

Microplastics pollution assessment in sediments of the northern Latium coastal area, Tyrrhenian sea, Italy.

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Marine litter is one of the major environmental problems of the contemporary era. It is globally acknowledged as a major challenge due to its multiple significant environmental, economic, social, political and cultural implications affecting the health and ecological function of organisms and ecosystems. Considering the importance of this environmental issue, the European Union has included the marine litter among the eleven descriptors of the Marine Strategy Framework Directive (MSFD) necessary to evaluate the marine environmental conditions and to reach the Good Environmental Status (GES). Marine litter is made up of various materials such as machined wood, glass, metal, cardboard and textiles. Among these categories the most abundant are plastics. The most abundant and potentially harmful fraction of plastic waste in the ocean is the microplastic (MP). The marine sedimentary environment is suspected to be a major sink of MPs. MPs with a higher density than seawater easily sink and accumulate in sediments whereas lighter particles can reach the seafloor after being subjected to degradation, aggregation and biofouling processes. Moreover, the importance of the study of the marine sedimentary environment is closely correlated with the presence of several key benthic species that are an integral part of marine trophic chains. The presence, the distribution, the abundance as well as the type of MPs accumulated in the marine sedimentary environment are widely studied internationally, although there are few studies focused on the Mediterranean marine sedimentary environment. On the contrary, Mediterranean transitional sedimentary environments such as lagoons and beaches are more investigated.

Coastal areas are widely considered as hotspots of MPs contamination due to the high population density. Urban and agricultural runoff and river discharges are the main land-based plastic sources in these areas. Moreover, industrial and maritime activities contribute to the plastic release in the marine environment. From these perspectives, this work gives an assessment of the microplastics abundance, shape and contributions in coastal sediments of the northern Latium coastal area, Northern Tyrrhenian sea (Italy). Microplastics from three shapes (fragments, pellets, and filaments) were identified and abundances have been compared with literature data related to the same depositional contexts in the Mediterranean Sea and elsewhere. No significant difference was found in filaments and fragments distribution, which resulted ubiquitous in the sediments of the study area. On the contrary, a significant difference was found in pellets distribution that appeared to be linked to the contributions of the local hydrographic network.