

## **Carbonate Precipitation Induced by Serpentinization on the Mid-Atlantic Ridge**

Serpentinization of peridotites at mid-ocean ridges leads to the formation of calcium carbonate minerals aragonite and calcite. It is the aim of this project to reconstruct the genesis of these carbonates and to understand the factors triggering their precipitation. Remarkably, serpentinization of peridotites is accompanied by hydrogen and methane anomalies. The former is produced during serpentinization as a consequence of the conversion of Fe(II) in olivine to Fe(III) in magnetite, whereas the latter is believed to form from Fischer-Tropsch type reactions, and is thus abiogenic in origin. Both hydrogen and methane are utilized by a variety of different microbes. In this project we will test, if biogeochemical cycling of methane-derived carbon and, in particular, anaerobic oxidation of methane favours carbonate formation during serpentinization. This process is indicated by (1) recent evidence for anaerobic oxidation of methane in hydrothermal environments, and (2) Mid-Atlantic Ridge (MAR) calcites depleted in  $^{13}\text{C}$  associated with microbial biofilms. Several rock samples with authigenic carbonate impregnations on serpentinized peridotites and carbonate veins in sulphides and peridotites have been sampled at three different sites (Stations 49, 54, 67 GTV) in the Logatchev Hydrothermal Field between 14°40'N and 14°55'N during *R/V Meteor* cruise M60/3 (January 14 to February 13, 2004).