

REEF FISH ASSEMBLAGE THROUGH SPACE AND TIME IN A THERMAL TRANSITION ZONE IN THE SOUTHWESTERN ATLANTIC

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RESUMO

Understanding the spatial and temporal dynamics of biodiversity is paramount in marine ecology and requires combining information across both local and regional scales over time. The southwestern Atlantic comprises a unique biogeographic province shaped by oceanographic barriers and environmental filters across a range of $\sim 30^\circ$ of latitude. Differences in biodiversity patterns within this range are primarily driven by a gradient in sea temperature, especially between tropical and subtropical regions. However, spatial-temporal patterns at local scales across this gradient are poorly investigated. In this study, we assessed spatial-temporal changes in reef fish assemblage (β -diversity) using a dataset from seven reef locations across a thermal transition zone in the southwestern Atlantic. It included the Abrolhos Bank (17°S , $\sim 26.4^\circ\text{C}$) and the coastal reefs from Espírito Santo state (20°S , $\sim 21.13^\circ\text{C}$). We identified two main clusters of reef locations along the latitudinal gradient, with reef sites from the Abrolhos Bank forming a distinct group characterized by higher fish diversity, abundance, and biomass. On the other hand, reef assemblages from Espírito Santo are largely a subset of species from the Abrolhos Bank, with a 79% species nestedness rate. Temporal analyses revealed a gradual decrease in β -diversity between the Abrolhos Bank and Espírito Santo over time, with species nestedness rates increasing from 49% in 2021 to 75% in 2024, suggesting a gradual homogenization of fish assemblage composition between the two regions over time. These results may be linked to both local impacts, including overfishing, and to thermal anomalies caused by climate change, which have become more frequent and intense in the southwestern Atlantic over the past years. Our findings add evidences supporting the emerging concept of tropicalization in the southwestern Atlantic, highlighting the importance of investigating and monitoring these reefs in the context of changing habitats driven by warming oceans.

Palavras-chave: β -diversity, Environmental change, Monitoring, Climate change, Brazil.

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