Geophysical Research Abstracts, Vol. 7, 04132, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04132

Environmental Control of Anaerobic Oxidation of Methane Mediated by different ANME Communities: a Comparison

K. Nauhaus (1,2), T. Treude (1), A. Boetius (1,3), **M. Krüger** (1,4)

(1) MPI for Marine Microbiology, Bremen, Germany (2) LMU, Munich, Germany (3) International University, Bremen, Germany (4) Federal Institute for Geosciences and Resources (BGR), Hannover, Germany (M.Krueger@bgr.de / Phone: 0049-(0)511-6433102)

The anaerobic oxidation of methane is known to be mediated by phylogenetically different groups of Archaea (ANME), most closely related to the *Methanosarcinales*. We present the first comparative in vitro investigation of the environmental regulation and physiology of different methane oxidizing communities dominated by ANME-I (Black Sea), ANME-II (Hydrate Ridge) and ANME-III (Haakon Mosby Mud Volcano), all living in association with sulphate-reducing-bacteria (SRB). Methane-dependent sulphate reduction showed much higher cell specific rates for the ANME-II dominated community under comparable experimental conditions. The variation of environmental parameters, like sulphate concentration, pH and salinity, did not influence the activity of the different ANME-communities within relatively broad ranges. However, all three communities responded to elevated methane partial pressures with increased substrate turnover. Temperature also strongly influenced the intensity of methane-dependent SR, with optimal temperatures close to values prevailing in situ. Besides sulphate, no other electron acceptor was used for the anaerobic oxidation of methane. However, AOM was completely inhibited by bromoethanesulfonate, indicating the participation of methanogenic enzymes in the process. This was further confirmed by the presence of substantial amounts of modified methanogenic enzymes and cofactors. In conclusion, the ecological niches of the more frequently oocurring ANME-I and ANME-II seem to be mainly defined by temperature and the availability of methane and sulphate.