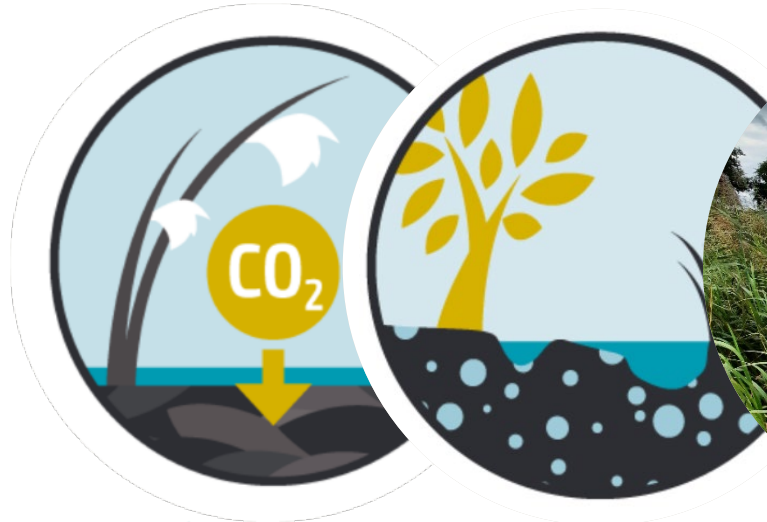


Peatlands & rewetting - scientific issues in climate policies

Trending Topics in Biology and Chemistry of Soil and Water

16 May 2023, Jeroen Veraart (Wageningen Environmental Research), Bart Kruijt (Wageningen University)



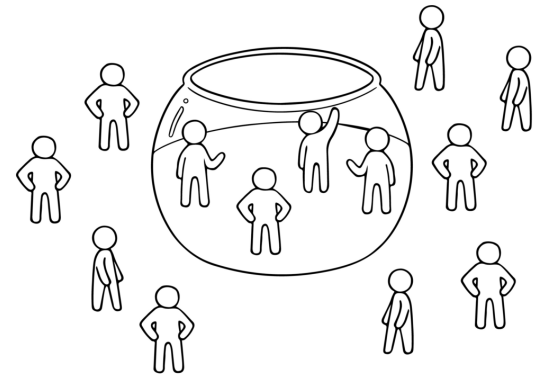
Contents

Presentation

- Introduction (Jeroen Veraart, Wageningen Environmental Research)
- Peatland restoration for climate change mitigation (Géral Juralinski, Greifswald Univ.)
- CH₄ and CO₂ emissions in Camphuysen/Onlanden (i.o. Bart Kruijt)
- Policy implications (Jeroen Veraart)

Fishbowl session:

- Discussion



The benefits of peatland restoration for Europe

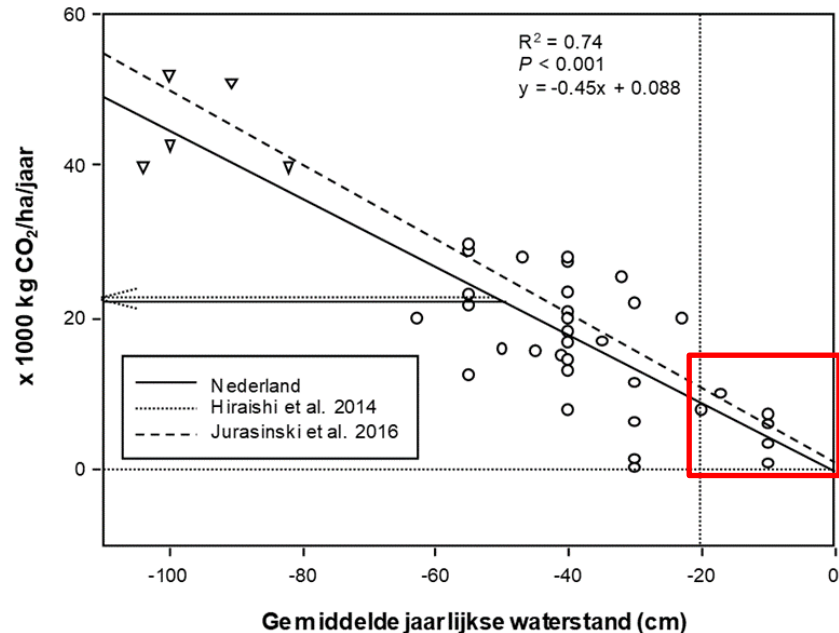
Berlin, Germany, 26-28 April 2023 Wednesday

