GREIFSWALD MIRE CENTRE

Nature-based solutions - the example of peatland restoration for GHG emission reduction, carbon dioxide removal and adaptation

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COP26, 01.11.2021

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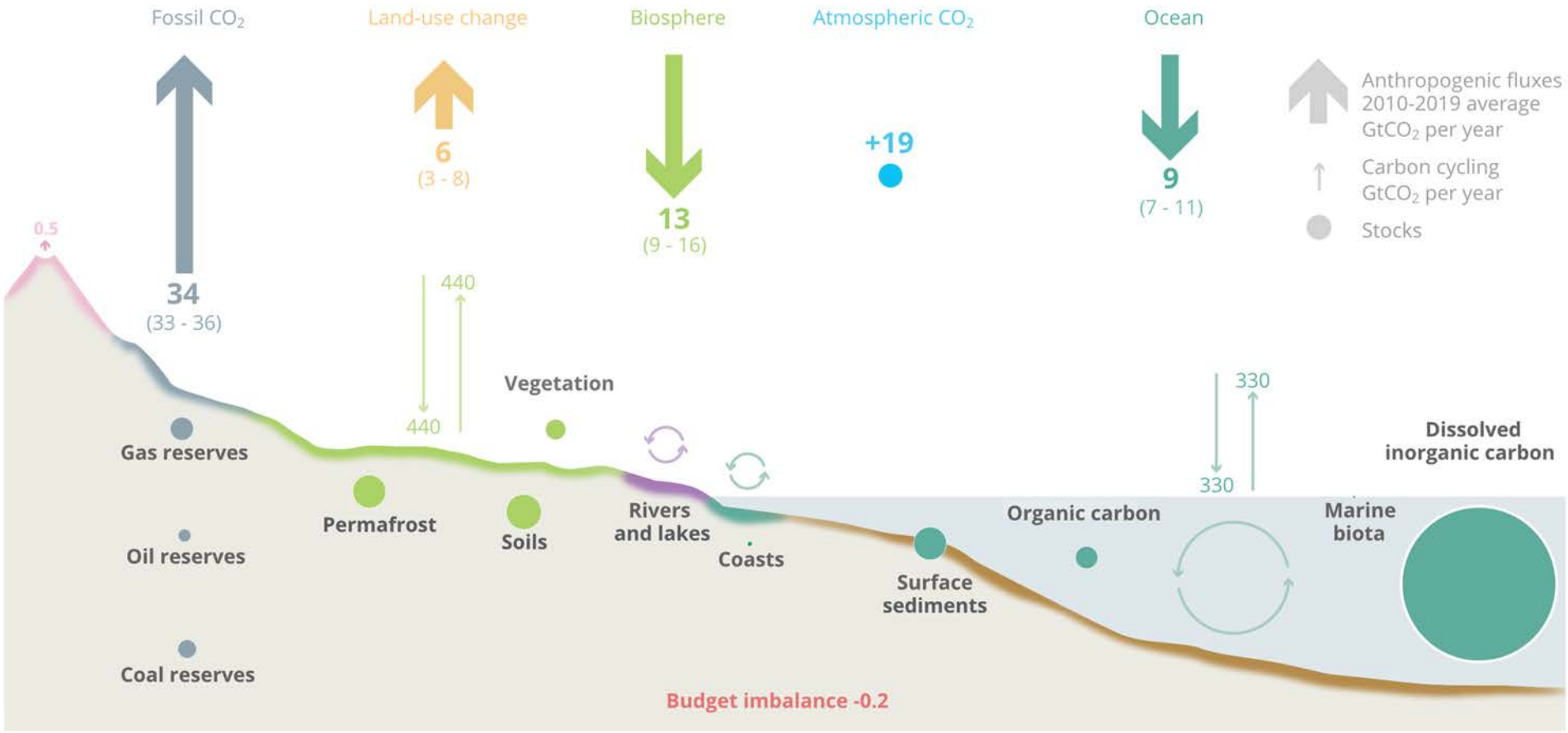
Ecosystems have the potential for large additional climate mitigation by combining enhanced sinks with reduced emissions



Global Carbon Project 2020

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Working with nature

- **Nature-based solutions** (NbS): working with nature to address societal challenges
- **Natural climate solutions** (NCS): conservation, restoration, and improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands
- NCS can provide over one-third of the cost-effective climate mitigation needed between now and 2030 to stabilize warming to below 2 °C (Griscom et al. 2017)
- Alongside aggressive fossil fuel emissions reductions, NCS offer a powerful set of options for nations to deliver on the Paris Climate Agreement while improving soil productivity, cleaning our air and water, and maintaining biodiversity.

