



Controls on zooplankton methane production in the central Baltic Sea

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The release of methane from aquatic systems contributes significantly to global warming. Recent studies indicate that methane production in the upper oxic water layers is a common phenomenon in limnic and marine systems. However, possible sources and the parameters that steer their individual strength are still controversially discussed and need further investigations. Studies in the Baltic Sea over the last few years show that subsurface methane enrichments below the thermocline occur in the central Baltic Sea during summer months. To investigate the particular contribution of zooplankton and potential controls on their methane production, we conducted community and food-specific grazing experiments during a research cruise in August 2016. To perform incubation experiments with a nearly natural abundance of copepods, we built a sea-going purge and trap system for measuring methane released by grazing on ¹⁴C-labelled phytoplankton. We found that methane production (1) increases with the number of copepods, (2) depends on the zooplankton community composition, and (3) is influenced by the food quality. These incubation experiments were accompanied by molecular biological studies to describe the microbial community in copepod guts, fecal pellets and surrounding water column. Altogether, our data point to the existence of a zooplankton-associated methane production in the surface waters in the central Baltic Sea.