{rokbox title=|Map of the study area showing observed megafauna richness obtained by summing presences across all taxa considered for each spatial cell within the standard grid :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-marine-megafauna-niche-coexistence-and-hotspot-areas-in-a-temperate-ecosystem-louzao-et-al-2019-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-marine-megafauna-niche-coexistence-and-hotspot-areas-in-a-temperate-ecosystem-louzao-et-al-2019.jpg{/rokbox}

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Abstract: In the last few decades, there has been a remarkable development of niche models to help understand the ecological response of species to current rapid environmental changes. In the present study, we applied niche modelling to the megafauna community of shelf waters of the northwestern (NW) and northern Iberian Peninsula in order to analyse the coexistence of different species taking into consideration their niche preferences. The Spanish Institute of Oceanography conducts the PELACUS multidisciplinary survey annually to assess pelagic fish stocks and collect information on the status of other ecosystem components, such as oceanographic conditions, phytoplankton, zooplankton and marine megafauna. Using data collected from these surveys, we developed niche models for 14 marine megafauna taxa (3 cetaceans, 10 seabirds and 1 fish) incorporating multi-trophic ecological descriptors collected simultaneously during the surveys alongside the more commonly used oceanographic variables (e.g. chlorophyll a and sea surface temperature). Megafauna niche models were developed by pooling observations from 2007 to 2013 and were found to be driven by mean fish biomass and its variability, in addition to sea surface temperature. Hierarchical clustering identified four distinct megafauna assemblages, the first comprising wide-ranging species and the other three associated with shelf-slope waters in Galicia, coastal/shelf waters in Galicia, and the eastern Cantabrian Sea, respectively. Community-level hotspot areas were found in shelf and shelf-break sectors of Galicia, along with small diversity spots scattered throughout the Cantabrian coastal area. Our results showed that synoptically collected survey-based ecological descriptors, especially acoustic-based preyscapes, were among the most important variables explaining megafauna niche preference. These findings highlight the advantage of using integrated ecosystem surveys to collect simultaneous information on a suite of ecosystem components for spatial assessments.

Keywords: Niche coexistence, Marine megafauna, Preyscapes, Species distribution models, Integrated ecosystem surveys