APPEARANCE AND POTENTIAL EFFECTS OF MICROPLASTICS IN THE BELGIAN COASTAL AREA

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Recently, the presence of small plastic particles has been reported in several areas worldwide. Little is known about the actual concentrations of these microplastics in the aquatic environment and their potential effects on organisms. This study reports the abundance of plastic particles (>38mm) in the Belgian coastal area. All the samples examined, contained microplastics, giving clear evidence of their widespread distribution and high abundance. Cores were taken at the flood mark and at the intertidal of two beaches with a steady sediment accumulation, to examine a possible historical evolution in microplastic concentrations. Over a time period of four years, no significant difference was found, but at a longer term of 16 years, significantly lower concentrations were found in the deeper layers of the sediment, suggesting an increase of the problem. Most likely due to growing production figures worldwide. Other samples were taken at the subtidal sediment and at a sandbank near the port of Zeebrugge; a Van Veen grab was used to sample estuarine sediment and the sediment in the three Belgian coastal harbors (Zeebrugge, Oostende and Nieuwpoort). The highest concentrations of microplastics were found in the harbors, on the beaches and in the estuarine region, while significantly lower concentrations are present in the subtidal sediment and in the sediment of the sandbank. Results are reported in different classes: fibers, granular particles and thin plastic films. Fibers are found in the highest numbers (an average of 109 fibers per kg dry weight on the beaches), but are outweighed by the other two classes. The concentrations in the harbors were very variable, with significantly more granular particles (24 to 118 particles per kg dry weight). This is the first time a study quantifies the abundance of small polystyrene spherules in the harbors (concentrations of 0 to 95 spherules per kg dry weight), suggesting scrubbers from hand cleansers as a possible environmental problem. To examine the potential effect of sorption of pollutants on microplastics, worst-case calculations were made of the possible transfer of PCB and phenanthrene from the particles to organisms. Assuming a previously non-polluted, closed system, microplastics could possibly cause concentrations of 0.0077ng phenanthrene and 0.0706ng PCB per worm (*Arenicola marina*) at plastic concentrations of 1,117μg per kg dry weight (the highest concentrations found on the beaches).