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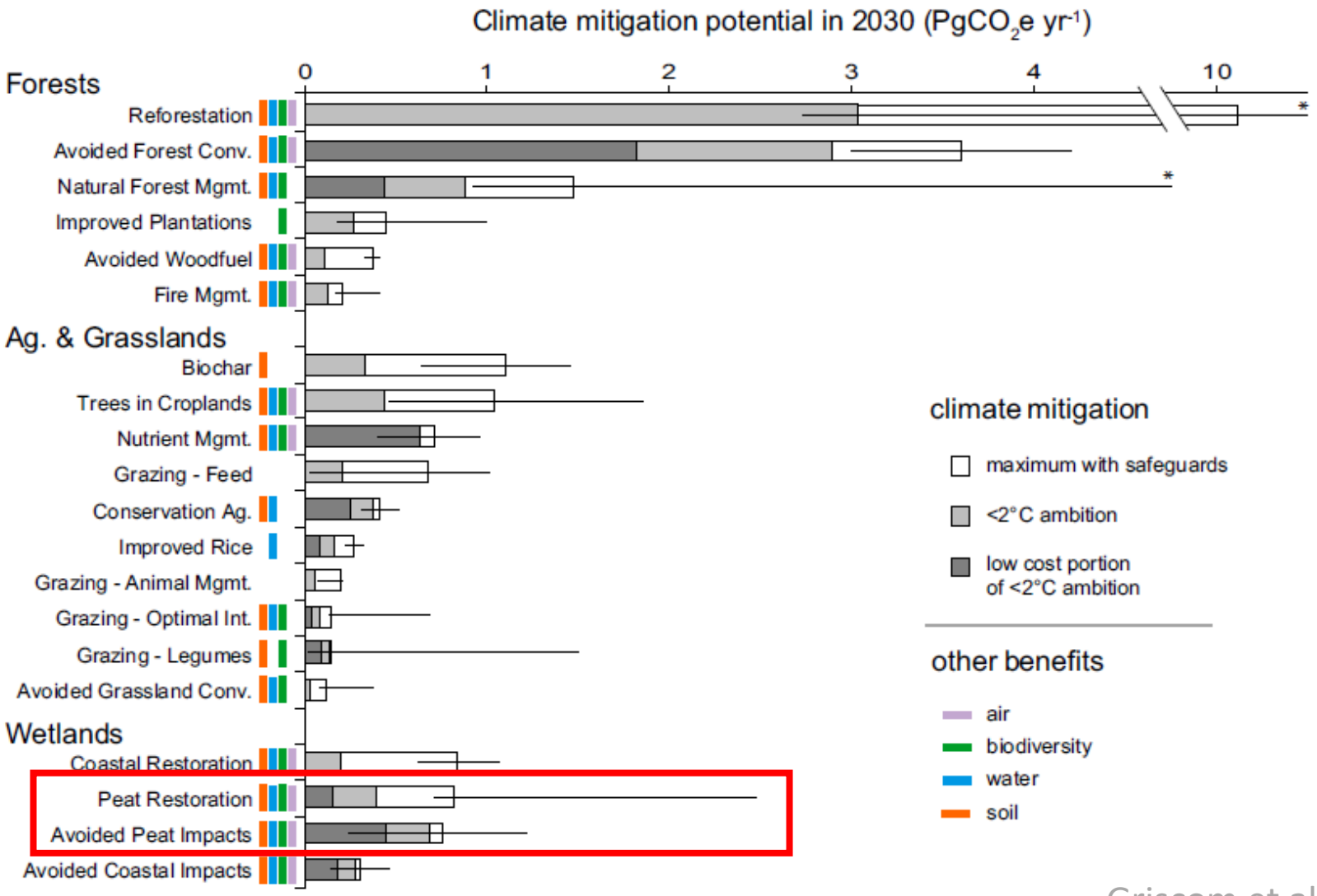
Natural climate solutions



Griscom et al. 2017

What is a peatland?

