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In Lake Tanganyika intense anaerobic and aerobic methanotrophy prevents methane release to the atmosphere

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In highly productive, stratified, and sulfate-poor tropical lakes organic matter degradation proceeds via carbon dioxide reduction or fermentation, leading to an accumulation of huge amounts of methane. Because methane is an important greenhouse gas, its emission to the atmosphere will unmistakably add to global warming. In this study we provide evidence for intense anaerobic and aerobic methanotrophic activity taking place in the water column of Lake Tanganyika, and effectively diminishing methane release to the atmosphere. Very high abundances (up to 25% from total DAPI counts) of single living archaeal methanotrophs identified by fluorescence in-situ hybridization and strong enrichment of ^{13}C ($\sim 26‰$) in dissolved methane in the lake's anoxic and suboxic water body imply that anaerobic methanotrophy is the major removal process today. If as predicted by other literature data the anoxic water mass expands to shallower depths and stratification enforces due to global warming, extensive anaerobic microbial oxidation of methane could further lessen fluxes of this greenhouse gas to the atmosphere.