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MicroplastiX

Integrated approach on the fate of microplastics towards healthy marine ecosystems

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Background and Rationale

Microplastics have been commonly reported in the marine environment, being found in all environmental matrices from mountain tops to benthic sediments. Research over the last decade has identified that solar radiation, abrasion and salinity contribute to the breakdown of plastic items into smaller pieces, potentially increasing the number of **fragments** available in the environment. Winds, oceanic currents and animals contribute to the widely distribution of microplastics across the globe, making them a **ubiquitous** problem. Also, it has been identified that microplastics can sorb persistent organic pollutants and trace metals from the surrounding environment, **potentially** increasing their toxicity and **harmful**ness. Therefore:

Microplastic fragments are ubiquitous and potentially harmful!

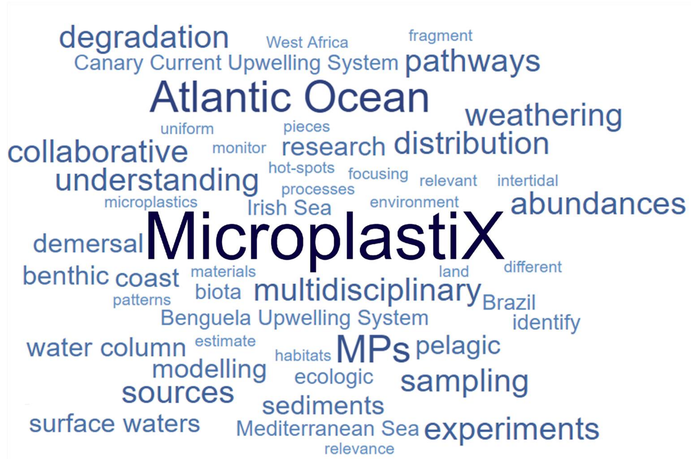
Yet, there are knowledge gaps associated to the **weathering, degradation and fragmentation** of plastics in the marine environment that scientists need to bridge in order to effectively assess the problem magnitude, efficiently manage sources and reduce potential pathways into the ocean. As such, an international and interdisciplinary consortium with a wide range of experience and expertise on the topic was established, from 7 countries – Sweden, Germany, France, Italy, Spain, Ireland and Brazil.

MicroplastiX is an international, multidisciplinary research project which will investigate the effects of **weathering** and **degradation** on plastic materials along with the consequent fragmentation into smaller pieces known as microplastics (MPs).

This project will also explore how these processes affect MP **distribution** and **dispersal** on the marine environment, as well as **effects** on marine biota.

Aims and Objectives

MicroplastiX aims to holistically assess MPs in the Atlantic Ocean and Mediterranean Sea by sampling water (surface and column), sediments (intertidal and benthic) and biota (pelagic, demersal and benthic) while deploying a comprehensive quality assurance scheme. Field and laboratory experiments will complement the *in-situ* data collection and will feed into an advanced multi-scale modelling of MPs dynamics.

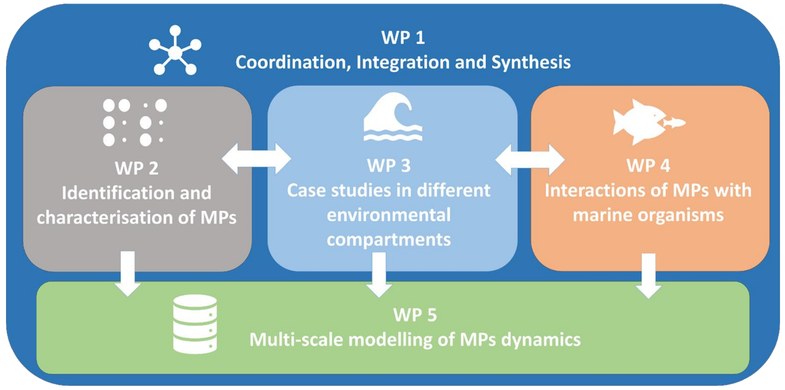


The main scientific questions related to this project are:

- How turbidity and stirring affect microplastic buoyancy;
- How microplastics are transported from the beaches and coastal areas to the open ocean;
- What are the effects of Stokes drift, Langmuir circulation, and other, non-linear wind effects on the microplastic dispersion and distribution;
- How microplastics are affected by movement, entrainment and accumulation in the water column and/or on the seafloor, both horizontally and vertically;
- What are the effects and impacts of degradation, fragmentation, bio aggregation and biofouling on the buoyancy of microplastic particles;
- How do microplastics impact marine organisms;
- How can we develop, optimise and validate mathematical tools and software to simulate the microplastics physical and biochemical processes in seawater.

Project overview

MicroplastiX is divided into five interrelated work packages, specifically designed to assess MPs abundance, distribution, pathways, biofouling, ingestion and bioaccumulation, under a specific set of analytical and technical protocols. Data collected in the project will inform multi-scale models, as described in the figure below:



Reach out to us

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SUSTAINABLE DEVELOPMENT GOALS

14 LIFE BELOW WATER

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BUILDING AN ALL ATLANTIC OCEAN COMMUNITY
Implementing the Belém Statement

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