BALTIC TRANSCOAST

Universität Rostock Traditio et Innovatio

Funded by DFG Deutsche Forschungsgemeinschaft German Research Foundation

This presentation participates in OSPP — EGU Outstanding Student & PhD candidate Presentation contest

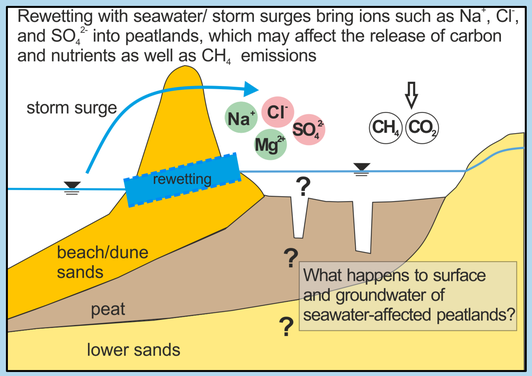
Groundwater Quality in Two Coastal Fens and the Influence of Storm Surge Flooding and Rewetting with Seawater

Erwin Don Racasa[1], Haojie Liu[1], Miriam Toro[1,2], Manon Janssen[1]

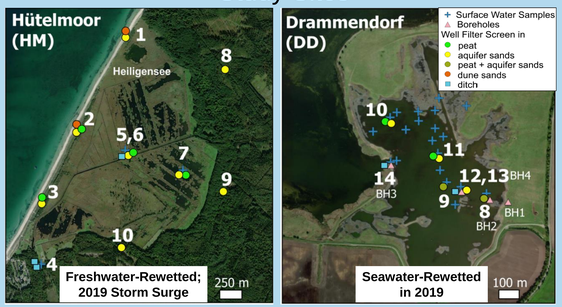
1 Soil Physics, Faculty of Agricultural and Environmental Sciences, University of Rostock, Germany | 2 Landesamt für Umwelt (Schleswig-Holstein), Flintbek, Germany | E-mail address: racasaerwin@gmail.com

Introduction & Methodology

Rewetting with seawater/ storm surges bring ions such as Na^+, Cl^-, and SO_4^{2-} into peatlands, which may affect the release of carbon and nutrients as well as CH_4 emissions



Study Sites



Surface & Groundwater Sampling (2016-2022)

In situ Parameters — Specific Conductivity (SC), pH, Dissolved Oxygen, Temperature

Laboratory Analyses — Major Ions, Nutrients, Dissolved In/Organic Carbon (DOC, DIC)

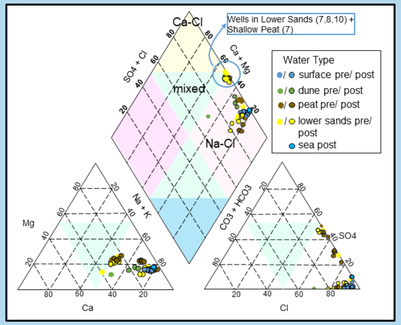
Aims

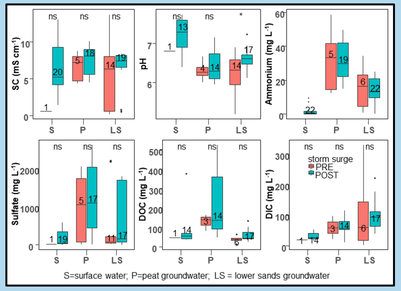
Coastal fens are unique ecosystems at the land-sea interface. They are susceptible to storm surges but are also perfect candidates for rewetting with seawater. The aims of this study are:

- ✓ To characterize surface and groundwater quality in two coastal fens prior to seawater impact
- ✓ To examine seawater impacts from storm surge flooding (freshwater-rewetted fen) and seawater rewetting (seawater-rewetted fen) in two coastal fens

Results & Discussion

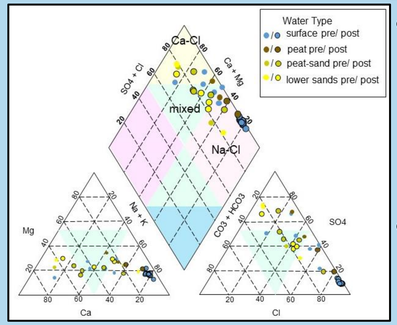
Freshwater-Rewetted Fen Flooded by Storm Surge in Jan 2019 (Hütelmoor)

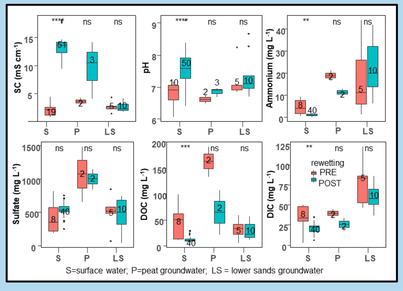




- Majority of sampled water has Na-Cl facies before and after storm surge flooding
- Mixed water facies at edge of peatland
- Surface: Short-term increase in SC, pH, DOC
- Peat/ Sands: Stable parameters & concentrations

Drained Fen Rewetted by Seawater from Nov 2019 (Drammendorf)

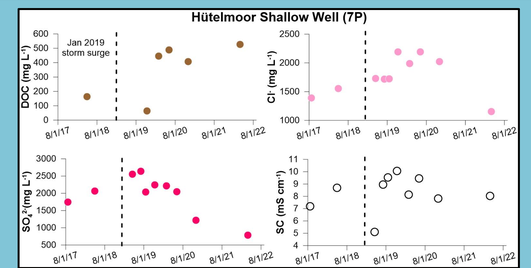




- Variable marine influence prior to rewetting (distance to coast, ditches, peat thickness)
- Major shift to Na-Cl facies after rewetting
- Surface: Significant changes in water chemistry
- Peat/ Sands: Stable parameters & concentrations

Acknowledgements — Credits for photos at header: https://wallpaperaccess.com/wave-japanese-art (wave); Dr. Lars Tiepolt (Hütelmoor); Matthias Naumann (Drammendorf)

DOC mobilization in shallow wells



- How does DOC increase despite high SC, lowered pH, and presence of cations?
- How much longer will DOC increase?

Conclusions

- Historical marine influence related to distance from coast, peat thickness, and ditches
- Seawater rewetting drastically changes surface waters; short-term impacts from storm surges
- Stable water parameters & concentrations in peat and lower sands groundwater 3 years after