

The FUNDING PARTNERS herewith announce the joint call for proposals under the framework of JPI Oceans on

Ecological aspects of microplastics in the marine environment

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1. Introduction

This call is being conducted as a Pilot Action under the framework of JPI Oceans. JPI Oceans is an intergovernmental European strategic process that focuses on solving the societal challenges related to our seas and oceans that cannot be solved solely on the national level. In JPI Oceans national ministries and agencies responsible for research funding seek to define common long-term strategic priorities for marine and maritime research and technology development in Europe as a basis for strengthening cooperation and coordination of national investments in these fields. A Pilot Action is an early action that aims at testing new instruments for cooperation and coordination in the framework of JPI Oceans.

Marine plastic and microplastic litter is more and more recognized as a newly emerging problem for marine systems worldwide. Plastics are used in a wide range of applications from food packaging, to basic household items, personal care products, agriculture and industry. The global production of plastics was 265 million tons in 2010, of which 57 million tons were produced in Europe alone¹. The degradation rate of plastic debris in the marine environment is negligible but larger plastic litter may disintegrate, through UV radiation and turbulence, into tiny fragments known as microplastics. Another source is the shedding of synthetic fibres from polymers used, for instance, in clothing, textiles and fishing related items.

Microplastics can be categorized in primary and secondary microplastics with a size smaller than 5mm. Primary microplastics are high production volume materials applied in a large range of products as plastic granulates, powders or micro- and nano-spheres. Secondary microplastics result from the partial degradation of larger pieces of plastic litter into fragments in the micro-and possibly nano-size ranges, while full decomposition is expected to take place over the course of hundreds of years. There is evidence that the abundance of these particles is increasing in the environment. Therefore, microplastics are a newly recognized type of pollution and as such are currently not regulated in terms of production, use or emissions.

¹ The Plastic Industry, 2011

Microplastics are persistent, ubiquitous and their high potential to cause physical harm and toxicological effect is being highlighted in various studies. Modes and mechanisms of microplastic toxic action have been indicated for different biological systems, and microplastics have been identified as an artificial substrate which can affect ecological processes, biodiversity and facilitate transport of invasive species as well as pathogens.

However, the knowledge about the origin, size range, abundance and spatial variability of microplastics in marine systems is still limited. The toxicological and ecological effects on marine organisms and ultimately on human health is also insufficiently studied.

Hence, for the protection of marine habitats – as implemented in the EU marine strategy framework directive (MSFD) to achieve Good Environmental Status by 2020 – and the safety of marine resources and seafood a trans-disciplinary European research initiative is necessary.

2. Scientific Framework

This call intends to increase the knowledge about the best analytical methods for identifying microplastics, their distribution in marine systems and their eco-toxicological effects on marine organisms. This call comprises three main themes:

- **Validation and harmonisation of analytical methods**
- **Identification and quantification of microplastics**
- **Eco-toxicological effects of microplastic – impact on marine organisms**

i. Validation and harmonisation of analytical methods

Quantifying microplastics is a relatively new and challenging analytical field. Method development and method validation are essential elements for proper analysis of new qualifiers in environmental assessments. Microplastic is usually defined as particles with a diameter of less than 5 mm and includes a broad spectrum of plastic polymers. Different analytical methods are required to detect the full size-spectrum down to the micrometer size. The first step in the identification is the extraction of micro-plastics from selected matrices (sediment, biota, water column). These procedures should include all kinds of plastic polymers and all measurable size fractions on the nano- and micro scale. There are still challenges related to the extraction and analysis steps, as well as harmonized reporting of microplastics in all matrices. Therefore, we are explicitly calling for proposals for

- Analytical method development including extraction and polymer identification of microscopic particulates from sediment, biota and water column.
- Interlaboratory studies (ring trials) aiming to validate, harmonise and standardise sampling techniques and analytical methods, including extraction, for sediments, biota and the water column. For the interlaboratory studies, the lower limit is set to 1 µm.

The interlaboratory study should aim to comprise a maximum of relevant laboratories from JPI Oceans member countries participating in a proposal submitted to this call. Laboratories in other member countries may be invited to participate with in-kind contributions.

ii. Identification and quantification of microplastics

Various studies have demonstrated the ubiquitous presence of microplastics in marine habitats as well as the uptake of microplastics by various marine biotas. Microplastic litter is accumulating in the water column, sediments and biota. The following objectives should be addressed by submitted proposals and are required for a better understanding of the occurrence and spatial variability of microplastics in marine systems:

- Identification and quantification of microplastic in marine systems (water, sediment, biota) – spatial distribution of microplastic litter, supported by modelling studies
- Fragmentation, aggregation, sedimentation and deposition characteristics of plastic in order to understand the fate of (micro)plastics in the marine environment.

iii. Eco-toxicological effects of microplastic – impact on marine organisms

Several studies have shown that microplastic particles are taken up by marine organisms (e.g. zooplankton, invertebrates). However, the eco-toxicological effects are still widely unknown or under debate as previous studies display inconsistent findings.

As microplastics adsorb persistent organic pollutants or harbour plasticisers, which are known to accumulate in the food web, the chemical equilibrium processes in the environment and more important, after ingestion of microplastics by organisms, are far from understood. Furthermore, although microplastics were already detected in a wide variety of biota, it is still unknown to what extent and how long (gut passage) the organisms are confronted with the particles *in situ* (concentration) and if selective feeding takes place (size). Hence realistic experimental scenarios have to be developed.

