

Abstract

The importance of artificial structures for the shallow water crustacea and demersal fish community of the southern North Sea

Coastal protection measures are becoming increasingly important with respect to the expected changes in climate over the next decades. Nevertheless, there is only limited information on the ecological role of artificial hard bottom structures in temperate and northern cold-water areas. In this study we investigated the effects of so called "Tetrapods" (4-footed breakwaters) as artificial constructions in sublittoral habitats in the southern North Sea.

In an *in situ* - study using SCUBA, we performed monthly countings of the visible fish and crustacea species along fixed transects in experimental "Tetrapod" fields in 5 and 10 m water depth. The results show that fish biomass in close vicinity to the artificial structures is significantly higher compared to the surrounding areas. In contrast, no effect has been revealed for crustacea. Furthermore, the species composition changes slightly towards the structures with an increase in semi-benthic species, i.e. juvenile cod (*Gadus morhua*) and goldsinny (*Ctenolabrus rupestres*).

We discuss whether the increase in biomass is mainly due to migration of fish towards the structures searching for food and hiding-places or whether an additional biomass increase is achieved by an increase in individual growth rates due to an additional food supply related to the structures.

Artificial structures are very common and effective tools as breakwaters in many parts of the world. Taking into account the expected increase in water level over the next decades (IPCC 2007), such structures will become of ever increasing importance as coastal protection measures to prevent erosion and flooding. Artificial constructions have the potential to significantly change species abundance and composition and therefore may have an important impact on the local biodiversity. We therefore have to address this question in detail and provide reliable data on the ecological impact of such structures on the marine shallow water environment.