Geophysical Research Abstracts, Vol. 9, 06265, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06265

Activity and diversity of methane oxidising microbes in the littoral zone of a boreal freshwater lake

A. Saari, H. Siljanen and P.J. Martikainen

University of Kuopio, Department of Environmental Science, Kuopio, Finland
(anne.saari@uku.fi)

Freshwater lakes are generally net sources of methane (CH_4). As much as 70% of the total release of CH_4 from lakes can originate from the littoral zone. Aerobic methane oxidising bacteria (MOB) present in the surface sediment and in the water column, can consume as much as 90% of the CH_4produced in anoxic sediment thus significantly limiting the flux of CH_4 from sediments to the atmosphere. However, MOB communities in freshwater lakes are still largely unknown. The aim of our Finnish study, which belongs to the research consortium METHECO, is to assess how eutrophication and water level fluctuation influence methane oxidation in a littoral wetland of Lake Kevätön, which is a shallow hyper-eutrophic lake in east-central Finland, and how changes in biodiversity affect this microbial function and its resilience against the environmental perturbations. We also study the effects of spatial and temporal variation on the activity and diversity of MOB. Methane fluxes are studied with static chamber technique in situ, activity of MOB by laboratory incubations and diversity of MOB by molecular biological methods including TGGE and microarray. The study will be carried out during 2006-2009 and by this far we have only some preliminary results about CH_4 fluxes and activity of MOB. The littoral wetland of Lake Kevätön has a gradient with changing moisture, vegetation and CH_4 emissions. Despite of an active CH_4 oxidation the wettest area had high CH_4 emissions, while the driest area had low CH_4 emissions and occasionally it even acted as a net sink for CH_4. Methane was oxidised along the moisture gradient with highest activity in the wettest area and lowest activity in the dry upland area. Methane oxidation was most active in the surface sediment layer of 0-2 cm and the activity decreased with depth and was minor below 30 cm from the sediment surface.