

Plastic on the Beach

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Plastic is an organic polymer used for many different products and purposes in modern society. In 2009, 230 million tonnes were produced globally. Many of the additives used in plastic, such as heavy metals, bisphenol A, polybrominated and chlorinated biphenyls are toxic to the environment and also contribute to the persistency of the plastic products.

The governing degradation of plastic is a photochemical process, which is oppressed in the sea since the water shields the plastic from the UV-rays from the sun. This leads to an accumulation of plastic particles and fragments that may create mechanical problems for marine animals as well as induce the leakage of additives. Persistent organic pollutants (POPs) can also sorb to the particles and be released when ingested. So far 267 different species have been proven affected by the marine plastic pollution.

In this study we set out to quantify the amount of macro plastic fragments and microscopic plastic particles in a series of Danish beaches on the northern coast of Zealand. Three beaches (Charlottenlund Fort, Vedbæk Strand and Helsingør Strand) were examined for macro litter using guidelines standardized by UNEP. Sediment samples from six beaches (Dragør Strand, Charlottenlund Fort, Vedbæk Strand, Nivå Strand, Espergærde Strand and Helsingør Strand) were examined for micro particles using density separation with a Sodium PolyTungstate solution and a microscope analysis.

In our study of macro litter we found a total of 368 fragments on 11,230 m² divided over the three beaches. Of these 86.8% were plastic litter fragments, whereas worldwide the percentage is between 60% and 80%. Most of the litter had been left in situ and not deposited by ocean currents. In our pilot study of microscopic plastic particles on the six beaches, we found an average of 6 particles per surface sample and 5 particles per core sample (each consisting of approximately 200 g of sediment).

Both of our studies showed a somewhat higher amount of plastic fragments/particles compared to international studies, which might be due to the season (for the macro investigation) and the use of Sodium PolyTungstate instead of a high saline solution (for the micro investigation).