Geobiological coupling between hydrothermal vent fluids and symbiotic primary producers at spreading axes

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One of the key interdisciplinary research goals in the DFG Priority Program "RIDGE" is to study the interactions between hydrothermal and biological processes. The proposed study will contribute directly to this goal by investigating the transfer of geochemical energy to one of the major groups of primary producers at hydrothermal vents on the Mid-Atlantic Ridge, endosymbiotic bacteria of invertebrate hosts. Molecular biological methods and stable isotope analyses will be used to study the symbiotic bacteria of shrimp and clams, with a particular emphasis on the dual symbioses of sulfide- and methane-oxidizing bacteria in mytilid mussels. In close collaboration with geologists and geochemists, we will investigate the influence of different geological settings and gradients in vent fluids on symbiotic diversity, biomass, and activity and examine the trophic interactions between energy sources, symbionts, and hosts. The proposed research will contribute to a better understanding of the coupling between geological and biological processes at slow-spreading ridge systems.