



## **Increased standing stocks of metazoan meiofauna in Gulf of Mexico seeps: oil or methane driven?**

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Metazoan meiofauna with particular reference to Nematoda was investigated at liquid and gaseous hydrocarbon seep sites in the northern Gulf of Mexico (GC 185/GC 234) in a water depth of 550 m. Eight sites covered to a different spatial extent with chemosynthetic microbial mats of the giant sulphide oxidising *Beggiatoa* in comparison to nearby reference sites were investigated. The seep sites encompass an environmental gradient from low to high sulphide pore water concentrations with a maximum of  $2.3 \text{ mmol l}^{-1}$  in the surface sediment. Occurrence of oil, which was easily detected by visual inspection is further indicated by strongly elevated C/N ratios of up to 20.1 in the uppermost sediment layer and 56.6 in deeper sediment horizons. At the seep sites strongly elevated abundances and biomasses of nematodes integrated over the upper 10 cm of the sediment of  $1443 \text{ ind. } 10 \text{ cm}^{-2}$  and  $363 \mu\text{g C } 10 \text{ cm}^{-2}$  were found respectively. In contrast, the average abundance and biomass at the reference sites (n=4) was  $106 \pm 30 \text{ ind. } 10 \text{ cm}^{-2}$  and  $10.7 \pm 3.6 \mu\text{g C } 10 \text{ cm}^{-2}$ . Highest standing stocks of nematodes were found to coincide with high sulphide fluxes and low oil concentrations. At the sites with highest oil concentrations nematode abundance and biomass decreased to  $180 \text{ ind. } 10 \text{ cm}^{-2}$  and  $23.8 \mu\text{g C } 10 \text{ cm}^{-2}$ . At the studied seep sites microbial anaerobic methane oxidation and/or the degradation of liquid hydrocarbons by sulphate reducing bacteria, either process releasing sulphide into the pore water, support the microbial chemosynthesis of organic carbon from which the meiofauna might benefit. High levels of oil might have rather an adverse effect on the distribution of meiobenthic organisms by impeding their locomotion, respiration, blocking their excretory organs and clogging their mouth parts.