

{rokbox title=| Maps of the spatiotemporal distribution of the quartile classification by localities, according to A)-B) fibres (items/m²), C)-D) MPs (items/m²) along the sea surface. The square brackets indicate the range of abundance values for each quartile classification :: Image: Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-novel-methodology-approach-assessing-2025-frau-thumb-et-al.jpg|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-novel-methodology-approach-assessing-2025-frau-et-al.jpg{/rokbox}

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[Novel methodology approach for assessing microplastic distribution in marine habitats along the Spanish Western Mediterranean coast.](#)

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Abstract:Microplastics currently represent one of the major threats to marine ecosystems. However, there is a lack of integrative methodologies to properly evaluate their impact and repercussion across ecosystems, as, until recently, most microplastic occurrence studies have been focused on assessing isolated marine habitats. Accordingly, we assessed the spatiotemporal variation (2017 to 2024) of anthropogenic particles at different spatial scales along sea surface and sediment across the Spanish Western Mediterranean coast. An innovative methodology was developed from abundance data, to characterise regions through quartiles (Q1, Q2, Q3, Q4) of accumulation and temporal variability. This methodology responds to the variability in microplastic distribution due to factors such as sampling effort and techniques used. Consequently, quartile analysis associated to multivariate statistics was used to evaluate anthropogenic particle contamination (including fibres), offering a standardized and integrated approach to compare different areas and habitats, while keeping each region's spatiotemporal variability. Results indicate an increasing gradient of fibre accumulation from the southern towards the north-western basin, and a lower microplastic accumulation in sediment. Fibre and microplastic were more ubiquitous on surface waters, showing a moderate accumulation, with hotspots of ecological relevance such as Cabrera MPA (Balearic Islands). Overall, this study provides a novel methodological framework for assessing the spatiotemporal distribution of microplastics, offering a valuable tool for improving the characterization of the plastic cycle and supporting more effective pollution mitigation strategies.

Keywords:fibres,marine ecosystems,sediment,sea surface,plastic pollution.