Sonderforschungsbereich 754
Climate-Biogeochemistry Interactions in the Tropical Ocean

SFB 754 colloquium: Thursday, 11th Sept, 09:00h
Large Conference Room (west shore)

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Title:

Emerging patterns of microbial diversity associated with deep-sea hydrothermal deposits

Abstract:
Deep-sea hydrothermal vents are recognized as important biogeochemical environments that support unique ecosystems rich in microbial diversity. As the high temperature hydrothermal fluid mixes with the cold, oxygenated seawater, minerals precipitate to form vent deposits. These porous deposits are quickly colonized by a diversity of Archaea and Bacteria that harness the abundant geochemical energy available in the hydrothermal fluids. The composition of the hot fluid is dependent on such factors as the depth of fluid circulation, the depth of the heat source, and the composition of the rocks that the fluid reacts with as it circulates through the Earth's crust. In order to explore the role that large-scale geological processes might play in the archaeal and bacterial diversity and colonization of vent deposits, we have used a combination of thermocouple array deployments and multiplexed bar-coded pyrosequencing of the 16S rRNA genes from multiple vent deposits from the Mid-Atlantic Ridge, Eastern Lau Spreading Center, Indian Ocean, East Pacific Rise, and Guaymas Basin. Although in general all hydrothermal vents support a rich diversity of Bacteria and Archaea, certain lineages within these domains drove the significant differences detected between communities from geologically very different hydrothermal systems. Furthermore, key groups such as the methanogens, were good indicators regarding the available hydrogen in these ecosystems. Additionally, whether the systems were more oxidizing or reducing, was reflected in the microbial community composition. The emerging microbial diversity patterns from deep-sea hydrothermal deposits suggest that the greatest differences in community compositions are from sites where the hydrogen in the end member hydrothermal fluids are the most different.