

Title: Microplastics in sediment and surface water from an island ecosystem in Bay of Bengal

Author: Md. Sonir Mia, Abu Reza Md. Towfiqul Islam, Mir Mohammad Ali, Md. Abu Bakar Siddique, Subodh Chandra Pal, Abubakr M. Idris, Venkatramanan Senapathi

Abstract: Microplastics (MPs) have garnered global attention as emerging pollutants in aquatic and terrestrial ecosystems. Despite their significance, studies on MP pollution have overlooked a biodiverse island ecosystem in the northeast Bay of Bengal. Hence, the current study is a pioneering effort to delve into this issue with the island. This research embodies the first comprehensive report exploring the presence of MP pollution in sediment and surface water and their influencing factors along Sandwip island in the northeast Bay of Bengal. The average MP concentration was 305 ± 37.16 (items/kg) in sediment and 106.14 ± 22.57 (items/m³) in surface water. Fragments emerged as the predominant type in sediment (78.77%) and surface water (54.64%) samples. Fourier Transform Infrared Spectroscopy identified three plastic polymers, the most abundant being polyethylene (56%) and polypropylene (41%). Anthropogenic activities, particularly fishing practices, improper waste disposal, and inadequate waste management strategies, were pinpointed as potential sources of MP contamination on the island. MP concentrations in water and sediment correlated positively with pH and organic matter ($p < 0.000$), indicating important factors influencing MP distribution. The spatial distribution and hotspots of MPs followed significant human routes. By shedding light on the extent of MPs' presence and their potential sources, this study contributes essential insights that can inform effective environmental management strategies for the island's future well-being.

Keywords: Microplastics (MPs), Sandwip Island, Bay of Bengal, Sediment and surface water, Spatial distribution, Polymer identification, Polyethylene (PE), Polypropylene (PP).

DOI: <https://doi.org/10.1016/j.rsma.2023.103332>

<https://www.sciencedirect.com/science/article/abs/pii/S2352485523005224>