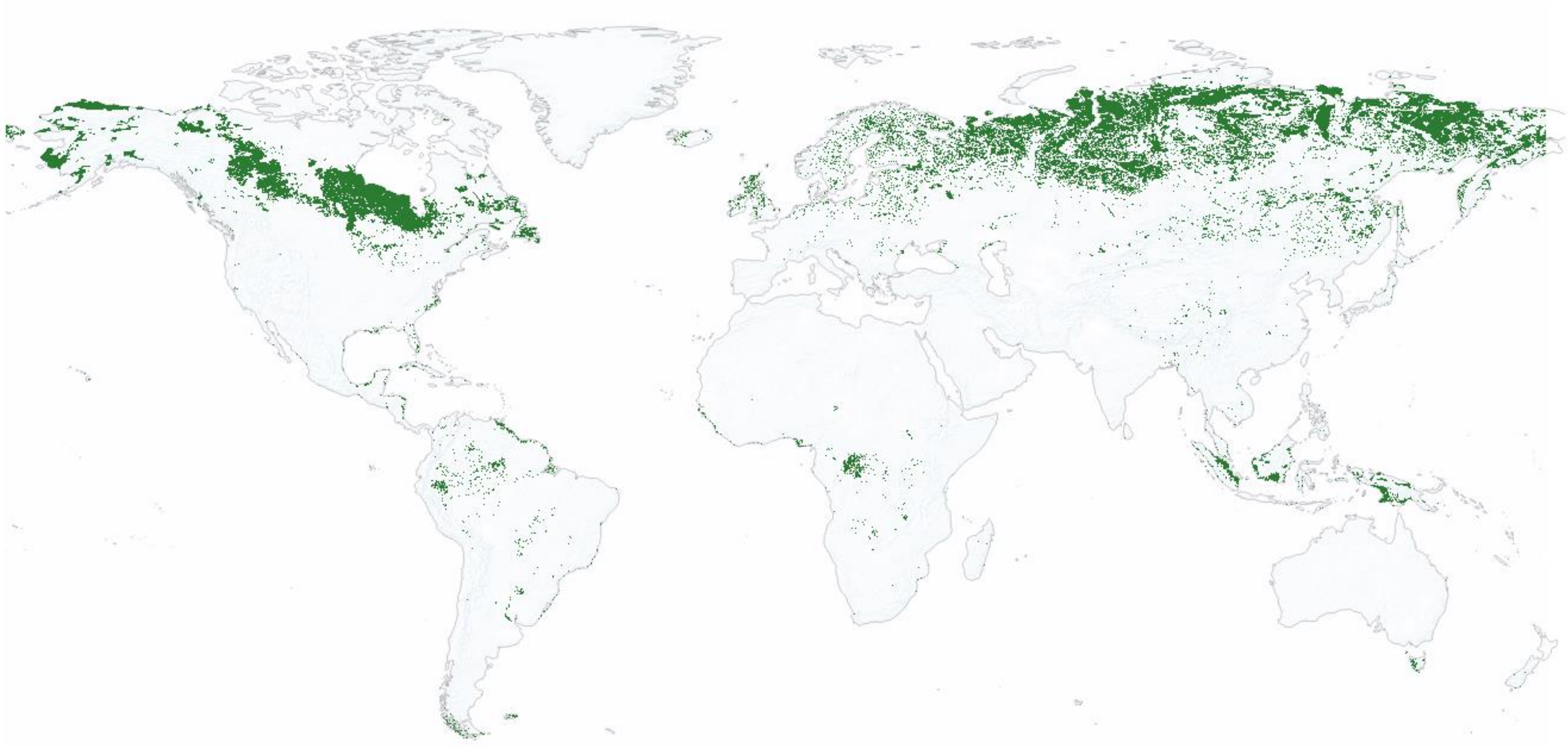
# Remote sensing methods to map the conditions of peatlands in North-East Germany

Lena Krupp, Leibniz Centre for Agricultural Landscape Research (ZALF)

# Peatlands – Climate-Critical Ecosystems

Peatlands cover around 3-4% of the Earth's surface but contain up to one third of the world's soil carbon.



Greifswald Mire Centre (2022). Global Peatland Map 2.0.

