

Intensified microbial activity of sediments in hadal trenches

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Hadal trenches often act as depocenters that focus and accumulate material at great depth. The organic fraction of this material sustains benthic communities that reach relatively high biomasses and apparently are able to efficiently metabolize the settling material. Using *in situ* technology, we hereby show that sediments of targeted Pacific trenches exhibit a higher microbial activity than abyssal counterparts and that the trench activity mirrors the productivity of the overlying water column. Proxies for i) the metabolic lability of deposited material, ii) the deposition rate of particles and iii) the prokaryotic abundance as quantified in recovered sediment cores all indicate intensified deposition of labile material and higher microbial biomass at the trench bottom. The data document that hadal trenches act as diagenetic “hot spots” and it can be speculated that the activity presumably is mediated by microbial communities that are adapted to efficient metabolism at extreme hydrostatic pressure. The presentation will discuss mechanisms that apparently can maintain a high supply of labile material to the central trenches and evaluate the importance of trenches for deep sea diagenesis.

Novel autonomous instruments developed for *in situ* quantification of diagenetic pathways and for *in situ* fixation of benthic microbial communities in hadal settings will be presented. During the next few years the instruments will be deployed in Hadal trenches of the Pacific Ocean to chart the “mare incognitum” of hadal trenches in terms of biogeochemical and microbial function.