<https://life-peat-restore.eu/>

- Peatland restoration for climate change mitigation

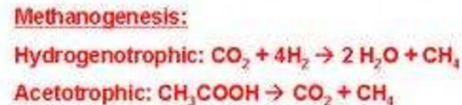
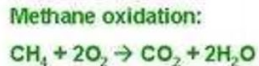
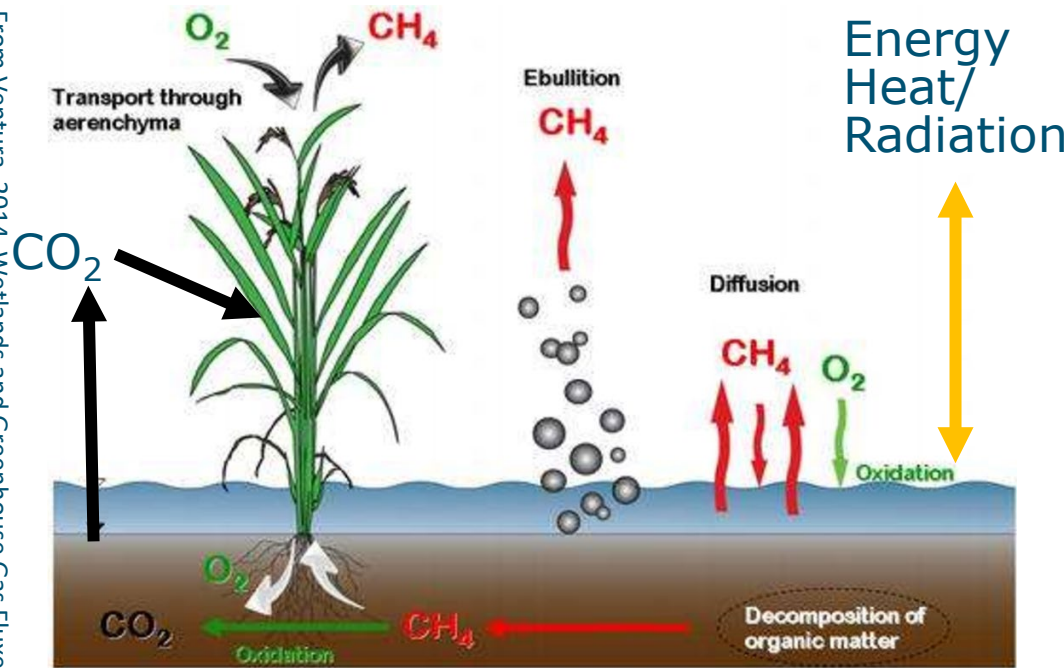
Prof. Gerald Jurasinski

University Greifswald, Germany



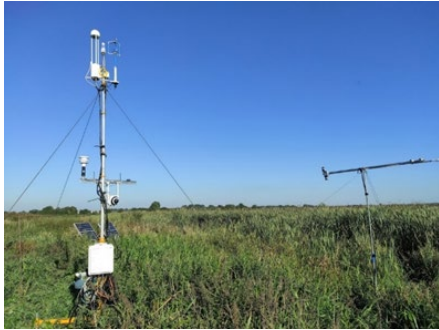
Basics GHG emissions in peat & wetlands

From Ventura, 2014, Wetlands and Greenhouse Gas Fluxes: Causes and Effects of Climate Change – A Meta-Analysis



- *CH₄ emissions are complex and show high variability*
- *CO₂ emissions from wetlands are better understood*

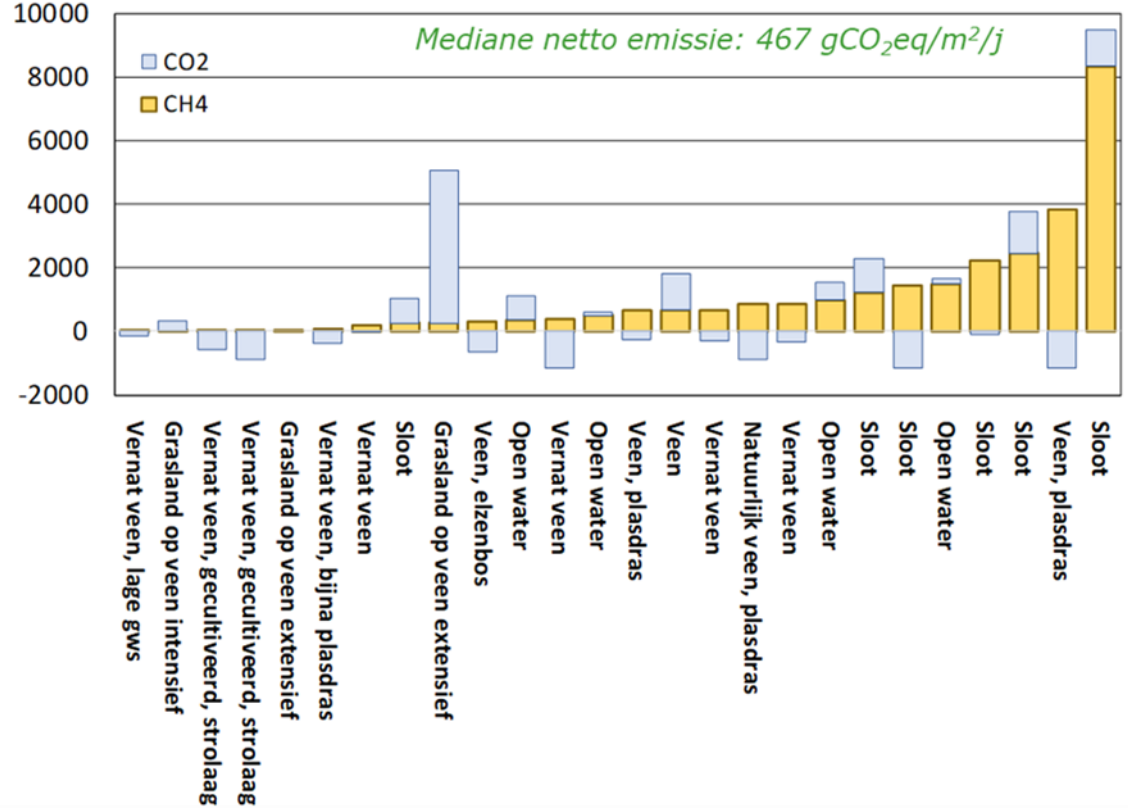
Methane emissions as measured in NL, B en DE



Meetlocaties:

CH₄ en CO₂ tegelijkertijd gemeten
Kamermetingen en/of EC

Jaarlijkse uitstoot of opname (gCO₂eq/m²)



Methane Global Warming Potential (GWP)

Methane disappears faster in the atmosphere than CO₂

New wetlands result in an increase of GWP?

