Preliminary study of the water gradient within a Belgian offshore windfarm

Mavraki Ninon[1], De Mesel Ilse[1] and Degraer Steven[1]

[1] Marine Ecology and Management, Operational Directorate Natural Environment, Royal Belgian Institute of Natural Sciences, 3de en 23ste Linieregimentsplein, 8400 Oostende, Belgium
E-mail: nmavraki@naturalsciences.be

The FaCE-It project aims to examine the effects of sediment fining and hardening on benthic ecosystem functioning caused by anthropogenic impacts. Human activities, e.g. the construction of offshore windfarms, add artificial hard substrate to naturally soft sediments, altering the existing seabed habitats. The input of hard substrates leads to partial or entire replacement of the native benthic communities by fouling communities. The organisms comprising a fouling community act as active "biofilters" consuming organic compounds from the water column and releasing inorganic and organic materials, in the forms of faeces and pseudofaeces, to the surrounding environment – a procedure known as biodeposition. It is known that some fouling organisms, such as the amphipod *Jassa herdmani* and the hydroid *Tubularia indivisa*, build tube-like structures that absorb suspended particulate matter (SPM). These activities result in the alteration of the biogeochemical processes and could also lead to the SPM plumes that have been reported to occur in the Belgian offshore windfarms.

The aim of the present study is to identify the alterations caused by fouling communities to the water characteristics and analyze the water gradient – flow of the water compounds according to the currents - around an offshore windfarm (C-Power) in the Belgian Part of the North Sea. The initial hypothesis is that organic and inorganic materials will flow according to the currents and will appear in different concentrations in front, within and behind the entire windfarm structure. For this purpose, a sampling campaign was organized in order to collect water samples from different areas of the windfarm and analyze them for a variety of water characteristics, such as chlorophyll a, suspended particulate matter, particulate organic carbon and nitrogen and dissolved organic carbon. The results of this study will present the concentrations of the water gradient occurring in the offshore windfarms due to the presence of the fouling community.

Keywords: fouling communities; biodeposition; organic matter; water flow