Poster Presentation
Theme 3.1: Biogeochemical Processes - Processes Understanding and Human Impacts
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Spatial and temporal variations of CO2 and CH4 fluxes in the Danube Delta

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In freshwater systems, carbon dioxide (CO_2) and methane (CH_4) are produced during organic matter degradation. Globally, the release of these greenhouse gases from inland waters to the atmosphere is estimated to be of the same order of magnitude as terrestrial carbon fixation. However, large uncertainties on the spatial and temporal dynamics of aquatic CO_2 and CH_4 evasions and the underlying processes persist. As part of the EU Horizon 2020 project C-CASCADES, we investigated the carbon cycling in Europe's second largest river delta, the Danube Delta, to better constrain the spatio-temporal variability of carbon fluxes from temperate deltaic systems. The Danube receives water from 19 European countries and is the major source of freshwater to the Black Sea. Before discharging into the Black Sea, parts of the Danube waters pass an extensive wetland area. While much of the northern Danube Delta has been transformed into agricultural land, the southern delta is still largely pristine and a UNESCO biosphere reserve. The delta is composed of three main river branches and a network of closely connected channels and flow-through lakes between vast reed stands. Hence, it offers an ideal setting to study the seasonal variability of carbon fluxes in different aquatic compartments of a river delta. Throughout the delta, we took monthly measurements of greenhouse gas concentrations and carbon fluxes as well as various physico-chemical parameters at 19 sampling sites over a complete annual cycle. The sampling campaigns were complemented by continuous multi-probe measurements in the upper delta and at the terminus at each of the three main branches. Our time-series study revealed a strong seasonal variability for both CO_2 and CH_4 concentrations and fluxes. We also observed large differences in carbon cycling between the different aquatic compartments (main river branches, channels, lakes) and identified channels in the inner delta as hot spots of greenhouse gas emissions.

Poster Session (see poster session schedule)