Geophysical Research Abstracts, Vol. 7, 04145, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04145

1 Methano- and Methylotrophic Microbial Activities and Populations at an Arctic Mud Volcano

F. Heinrich (1), T. Lösekann (1), A. Boetius (1,3), **M. Krüger** (1,2)

(1) MPI for Marine Microbiology, Bremen, Germany (2) Federal Institute for Geosciences and Resources (BGR), Hannover, Germany (3) International University, Bremen, Germany (M.Krueger@bgr.de / Phone: 0049-(0)511-6433102)

The Haakon Mosby Mud Volcano is located in a water depth of 1250 m with a permanent in situ temperature of –1.5 C. Since the introduction of organic material from the water column is limited, the dominant carbon and energy source for microbial communities is methane seeping out of the sediment. The potential for aerobic methane oxidation was found in the top layers of all samples. Interestingly, very high concentrations of methane were needed to induce methanotrophic activity in vitro, most likely a consequence of the adaptation to the very high methane concentrations found in situ. The anaerobic oxidation of methane (AOM) as well as methane production were limited to the reduced sediments adjacent to the centre that are covered by thiotrophic mats consisting of *Beggiatoa*. AOM followed a 1:1 stoichiometry and was stimulated by increasing methane partial pressures. All methane turnover processes had a psychrophilic temperature optimum. In addition to enrichment cultures with methane, formate, methanol, DMS and succinate were used as substrates. The comparison of aerobic methano- and methylotrophic microbial communities was carried out using PCR based DGGE, targeting 16S rRNA and different functional genes. Both, type I and II methanotrophs were present. A novel, yet uncultured group of aerobic methanotrophs was found to dominate the bacterial community in the center of the volcano as revealed by FISH analysis.