

Bottom trawling effects on marine macrobenthos: Changes in ecological functioning interpreted by a biological multiple traits approach

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Bottom trawling may adversely affect the ecological functioning of marine habitats and associated macrobenthos communities. While several studies have assessed the variability and sensitivity of invertebrate taxa and biodiversity indices to human impacts, few ecological indicators have proven sensitive to bottom trawling. In a recent study, trawling intensity explained more of the variation in total macrobenthos density than in species density and derived biodiversity indices; however, changes in ecological functioning were not tested. The aim of this study was to investigate whether trawling induced variation in total macrobenthos density translates into changes in ecological functioning by using 35 modalities across 8 response and effects traits. Quantitative macrobenthos time series data (2006-2015) from a complex, northern European sea (the Kattegat connecting the North Sea and Baltic Sea) were analysed to decipher ecosystem responsiveness to trawling intensity and 6 key environmental variables. Linear mixed effects models were used to identify potential indicators sensitive to bottom trawling while accounting for spatial and temporal random effects as well as for individual-species density correlations. We compare these results with those of multivariate statistical analyses (DistLM, dbDA) and discuss the fundamental implications of our findings and their application for fisheries management and seafloor integrity assessments.

Keywords: Fisheries, Ecological functioning, Biological traits, Seafloor integrity.

Short description: Bottom trawling effects on macrobenthos and ecological functioning interpreted by a biological multiple traits approach.