The following objectives should be addressed in proposals aiming at a better understanding of the eco-toxicological effects of microplastics in marine systems:

- Description of particle toxicity effects (cytotoxicity, immunotoxicity, etc.) of microplastic exposure: cell, fluid, tissue, organism levels and studies of mechanisms of action, uptake and clearance
- Analysis of absorption and transportation of toxic organic and inorganic substances by microplastic particles
- Investigation of the transfer and accumulation of microplastics in the marine food web
- Investigation of possible effects of microplastics on the food web and links to other particle toxicity research – (cross-pollination with various other non-marine science fields).

3. Procedures and Criteria

Proposals should address at least one of the three themes in the call text. Applicants are advised to consult their national contact points for this call prior to planning and submitting proposals (contact person see further information).

a) Eligibility

- The call is open to proposals that meet the following criteria:
 - The proposal addresses at least one of the three themes in the call text
 - Researchers who are eligible to apply for financial support from any of the participating FUNDING PARTNERS are eligible to apply for funding within this call for proposals;
 - Researchers from other countries (ASSOCIATE PARTNERS) can participate in project proposals on the condition that they provide written proof that their part of the project will be covered independently of this call (in kind), however they cannot coordinate a project and their contribution to the project should not be vital;
 - The principal investigator (PI) leading an application must be eligible for submitting funding proposals to one of the FUNDING PARTNERS;
 - The trans-national collaboration must have a clear added value for at least one of the three proposed research themes.

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- Number of applicants per proposal:
 - Each application must involve researchers from at least three eligible countries (countries of the FUNDING PARTNERS); no maximum number of partners is specified; (Topic 1 preferentially from all partners supporting this call)
 - Funding Period: Project duration should be:
 - Maximum of three years;
 - Projects should preferably start on **01.12.2015** (earliest).
 - The maximum budget per partner per proposal is as follows:
 - € 150,000 (Ireland, Spain)
 - € 200,000 (Belgium², France, Italy, Sweden)
 - € 250,000 (The Netherlands)
 - € 300,000 (Norway, Germany)
 - The general eligibility criteria specified by the respective FUNDING PARTNERS have to be followed. For details please contact the national representative(s) for further advice.

b) General Procedure

The following procedure will be applied:

1. Proposals are submitted to the LEAD AGENCY (**Project Management Juelich**)
2. Proposals are sent to independent, international peer referees for assessment. Some or all of the referees will serve as members of the EVALUATION PANEL.
3. An EVALUATION PANEL, consisting of independent, international experts, ranks the proposals based on the results of the peer-review procedure (review reports and rebuttal). The EVALUATION PANEL recommends the top-ranked proposals for funding.
4. The FUNDING PARTNERS jointly decide on a short-list for funding out of the top-ranked proposals based on the recommendations from the EVALUATION PANEL.

The composition of the EVALUATION PANEL will be made available on the website of the LEAD AGENCY after the funding procedure has been completed. Strict confidentiality is maintained with respect to the identities of applicants and the contents of the proposals throughout the duration of the whole procedure. The list of funded projects will be published on the website of the LEAD AGENCY. All participating FUNDING PARTNERS and the JPI Oceans will publish this list on their websites.

c) Evaluation and Selection

Potential applicants are advised to take careful notice of the aims and scope of the call as described above. The following criteria will be applied to assess the quality of proposals:

Main criteria

Scientific quality is the leading criterion and will be assessed by means of the following criteria:

- Scientific quality, including novelty, originality and innovation of the proposed research
- Feasibility and applicability of the proposed research in relation to the call objectives
- Relevance to the call, esp. added value of transnational collaboration
- Quality of applicants and suitability of the consortium

² The Research Foundation Flanders (FWO) has a maximum budget for 30.000 € per partner per proposal

Additional criteria

The following criteria will also be considered when ranking the proposals:

- Level of integration and collaboration
- Interdisciplinarity
- European added value
- Project governance
- Suitability of budget requirements
- Networking and dissemination activities
- Training opportunities

d) Call Structure and Management

Funded projects are required to report on a yearly basis to their national funding agency under the administrative rules of the relevant funding organisation. An English summary is required in all cases and will be forwarded to the Lead Agency. The principal investigator will be responsible to submit a final report to the Lead Agency, in English, within six months after the end of the project. This report should cover the work undertaken by all of the proposal partners.

A workshop will be organised half way through the funding period. A final conference will be organized at the end of the funding period. Participants of funded projects are expected to participate in this workshop and in this final conference and should include the relevant costs in their proposal budgets.

e) Funding

A total amount of up to **€ 7.5 million** has been blocked by the FUNDING PARTNERS from Belgium, France, Germany, Ireland, Italy, The Netherlands, Norway, Spain and Sweden for this call. Each participant in a funded consortium will be funded by his or her national partner organisation (see point g). The FUNDING PARTNERS aim at funding as many top-ranked proposals as possible.

ASSOCIATE PARTNERS from other countries are welcome.

f) Eligible budget items

Eligible costs are governed by national regulations. Specific questions should be addressed to the national partner organisations, if possible in advance of submitting an application.

g) Further information

Potential applicants are advised to consult the general funding requirements of the national organisations participating in the call and to contact the national contact persons whenever necessary, especially with regard to eligible costs and other country-specific aspects of the call.

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**Swedish Agency
for Marine and
Water Management**

h) Call Secretariat

The call will be run by Project Management Juelich, Div. MGS. The call secretariat is responsible for organizing the evaluation procedure and for all communication with coordinators regarding their applications.

i) Submission of Proposals and Deadline

The language of the application is English. Applications should be submitted electronically to PTJ via the link provided on the website <https://epss-jpi-oceans.ptj.de>. The use of the official application form for this call is mandatory. Instructions and guidelines for submitting applications can be found on the website. In case of technical questions, please contact the call secretariat (show website).

The deadline for submitting proposals is **31.03.2015, 12:00 CEST**. Applications received after the deadline will not be considered.