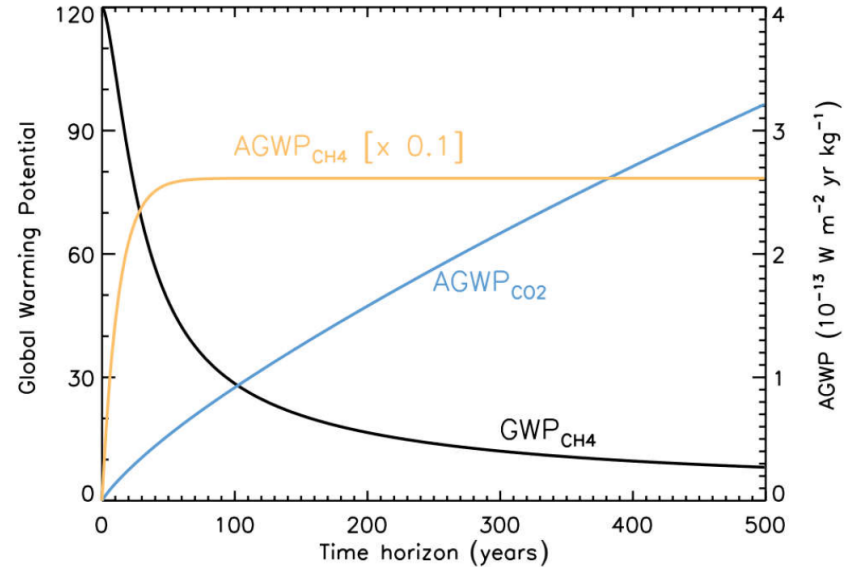
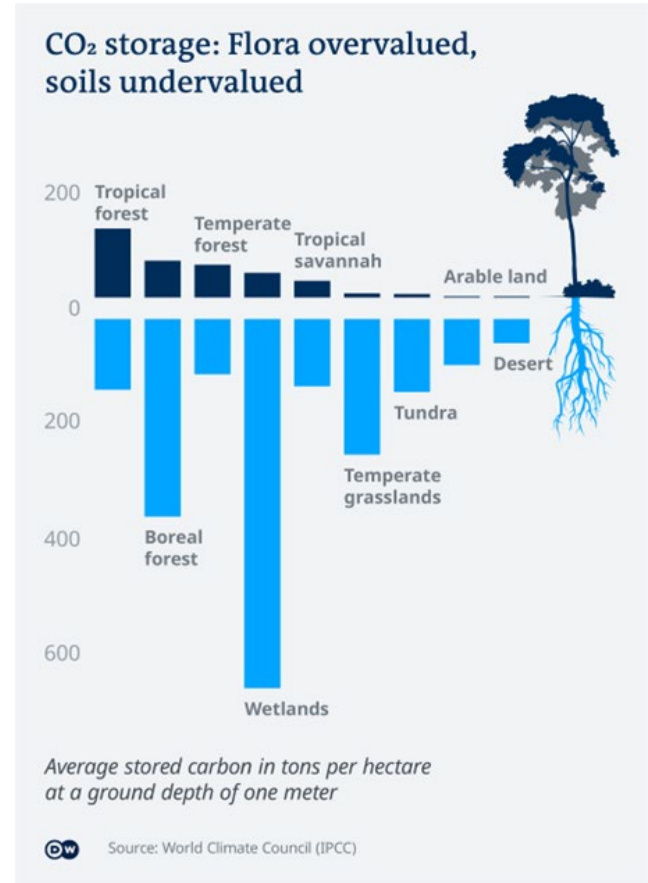


Figure 1: Time Horizon Impact on Methane AGWP and GWP (Figure 8.29 in Myhre et al. 2013⁴).



Wetlands and climate policies

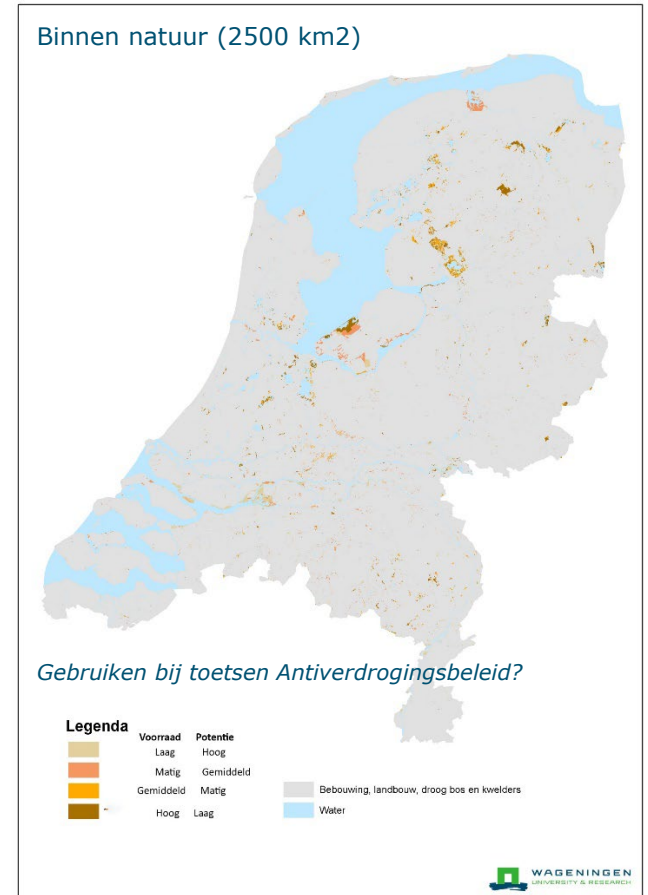
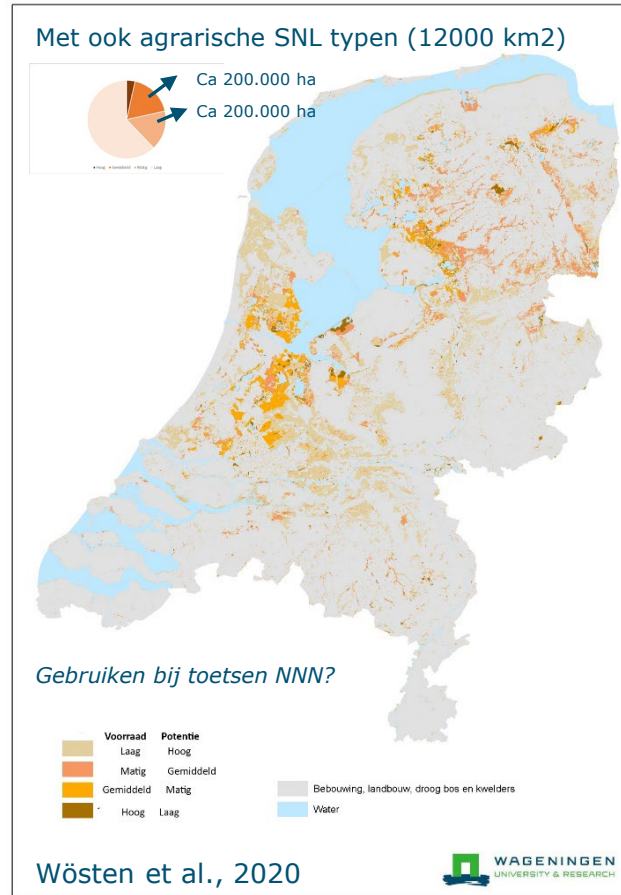
- Dutch climate agreement:
 - Wet nature (mineral, organic soils)
 - Forests
 - Organic soils (agriculture)
- Uncertainty: Wetlands are a sink for CO₂ but also CH₄ source



