Identifying macrofloating debris hotspots in the Mediterranean Sea applying combined methodologies: aerial and vessels

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Abstract

The Mediterranean Sea is considered the world's sixth greatest hotspot for marine debris, however quantifying the extent of marine debris in the oceans is a challenge, especially due to variations in survey methodologies. This study aims to assess the spatial abundance and distribution of floating macrodebris in the Mediterranean basin through visual surveys carried out by different types of sampling methods: research vessels, sailing vessels and aerial surveys. Mean values of 1.88±2.3 items·km-2 for aerial and 0.89±1.61 items·km-2 for vessel surveys were obtained along the whole Mediterranean basin, with particularly high abundances in the east of Algeria, Tyrrhenian, Adriatic and Alboran Seas. In addition, mean values of 8.6±7.8 items·km-2 for 2021 and 3.88±3.96 items·km-2 for 2022 were obtained along coastal waters of the Spanish Mediterranean platform and up to 70.87±257.23 items·km-2 were observed in waters of the Archipelago of Cabrera, a Marine Protected Area at the south of the island of Mallorca. These results could be attributed to some factors, such as the influence of mighty rivers, the dense population along coastal areas of the study area, especially during the summer season and the effect generated by some currents and eddies such as the Algerian and the Northern currents, which also influence the transboundary of plastics. Besides, abundances obtained through aerial survey were higher than abundances obtained from vessel survey (mean 1.92±2.61 items·km-2 vs. 0.94±1.69 items·km-2) which might suggest that the use of different methodologies influence debris detectability, what is also affected by some factors as size fraction considered, sampling season as well as the main objective of the study. Finally, results regarding citizen science showed that the implement of this tool could be very useful to obtain greater datasets.

Keywords: Mediterranean Sea, macrofloating debris, aerial survey, vessel survey

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