

Clay Tectonics: investigating the influence of clay tectonic deformations on offshore windfarm development on the Belgian Continental Shelf

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Abstract

In the coming years, a new zone for offshore windfarms (285 km², up to 3.5 GW capacity) will be developed on the Belgian continental shelf (BCS), in the Southern Bight of the North Sea. The substrate in this so-called "Princess Elisabeth Zone" consists of a thin Quaternary cover (locally only a few to < 1 m thick) overlying Early Eocene Ypresian clays, which are part of the Kortrijk Formation. Clay tectonic deformations, manifesting as polygonal fault networks and diapiric structures, have been reported to occur in this formation since the 1980s (Henriet et al. 1983, Henriet et al. 1988), yet, they have so far received little attention in the context of offshore infrastructure works on the BCS. New acoustic measurements in the Princess Elisabeth Zone, using very-high-resolution parametric sub-bottom profilers, have now revealed the style and intensity of the deformations in unprecedented detail, readily highlighting the potential risk to the design, installation and operation of the newly planned windfarms. This instigated the "Clay Tectonics" project (2023-2025), which aims to address the problem through the integration of geophysical measurements, geological analyses and geotechnical simulations. This presentation will outline the project's rationale and strategy, and provide preliminary results from the geophysical measurements performed during the first year of the project.

References

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