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## Paddle surfing for science on microplastic pollution: a successful citizen science initiative

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Research on microplastics has rapidly expanded in recent years and has led to the discovery of vast amounts of microplastics floating offshore in all main oceanic gyres and including the Mediterranean Sea. However, there is a lack of information from a few meters from the coastline where the largest plastic mass flux is suspected to occur. The reason behind is the general use of manta trawls towed by boats or research vessels to obtain samples, which hinders nearshore sampling. We have designed a manta trawl to collect samples in the nearshore from any type of recreational sports floating gear like kayaks, sailboats, rowing boats, windsurf boards and others. Data generated is comparable to that obtained with traditional scientific equipment towed from boats. During one year, starting from October 2020, 12 social, environmental and sports associations along the NW Mediterranean coast are acquiring scientific samples in the nearshore within the frame of two citizen science monitoring projects lead by the Spanish delegation of the non-governmental organization Surfrider Foundation Europe and the University of Barcelona. The projects represent a paradigm shift in microplastic research, allowing to fill the gap in knowledge of this transition coastal area, and actively involving citizens in the generation of new monitoring data (<http://surfingforscience.org/>).

Our results reveal that densities of floating plastics in the nearshore along the NW Mediterranean coast are on average similar to those found offshore. However, we observe high variability due to meteorological and oceanographic conditions (i.e. the occurrence of eastern storms). We also observe that whereas floating microplastics dominate offshore, greater proportions of

mesoplastics and macroplastics dominate at the nearshore waters, especially in between the breakwaters in Barcelona city. Indeed, the breakwaters, that protect Barcelona beaches against wave action and coastal erosion, behave as plastic traps. This is an indication of the importance of the nearshore as a source of plastic fragments to the open sea and calls for increased research in this area.