biota among La Pérouse, MAD-Ridge, Walters Shoal seamounts, and Reunion Island.
- Examining the potential influence of species, stomach fullness, and the depth at which fish were caught on the amount of microplastics found in their gut contents.
- Analyzing how the type, shape, and size of microplastics in the guts of deep-sea fishes differ between study sites.
- Assessing whether the mouth size and morphology of deep-sea fishes play a role in influencing the amount and type of plastic ingested.

Despite the significant fishing pressures and environmental impacts faced by marine ecosystems at these locations, no previous studies have explored the impact of plastic on deep-sea fishes inhabiting these seamounts and oceanic areas. This research aims to fill this knowledge gap and contribute to a better understanding of the interaction between microplastics and deep-sea ecosystems in the Western Indian Ocean.

Keywords
Microplastics; Deep-sea Fish; Fenton Reaction; Microscopy