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# The Hyperbenthos: A forgotten habitat for plastic pollution

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## Abstract

This study investigates the abundance and composition of microplastics (MP) within the coastal areas of a Mediterranean marine protected area (*Cabrera MPA* – NW Mediterranean Sea) analyzing seafloor sediments, hyperbenthos, and middle waters, focusing on the contribution of fibers to plastic pollution in those habitats. *Cabrera MPA* is a shallow coastal area characterized by a continuously stratified low-energy system and has previously been described as affected by high abundances of MPs, representing a suitable environment to study the stratification of MPs. The middle waters and hyperbenthos samples were collected by scuba diving with a mid-water net, mid-way between the sea surface and the seafloor and above the seafloor, respectively, and superficial seafloor sediments were collected using core tubes. The seafloor sediments had a mean abundance of  $378769.20 \pm 508109.11$  MPs/m<sup>3</sup>, 3 orders of magnitude higher than the hyperbenthos layer where a mean of  $209.17 \pm 117.07$  MPs/m<sup>3</sup> was quantified, which, in turn, was twofold than middle waters layer with a mean of  $106.48 \pm 107.17$  MPs/m<sup>3</sup>. Overall, fibers represent more than 89% of the total MPs found at each layer. An increasing vertical gradient in MP abundances, mainly fibers, was observed. *Cabrera MPA* resulted in being suitable as a final sinking area for microplastics, particularly for fibers that could be, temporally, resuspended in the benthic boundary layers. MPAs have been proposed as receptor areas for small fragments, the present study suggests that their sediments could also represent a reservoir of fibers. Moreover, this study highlights how determining the severity of plastic pollution in a marine area by evaluating only the sea surface could induce considerable underestimations. Considering the threat that fibers pose to marine habitats and species, there is an urgent need to increase efforts to find solutions to mitigate their release into the marine environment.

**Keywords:** microplastics, fibers, marine protected areas, plastic pollution, hyperbenthos

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