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TITLE: High diversity of benthic bacterial and archaeal assemblages in deep-Mediterranean canyons and adjacent slopes

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ABSTRACT:

Submarine canyons and slopes increase the topographic heterogeneity of continental margins and enhance mass and energy transfer from the shelf to the deeper basins, profoundly influencing the biodiversity and functioning of deep-sea ecosystems. However, information on the distribution and diversity of microbial assemblages in such habitats is extremely scant. In the present study, for the first time, we investigated abundances of benthic prokaryotes and their diversity (i.e., bacterial and archaeal) in two of the largest canyons of the Mediterranean Sea (Bisagno and Polcevera Canyons, in the Ligurian Margin) and their adjacent open slope along a water-depth gradient from 200 to 2000 m. We found that prokaryotic abundance and the richness of Operational Taxonomic Units (OTUs) varied within a narrow range despite the high variability of thermohaline and trophic conditions in the habitats investigated. Conversely, the taxonomic composition (in terms of OTUs) was highly variable among the different habitats and depths investigated. The largest fraction of OTUs (representing >80% of the total OTUs identified) were unique of each sampling site, indicating a high prokaryotic α -diversity among the investigated systems. Thermo-haline and trophic conditions and water depth only partially influenced the composition of the prokaryotic assemblages suggesting that other factors, potentially related to physical forcing typically occurring in margin ecosystems, could promote a high diversification of benthic bacterial and archaeal assemblages. This study provides new insights into the benthic prokaryotic diversity of Ligurian canyons and suggests that microbial assemblages thriving in continental margins can largely contribute to the whole diversity of Mediterranean deep-sea ecosystems.

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