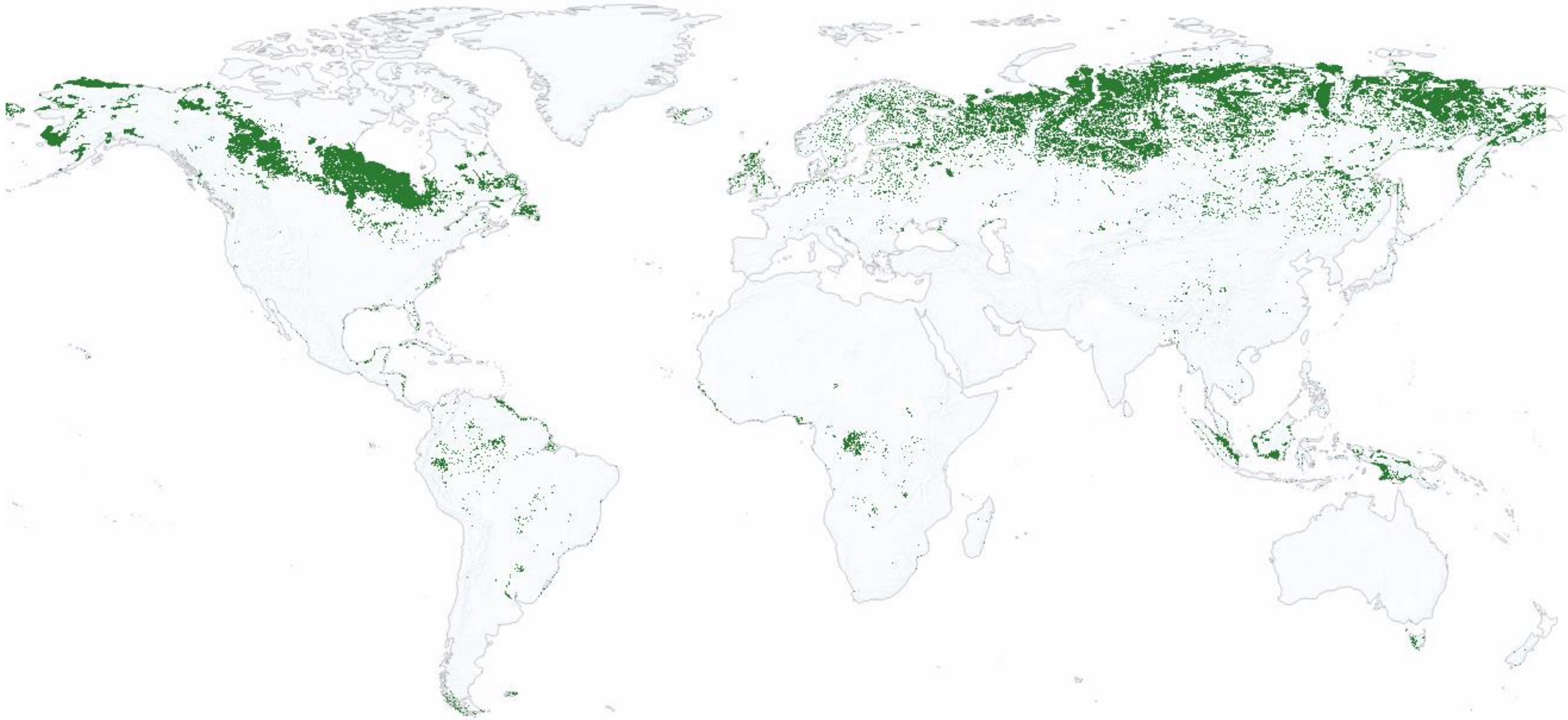
Hugh Venables (2003)
CC BY-SA 2.0

Roquai (2008)

MoorgrünFE
(2023)

# Peatlands – Climate-Critical Ecosystems

Degraded peatlands are responsible for ~4 % of the global anthropogenic emissions (UNEP 2022).



