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Plant species specific effect of brackish water intrusion on methane emission of a coastal fen

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Due to climate change and rising sea water levels coastal ecosystems will be more frequently affected by inundation. The inundation with brackish waters has been shown to affect greenhouse gas (GHG) emissions from wetland soils in many in vitro experiments, giving the possibility of significant climate change feedbacks.

We examined the effect of brackish water intrusions on methane emissions of a rewetted coastal fen at the Baltic Sea (Northeast Germany) over the course of one year. Since plant productivity has been shown to act as important control in other GHG studies located at the Baltic Sea we conducted biweekly close chamber measurements on different mono-dominant stands of vegetation (*Bolboschoenus maritimus*, *Schoenoplectus tabernaemontani*, *Carex riparia/acutiformis*). Further, data on water table position and water temperature were recorded.

Annual methane emissions were very low which we relate to an inundation event in winter. This is in contrast to other studies from ecosytems at the Baltic Sea which we attributed to comparatively high sulphate contents after inundation. Furthermore we observed distinct methane emission behaviors for different plant species with significantly higher methane fluxes from *Bolboschoenus maritimus* stands. Independent from the type of vegetation the relation between water level and methane emission is unimodal with an optimum water level below soil surface. Beyond certain limits of electrical conductivity less methane emissions occur. Inundation seems to be an important trigger for methane emission in the investigated brackish ecosystem, but specific plant species can compensate its inhibiting effect and induce a seasonal pattern with relatively high fluxes in the growing season.