



## **The impact of wind energy turbine piles on ocean dynamics**

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The small- and meso-scale ocean response to wind parks has not been investigated in the southern North Sea until now with the help of high-resolution numerical modelling. Obstacles such as e.g. wind turbine piles may influence the ocean current system and produce turbulent kinetic energy which could affect sediment dynamics in the surrounding area.

Two setups of the unstructured-grid model SCHISM (Semi-implicit Cross-scale Hydroscience Integrated System Model) have been developed for an idealized channel including a surface piercing cylindrical obstacle representing the pile and a more realistic test case including four exemplary piles. Experiments using a constant flow around the obstacles and a rotating M2 tidal wave are carried out. The resulting current and turbulence patterns are investigated to estimate the influence of the obstacles on the surrounding ocean dynamics.

We demonstrate that using an unstructured ocean model provides the opportunity to embed a high-resolution representation of a wind park turbine pile system into a coarser North Sea setup, which is needed in order to perform a seamless investigation of the resulting geophysical processes.