Een heel simpel
liedje over best
wel ingewikkeld
onderwerp!



Rewetting in existing natural areas or elsewhere?



Definition of wetlands in LULUCF

WATER EN NATURE policies



- Sea, Salt marshes
- Hoogveen, trilveen, veenmosrietland en vennen
- Moeras beheertypen bij o.a. beek en rivier , moerassig bos
- Laagveen/grasland
- Open water

LULUCF

	Bos	Grasland	Wetland
		×	×
			×
	×		×
		×	
			×



LULUCF Methodiek - Wetlands

- Land use change
- Emissiefactoren per land use type
- *Management*
 - *Natural ↔ managed wetland*
 - *Hydrology*
 - *Water Quality*
 - *Vegetation*



Dutch experiences: Onlanden & Camphuys





Locations



Onlanden
Onlanden



Polder
Camphuys



Vegetation



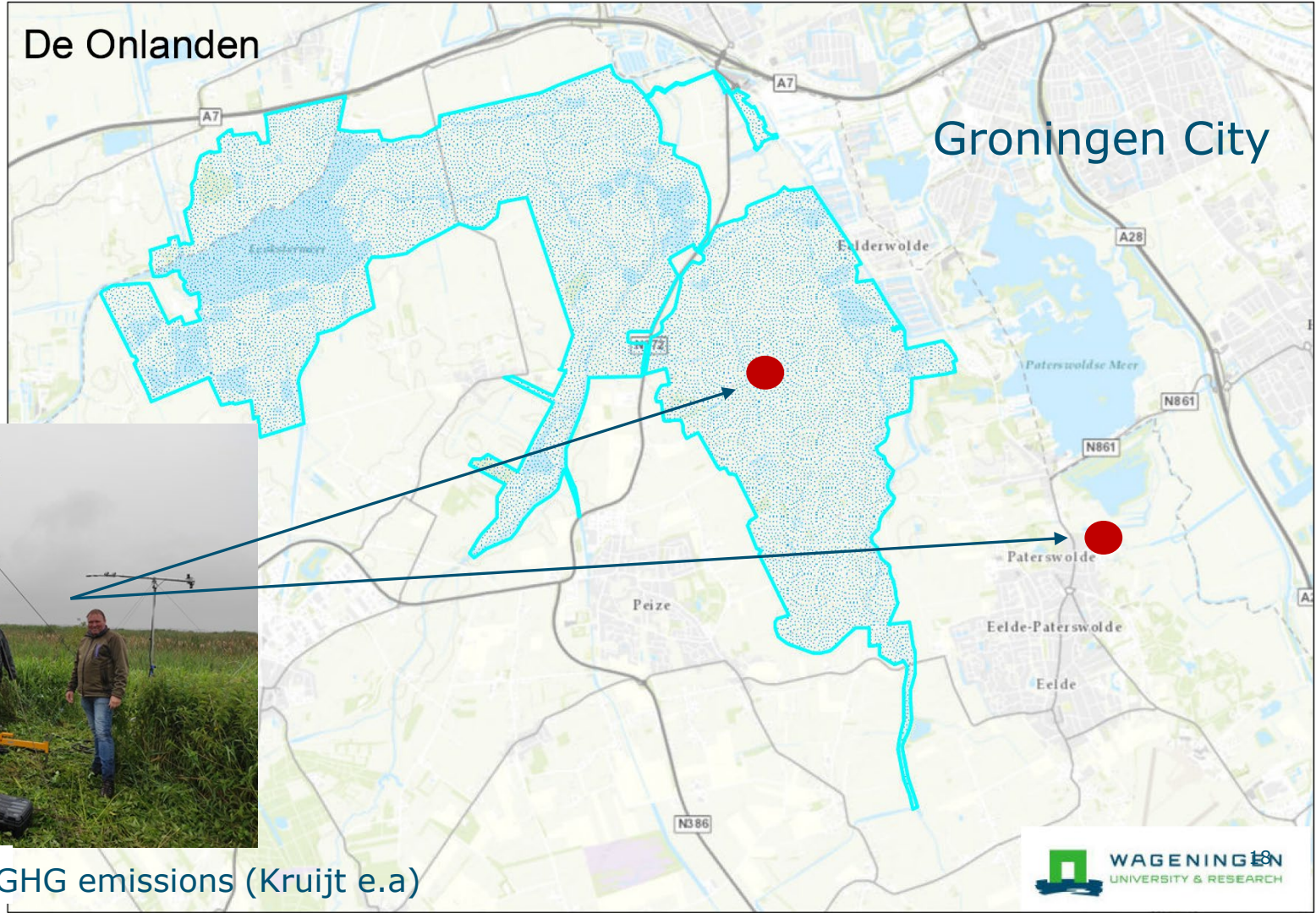
Climate policies in this area

- >5 million m³ Water retention capacity (surface water) to protect city Groningen for water nuisance
- Restoration of 1100ha peat bog nature (In Dutch: laagveenmoeras)
- Reduced GHG emissions (in CO₂-eq ha⁻¹yr⁻¹) compared to agricultural areas (*proven*), on the long-term a netto GHG sink? (*in research*)



[Veraart et al, 2019](#); [Zingstra & Vertegaal, 2021](#)

De Onlanden



Groningen City



Monitor locations GHG emissions (Kruijt e.a)

What do we measure at this location?

- CO_2 flux = netto CO_2 exchange of entire ecosystem
NEE = GPP (opname) – Reco (uitstoot)
- CH_4 flux = see CO_2 flux
- *Heath flux & evaporation*
- Radiation energy
- Normalized Difference Vegetation Index (groenheid)' & webcam foto's
- Basics meteorology (wind, air/soil temperature, etc.)

