The Global Peatland Map 2.0, statistics and thematic maps for Europe

Webinar: Peatlands in Europe and the way forward: Insights from the Global Peatland Assessment – Europe

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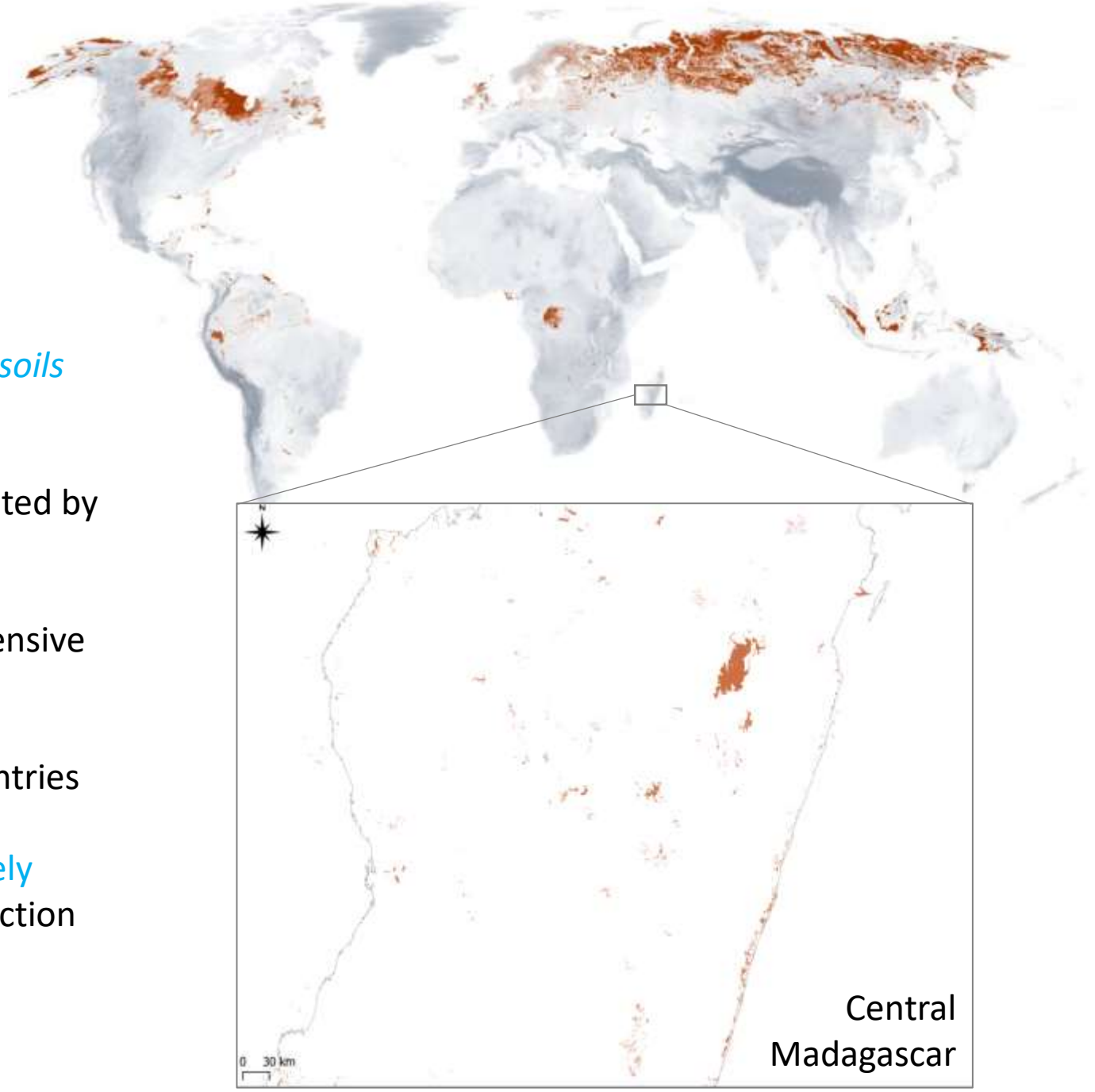
Global Peatland Map 2.0

