

Measuring the ‘shadow’ effect of an artificial structure on benthic communities in the Southern North Sea

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Artificial structures in the North Sea, such as oil and gas extraction platforms, provide a solid substrate for sessile epifauna in areas which are characterized by soft sediment habitats. This epifauna mainly consist of filter-feeders and may reach up to 500-fold the biomass found in the surrounding environment. These filter-feeders can alter the nutrient composition in the overlying water column by depleting organic matter and enriching it by producing faeces and nutrients. In addition, hydrodynamics in the wake of the platform are altered by the structure itself causing a change in sedimentological characteristics. So far it is unknown to which extent both the biogeochemical as physical effects influence the surrounding benthic community composition in the long-term. Epifauna communities on artificial structures have been shown to change in composition even after a long time span, nevertheless, the effects of this epifauna on the environment were only investigated for short-term periods.

This study assesses the effects of an >40 years old offshore gas platform on the species composition in the wake of the platform. The species composition and a set of biotic factors of the sediment were assessed up to 600m from the platform along four transects in perpendicular directions. The benthic species were identified by both morphological and molecular approaches. The molecular approach was able to recover on average three times more taxonomic families compared to the morphological approach. Whereas the morphological approach was restricted to macrofauna solely, the molecular approach was able to detect many meiofaunal families. Both approaches revealed small differences in species composition closer to the platform. These differences were mainly due to sedimentological changes, and in particular changes in organic matter contents. This study found no evidence for far reaching effects on the surrounding benthic community composition.

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