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"Methane oxidation in the Estuary of a medium-sized European river, the Scheldt"

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Coastal systems including river deltas are the major sources of methane from the ocean to the atmosphere; however, large uncertainties exist on the actual source strength. Abiotic and biotic factors controlling methanogenesis, methanotrophy and methane efflux to the atmosphere thus need better understanding. In this presentation, we will show data from a recent cruise along the Scheldt Estuary from Antwerp (salinity: 2 psu) towards the open North Sea (salinity: 31 psu). Methane concentrations were elevated in Antwerp with up to 110 nM, decreased downriver to values ~50nM, increased to 180 nM at the inflow of a large canal (Ghent–Terneuzen Canal) and then decreased to ~70nM in the open North Sea. Methane oxidation rates were highest in the city of Antwerp (~29 nM/d), only slightly elevated at the inlet of the Ghent–Terneuzen Canal (~10 nM/d) and lower in the open North Sea (5nM/d). Differently to previous findings in other river systems, we could not find a clear dependency of methane oxidation to salinity. In this presentation, we will also present data on CH₄ fluxes from the river to the atmosphere, CH₄ stable isotope systematics and the composition of the methanotrophic community to further constrain methane dynamics in the estuary.