

Types and concentration of microplastics found on remote island beaches during the Race for Water Odyssey

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In 2015, The Race for Water Foundation, a NGO dedicated to water preservation, conducted the Race For Water Odyssey.

This Odyssey was a unique environmental expedition, which sailed across the Atlantic, Pacific and Indian Oceans to compile a human and environmental assessment of the current state of plastic pollution in the oceans.

Three main goals were followed: study plastic pollution on beaches of remote islands located within the oceanic gyres (which act as a sort of natural barrier against the movement of marine debris), raise awareness on the issue and identify solutions preventing waste from ending in the ocean.

The team realized 7 scientific island stopovers (Azores, Bermuda, Easter Island, Hawaii, Guam, Koror, Rodrigues) and went to 7 main coastal cities (Bordeaux, New York, Valparaiso, Tokyo, Shanghai, Cape Town, Rio de Janeiro and the arrival in Bordeaux). Due to boat capsizing in the Indian Ocean, local scientists helped us finalizing the sampling on Chagos and Tristan da Cunha, using the same protocol.

At each stopover, the National Oceanic and Atmospheric Administration's (NOAA) standardized protocol has been performed to identify and quantify macrodebris, and collect microplastic samples on shorelines. Microplastics samples are currently being analysed in three laboratories to categorize them and assess their concentration, to analyse the ecotoxicological effect on fish larvae and the persistent organic pollutants adsorbed on their surface.

Plastics have been found on every beach during the Odyssey at various concentrations. The worst spot was in Hawaii, Kamilo beach, with a maximum density of 3357 macroplastics (i.e. items larger than 2,5 cm) by 100 square meters, and more than 30'000 microplastics (i.e. items smaller than 0.5 cm) on average per square meter.

Here, we will focus more on preliminary results of the Odyssey, specifically on microplastics concentration and typology according to the categories (hard, foam or film fragments, fibers, microbeads, pellets...) and polymer types (PET, HDPE, LDPE, PVC...) collected during this expedition.

Keywords: Microplastics concentration and typology, Polymers types, Spectrometry.