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Activity of methane oxidizing bacteria along the River Elbe downstream to its estuary

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Contribution of rivers and estuarine systems to the global methane (CH_4) budget is still not clear yet and for improving the estimations on the CH_4 emission it is essential to cover the whole natural system in large-scale studies. In this context we quantified the activity of methane oxidizing bacteria (as a microbial "biofilter") over almost two seasons along a large European river system, the river Elbe, from its source in the Czech Republic towards to its estuary in the North Sea. Determination of methane oxidation rate was measured using a tritiated CH_4 radiotracer technique. Methane concentrations in the water column were analyzed by the headspace method.

The range of CH_4concentrations and related microbial oxidation activities displayed a strong increase from the upper river parts, which includes mainly natural river, to the polluted downstream canalized parts of the river with high CH_4concentrations and microbial activities, where anaerobic sediments occur. In the water column of the estuarine zone a sharp decrease of the CH_4 concentration- and CH_4 oxidation rates is mainly influenced by the increasing salinity.

Additional parameters (temperature, dissolved oxygen, amount of suspended particular matter and nutrient content) are possible factors influencing the methanotrophic activity. Further investigations will compare the population structure of MOB at the different sites along the whole transect.