

PLAWES – The Journey of Microplastics from the River Weser to the North Sea

Plastics in the Environment – Sources · Sinks · Solutions

Existing studies on the effects of tiny plastic particles on the environment usually only provide snapshots; both the methods used and the results are hardly comparable with each other. Following a holistic approach, the joint research project PLAWES aims to contribute to filling some important knowledge gaps. In the model region of the German national park Weser-Wadden Sea, researchers are investigating for the first time how microplastics reach the sea coming from the mainland, which entry points and transport routes are involved and to what extent, as well as the risks associated with the pollution of different ecosystems.

Different Ecosystems at a Glance

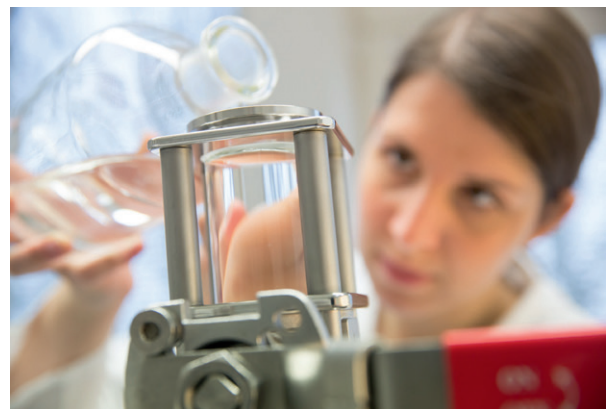
Which role do wind and weather, soil erosion, wastewater systems and wastewater treatment plants play in the formation and distribution of plastic particles that are barely visible to the naked eye? How do microplastics accumulate in different ecosystems? Which interactions occur between plastic inputs in the environment and animal organisms? To date, there is far too little reliable data and knowledge available on these questions.

PLAWES is one of the first national and international research projects to investigate and evaluate microplastic pollution across ecosystems from the river catchment area to the estuary on the coast in an interdisciplinary manner and over longer periods. The Weser-Wadden Sea region offers optimal conditions for these investigations: It comprises both urban and agricultural regions, allowing the respective plastic inputs into the environment to be balanced and compared independently of one another. In addition, the Weser estuary is located in the sensitive Lower Saxony Wadden Sea National Park, which has been recognized by UNESCO as a World Natural Heritage Site.

Identifying Entry Paths and Analyzing Risks

The project partners are specifically sampling the Weser and its tributaries, including the Lower Weser and the Wadden Sea, in two measurement campaigns in order to capture the contamination by microplastics. The campaigns are carried out in spring and autumn at varied water conditions on the Weser river. Additionally, the researchers will analyze various microplastic entry points as examples: important point sources such as wastewater treatment

plants and separation systems as well as diffuse entries from drains and the atmosphere. They will then model the particle inputs from the various sources to obtain an overview of the quantities, transport mechanisms and accumulation zones.



Preparation of a sediment sample to filter out microplastics.

In order to assess the health risks for humans, the joint research project PLAWES investigates whether the spread of pathogens and the development of antibiotic resistance could be supported by microplastics in the environment. As microplastics can also enter the food chain via aquatic organisms, researchers furthermore examine mussels and worms in freshwaters and in the North Sea; they are interested in possible harmful effects that microplastics could have on these organisms.



Preparation of spectroscopic analysis: In the laboratory, a water sample with microplastics is purified. To do so, a method based on several enzymes is used that is gentle on plastics.

New Concepts in Environmental Education

Another focus of the project is environmental education. The results obtained by PLAWES will be integrated into new information and teaching concepts. Biology education experts will first assess what students and teachers know about plastic waste and their attitudes towards it. In order to raise awareness, they will develop teaching materials with a sound reference to everyday life. These will then be disseminated via a multilingual internet portal.

The results will also be incorporated into strategic recommendations for action for politicians, industry and civil society. In addition, the findings could contribute to the development of measures and technologies for the reduction of plastic discharges that are specifically tailored to the most important sources and entry points.

Research Focus

Plastics in the Environment – Sources • Sinks • Solutions

Project Title

Microplastic Contamination in the Weser-Wadden Sea – National Park Model System: an Ecosystem-Wide Approach (PLAWES)

Grant Number

03F0789A-G

Duration

September 1, 2017 – August 31, 2020

Funding Volume

EUR 2,840,977.60

Contact

Universität Bayreuth
Lehrstuhl für Tierökologie I
Prof. Dr. Christian Laforsch
Universitätsstr. 30
95447 Bayreuth
Phone: +49 (0) 921/55 2651
E-mail: christian.laforsch@uni-bayreuth.de

Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung (AWI)

Dr. Gunnar Gerds
Kurpromenade 201
27498 Helgoland
Phone: +49 (0) 4725/819 3245
E-mail: gunnar.gerds@awi.de

Project Partners

Carl von Ossietzky Universität Oldenburg,
Institut für Chemie und Biologie des Meeres, Oldenburg
Forschungsstelle Küste im Niedersächsischen Landesbetrieb
für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN),
Norderney
Forschungszentrum Jülich GmbH, Jülich
Goethe Universität Frankfurt, Frankfurt am Main
Johann Heinrich von Thünen-Institut, Braunschweig

Website

www.bayceer.uni-bayreuth.de/PLAWES/en

Publisher

Federal Ministry of Education and Research (BMBF)
Department of Resources, Circular Economy; Geosciences,
53170 Bonn
Department of Marine, Coastal and Polar Research, 53170 Bonn

Editorial Work and Design

Project Management Agency Karlsruhe (PTKA)
Project Management Agency Jülich

Print

BMBF

Photo Credits

Front page: Tristan Vankann, Alfred Wegener Institut,
Helmholtz-Zentrum für Polar- und Meeresforschung (AWI)
Back page: Martin Löder, Universität Bayreuth

Version of

November 2018

www.bmbf.de