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Testing deep-sea biodiversity paradigms on abyssal nematode genera and *Acantholaimus* species

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Abstract

Biodiversity patterns in the deep sea have been extensively studied in the last decades. In this study, we investigated whether reputable concepts in deep-sea ecology also explain diversity and distribution patterns of nematode genera and species in the abyss. Among them, three paradigms were tackled: (1) the deep sea is a highly diverse environment at a local scale, while on a regional and even larger geographical scale, species and genus turnover is limited; (2) the biodiversity of deep-sea nematode communities changes with the nature and amount of organic matter input from the surface; and (3) patch-mosaic dynamics of the deep-sea environment drive local diversity. To test these hypotheses, diversity and density of nematode assemblages and of species of the genus *Acantholaimus* were studied along two abyssal E-W transects. These two transects were situated in the Southern Ocean (~50° S) and the North Atlantic (~10° N). Four different hierarchical scales were used to compare biodiversity: at the scale of cores, between stations from the same region, and between regions. Results revealed that the deep sea harbours a high diversity at a local scale (alpha diversity), but that turnover can be shaped by different environmental drivers. Therefore, these results the second part of the paradigm about limited species turnover in the deep sea. Higher surface primary productivity was correlated to greater nematode densities, whereas diversity responses to the augmentation of surface productivity showed no trend. Areas subjected to a constant and low food input revealed similar nematode communities to other oligotrophic abyssal areas, while stations under high productivity were characterized by different dominant genera and