

Preliminary GHG balances of different drained and rewetted peatland ecosystems in North-eastern Germany

Daniel Köhn, Anke Günther, Gerald Jurasinski – University of Rostock, Germany

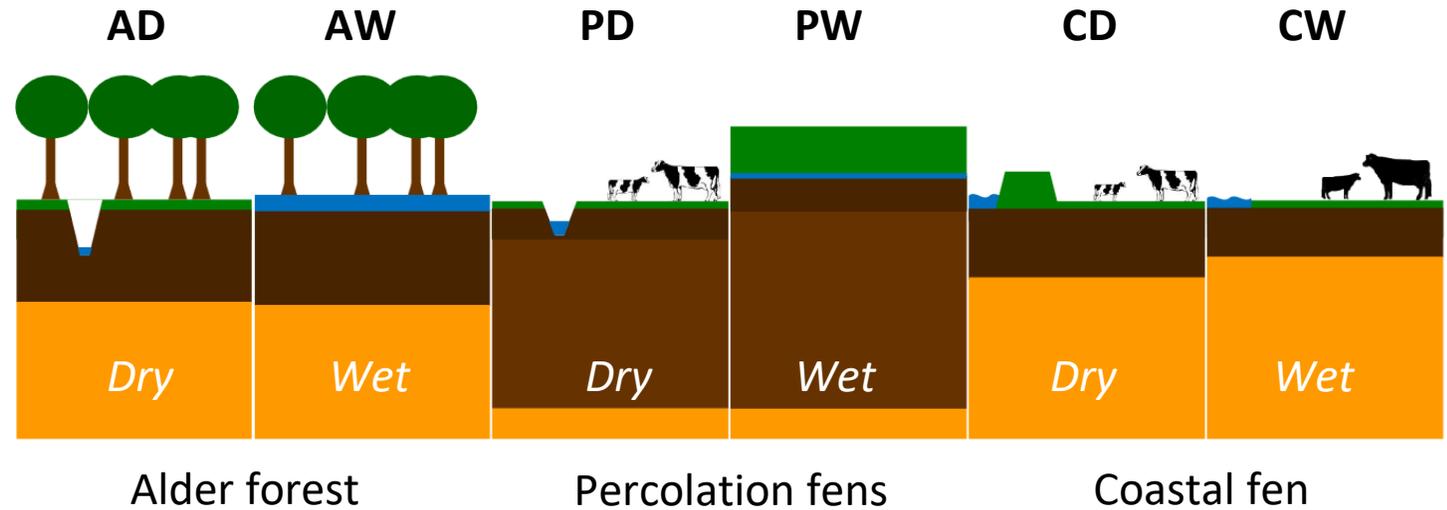
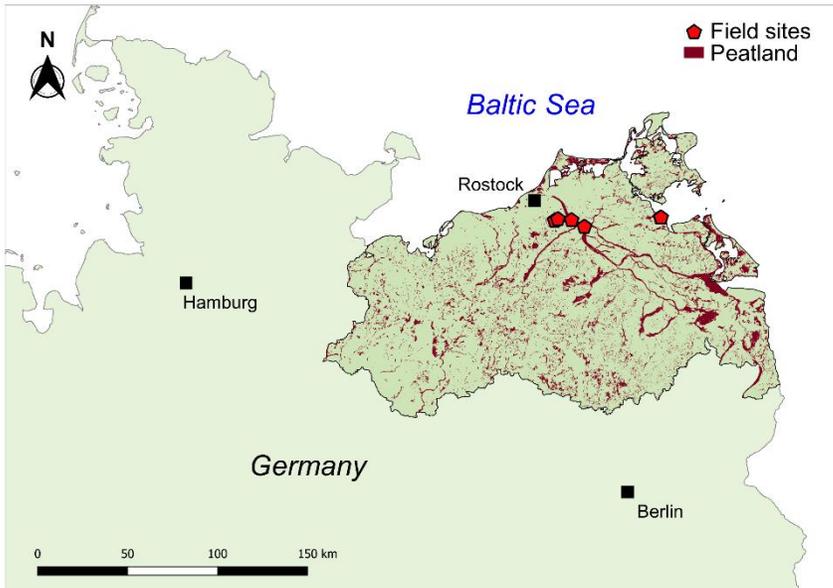
- Drained peatlands are responsible for roughly 5% of the global anthropogenic GHG emissions – while only covering less than 0.5% of the land area
- In North-eastern Germany more than 90% of all peatlands are heavily drained
- In Mecklenburg-Western-Pomerania GHG emissions from drained peatlands are responsible for roughly 30% of all anthropogenic GHG emissions

Main research question:

- How do GHG emissions differ between peatland types and peatland management depending on waterlevel dynamics?

