



Carbon dioxide and methane exchange in a rewetted, episodically flooded brackish fen

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Whilst there is a number of studies regarding carbon stocks and exchange in intertidal saline wetland soils, coastal freshwater peatlands have been rarely investigated. However, they might be susceptible to inundation driven peat consumption that possibly feeds back to climate change. Our investigation site in the Northeast of Rostock (Germany) is episodically flooded with brackish baltic sea water. Therefore the vegetation as well as the according biogeochemical processes can be seen as representative for coastal ecosystems susceptible to flooding because of future sea level rise and the expected developments can already be studied here in detail. Enduring protection against flooding might be very expensive. Furthermore, a reanimation of naturally provided ecosystem services (as carbon storage) may be aspired. Therefore it is crucial to investigate what happens to vegetation composition, matter (carbon) storage and GHG emissions in these ecosystems under dynamic flooding regimes and therewith potentially higher salinities.

We will present one year eddy covariance flux data from the site representing the annual CO₂ net ecosystem exchange. Further we present data on estimated annual CH₄ efflux from the system that is derived from year round bi-weekly closed chamber (CC) measurement campaigns. The CC measurement spots were distributed across the investigation site to cover all major vegetation types and the occurring gradients in the expected major drivers (water level, salinity, water temperature) with repetitions. The annual emissions from each spot are estimated using regression functions (when appropriate model fit can be obtained) and/or the integral of the single flux rates over time for each vegetation type. A map of the vegetation presenting the proportion of area that is taken up by each vegetation type serves to scale up the CH₄ emissions to ecosystem scale. We'll conclude with an estimated carbon balance of the brackish coastal fen.