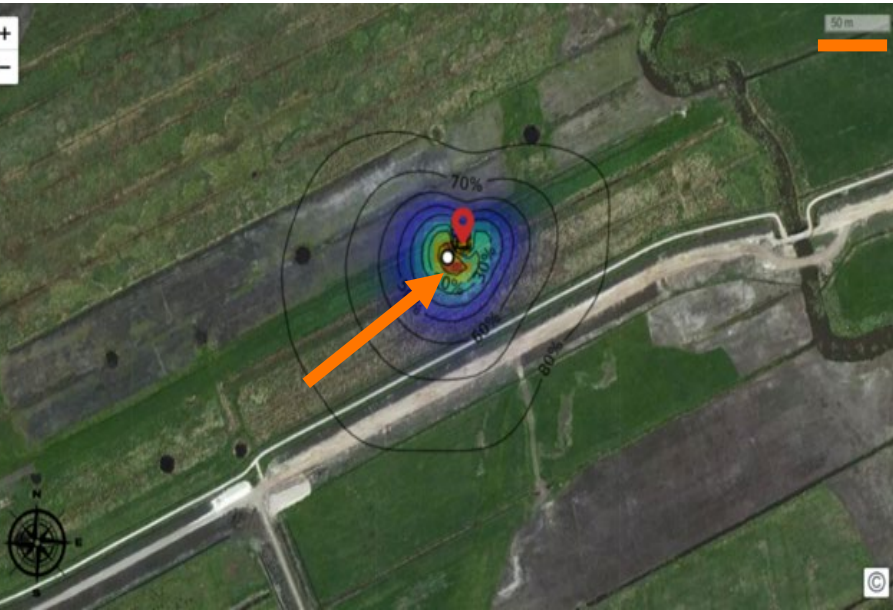


Monitoring at two locations



The footprint of the measurements

Onlanden

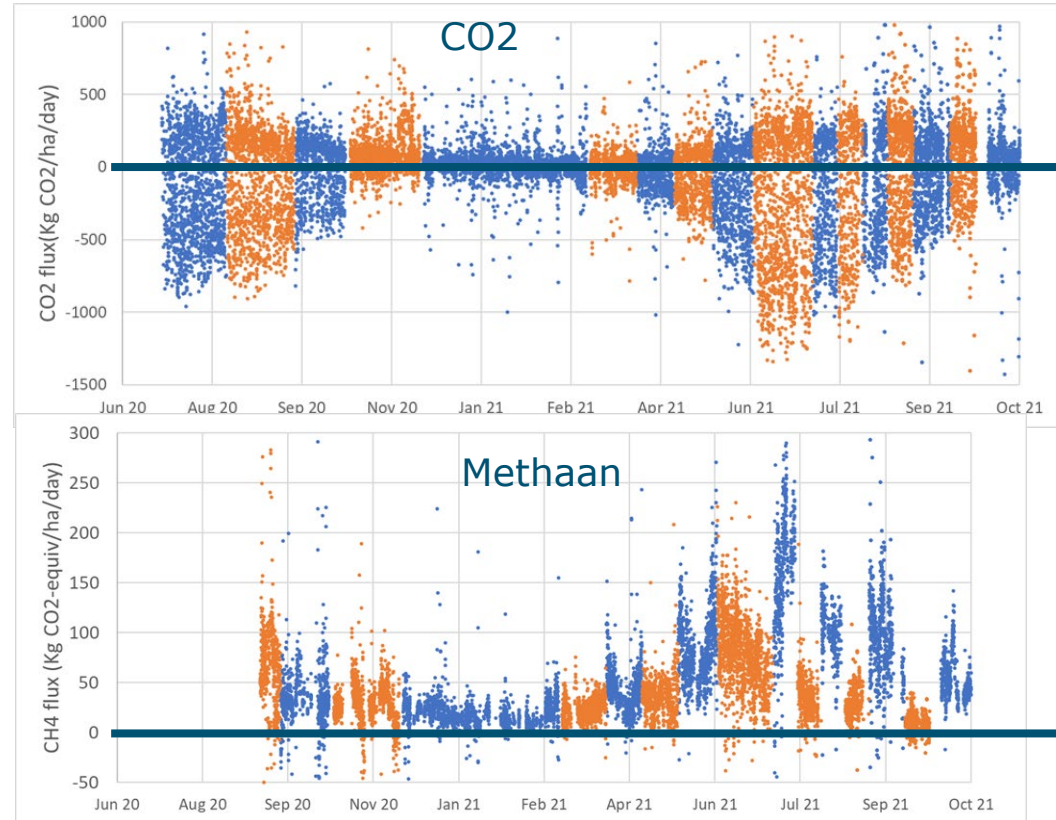


Polder Camphuys, Paterswolde

