

The effect of the installation of offshore wind farms on soft-sediment macrofauna: a 5-year study from the Thornton Bank (Belgian part of the North Sea)

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Following to the European directive 2001/77/EC for reducing the emissions of greenhouse gasses, Belgium aims to produce 13% of its electrical consumption from renewable energy sources by 2020. Wind farms are a good option to achieve this target and therefore Belgium facilitated the installation of five offshore wind farms in the Belgian part of the North Sea. MUMM started a monitoring program to determine the possible impact of offshore wind farms on the marine environment, including the soft-sediment macrobenthos (the organisms larger than 1mm that live in the soft-sediment of the seabed). To assess the cumulative impact of the wind farms in the macrobenthic community at the impacted sandbank (the Thornton Bank), a 5-year (2009–2013) dataset was analyzed. Because of the different sampling strategies that were applied during the last five consecutive years, the long-term dataset was heterogeneous. Two statistical analyses were designed based on the heterogeneity of the data: “Design 1” is based on a limited number of stations, where replicate samples were obtained. “Design 2” reflects a sampling design based on more stations where only 1 replicate is obtained. With these two statistical designs, two main objectives were aimed for. Firstly, we evaluated the possible effects of constructing windmill farms on the marine macrobenthos in the Thorntonbank. Secondly; we aim to provide advice on the best biomonitoring design for future monitoring purpose for soft sediment macrobenthos. Our results reveal that macrobenthic community composition has changed thru time, and is different between locations, but species richness and diversity did not change. In addition, the installation of the windmill farm had no effect on the environmental variables (grain size composition, total organic matter content). As such, we believe that the changes in macrofaunal community composition are due to natural internal variability. Both sampling designs have advantages and disadvantages: sampling less stations while increasing the number of replicates per location increases the capacity of the analysis to take into account the natural, local variation in the fauna. However, sampling more stations with one replicate allows to cover a larger area at the same cost.

References

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