

Proposal for SPP 1144, 3rd phase

Emission and plume transport of methane and hydrogen from the Mid-Atlantic Ridge

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Our objective in the third phase of the SPP is to determine the transport of methane, hydrogen and 3-helium in the plumes originating from the Logatchev vent field on the Mid-Atlantic Ridge. We (IFM-GEOMAR and IOW) intend to conduct tow-yo CTD surveys of these dissolved gases within a distance of a few kilometers from these vents. We will combine this information with long-term current monitoring measurements that will be carried out by Fischer and Visbek (IFM-GEOMAR). The tow-yo surveys will be conducted at the beginning and at the end of the moored profiler/current meter monitoring, on F/S MERIAN cruises 06/2 and 10/3, in order to provide cross-sectional snap shots of the gas distributions in conjunction with these time-series records. Additional vertical CTD-rosette sampling stations will be placed along the 100 km length of the rift valley axis that starts from the 15°20'N Fracture Zone in order to obtain an estimate of the inventories of these gases in this segment. Methane and hydrogen will be measured on board these expeditions; helium isotope measurements will be conducted at the University of Bremen subsequently. We will also measure dissolved methane and hydrogen concentrations in the vent fluids collected during these expeditions, and we shall measure the methane ¹³C/¹²C ratio in all gas samples collected on these expeditions. We will be working with M. Perner on kinetic incubation experiments for the purpose of measuring hydrogen consumption rates due to the activity of bacteria found in the vent fluids.