- A **peatland** is an area with a naturally accumulated layer of peat at the surface (Joosten et al. 2017)
- **Peat** is sedentarily accumulated material consisting of ≥30% dead organic material; peat formation is carbon sequestration
- The peat layer is preserved under wet conditions but oxidises to **CO_2** under drained conditions

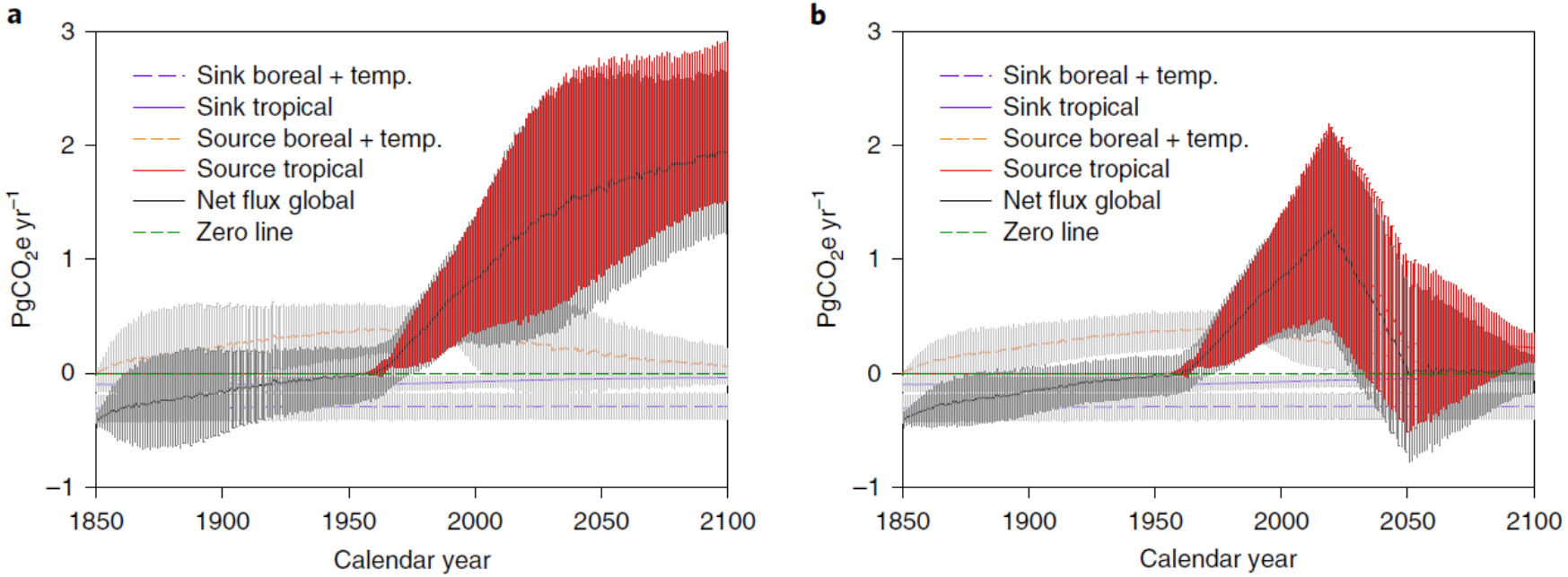
Albrecht Dürer 1495

Global distribution of peatland

→ new Global Peatland Map, will be launched on 9.11.2021 at COP26

https://www.greifswaldmoor.de/global-peatland-database-en.html

Annual GHG flux from anthropogenic peat loss and peat formation in 1850-2100 without and with peatland restoration