Study sites and methods

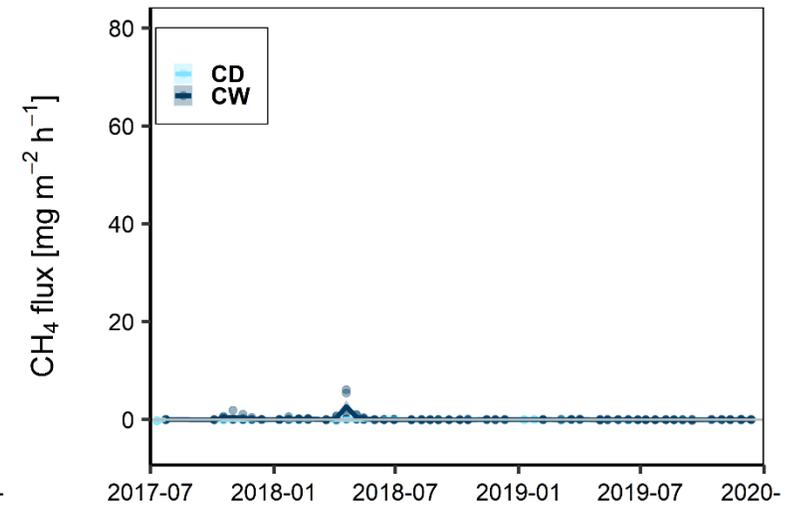
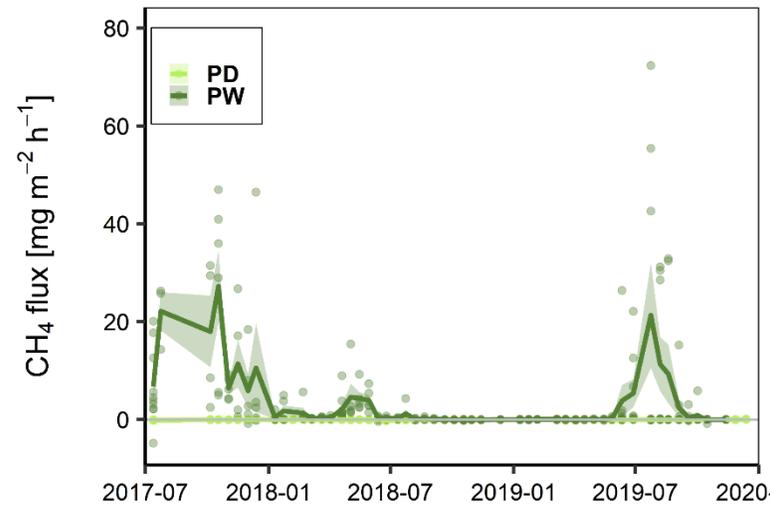
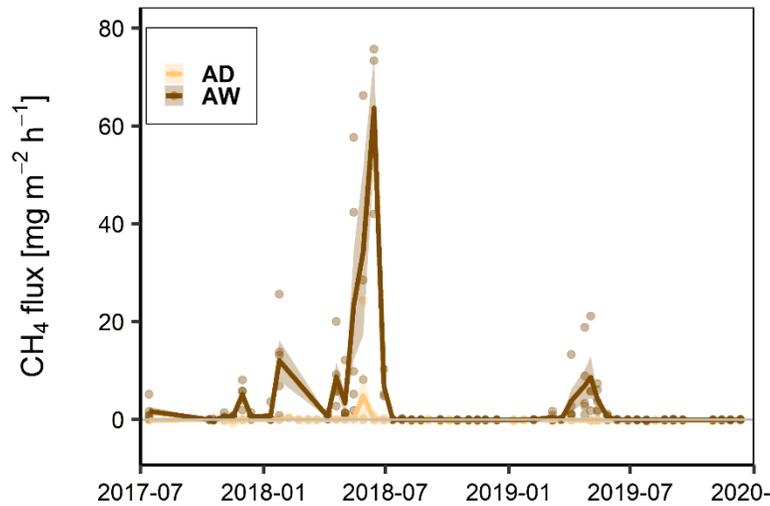
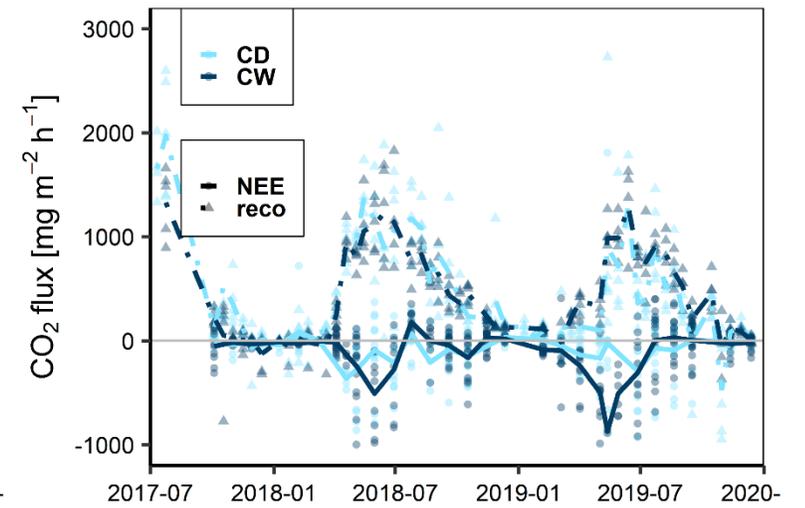
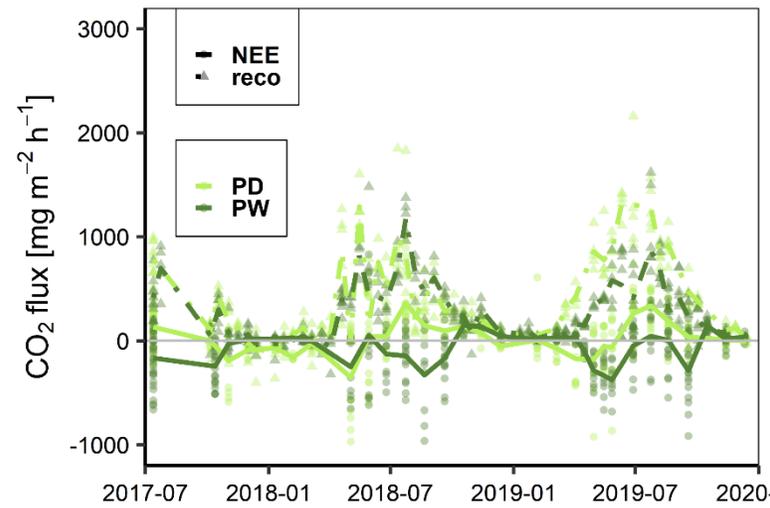
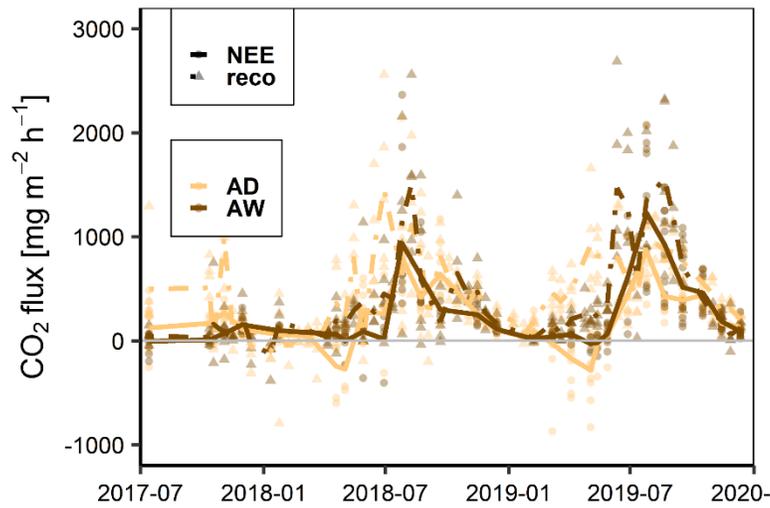
- Three important peatland types (one drained and rewetted per peatland type) = 6 study sites
- > 2.5 years continuous measurements



