Redox gradients in deep-sea sediments and associated microbial communities: Methane seeps and large food falls

ANTJE BOETIUS[123]

[1]Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Bremerhaven; antje.boetius@awi.de
[2]Max Planck Institute for Marine Microbiology, Bremen
[3]MARUM University Bremen, Germany

Most deep-sea sediments are characterized by low carbon input and deep penetration of oxygen as key electron acceptor. Where energy becomes available in the form of organic matter or as gases such as methane or sulfide, redox gradients develop quickly as a consequence of the microbial exploitation of such energy sources. Such hot spots at the deep-sea floor are associated with hydrocarbon seepage, or with local deposits of matter, for example from massive sedimentation of algal blooms, kelp, carcasses of wood falls. This presentation discusses the identification, distribution and function of key groups of bacteria and archaea populating redox gradients of cold seeps and large food falls in deep-sea sediments, thereby forming the basis of hotspot ecosystems in the deep-sea. It addresses global patterns in microbial activity at the interface between oxic and anoxic realms in the seabed, by combining biogeochemical and microbiological data from recent *in situ* field studies, highlighting the dynamics of deep-sea ecosystems. An unexpected finding is the ubiquity and dominance of a few core groups of microorganisms with global relevance in the cycling of organic carbon, methane and sulfur, among a huge diversity of microbial ecotypes with unknown functions and adapations to their habitats.