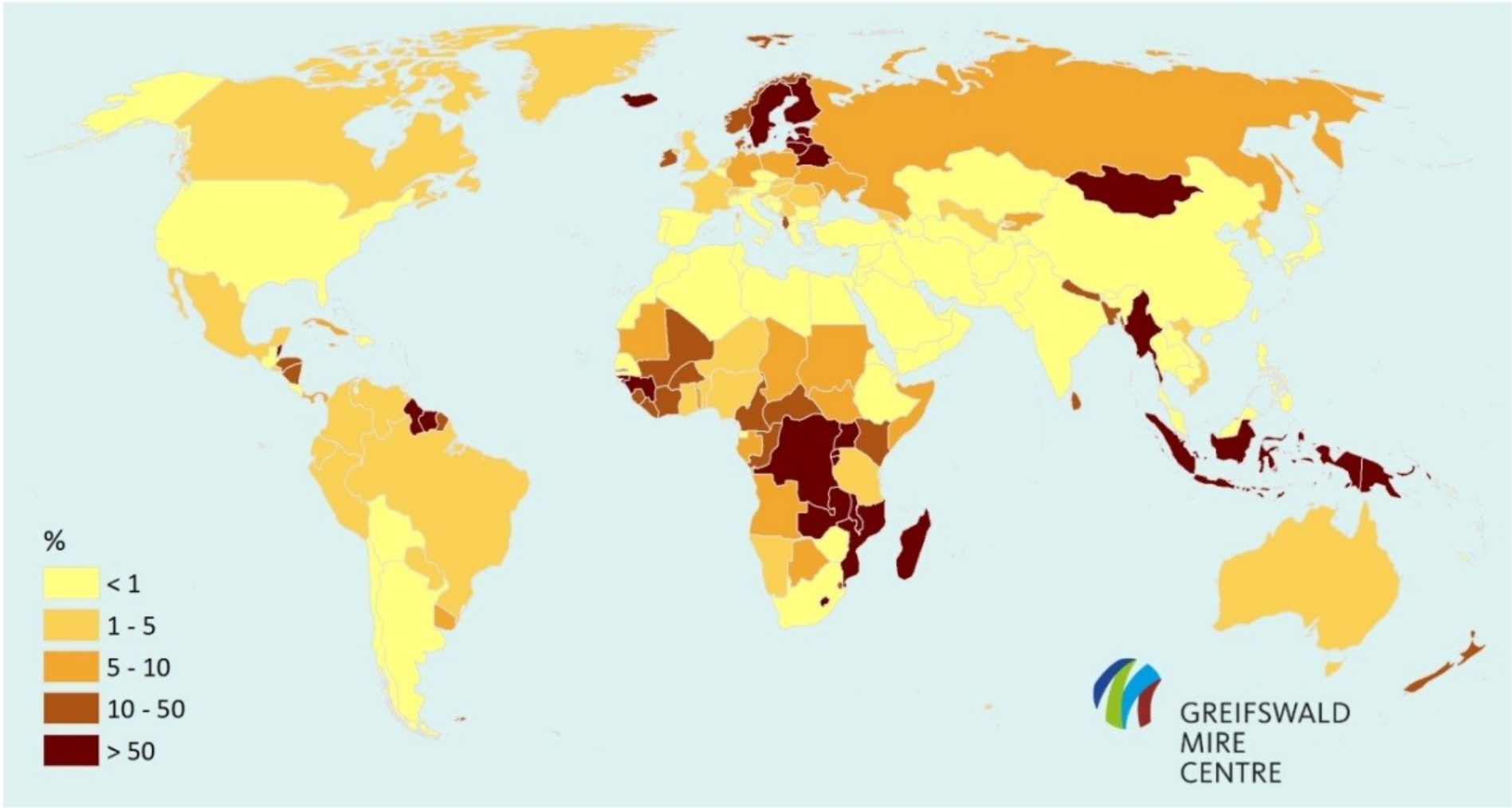


→ In 1960 the global peatland biome turned from a net sink into a net source of soil-derived GHGs due to drainage and peat oxidation

→ Annual backconversion of most of the drained area would render peatlands GHG neutral, whereas emissions from peatland may comprise 12–41% of the GHG emission budget for keeping global warming below +1.5 to +2 °C without restoration