Global Peatland Map 2.0

- composite map showing *global peatlands, organic soils and suitable proxy data*
- mainly based on collated external data; supplemented by 'own' mapping at GMC
- covers global peatland distribution more comprehensive and correct
- improved peatland coverage for many tropical countries
- most regions and countries still have to be accurately mapped for peatlands to guide regional and local action



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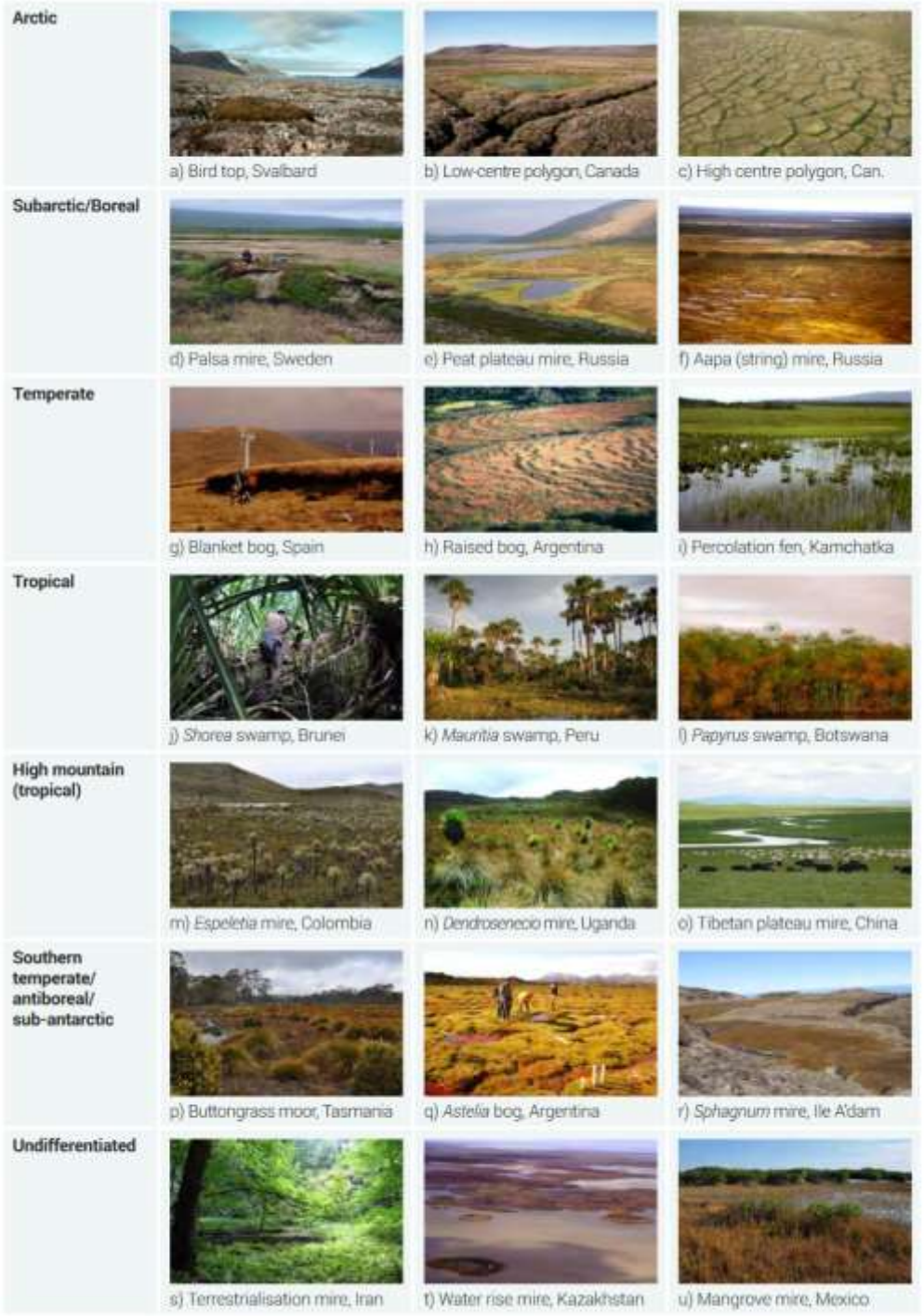
Global Peatland Database ('GPD') - mapping and documenting peatlands globally

