

Physical Disturbances Affect Food Availability To Shape Benthic Community Structure in Submarine Canyons

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Submarine canyons are geomorphic features that incise into continental margins. They are characterized by complex hydrodynamic processes, heterogeneous spatial variations, and steep topography. Globally, there are approximately 9,000 submarine canyons, covering 11.2% of the world's continental margins. Six canyons are distributed along the coast of southwest Taiwan. Past studies commonly identify submarine canyons as hotspots of biodiversity and population density. This research conducted field sampling in Gaoping and Fangliao canyons, located in SW Taiwan, to gain insights into this phenomenon. The two canyons have different sediment characteristics and physical disturbance intensities, leading to discrepancies in food availability and level of physical stress on organisms. Consequently, they display opposite patterns of benthic macrofaunal density distribution and possess dissimilar taxonomic compositions. Through a structural equation model, physical disturbance and food supplies were identified as the driving factors of community structure. Physical disturbance was found to be more influential than food abundance. This study highlights that disturbance in high-energy environments can impact sediment distribution, altering the abundance of food supplies. Contrary to past studies, both Gaoping and Fangliao canyons are not ecological hotspots, respectively due to extreme disturbance and food limitation. In summary, this study provides new insights into the factors driving community structure in submarine canyons and discusses their ecological roles as unique habitats.

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