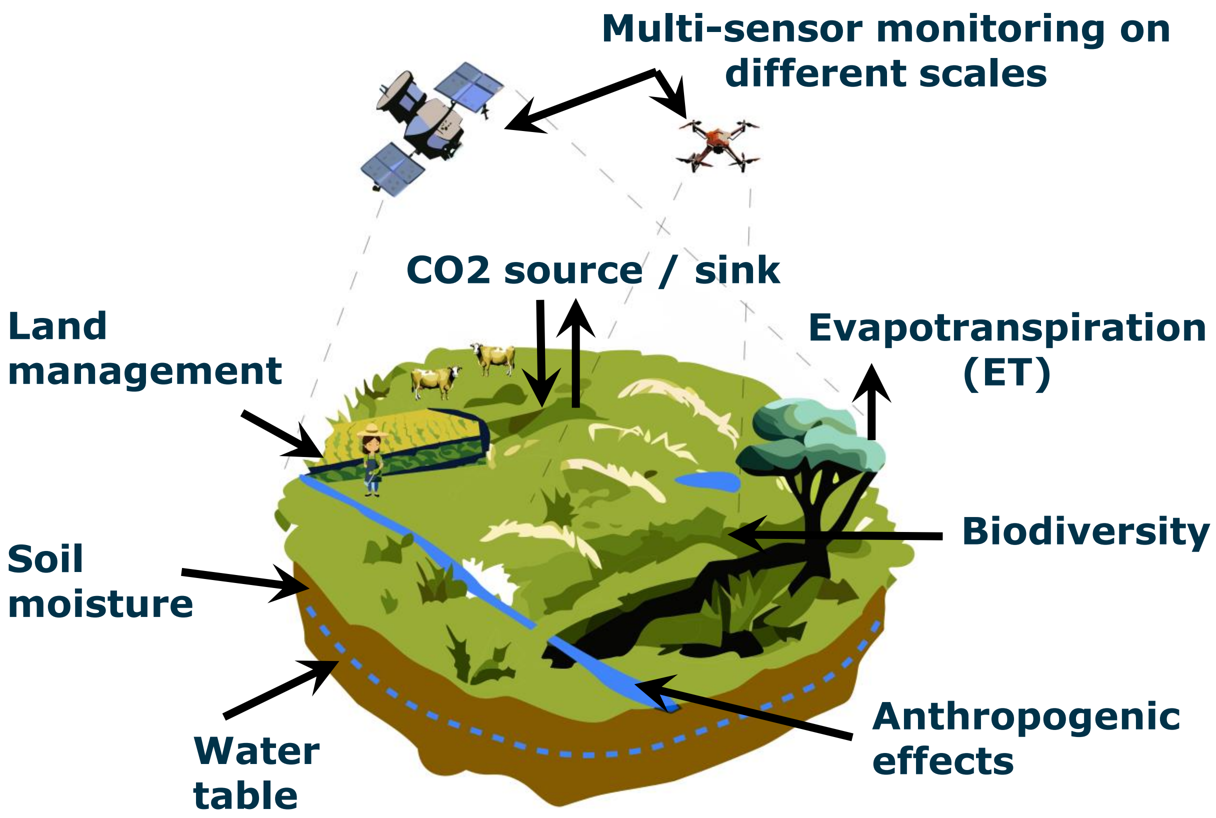
Greifswald Mire Centre (2022). Global Peatland Map 2.0.

Hugh Venables (2003)


Roquai (2008)

MoorgrünFE (2023)

# Monitoring peatland conditions




Peatland monitoring embedded in the MoorgrünFE project

## Research Goals

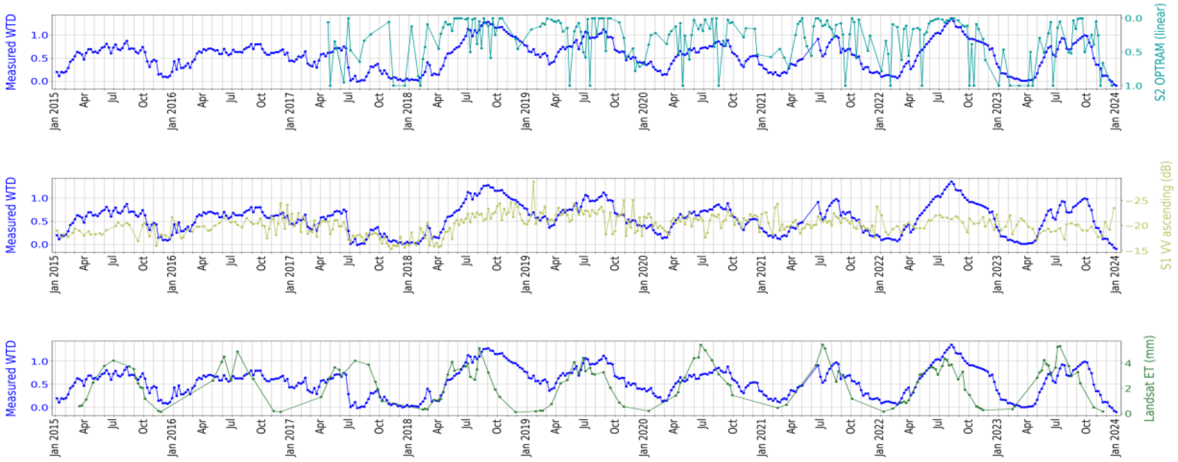
- Improving the monitoring of peatland parameters with remote sensing that influence their function as carbon source/sinks.
- Integrating multiple remote sensing scales, from satellite to UAV based down to the field level
- Focus on hydrological conditions, the plant species distribution and soil organic carbon (SOC)

