

Date prints on stranded macroplastics: Marine litter as a chronological marker in recent coastal deposits

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Plastic is a collective term describing a group of synthetic materials, most of which were invented over the course of the last century. Already in the 1970s, the magnitude of plastic pollution has been recognized as an issue of concern for the global marine environment. It is hence no longer a rare event to encounter plastic fragments and objects in coastal or marine deposits. Plastic holds a chronological indication: a deposit containing plastic must be younger than the invention of the material.

The potential of this approach was tested in an investigation into the spatial distribution of stranded macroplastics in recent overwash deposits in SW Denmark. Larger litter items can be surveyed as discrete objects and allow the retrieval of more precise, though indirect age-information, such as production-date prints. A subgroup of >110 georeferenced surface samples containing date information were surveyed in summer 2015. Objects with ages from the late 1970s until 2014 were encountered. The distribution of the litter was clearly non-random in relation to overwash morphology, and based on the collected samples, it was possible to reconstruct indication on both the timing and the extent of extreme events since the 1990s. These observations were cross-compared with a dense time series of satellite images and orthophotos.

It is proposed that an improved interpretation of indications from the plastic record may be obtained by broader surveys including additional parameters, such as the exact location, elevation, chemical composition, assemblage, origin, product design, decay, fracturing or the colonization by marine sessile organisms, from all encountered macroplastic objects. If calibrated properly, the plastic assemblages may serve as fast, cheap and reliable chronological markers in recent coastal deposits.