

OOS2025-778, updated on 23 Apr 2025

<https://doi.org/10.5194/oos2025-778>

One Ocean Science Congress 2025

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## Submarine canyons, a challenge for the conservation of cold-water coral reefs exposed to global change

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Reef-building cold-water corals act as ecosystem engineers in the deep-sea, supporting a rich biodiversity and various ecosystem services, including fisheries resources, carbon sink, paleoclimate archives and biomedical compounds. The study and the protection of these ecosystems is an important pillar of strategies for assessing the ecological status and conservation of the biodiversity associated to deep reef habitats, as promoted by various national and international conventions (IUCN, Habitat Directive, Marine Framework Directive...).

In submarine canyons, coral reefs face major threats: climate change, pollution (particularly plastics and other waste discharges) and fishing activities (trawling and longlining). The corals of the Mediterranean Sea are particularly at risk as they are already living close to their known upper thermal maximum (i.e., 13°C), the Mediterranean canyons are among the most polluted in the world (with an average of 51,000 items.km<sup>-2</sup>), and are subject to direct or indirect damage by trawling in the canyons and on the outer shelf.

To characterize the response of the main reef building species and their resilience to global change, *in situ* and controlled aquaria experiments have been conducted over the last 15 years on corals from the Gulf of Lion and the Bay of Biscay. In particular, the impact of temperature, exposure to plastics and sediment flux were investigated, showing the urgent need for collective awareness and the implementation of drastic management measures. Cross-border areas such as the French-Spanish zone are particularly sensitive because of the difficulties in regulating human activities and applying conservation measures. Supra-national regulatory processes must be engaged to act coercively on limiting the impacts of global change.