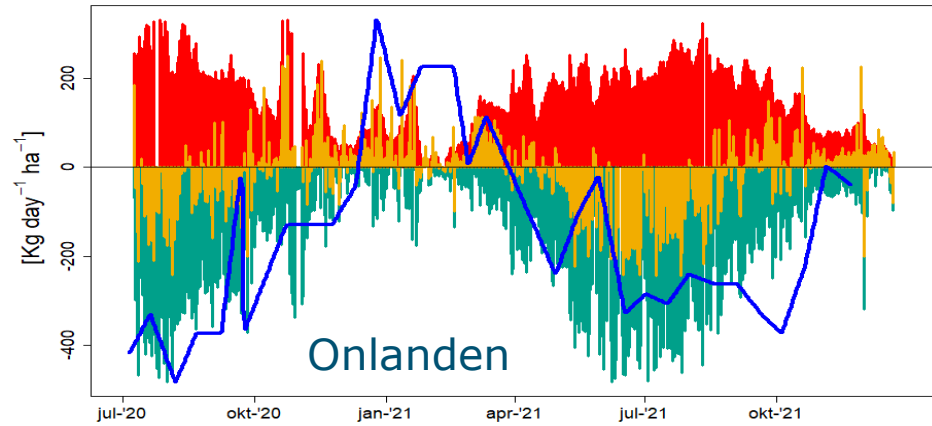


Measurements in the Onlanden region

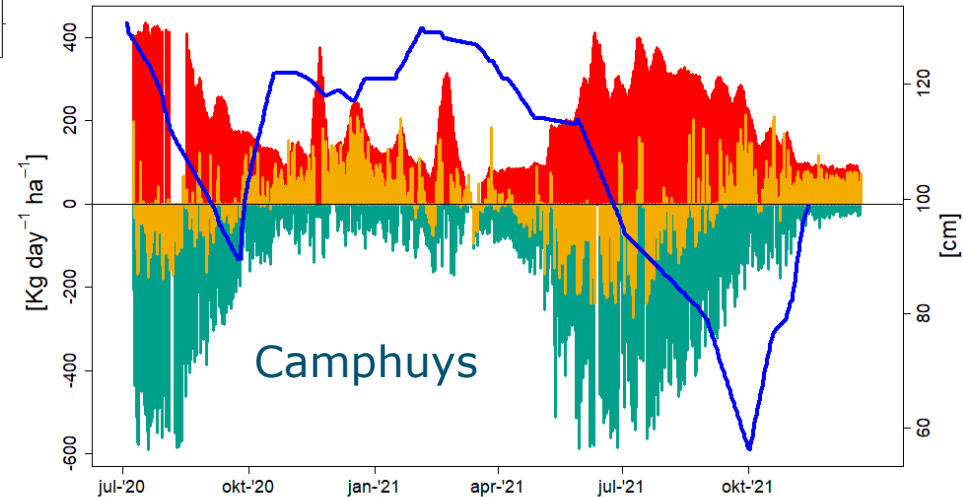
- Polder Camphuys/Onlanden
(BO Klimaatenvelophe)



