Microplastic levels on sandy beaches: Are tourism and coastal recreational activities effects really important?

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Abstract

This study assessed the effect of tourism and other recreational activities on microplastics (MPs) levels and their characteristics in the sand and the surf zone of the seawater. Six sites belonging to 3 sandy beaches with similar geomorphologic and morphodynamic characteristics but with different tourism activities were chosen. On average, a concentration of 1133.3 ± 811.3 items/kg dry wet (d.w.) and 12.7 ± 14.9 items/m3 were found for sand and seawater samples, respectively. Fibers and films predominated and were less than 1 mm in length. In the sand, films matched mainly with the PE polymer spectra and the fibers with PET polymer, cotton, and indigo blue dye; in the seawater samples, PP films and PET fibers prevailed. In the Coastal Marine MPA Pehuén Co – Monte Hermoso where the flow of tourists is low, MPs levels were the lowest and particles were the largest found, mainly blue or black fibers, and with less polymer diversity, being cotton and PET the most prevalent suggesting a recent input of textile fibers to this site. Besides, in the southern site of a beach considered more pristine due to the negligible human activity, the highest concentration of MPs was found, including the smallest size pattern, mostly composed of white films or fibers with a greater diversity of polymers, prevailing PE > PET > PP. A great occurrence of PVC white films was also found in the surf zone of this site. Proximity to the mouth of a river, coastal drift, and other point sources were pointed as the main sources, indicating that apart from tourism and recreational activities, other sources might play a major role in the input of MPs to sandy beaches.

Keywords: coastal zone, plastic debris, artisanal fishing, littoral drift

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