Deposition, element cycling & microbial life in hadal sediments

Trenches act as depocenters for organic material and appear to represent globally important sites of carbon sequestration, but at the same time they act as hots spots for microbial life flourishing at extreme hydrostatic pressure. Microbial mineralization rate along trench axes is highly intensified as compared to adjacent abyssal plains, and early diagenesis in surface sediments of the most active trench systems includes the complete redox sequence of anaerobic mineralization known from coastal margins. The intensified mineralization is mediated at extreme hydrostatic pressure by largely unexplored communities and preliminary investigation suggests that hadal biomes are distinct but surprisingly diverse.

Hadal trenches are unique but highly dynamic and diverse deep-sea environments, and their function or importance cannot be understood by extrapolating our insights from the ambient ocean. The sources and nature of organic material sustaining hadal life as well as the origin, composition and nature of the microbial communities overturning organic matter at hadal depth remain poorly constrained. The presentation will provide an overview on the status of hadal biogeochemical research and discuss some unresolved questions and paradigms that will spark hadal research in the coming years.