CO₂ fluxes

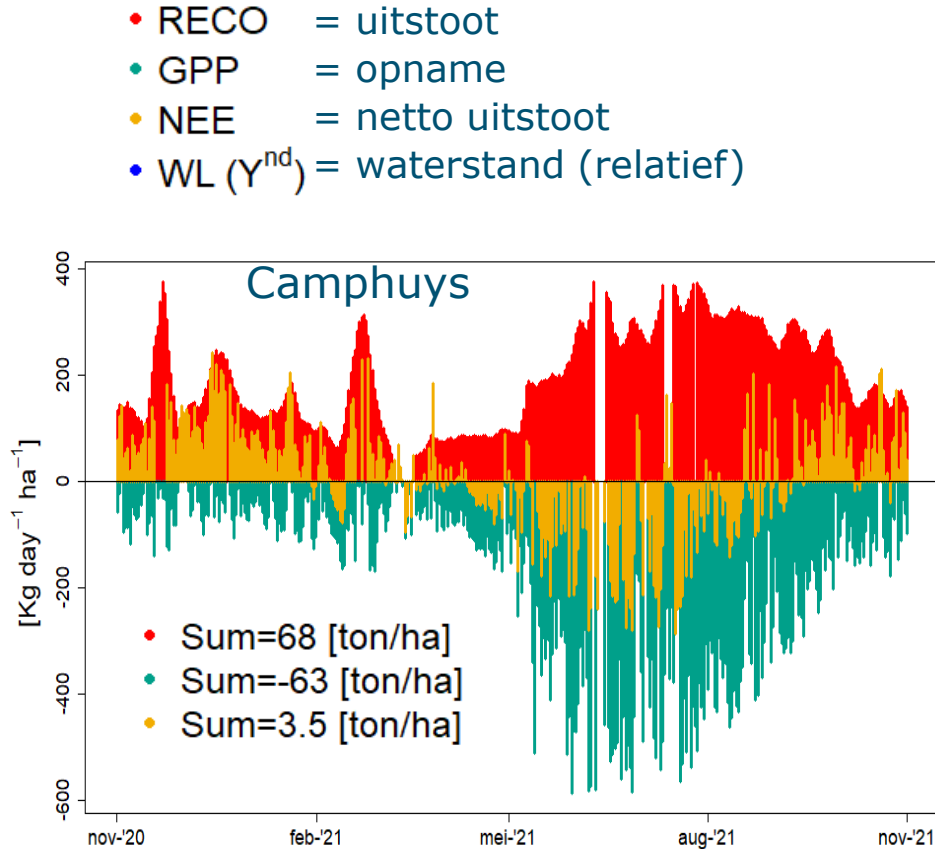
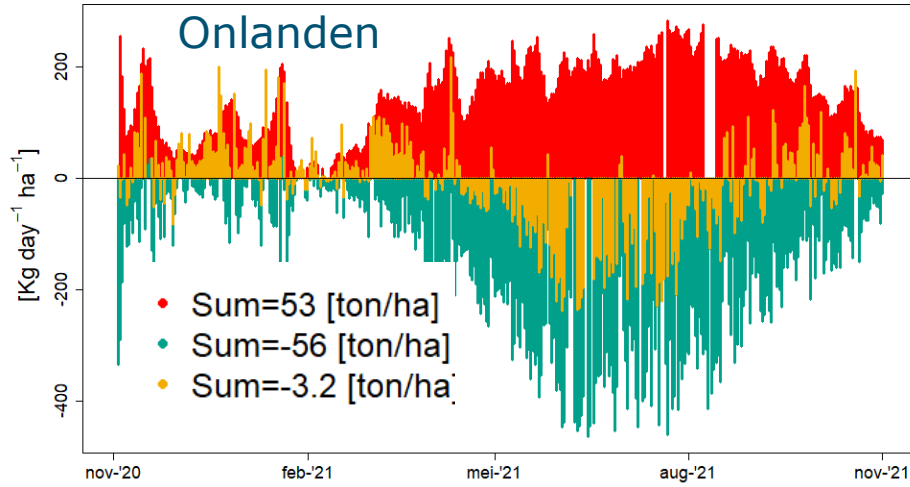


- RECO = uitstoot
- GPP = opname
- NEE = netto uitstoot
- WL (Ynd) = waterpeil (relatief)



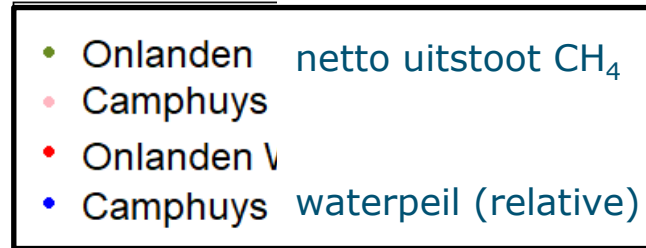
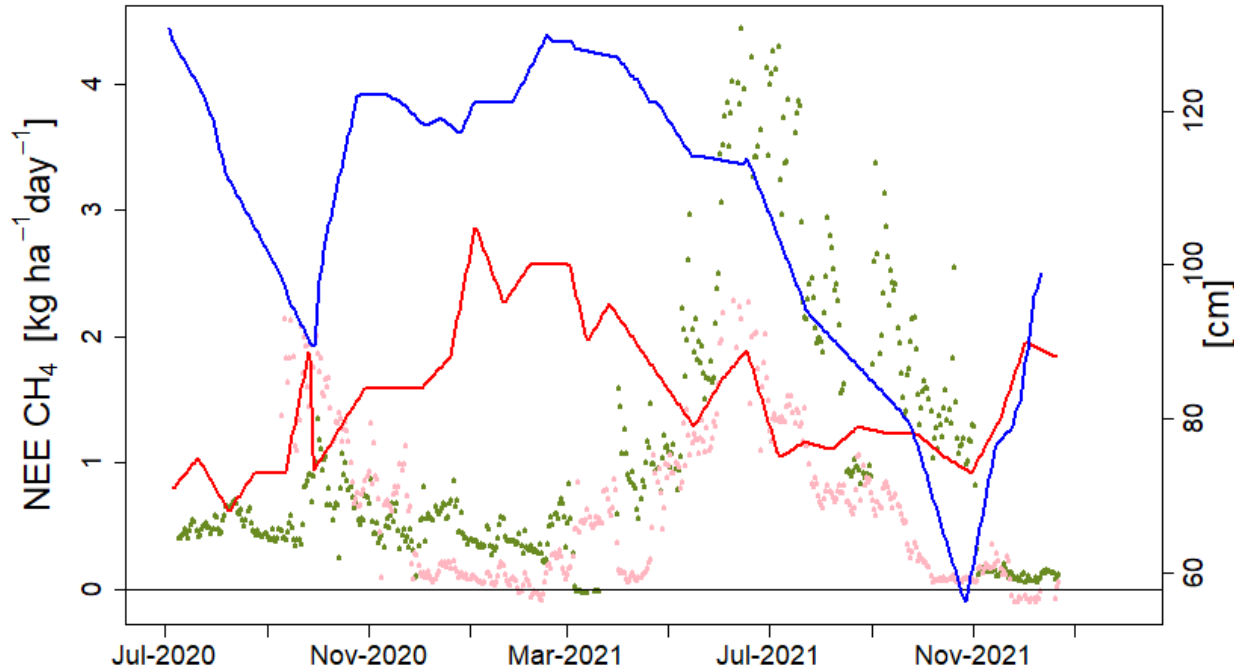
More information: [Kruijt e.a., 2023](#)

CO₂ year balance (2020-2021)



More information: [Kruijt e.a., 2023](#)

