

Abundance, biomass and species richness of macrozoobenthos along an intertidal elevation gradient

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Abstract

Tidal flats can be found on most of the world's coastlines and are particularly vulnerable to anthropogenic disturbances. They are important transient ecosystems between terrestrial and marine ecosystems and their biodiversity provides important ecosystem services. Owing to their unique position between the terrestrial and the marine realm, strong environmental gradients of elevation, sediment composition but also food availability are prevailing. Here we investigate which environmental factors drive the spatial and temporal patterns in macrozoobenthos abundance, biomass, richness, diversity and species composition on back barrier tidal flats in the East-Frisian Wadden Sea. We found that with increasing mud content the total abundance of organisms in the sediment significantly increased, while biodiversity and biomass were not changing significantly with increasing mud content. Biomass of macrozoobenthos decreased with higher elevation towards the salt marsh. In contrast to expectations, increasing Chl a availability as a measure of primary productivity did not enhance biomass or abundance, but was associated with significantly reduced species richness. Species composition varied significantly among and within islands due to variation in sediment composition, resource availability and human-induced disturbance. In conclusion, macrozoobenthos biomass, abundance and biodiversity is interrelated in a complex way with the physical, abiotic and biotic processes in and above the sediment. Negative impacts of primary production on macrozoobenthos species richness demonstrate possible negative effects of nutrient inputs in tidal flat areas and the need for cross-boundary protection.

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