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TITLE: Spartina alterniflora invasions impact CH4 and N2O fluxes from a salt marsh in eastern China

AUTHOR: ['Shenglai Yin', 'Shuqing An', 'Qi Deng', 'Jinghan Zhang', 'Haiting Ji', 'Xiaoli Cheng']

ABSTRACT:

Spartina alterniflora, an invasive species originating from North America, has spread widely along the eastern coast of China. However, the impacts of S. alterniflora invasions on CH4 and N2O fluxes from salt marshes in eastern China are not fully understood. We conducted a field experiment in three treatments (transparent, opaque, and clipping) to compare the CH4 and N2O fluxes from S. alterniflora community with native C3 plant Suaeda salsa and Phragmites australis communities and the mudflat in a coastal wetland of eastern China over one year. CH4 flux from the S. alterniflora community was higher than the S. salsa community and mudflat but lower than the P. australis community. The opaque treatment did not significantly alter CH4 flux, except for the S. salsa community. Clipping significantly decreased CH4 flux from the S. alterniflora and P. australis communities but increased CH4 flux from the S. salsa community. In contrast, N2O fluxes in the S. alterniflora and P. australis communities were lower than for the S. salsa community and mudflat. The opaque treatment did not significantly change N2O fluxes across communities. Clipping significantly increased mean N2O fluxes from the S. alterniflora and P. australis communities but did not significantly change N2O flux in the S. salsa community. CH4 flux was positively related to the aboveground biomass and negatively related to density, whereas N2O flux was negatively related to aboveground biomass and positively related to density. Meanwhile, CH4 flux was strongly dependent on temperature, soil moisture and water depth ($P < 0.05$), while N2O fluxes under the transparent and opaque chambers were significantly related to water depth ($P < 0.05$), but N2O flux under the clipping treatment was not significantly related to environmental factors ($P > 0.05$). Overall, CH4 and N2O fluxes from this coastal wetland were 17.38g m?2 and ?36.64 mg m?2, respectively, indicating that S. alterniflora invasions in this salt marsh in eastern China could play a negligible role in emitting CH4 and a significant role in absorbing N2O when compared with other studies worldwide.

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