

Significance of micro- and macro-faunal assemblages from the Palmahim Disturbance (offshore Israel, Eastern Mediterranean): Environmental implications for recent and past methane seep and cold-water coral ecosystems

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Planktonic (pteropods) and benthic faunal assemblages (foraminifera, molluscs), collected during the EUROFLEETS2 SEMSEEP Cruise allow to better understand the past seepage emission history in the Palmahim Disturbance (PD, offshore Israel, Eastern Mediterranean Sea) over the last 5800-5300 cal BP.

Seafloor video surveys revealed patches of the chemosymbiotic mollusc *Lucinoma kazani*, a species that can give indication about duration and timing of gas emissions. The co-occurrence of chemosymbiotic molluscs and low-oxygen tolerant benthic foraminifera reveal that they can be potential seep indicators in the Levantine Basin. A new chemosymbiotic mollusc species, *Waisiuconcha corsellii* is described, its identification contributes to our general knowledge on chemosymbiotic molluscs. Cores and surfaces samples selected from three representative area in the PD are investigated: Pockmark, Coral, and Gal-C channel areas. Pteropod assemblages show that the exclusion of the small size fraction, can bias environmental reconstruction. Pteropods aragonite internal molds suggest that they may be indicative of seepage, as aragonite usually precipitates during advective emissions. Integration of benthic foraminifera, giving short term response to environmental perturbation with long-term response molluscs, allows to have a multi-scale approach in environmental interpretations. Chemosymbiotic micro- and macrofauna co-occurring with authigenic carbonate crusts fragments, oxidized and pyritized tubes, gypsum crystals, anomalous isotopes values and increase in TOC%, suggest dynamic environments supporting advective and diffusive emissions around 3500-4500 BP. In the Pockmark area the diffusive methane flux sustained the development and recruitment of mature chemosymbiotic faunal assemblage. Overall, the thesis highlights the importance of multidisciplinary in paleo/environmental studies and the important role of parameters that are often overlooked during faunal and sedimentological analyses.

Jury:

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