- **'globally' means 'everywhere'** (not restricted to the 'global scale', but covering all scales)
- **'mapping' includes multiple data sources and types, and different methods** - depending on regional available input data, purpose of mapping and skills of the mapper
- includes data on **peatlands, organic soils, histosols and indicative proxies**
- if documented & applicable **>12% SOC threshold** for including of data
- **no minimum depth** of peat layer applied



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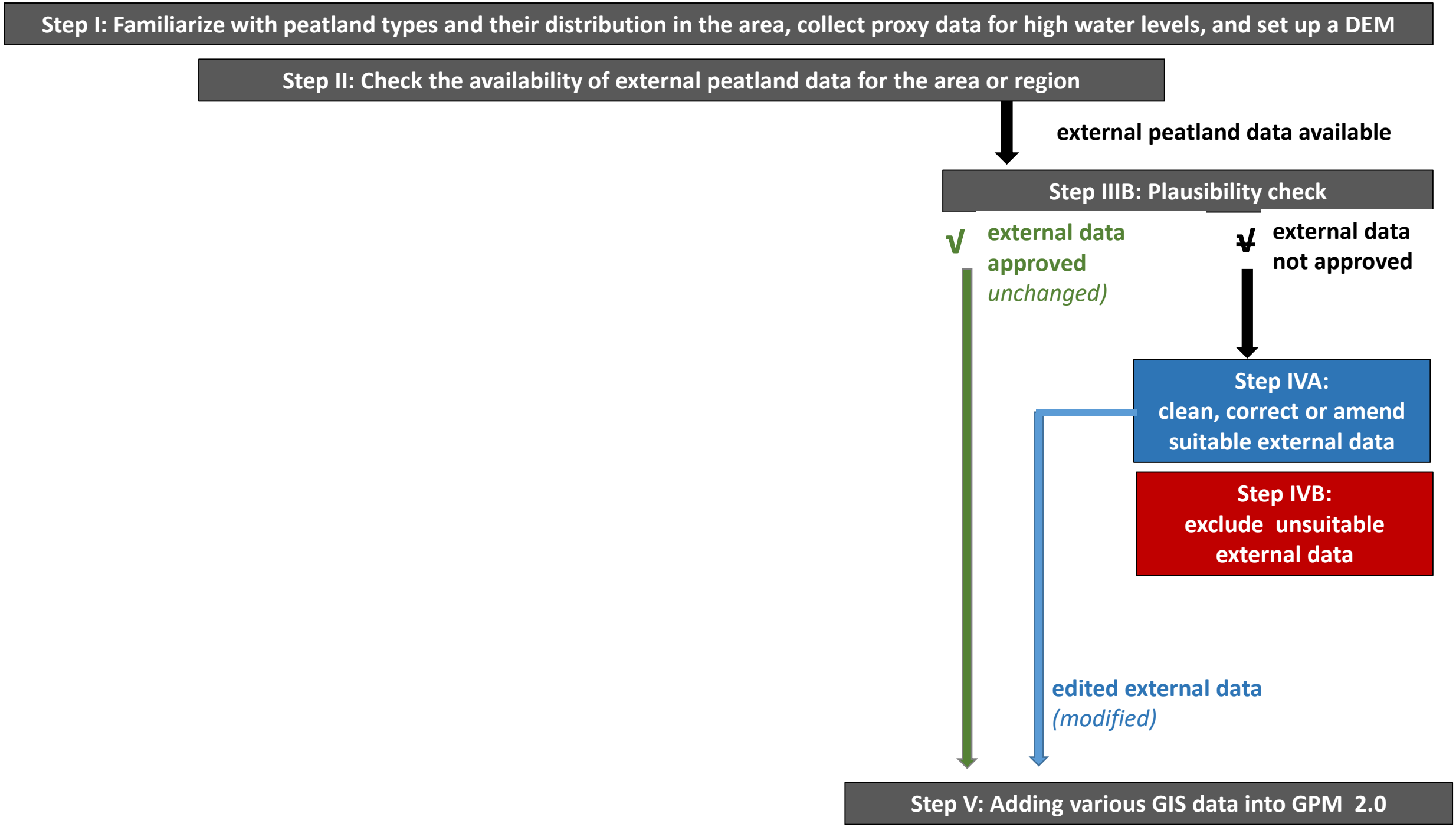
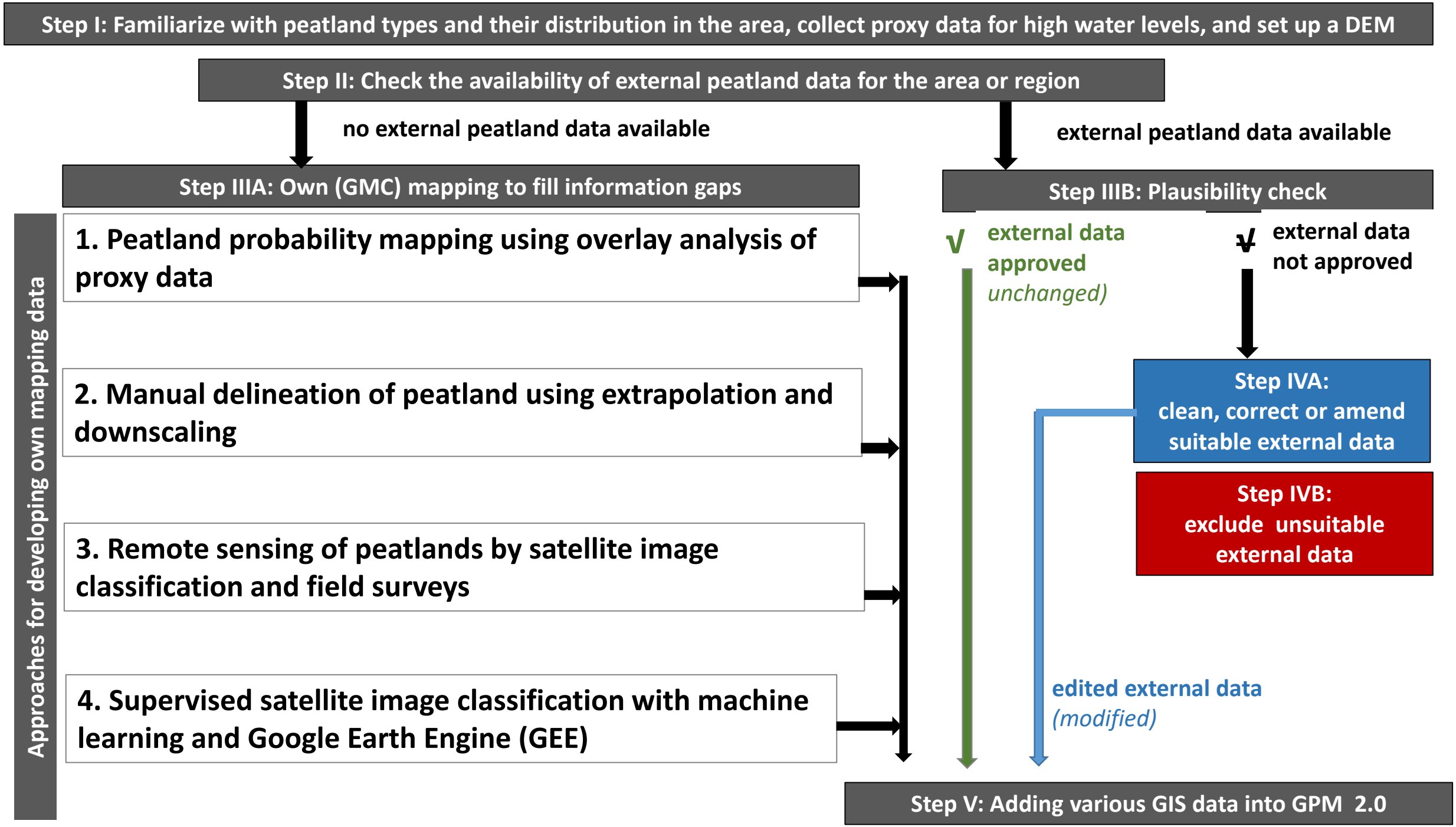
Step I: Familiarize with peatland types and their distribution in the area, collect proxy data for high water levels, and set up a DEM

