{rokbox title=|Study area :: Image: Authors| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-estimating-spatial-variability-baseline-isoscapes-fish-isotopic-signatures-ortiz-et-al-2024-thumb.jpg| }images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-estimating-spatial-variability-baseline-isoscapes-fish-isotopic-signatures-ortiz-et-al-2024.jpg{/rokbox}

J.J. Ortiz, I. Preciado, **M. Hidalgo**, J.M. González-Irusta, I.M. Rabanal, L. López-López, 2024. **Estimating spatial variability of baseline isoscapes from fish isotopic signatures at the community level**

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Progress in Oceanography. Volume 221, February 2024, 103205.
https://doi.org/10.1016/j.pocean.2024.103205

Abstract: One of the main limitations in the application of stable isotopes to marine trophic ecology is obtaining a reliable baseline upon which to calculate isotopic enrichment. Isotopic baselines are variable in space and time, influenced by several environmental factors such as terrestrial runoff, oceanic currents or primary production, and thus, investigating their patterns of variability is essential to gain confidence in the estimates of trophic position based on isotopic signatures. We here propose a multispecies and multitrophic approach to study baseline isoscapes for nitrogen (δ15N) and carbon (δ13C), which we test on the demersal community of the Northwestern Iberian Peninsula. Using a set of 372 isotopic data of 11 demersal fish species sampled during autumn, we modelled the spatial variability of the isotopic baseline (for δ15N and δ13C separately) by removing the biological effect of species identity and individual length. Using the residuals of these models, which represent the isotopic baseline anomalies, we investigated the effect of environmental variables in driving the observed spatial patterns. Our results identify clear and consistent spatial patterns for the δ13C isotopic baseline. This isoscape achieved the lowest values in the westernmost part of the study area (Galician coast) increasing towards the east (Cantabrian Sea). This spatial pattern was mostly driven by primary production and organic matter in the sediment, reflecting the influence of upwelling intensity in the δ13C isotopic baseline over the study area. Baseline isotopic anomalies of δ15N, on the other hand, did not show clear spatial patterns, suggesting that for this isotopic baseline spatial patterns at the regional scale might not be as consistent. Our study brings forward the potential of multispecies isotopic data for approximating the environmental isotopic baselines for the whole ecosystem.

Keywords: Fish community, Demersal, GAMs, Isotopic baseline, Linear mixed-effects models, Stable Isotopes, Trophic ecology