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TITLE: Cold-Water Coral Habitats in Submarine Canyons of the Bay of Biscay

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ABSTRACT:

The topographical and hydrological complexity of submarine canyons, coupled with high substratum heterogeneity, make them ideal environments for cold-water coral (CWC) habitats. These habitats, including reefs, are thought to provide important functions for many organisms. The canyons incising the continental slope of the Bay of Biscay have distinct morphological differences from the north to the south. CWCs have been reported from this basin in the late 19th century; however, little is known about their present-day distribution, diversity and environmental drivers in the canyons. In this study, the characteristics and distribution of CWC habitats in the submarine canyons of the Bay of Biscay are investigated. Twenty-four canyons and three locations between adjacent canyons were sampled using a Remotely Operated Vehicle (ROV) or a towed camera system. Acquired images were annotated for habitat type (using the CoralFISH classification system), substrate cover and coral identification. Furthermore, the influence of hydrological factors and geomorphology on the CWC distribution was investigated. Eleven coral habitats, formed by 62 morphotypes of scleractinians, gorgonians, antipatharians and seapens, inhabiting hard and/or soft substrate, were observed. The distribution patterns were heterogeneous at regional and local scales; the south Bay of Biscay and the southeastern flank favored soft substrate habitats. Biogenic and hard substrate habitats supported higher coral diversities than soft substrate habitats and had similar species compositions. A higher coral species turnover characterized soft substrate habitats. Substrate type was the most important driver of the patterns in both distribution and composition. Observations of coral reefs on steeper areas in the canyons and coral rubble on flatter areas on the interfluvial/upper slope, support the hypothesis that canyons serve as refuges, being less accessible to trawling, although natural causes may also contribute to the explanation of this distribution pattern. The results of this study fed into a proposal of a Natura 2000 network in the Bay of Biscay where management plans are rare.

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