Short-term hypoxia does not affect nematode densities and vertical distribution patterns at the Belgian Part of the North Sea

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We investigated the effect of coastal hypoxia on nematode communities from different sediment types at the Belgian Part of the North Sea (BPNS). Different sediment types are characterised by different biogeochemical environments, which is reflected in nematode densities, community composition and vertical distribution in the sediment. As such, we investigated whether the effect of hypoxia depends on the identity of the receiving nematode communities. Samples were collected at St700 (median grain size: 25µm), St115 bis (median grain size 185µm) and St330 (median grain size 330-360µm), covering a wide gradient of biogeochemical environments. The environmental differences were reflected in significantly higher nematode densities at St115bis. PERMANOVA analysis (relative abundances) did not indicate a significant difference in the vertical distribution pattern in the field situation.

In the lab, oxygen concentrations in the water column were manipulated to reach hypoxic conditions in the water columns (1.34±0.09 mg^{-1}) or to maintain oxic condition (7.70±0.09mg^{-1}). Samples were collected after 1 day (short term effect) and 7 days. Hypoxia in the water column resulted in reduced oxygen penetration depth in hypoxic treatments from Day 1 onwards at St330, and at Day 7 at both other stations. However, as oxygen penetration depth was limited to the upper cm at the onset of the experiment, direct oxygen-related hypoxia effects are limited to the upper cm of the sediment.

Nematode densities and vertical distribution were not significantly affected by the experimental conditions at the start of the experiment. Hypoxia did not affect nematode total densities after 1 and 7 days at any of the stations. Similarly, hypoxia did not affect the vertical distribution of the nematodes at any of the stations.

Our results indicate that nematode communities from different sediment types from the BPNS were not negatively affected by short-term hypoxia, in terms of total densities and vertical distribution patterns. This can partly be explained by the buffering capacity of all types of sediment, as reflected in the relatively small differences in oxygen penetration depth in most of the sediments. On the other hand, nematode communities present at the start of the experiment probably were adapted to life in oxygen-stressed environments, as they were sampled after the deposition of the spring phytoplankton bloom. However, more detailed (but ongoing) analyses of the nematode communities (e.g. at species level) and environmental variables are needed to increase our understanding of the response of different nematode communities to short-term hypoxic events.