

Zoobenthic fauna distribution in an Antarctic fjord area under glacier retreat

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The West Antarctic Peninsula faces a significant increase in temperature and anthropogenic carbon emissions, affecting its marine and terrestrial biodiversity. Species Distribution Models (SDMs) are essential tools for assessing habitat suitability and predicting the responses to these changing conditions. In the coastal fjord ecosystem Potter Cove, glacier retreat exposed new ice-free areas altering the environment through meltwater input and sediment runoff. This research aims to identify the environmental drivers influencing the distribution of Antarctic zoobenthos in this changing coastal ecosystem and to analyze potential zoobenthic assemblage compositions in areas strongly affected by glacier retreat. Analysis of eight benthic taxa distributions reveals distinct habitat types within a maximum range of approximately 1.5 km. About 60% of the study area (equivalent to 5.45 km²) is estimated to be suitable for zoobenthic occurrence. Interpretation of binary transformation thresholds highlights taxa-specific environmental preferences, where lower values correspond to broader habitat extensions, suggesting potential coexistence in glacier-influenced areas. This study emphasizes the significance of interdisciplinary approaches in understanding benthic responses to climate change in the Antarctic coastal ecosystem. It highlights the necessity for ongoing long-term research and the development of conservation and management strategies to address the continuing environmental shifts effectively.