

from transition area has a pattern globally similar to offshore one while inshore presented an inversed pattern. Analyse of annual change using EI descriptors reveal one common trait: the number of SSLs significantly increase whatever the depth strata considered. This study highlights differences and similarity in water column organization between depth strata.

Switching off the Sun to observe the twilight zone spatial dynamics across Saint-Paul and New-Amsterdam Islands, Southern Indian Ocean

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Information on micronekton (> 1 cm organisms) is globally scarce in the open ocean, and its vertical and horizontal distribution in relation to oceanographic structures is poorly known. The complex biodiversity composing micronektonic functional groups lead to even more challenging interpretations of their spatial dynamics. Advanced generations of echosounders emit simultaneously several acoustic signals (multi-frequency device), allowing a finer view of the micronektonic community. While data becomes more abundant and complex, it is crucial to develop statistical tools aiming to objectively extract key components of its variability. In this study, we analyse data recorded onboard the R/V Marion Dufresne from an EK80 echosounder emitting at 18, 38, 70, 120 and 200 kHz. We developed a Multivariate Functional Data Analysis method to identify patterns in micronekton structures across Saint-Paul and New Amsterdam economic exclusive zone, at the boundary between vast oceanic domains. This approach proposes an objective method to analyse the vertical backscatter distribution and quantify temporal and spatial modes of variability in multivariate acoustic data. By filtering the temporal mode, we uncovered a latitudinal acoustic pattern in concordance with hydrological features and biological samples distribution. Such methods could be implemented at a global or local scale and allow 3-D modelling of micronekton structuring.

A finer look into the twilight zone: comparing acoustic records from an animal-borne miniature sonar and a multifrequency echosounder

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An animal-borne miniature active echo-sounder has been recently deployed on southern elephant seals (*Mirounga leonina*) from the Kerguelen and Argentinian colonies. This high frequency sonar (1.5 MHz) has shown a strong potential in detecting small mid-trophic level targets (zooplankton and micronekton). Relative abundance and distribution can be assessed, allowing to observe temporal (diel migration) and spatial patterns of plankton. However, the interpretation

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