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EDITORIAL

New insights into Mediterranean cold seep ecosystems: editorial comment on the feature article by Ritt et al

Michael Kühl

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Tectonically active areas of the ocean floor harbor diverse benthic ecosystems that are essentially independent of photosynthesis and are largely driven by chemosynthetic bacterial processes. This includes symbiotic relationships between invertebrates and chemosynthetic bacteria oxidizing, e.g., methane (CH_4) or sulfide (H_2S). In contrast to the relatively ephemeral hydrothermal vent systems that flourish along very active rift zones and other hot spots of volcanic activity, cold seeps are more long-term stable systems found in less active areas around fissure zones in the sea floor, where reduced gases (H_2S, CH_4) and hydrocarbon-rich fluids emerge over larger areas (Levin 2005).

Cold seeps were first discovered in the Gulf of Mexico (Paull et al. 1984) and have since been found worldwide in many other ocean regions including polar seas and the Mediterranean. Cold seeps have been subject for intense interdisciplinary studies in recent years. They represent extremely heterogeneous habitats harboring a multitude of microbial, meiofaunal and macrofaunal communities that respond to changes in structural complexity, habitat geochemistry, nutrient sources, and interspecific interactions (Cordes et al. 2010). Understanding cold seep community composition and biogeography is a central topic of such studies, yet quantitative information is still scarce (Vanreusel et al. 2010).

The study by Ritt et al. (2011) now presents the hitherto most detailed study of the macro- and meio-fauna communities associated with Mediterranean cold seeps along with geochemical data on their habitats. The authors compare faunal communities of Mud volcanoes and pockmarks to the surrounding oligotrophic deep-sea habitats and conclude that cold seep communities harbor both larger biomass and biodiversity. However, the results do also highlight a tremendous heterogeneity in structure and composition of animal communities associated with cold seep ecosystems, which in part are linked to different reduced microhabitats and substrate types in carbonate crusts and sediments. In conclusion, this article gives new important insights to the animal community ecology of cold seeps and points out directions for future studies of these relatively recently discovered habitats.

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M. Kühl (✉)
Department of Biology, Marine Biological Section (MARS), University of Copenhagen, Strandpromenaden 5, 3000 Helsingør, Denmark
e-mail: mkuhl@bio.ku.dk

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