ID: 6008

Effects of oil water-soluble fractions (WSFs) on marine and freshwater nematode assemblages: a microcosm approach

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The water-soluble fractions (WSFs) of oils contain highly toxic compounds, despite their low persistence in aquatic environments. Their effects may be instantaneous or delayed, provoking immediate mortality or sublethal effects, for instance on growth and reproduction. We investigated the effects of crude oil WSFs on both marine and freshwater (FW) meiobenthos, with focus on nematode assemblages, in microcosm experiments lasting up to 15 weeks. Both experiments were performed simultaneously. Nematoda was the most abundant group, comprising ca. 90% of the meiofauna in both marine and freshwater sediments. Oligochaeta (both marine and freshwater), Copepoda (marine), Amphipoda (marine), and Tardigrada (freshwater) almost disappeared from oil WSF treatments. Significant impacts on total nematode abundance, diversity and species composition only became apparent after 15 weeks, indicating that delayed effects are far more pronounced than instantaneous effects. In the short-term, significant oil WSF effects occurred in marine but not in freshwater microcosms: After one week, oil WSFs reduced the number of deposit- and epistrate feeders. In freshwater microcosms, significant effects on nematode feeding types were only detected by differences in the index of trophic diversity, but not by the multivariate comparison of feeding-type composition. Overall, sensitivity was species-specific in both marine and freshwater microcosms, with sometimes opposing responses between even congeneric species. Our results showed that oil WSFs can yield strong effects on both marine and freshwater meiobenthos, and demonstrate the need to assess WSF effects on communities at the species level and over time periods well exceeding the residence time of WSF compounds in the environment.

Keywords: Oil pollution, Nematoda, benthic communities, direct toxicity, experiments, microcosms

ID: 6017

Meiofauna research to understand the future impact of deep-sea mining in the Clarion-Clipperton Zone

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Polymetallic nodule mining in the abyss is a nascent industry hoping to meet the growing worldwide demand for metallic minerals. Given that prospective mining is likely to have a profound impact on deep seafloor communities, knowledge on their ecology is pivotal in order to provide sound guidelines for environmentally