

{rokbox title=|Average sea surface circulation in the western Mediterranean and biological time series locations :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-dispersal-patterns-marine-species-pelagic-ramirez-romero-et-al-2023-thumb.jpg|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-dispersal-patterns-marine-species-pelagic-ramirez-romero-et-al-2023.jpg{/rokbox}

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[Atmospheric–ocean coupling drives prevailing and synchronic dispersal patterns of marine species with long pelagic durations.](https://doi.org/10.1038/s41598-023-29543-7)

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Abstract: Dispersal shapes population connectivity and plays a critical role in marine metacommunities. Prominent species for coastal socioecological systems, such as jellyfish and spiny lobsters, feature long pelagic dispersal phases (LPDPs), which have long been overlooked. Here, we use a cross-scale approach combining field surveys of these species with a high-resolution hydrodynamic model to decipher the underlying mechanisms of LPDP patterns in northwestern Mediterranean shores. We identified basin-scale prevailing dispersal routes and synchronic year-to-year patterns tightly linked to prominent circulation features typical of marginal seas and semienclosed basins, with an outstanding role of a retentive source area replenishing shores and potentially acting as a pelagic nursery area. We show how the atmospheric forcing of the ocean, a marked hydrological driver of the Mediterranean Sea, modulates dispersal routes and sources of LPDP at interannual scales. These findings represent a crucial advance in our understanding of the functioning of metapopulations of species with LPDP in marginal seas and may contribute to the effective management of coastal ecosystem services in the face of climate change.

Keywords: