Microbial sulfate reduction and sulfide mineral formation at deep-sea hydrothermal vents

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Deep-sea hydrothermal vents are characterized by steep temperature and chemical gradients as well as moderate pressures. At these sites, mesophilic sulfate-reducing bacteria thrive, however their significance for the sulfur cycle and the formation of sulfide minerals is unknown. In this study we investigate sulfate reduction and sulfide biomineralization by the deep-sea bacterium *Desulfovibrio hydrothermalis* AM13 isolated from a deep-sea vent chimney at the Grandbonum vent site (13°N, East Pacific Rise, 2600 m water depth) [1]. Hydrogen sulfide production rates were determined as a function of pressure and temperature. Biomineralization of Fe sulfide minerals in the presence of various Fe concentrations was characterized using microscopy and spectroscopy. We seek to better understand the significance of biological sulfate reduction in deep-sea hydrothermal environments, to characterize the influence of microorganisms on sulfide mineral nucleation and growth, and identify the interactions between cells and minerals.

[1] D. Alazard, S. Dukan, A. Urios, F. Verhe, N. Bouabida, F. Morel, P. Thomas, J.L. Garcia and B. Ollivier, *Desulfovibrio hydrothermalis* sp. nov., a novel sulfate-reducing bacterium isolated from hydrothermal vents, *Int. J. Syst. Evol. Microbiol.*, **53** (2003) 173-178.