Effect of pockmark environmental conditions on metazoan meiofaunal community, the tiniest and most abundant benthic component

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Résumé

Organisms inhabiting at pockmarks are able to cope with the extreme conditions that characterize this kind of cold seep, such as high concentrations of reduced chemical compounds, low oxygen availability, high primary production, and habitat heterogeneity. This fauna is usually particularly sensitive to changes in the environmental conditions, making them good biological indicators. Particularly, meiofaunal component (organisms of small size, < 1mm) has several advantages for benthic ecological studies because of its worldwide distribution, high abundance and diversity, fast metabolic rates, and its extremely sensitivity to alterations due to the lack of pelagic larval dispersion. Despite meiofauna is the most abundant size class in the benthos and one of the most diversified component of the marine realm, its study has been often neglected. We investigated and compared several pockmarks to understand whether and how the environmental conditions (concentration of reduced compounds, organic carbon, and dissolved oxygen) and the organism's interaction affect metazoan meiofauna. Despite the extreme conditions, meiofauna at pockmarks usually reaches high abundances compared with the surrounding areas. Furthermore, we also explored the community structure of the dominant meiofaunal taxa, i.e. the phylum Nematoda, which usually dominates meiofaunal communities, as well as the phylum Kinorhyncha, one of the so-called rare meiofaunal groups that flourish at some pockmarks. Meiofauna assemblages, and particularly the referred phyla, indicate a pronounced replacement of taxa between sites located inside and outside the pockmarks, with a high percentage of exclusive taxa associated with the pockmarks. Therefore, gas emission seems to act as a key factor to determine meiofauna diversity, abundance and community composition, as well as for the two investigated phyla. Additionally, some taxa do not simply survive under the gas emissions and low oxygen availability at the pockmarks, but profit from a habitat with a lower competition, enhancing their density. This is the case of the Nematoda genus *Desmodora* and the Kinorhyncha *Echinoderes hviidarum*, which may be considered as potential bioindicator of seepages. Finally, pockmarks provide significant contributions to the regional meiofauna diversity and thus the protection of this habitat is highly important to the conservation of local biodiversity.

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