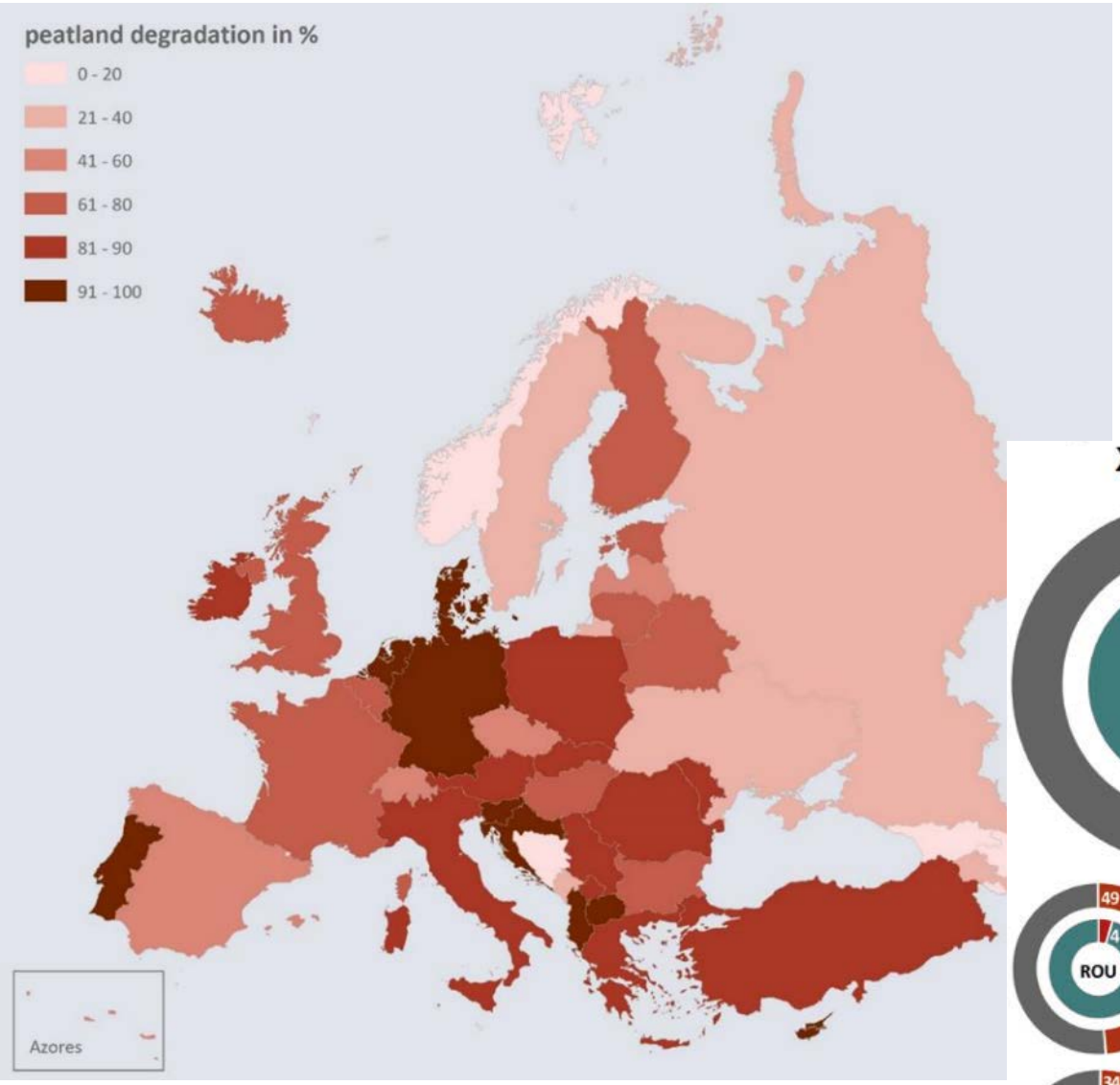
Leifeld et al. 2019

Peatland emissions as % of national fossil fuel and cement emissions

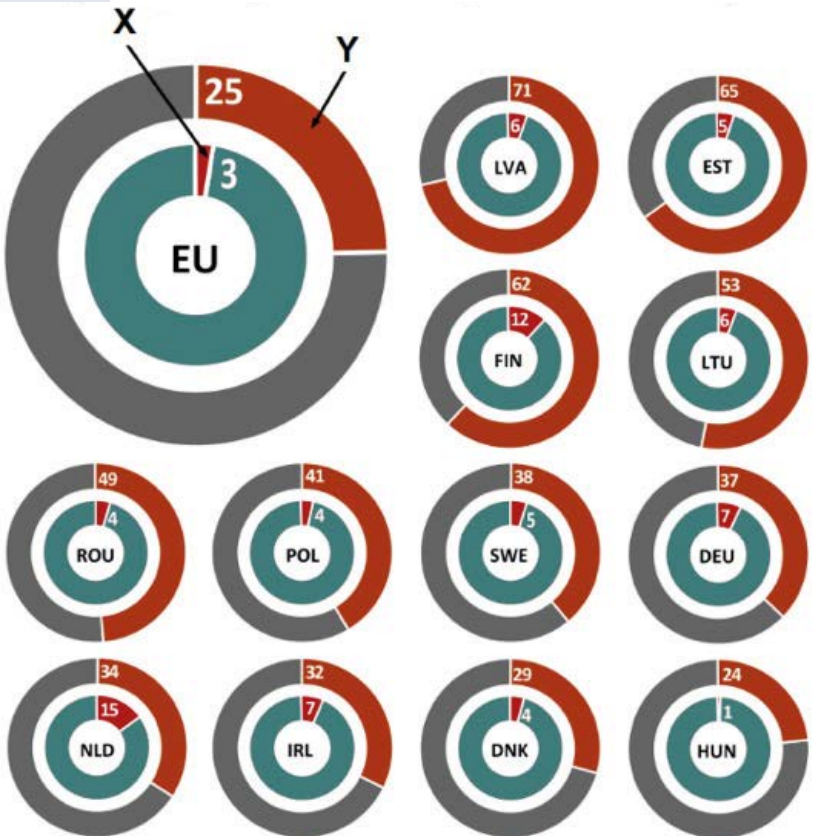


