

INDI67

Developments of methods to improve monitoring of MSFD indicators 6 and 7

DURATION
15/12/2014 - 15/03/2019

BUDGET
648 271 €

PROJECT DESCRIPTION

The INDI67 project relates to the EU Marine Strategy Framework Directive (MSFD) that aims to protect more effectively the marine environment across Europe. The Directive is based on an ecosystem approach to manage the impact of human activities on the marine environment through the establishment of targets and associated indicators. Especially the latter has proven to be difficult. The main objective of INDI67 is therefore to propose tools and methods to support the monitoring of descriptors 6 (seafloor integrity) and 7 (hydrographical conditions) by developing and evaluating cost- and time-efficient integrative indicators. Three parameters that are already measured and modelled, are selected as key indicator, i.e. **turbidity**, **bottom shear stress** and **seabed/habitat type**. These parameters are related to seafloor-, sediment- and hydrodynamics and witness changes induced by human activities (dredging/disposal, aggregate extraction, constructions, fishery).

- **Turbidity** of the water is caused by mainly suspended particulate matter (SPM). SPM occurs as flocs of variable sizes, composition and density and has critical impact on sediment transport through the modification of settling velocities. SPM mediates many bio-geo-chemical processes that are of particular interest for many ecosystem functions. INDI67 focusses on quantifying turbidity through measurements of SPM concentration and floc size and on the development of flocculation models that can take into account bio-physical processes in marine environments.
- **Bottom shear stress** links the sea floor to the water column as it suspends sediment; influences and is influenced by seabed and surface sediment texture; contributes to turbulence generation and to entrainment and mixing; directly and indirectly impacts benthic organisms; and is influenced by human constructions or activities. In INDI67, existing numerical models are used to calculate the bottom shear stress, and to identify the effect of human activities on it. High frequency measurements are used to calculate bottom shear stress and to validate the model results.
- Within MSFD the benthic habitat is the backbone of many **seabed** related indicators. To assess its distribution and its variability in time, seabed mapping using multibeam echosounders (MBES) is increasingly used. With MBES large areas of the seafloor can be mapped time- and cost-effectively, and, in combination with appropriate ground-truthing, new insights become available on the status of the benthic habitats. However, for the detection of changes in seabed and habitat types, further evaluations are needed on the precision, sensitivities and repeatability of the acoustic devices. This is especially the case for MBES-derived acoustic backscatter, being a proxy of seabed type.

Direct or indirect measurements of parameters and modelling of processes are inherently associated with uncertainties due to a lack of accuracy of the measuring instruments, numerical errors associated with the discretisation and lack of adequate boundary conditions, use of empirical equations to model complex processes, and the statistical nature of the variables to be studied. A major scope of INDI67 is therefore to evaluate the confidence with which bottom shear stress, turbidity, seabed/habitat types and the impact of human activities can be measured, modelled and predicted.

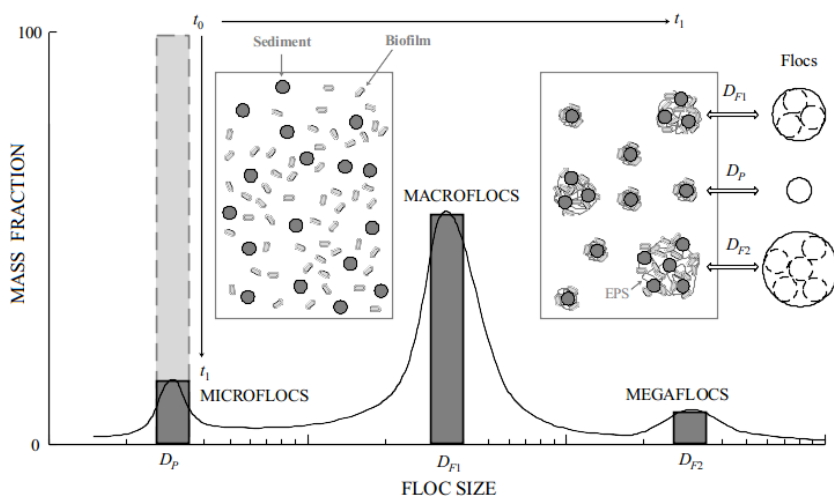


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The expected research results of the project are:

- A quantification of the uncertainty associated with in situ measurements of SPM concentration, bottom shear stress and seabed/habitat type.
- A better understanding of the flocculation dynamics affected by biological processes through new measurements and model developments.
- The setting up of protocols for SPM concentration measurements and for the seabed mapping with MBES in the Belgian part of the North Sea.
- Evaluation of the use of bottom shear stress, turbidity and seabed/habitat type as MSFD indicators. As such the results could have an impact on the evaluation of Good Environmental Status in marine areas in Belgium and France.

The scientific results will be valorized through peer-reviewed publications, two PhD thesis, the organization of workshops and the presentation of results during international workshops and conferences.



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