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TITLE: Megabenthic assemblages at the Hudson Canyon head (NW Atlantic margin): Habitat-faunal relationships

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ABSTRACT:

The distribution of megabenthic communities at the head of Hudson Canyon and adjacent continental shelf was studied by means of underwater video transects and still photo imagery collected using a towed camera system. The goal was to explore the relationships between faunal distribution and physical seafloor conditions and to test the hypothesis that increased seafloor heterogeneity in the Hudson Canyon supports a larger diversity of benthic communities, compared with the adjacent continental shelf. Hierarchical cluster analysis was performed to identify benthic assemblages as defined in imagery. The BIO-ENV procedure and the Canonical Correspondence Analysis were carried out to elucidate species groupings in relation to terrain variables extracted from bathymetric data. Species accumulation curves were generated to evaluate species turn over in and out of Hudson Canyon. The results indicate that seafloor morphology is the main physical factor related to benthic community composition and distribution. Assemblages dominated by sponges, zoanthids and cup corals colonized the canyon margins and flanks, and were associated with coarse-grained sediments, while sea pen assemblages were observed along muddy seafloor within the thalweg. An assemblage dominated by sea stars occurred on the shelf, associated with a sandy seafloor. Some assemblages were exclusively observed in the canyon area, suggesting that the increased variability of seafloor composition, together with the oceanographic processes specific to the canyon area, enhance beta diversity. The colonization by benthic suspension feeders within the canyon, in contrast to shelf assemblages, mainly composed of carnivores and detritus feeders could be favored the intense hydrodynamics at the canyon head that increase the availability of suspended organic matter. From the perspective of management and conservation of marine resources, the results obtained support the relevance of Hudson Canyon as a biodiversity hotspot. Such results are of particular significance in light of the recent action promoted by the Mid-Atlantic Fisheries Management Council, that restricts bottom trawling in most of the submarine canyons of the US Atlantic margin, including the Hudson Canyon, to protect cold-water corals from damage by fishing gear.

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