# Parameters monitored on multiple scales

esa

## Water table dynamics

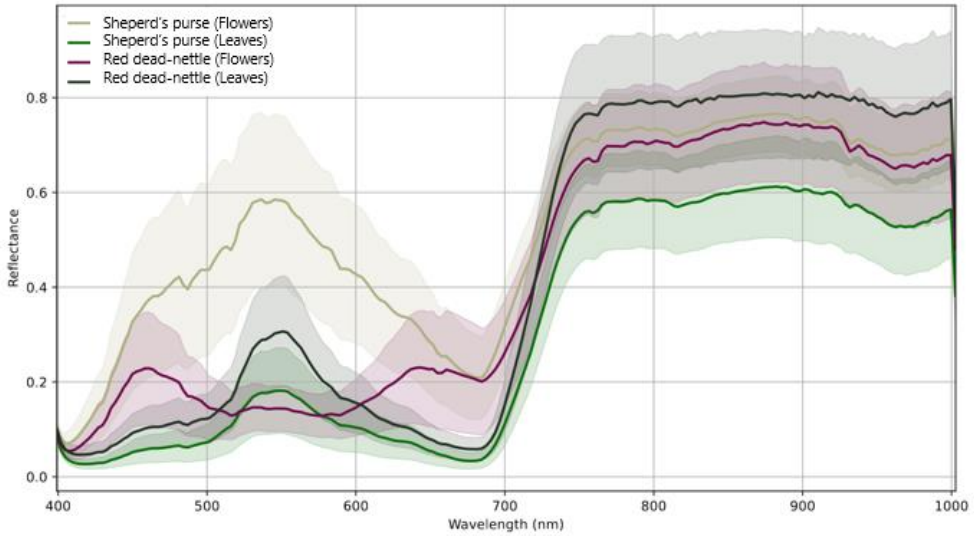
- Analysing measured water table dynamic in peatlands vs. Sentinel-1 backscatter, Sentinel-2 moisture indicators like OPTRAM, and Landsat based Evapotranspiration (ET)




Time Series of OPTRAM, VV and ET compared to measured Water Table Depth (WTD)

## Plant species distribution

- ML Classification of individual plants and communities based on images from a tripod-mounted hyperspectral camera (VIS-NIR, <1 cm resolution



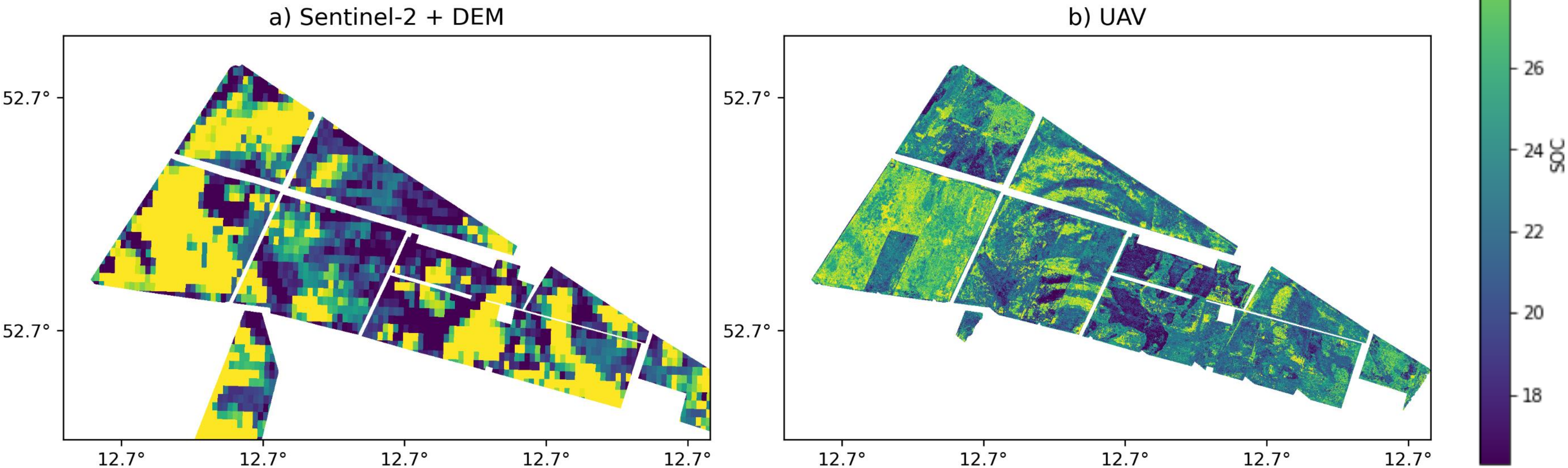

Spectra of plant parts (flowers, leaves) of Sheperd's purse (*Capsella bursa-pastoris)* and Red dead-nettle (*Lamium purpureum)*

icons: Flaticon.com

# Parameters monitored on multiple scales

## Soil organic carbon (SOC) mapping

- Calculated from bands and indices based on Sentinel-2 and a UAV-mounted hyperspectral camera (VIS-NIR, 20 cm resolution) using Machine Learning
- Soil samples for SOC ground truthing taken at several locations in North-East Germany




icons: Flaticon.com

# Peatlands – Climate-Critical Ecosystems