

Proposal for SPP 1144, 3<sup>rd</sup> phase

**Primordiales Helium und vertikale Vermischung am Mittelatlantischen Rücken zwischen 2°S - 11°S**

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The priority program 1144 of the DFG aims to investigate energy-, material- and lifecycles at spreading axes from mantle to ocean. With this proposal, we want to contribute toward a quantification of the export of hydrothermal products into the ocean by studying plume dynamics.

The main goals of this proposal are

- To study the effect of tidal generated internal waves and mixing on plume dispersal and the distribution of hydrothermal fluids and gases
- To study the plume dynamics by quantifying turbulence, velocity distribution and stratification in the near field
- To quantify the helium and heat flux from the hydrothermal source
- To quantify the temporal variability of the volume-, heat- and helium transport from the vent site to the open ocean

We will employ shipboard and ROV based measurements of current velocities, density stratification, turbidity and sampling of helium to map the near and far field of the plume of a hydrothermal vent site. To assess the temporal variability, these data will be combined with time series of moored current meters, equipped with temperature sensors and additional turbidity probes. The resulting data will help to understand the coupling between physical, geochemical, and biological processes: The current field at hydrothermal vent sites has direct impact on the colonialization patterns and possible migrations strategies of vent communities; the analysis of the Helium signal in the water column provides insights into the geochemical processes inside the hydrothermal system. The variability and strength of Helium and heat fluxes of a vent site gives informations about the export of a hydrothermal system and its variability in relation to the oceanographic and geophysical boundary conditions. The focus of the proposal will be on the 4°48'S location.

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Proposal for SPP 1144, 3<sup>d</sup> phase