

Microplastic abundance and spatial distribution in North Sea (German Bight) surface waters

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Introduction

Microplastics (MP), particles ranging from 1 μm to 5 mm, are ubiquitous pollutants in the marine environment. Particle number and size related data are a common measure and highly relevant for ecotoxicological studies, whereas complementary mass related data enable geospatial or temporal studies.

Method & Aim

In this first mass related survey of MP in surface waters of the German Bight, North Sea, the spatial MP load as well as its potential sources and temporal variation were comprehensively examined. The most relevant nine consumer plastics (polyethylene, polypropylene, polystyrene, polyethylene terephthalate, polyvinylchloride, poly(methyl methacrylate), polycarbonate, polyamide and MDI-polyurethane) were analyzed using pyrolysis-gaschromatography-mass spectrometry/thermochemolysis as an excellent method for qualitative and trace level polymer specific mass quantitative analysis [1].

Results and Discussion

The overall MP concentration in surface waters of the German Bight ranges between 2 and 2000 ng m^{-3} (ppt to lower ppb level). Neither MP concentration nor type distribution is homogenous. Based on MP type composition different sources, namely long distance transport, coastal tourism activities, commercial shipping routes and riverine urban and industrial input could be distinguished on a spatial scale. MP mass load is comparable to concentrations of other environmental pollutants and seem to be substantial influenced by meteorological as well as oceanographically conditions.

Reference

[1] Fischer & Scholz-Böttcher (2017), Environmental Science & Technology. 51, 5052–5060.
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