GMC/Global Peatland Database (2015)

Peatland GHG emission hotspots: SE Asia, Europe



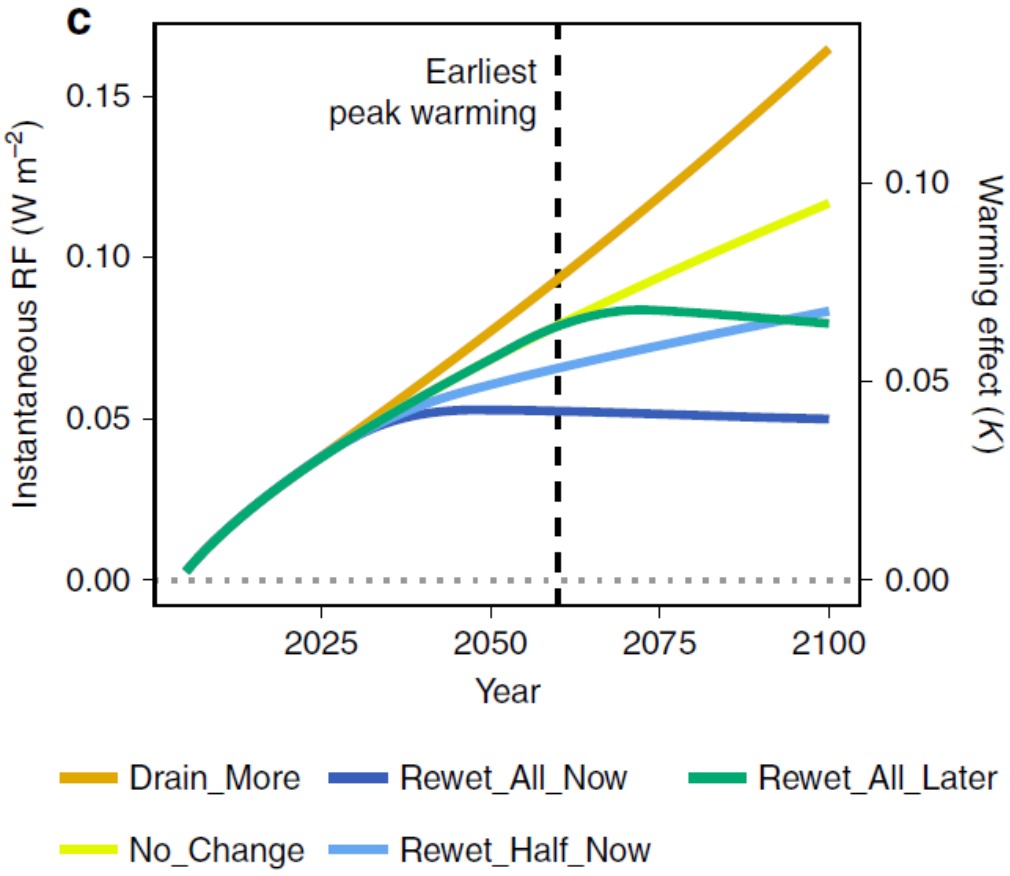
Small area (3%) causes high emissions (25% of agricultural land use emissions)



