



IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

Via Amm. F. Acton, 38 - 80133 Napoli, ITALY

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Topic: Biogeochemistry

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ABSTRACT Subject :

Molecular time-capsules – reconstructing the Ross Sea ecosystem using eDNA obtained from marine sponge specimens

Abstract 10/01/2023 00:09:09

Direct anthropogenic pressures and human-induced climate change are modifying our natural world at an unprecedented pace, radically affecting ecosystem stability and health. To understand the consequences of these changes, monitoring biodiversity trends is crucial. Obtaining such information for the Ross Sea marine ecosystem is challenging, however, due to the remoteness of the area, logistical constraints, and complexity of the biological community. Given the ecological and economic importance of the Ross Sea, it is imperative that additional biological monitoring approaches are explored. Recently, our team showed that marine sponges, which are frequently caught and discarded in Southern Ocean fisheries, naturally accumulate environmental DNA (eDNA). In this study, we compare fish and eukaryotic eDNA signals from marine sponge specimens to fish catch records and visual surveys for seventeen locations on the continental slope (887m 1,612m), nine locations on the continental shelf (523 m 709 m), and seven locations along the Ross Sea coastline (10m 25m). Overall, sponge eDNA signals detected a larger fraction of the Ross Sea fish and eukaryotic community compared to fish catch records and traditional monitoring approaches. Furthermore, a pairwise comparison between fish catch and sponge eDNA revealed eDNA signal strength correlating more strongly with fish abundance over biomass, thereby enabling the prediction of fish catch abundance through eDNA monitoring. Additionally, spatial biodiversity patterns were observed within our eDNA data, corresponding with known species distributions in the Ross Sea. Our results highlight the potential of sponge eDNA monitoring in the Ross Sea by detecting a larger fraction of the biological community, thereby increasing our knowledge of this understudied ecosystem and, ultimately, aid conservation efforts.

