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Residency and diurnal habitat use of Atlantic cod (*Gadus morhua*) at an offshore wind farm using acoustic telemetry

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Atlantic cod (*Gadus morhua*) is a commercially important fish species suffering from overexploitation in the North-East Atlantic. In recent years, their natural environment is being intensively altered by the construction of offshore wind farms in many coastal areas. These constructions form artificial reefs influencing local biodiversity and ecosystem functioning.

The wind farms in the Belgian part of the North Sea create a unique opportunity to investigate the influence of these manmade constructions on the natural behaviour and movements of Atlantic cod. It has been demonstrated that Atlantic cod is present in the vicinity of windmill artificial reefs. However, empirical data concerning the residency and movement patterns of Atlantic cod in the vicinity of these artificial reefs is lacking. Directly observing the behaviour of marine fish in the wild is logistically very difficult. As a result, other methods are essential to infer fish behaviour. In this study we used acoustic telemetry to empirically quantify diel movement behaviour.

During the feeding season (i.e. summer and autumn) Atlantic cod were strongly resident and showed high individual detection rates within the offshore wind farm investigated. During this period, Atlantic cod exhibited crepuscular movements related to feeding activity. A 12 h cycle in activity was found and the highest detection rates were recorded close to sunset and sunrise. We conclude offshore wind farms to play an important role in Atlantic cod behaviour.

Keywords: demersal fish, windmill artificial reefs, acoustic telemetry, Belgian part of the North Sea

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