Study design

Closed chambers and online gas analysers to estimate CH₄ and CO₂ exchange between soil and atmosphere





- Upper: Netto ecosystem exchange (NEE) flux (CO₂) and ecosystem respiration (reco) flux (CO₂)
- Lower: Methane fluxes (CH₄)

Table: Annual GHG balances in g m⁻² of all sites (N₂O) still missing data

Site	CO ₂		CH ₄		N ₂ O	
	Year 1	Year2	Year 1	Year 2	Year 1	Year 2
AD	2620 ± 730	2450 ± 520	0.1 ± 0.4	-0.1 ± 0.2	0.3 ± 0.3	
AW	2490 ± 750	2890 ± 880	96 ± 45	11 ± 3	0.4 ± 0.4	
CD	2640 ± 690	1750 ± 510	0.0 ± 0.1	0.0 ± 0.2	0.0 ± 0.2	
CW	2480 ± 720	1920 ± 570	1.8 ± 1.1	0.0 ± 0.1	-0.0 ± 0.2	
PD	1930 ± 870	1650 ± 830	-0.1 ± 0.1	-0.1 ± 0.2	-0.0 ± 0.2	
PW	1350 ± 720	740 ± 390	40 ± 21	0.4 ± 0.1	0.1 ± 0.2	

Annual GHG balances in g m⁻². Uncertainties of CO₂ = 1 SD, CH₄ and N₂O = 1 SE

Discussion / Feedback

- How do these balances compare to your experiences from drained and rewetted peatlands?
- Do you have experience in incorporating forests in your balances without eddy covariance?

Take home:

- Intensive droughts of 2018 and 2019 make all sites a CO₂ source
- Rewetted sites show a tendency of lower CO₂ emissions, especially higher uptake rates in summer
- CO₂ emissions are surprisingly high, while CH₄ emissions are characterized by shortlived emission peaks, and are otherwise low