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TITLE: Biogeography and Potential Exchanges Among the Atlantic Equatorial Belt Cold-Seep Faunas

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ABSTRACT:

Like hydrothermal vents along oceanic ridges, cold seeps are patchy and isolated ecosystems along continental margins, extending from bathyal to abyssal depths. The Atlantic Equatorial Belt (AEB), from the Gulf of Mexico to the Gulf of Guinea, was one focus of the Census of Marine Life ChEss (Chemosynthetic Ecosystems) program to study biogeography of seep and vent fauna. We present a review and analysis of collections from five seep regions along the AEB: the Gulf of Mexico where extensive faunal sampling has been conducted from 400 to 3300 m, the Barbados accretionary prism, the Blake ridge diapir, and in the Eastern Atlantic from the Congo and Gabon margins and the recently explored Nigeria margin. Of the 72 taxa identified at the species level, a total of 9 species or species complexes are identified as amphi-Atlantic. Similarity analyses based on both Bray Curtis and Hellinger distances among 9 faunal collections, and principal component analysis based on presence/absence of megafauna species at these sites, suggest that within the AEB seep megafauna community structure is influenced primarily by depth rather than by geographic distance. Depth segregation is observed between 1000 and 2000 m, with the middle slope sites either grouped with those deeper than 2000 m or with the shallower sites. The highest level of community similarity was found between the seeps of the Florida escarpment and Congo margin. In the western Atlantic, the highest degree of similarity is observed between the shallowest sites of the Barbados prism and of the Louisiana slope. The high number of amphi-atlantic cold-seep species that do not cluster according to biogeographic regions, and the importance of depth in structuring AEB cold-seep communities are the major conclusions of this study. The hydrothermal vent sites along the Mid Atlantic Ridge (MAR) did not appear as "stepping stones" for dispersal of the AEB seep fauna, however, the south MAR and off axis regions should be further explored to more fully test this hypothesis.

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