



The potential role of aerobic methanotrophy in iron-coupled anaerobic oxidation of methane in lake sediments

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In many aquatic sediments significant dissimilatory microbial iron reduction has been observed in the deep methanogenic zone, sometimes accompanied by methane decrease. Our recent lake sediment results from sedimentary profiles combined with slurry incubations indicate that this reduction of iron is coupled to anaerobic oxidation of methane (AOM). The process was found to involve both methanogens and (aerobic) methanotrophs. It seems that the methanogens are involved in reducing the iron and producing some intermediates, but do not incorporate methane as carbon source. The methanotrophs, on the other hand, assimilate and oxidize the methane. New sets of geochemical experiments test the potential role of aerobic methanotrophy in the iron-coupled AOM process using inhibitors for their activity and addition of oxygen. These experiments provide insight into the methane oxidation mechanism of the methanotrophs.