Greenhouse gas emissions from reservoirs

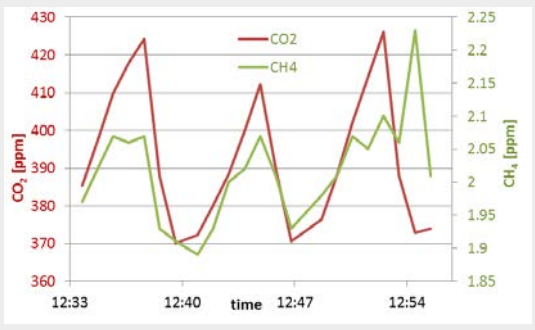
Rappbode pre-dam in the Rappbode Reservoir Observatory, Harz Mountains, Germany

Goal

Quantify exchange of greenhouse gasses (GHG) between reservoir surface and atmosphere.

Methods

Floating Chamber: Measure concentration-changes (CO_2, CH_4, N_2O) in a floating chamber by a portable FTIR analyzer.



TBL (Thin Boundary Layer) approach: Analyze dissolved CO_2 and CH_4 in surface water by gas chromatography (GC) or CO_2 probe, calculate flux from concentration data and wind-speed.

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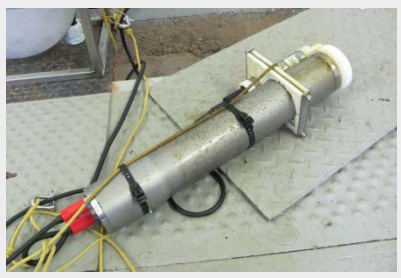
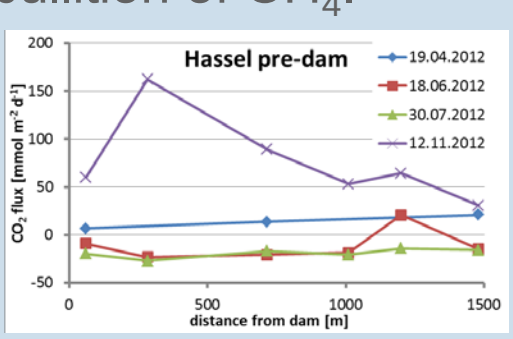


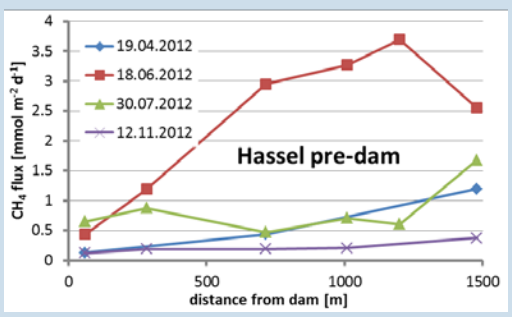
Results

Longitudinal Gradients

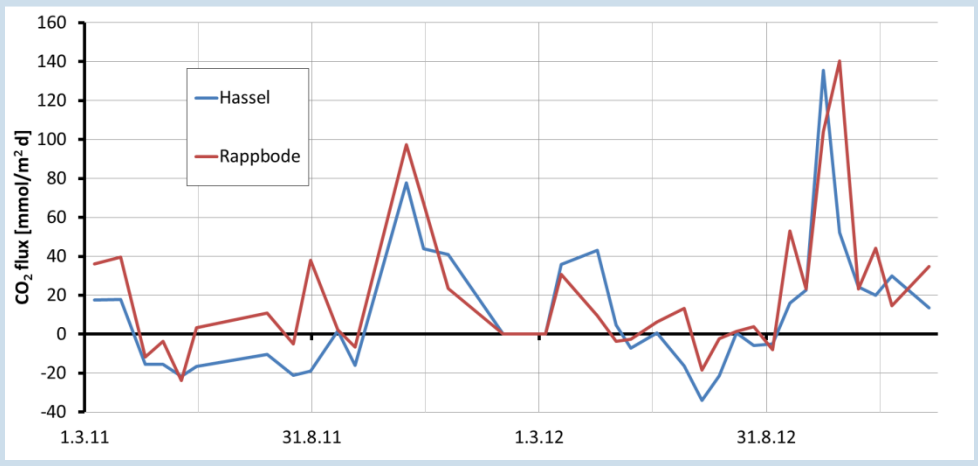
Highest CO_2 fluxes not at the deepest point. Episodic ebullition of CH_4.

Higher CH_4 fluxes near the inflow.





GHG flux at Hassel- and Rappbode pre-dam: Seasonal fluctuations and differences between reservoirs. Highest emission during overturn. Primary production may turn pre-dam into a CO_2 sink in summer. CH_4 fluxes very low.



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