5 % of the EU‘s annual GHG emissions

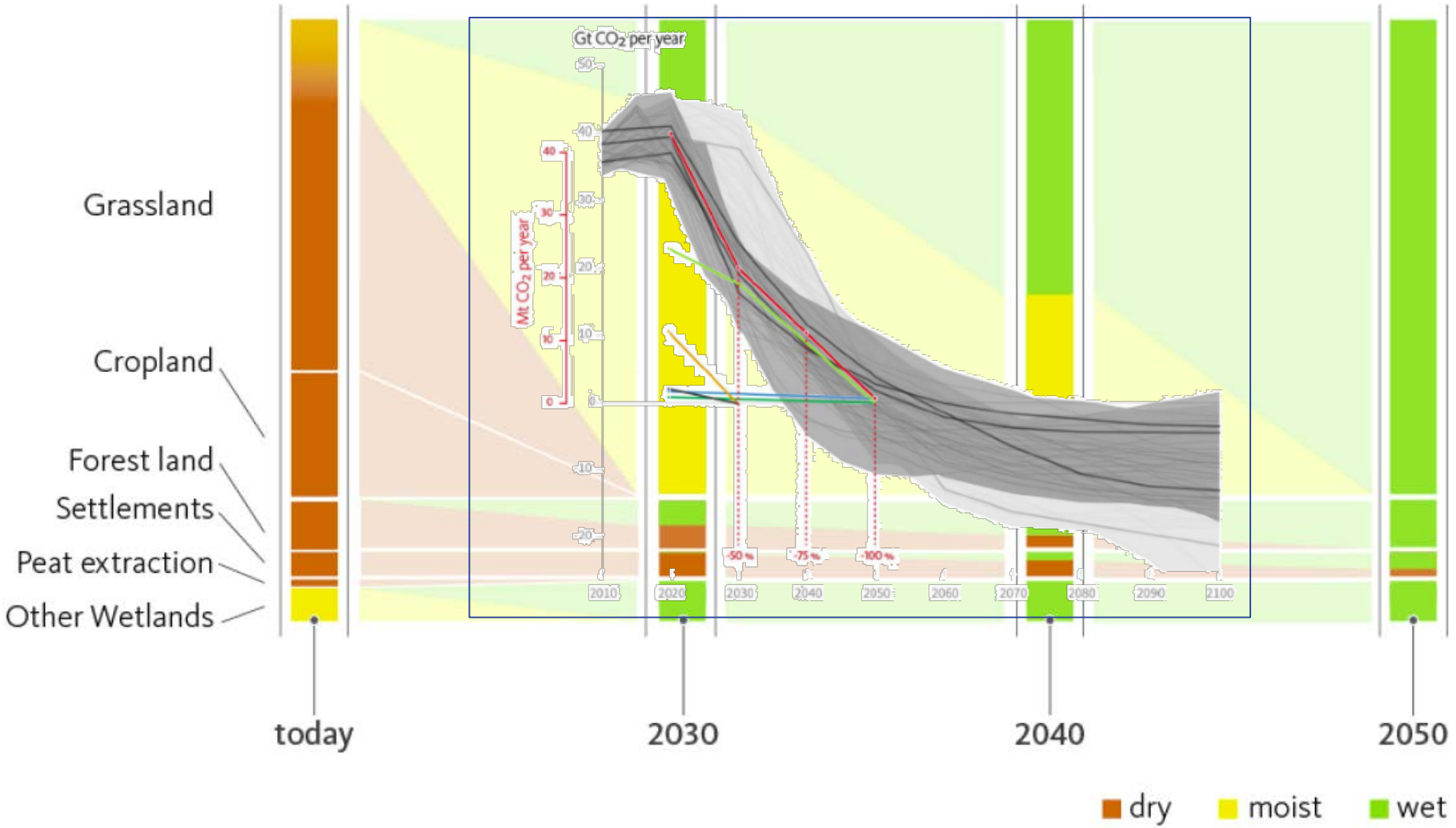
= 220 Mt CO_2e

Prompt rewetting of drained peatlands reduces climate warming despite methane emissions



Günther et al. (2020)

The Paris Agreement implies that all peatlands are (re)wet(ted)



Tanneberger et al. (2021) for Germany

… and this implies a fundamental change of agriculture on peatlands

Conventional agriculture on organic soils

Sneaking loss of the peat layer

~30-40 t CO2e ha -1 yr -1 (IPCC 2014)

Paludiculture

Preservation of the peat layer

0-8 t CO2e ha -1 yr -1 (GMC own figures)

