

The influence of marine sand extraction on benthic copepod communities

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More than 95% of the sand extraction on the Belgian Continental Shelf occurs on the Kwintebank and is concentrated at the north-western tip and in the centre of the bank. The extraction activities impact bottom habitat structure and diversity by coarsening and homogenising the sediment and cause a strong erosion process. Density, diversity and community structure of harpacticoid copepods on the Kwintebank were determined and related to sediment characteristics and sand extraction intensity. Samples were taken in 1997 with a Reineck box corer and included 10 stations on the bank and 2 in the channels next to the bank. Eighty copepod species were recorded, of which 38% were new to science. Three major copepod communities were distinguished on the bank. Their occurrence was related to a linear gradient from fine sands in the south to coarser sands in the north. This gradient is a result of local tidal current patterns. A fourth community was found in the gullies next to the bank and in one station positioned in the centre of the bank. The sediment composition of this station however was comparable to the other bank stations. Analogies could be found in the occurrence of erosion and extraction areas and the occurrence of communities on the sandbank. The results of 1997 were compared with copepod species distribution data collected in 1978 prior to intensive sand extraction. The harpacticoid community structure of the southern part of the bank was still comparable after 20 years and hence stable in time. In the northern part the species composition altered in favour of interstitial species. In the centre of the bank a community shift was recorded due to changes in sediment characteristics, adjacent to an area with very low density and diversity. The harpacticoid communities of areas with a high amount of exposure, like on the Kwintebank, are adapted to continuously changing conditions. Nevertheless human-induced physical disturbances may decrease community complexity in the centre of the bank, where the extension of a present depression can become quite problematic. This depression may grow due to sand extraction. The presence of some harpacticoids that are adapted to physical stress and the significantly higher density of juveniles in the most intensively exploited stations, suggest the existence of a frequently disturbed environment. Spreading the extraction activities over the different sandbanks in the concession zone will help decreasing the disturbance frequency and intensity.