Methane fluxes and water levels



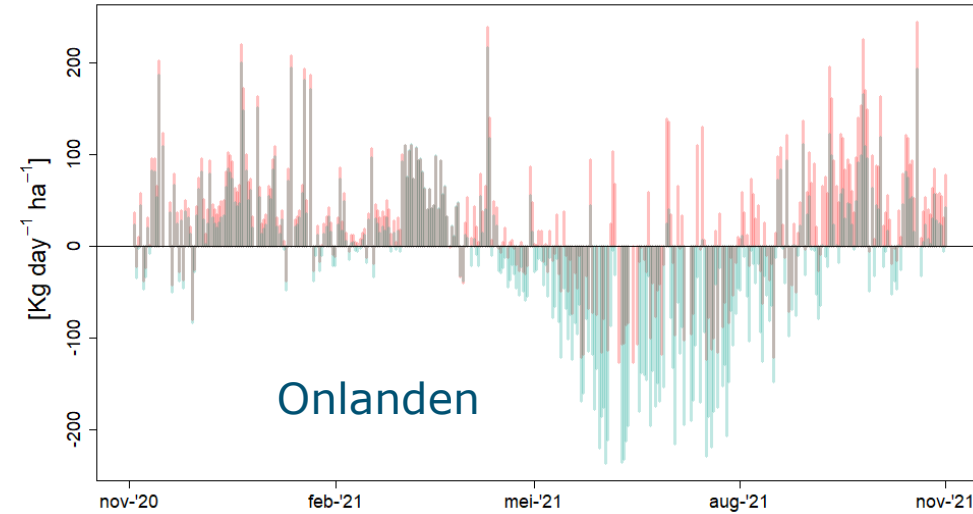
Som van nov '20 – nov '21

Onlanden 13.2 t/ha CO₂eq

Camphuys 5.9 t/ha CO₂eq

More information: [Kruijt e.a., 2023](#)

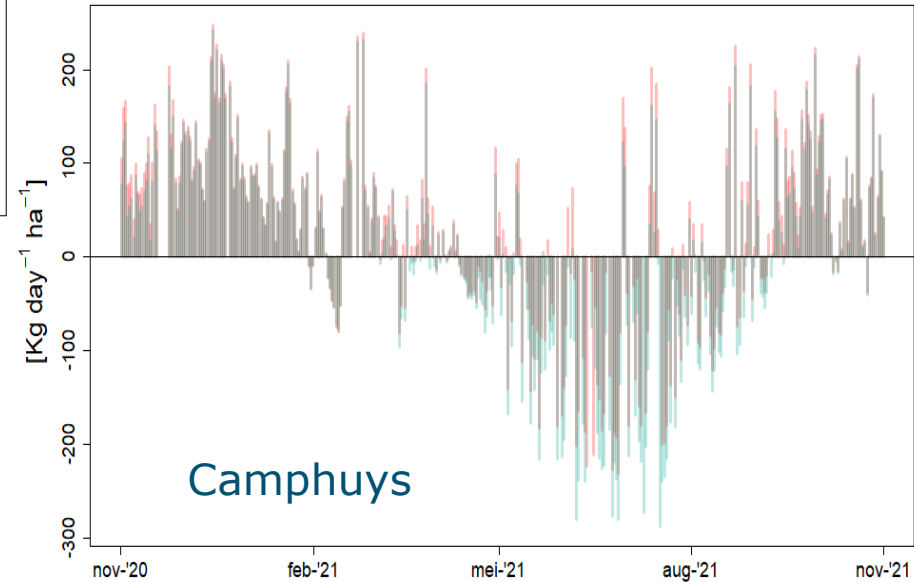
GWP budget in CO₂ equivalents



Onlanden

- GWP (CO₂+CH₄)
- Sum=10 [ton/ha]
- NEE (CO₂)
- Sum=-3.2 [ton/ha]

- GWP (CO₂+CH₄)
- Sum=9.5 [ton/ha]
- NEE (CO₂)
- Sum=3.5 [ton/ha]



Camphuys

First conclusions (from example)

- Monitoring 2020-2022 included 2 dry years
- Both sites are a small source of CO₂-eq, but significant lower emissions compared to peat in agricultural use . At least 5 years are necessary to calculate reliable year budgets.
- CH₄ emissions are dependent of water tables, so manageable?
- CO₂ fluxes are reasonable predictive at these sites thanks to monitoring
- The wetland is also a buffer for heat (learnt from summer 2020)



Fishbowl

Start

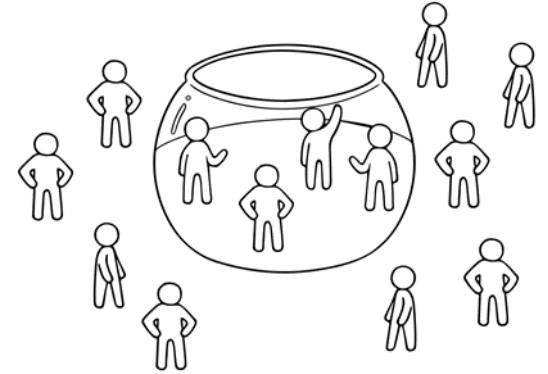
- 5 persons

Kick off discussion point

- Methane emissions are a limitation for rewetting peatlands

Progress

- Do you want to join the current discussion or introduce a new discussion point: tap the shoulder of 1 of the people in the fishbowl



Thank for your attention

More information?

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Bart.kruijt@wur.nl

See also:

- www.klimaatbuffers.nl
- [Kansenkaart klimaatbuffers](#)
- www.waterlandschappen.nl
- [Follow the fluxes in Onlanden live](#)
- [Klimaatenvolpe Natte natuur](#)
- [Nature-based Solutions for Climate Resilient and Circular Food Systems](#)

Acknowledgements

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