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New value chains from paludiculture

- Construction and insulation material
- Fibre for paper and moldings
- Bioenergy
- Biorefinery
- Potting soil and substrates

Products are 3 (4) fold climate protective:

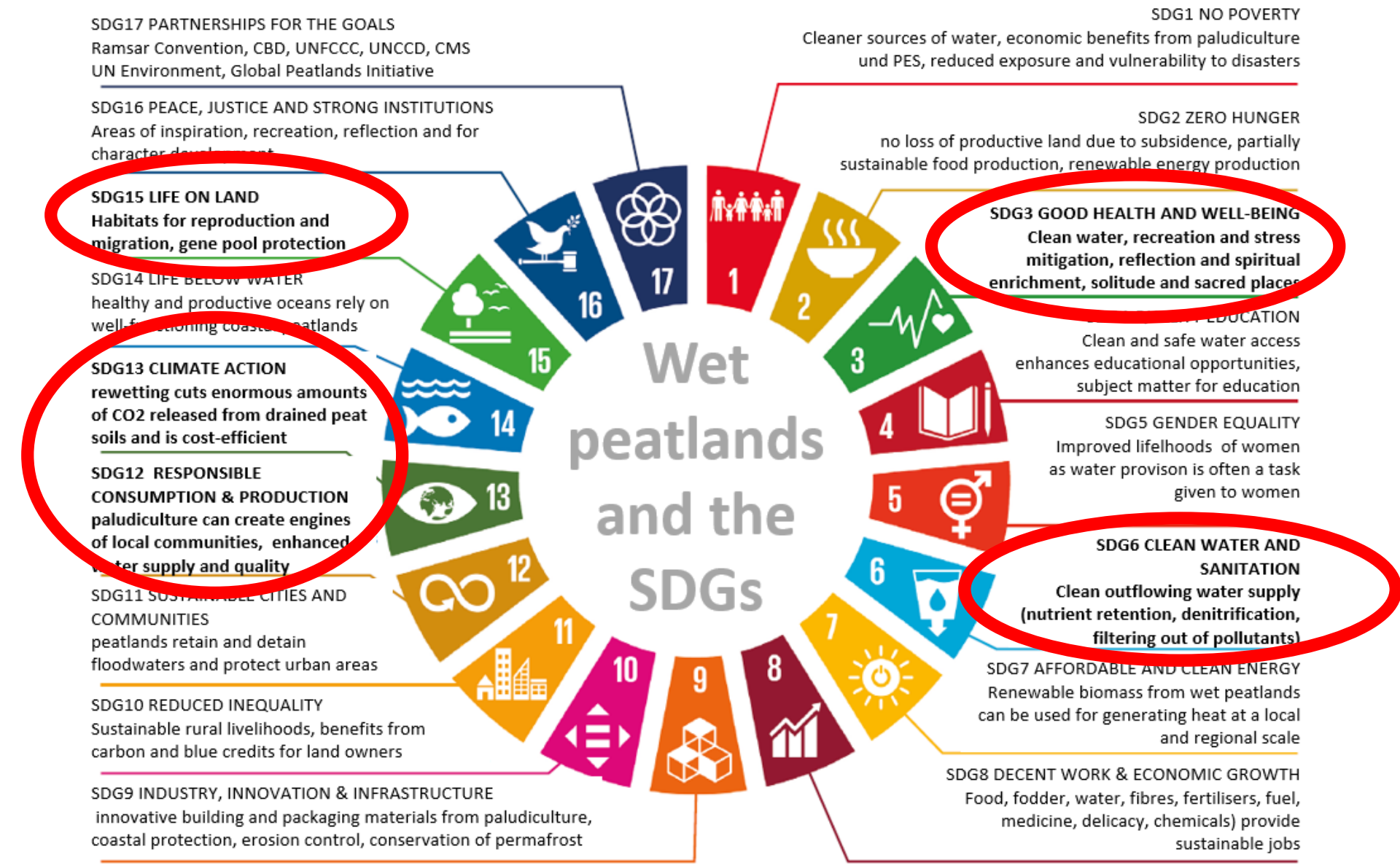
a) Reduction of soil-borne emissions

b) Replacement of fossil ressources

c) Carbon sequestration in long-life products

d) Carbon sequestration through new peat formation

Wet peatlands help achieving the SDGs



Thank your for your attention.

#peatlandsmatter