

New insights into the benthic macrofauna communities in sedimentary shores of Deception Island, Antarctica: Spatial and temporal patterns

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Abstract

Benthic macrofauna inhabits marine environments from the polar regions to the tropics and is widely recognized as a significant contributor to marine ecosystem functioning. These organisms serve as a crucial trophic link between primary producers and higher trophic levels, and they play a key role in regulating major ecosystem processes. Despite their importance, our knowledge of benthic macrofauna in intertidal and shallow subtidal sedimentary shores in polar regions remains limited. We investigate the spatial variability in diversity and structure of intertidal and shallow subtidal benthic macrofauna communities across different sites of Deception Island (South Shetland archipelago, Antarctica) and the interannual variation observed over three years. Surveys were conducted during consecutive Antarctic summer seasons from 2008 to 2011 at six sedimentary coastal sites across the island. During low tide, we surveyed the intertidal and shallow subtidal zones (0.5 m depth) of the nearshore. Sampling was conducted using 0.05 m² corers and a 40 x 25 cm hand sledge to collect benthic and hyperbenthic macrofauna, respectively. Subsequent laboratory analysis enabled the identification and quantification of taxa. Our investigation encompasses the abundance, community structure (i.e. taxa-specific abundance) and diversity of macrofauna. Preliminary results reveal high spatial variability in communities and interannual changes, likely influenced by the physically heterogeneous and patchy nature of the Antarctic marine environment, both spatially and temporally. These results underscore the dynamic nature of benthic ecosystems in polar regions and highlight the importance of monitoring at broader spatiotemporal scales to understand ecological responses in the context of ongoing environmental changes.