Step II: Check the availability of external peatland data for the area or region

external peatland data available

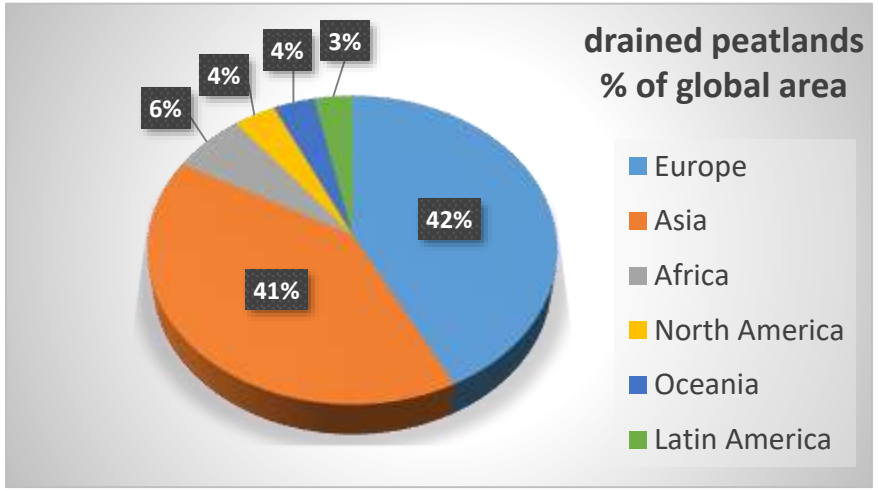
Step IIIB: Plausibility check

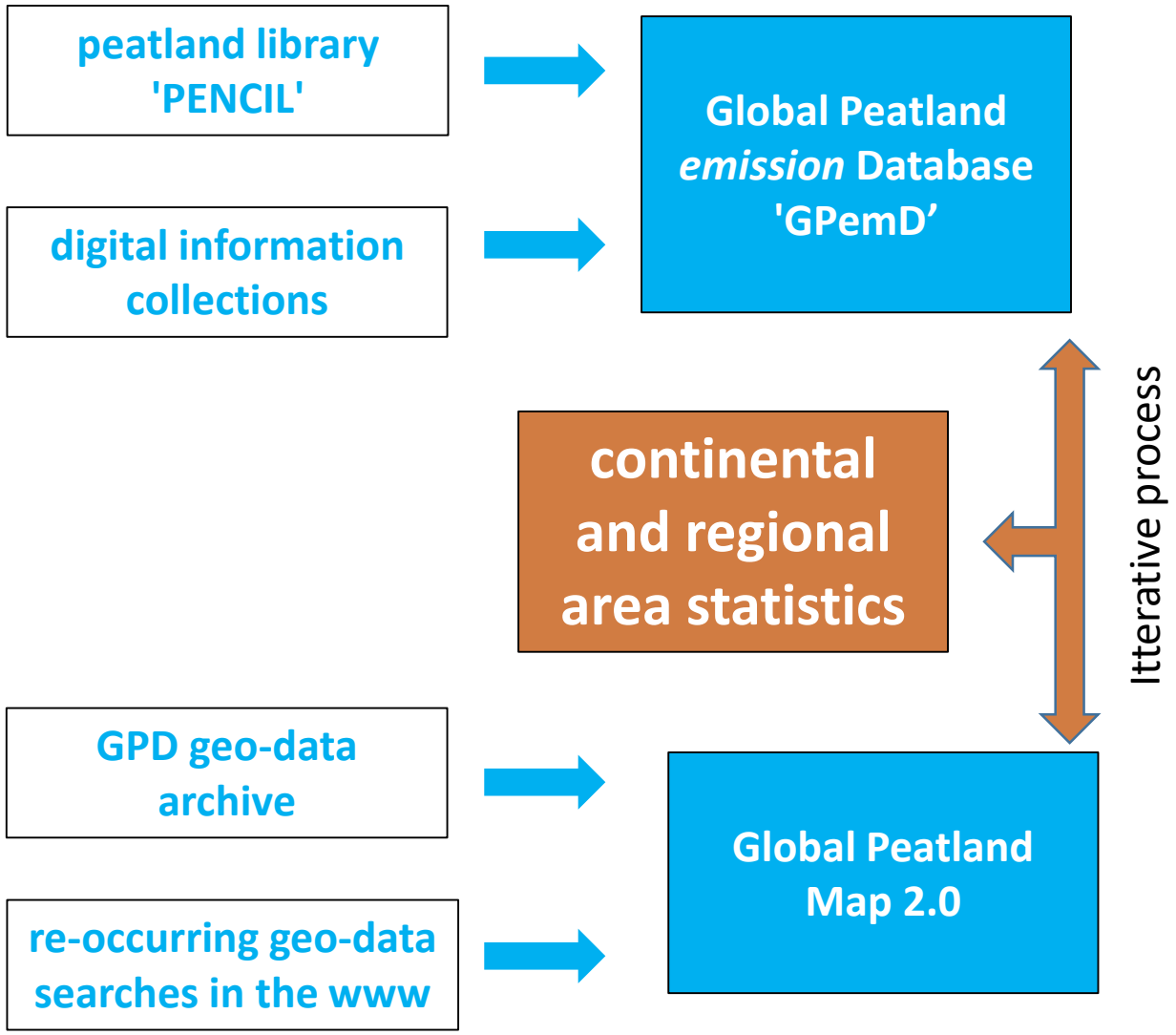

Step I: Familiarize with peatland types and their distribution in the area, collect proxy data for high water levels, and set up a DEM
Step II: Check the availability of external peatland data for the area or region
external peatland data available
Step IIIB: Plausibility check
external data approved
unchanged)
external data not approved
Step IVA:
clean, correct or amend suitable external data
Step IVB:
exclude unsuitable external data
edited external data
(modified)
Step V: Adding various GIS data into GPM 2.0


Step I: Familiarize with peatland types and their distribution in the area, collect proxy data for high water levels, and set up a DEM
Step II: Check the availability of external peatland data for the area or region
no external peatland data available
external peatland data available
Step IIIA: Own (GMC) mapping to fill information gaps
Step IIIB: Plausibility check
Approaches for developing own mapping data
1. Peatland probability mapping using overlay analysis of proxy data
2. Manual delineation of peatland using extrapolation and downscaling
3. Remote sensing of peatlands by satellite image classification and field surveys
4. Supervised satellite image classification with machine learning and Google Earth Engine (GEE)
√ external data approved (unchanged)
√ external data not approved
Step IVA: clean, correct or amend suitable external data
Step IVB: exclude unsuitable external data
edited external data (modified)
Step V: Adding various GIS data into GPM 2.0

GPD & 2022 UNEP GPA

We also derived statistics on total, drained and undrained peatlands and related GHG emissions





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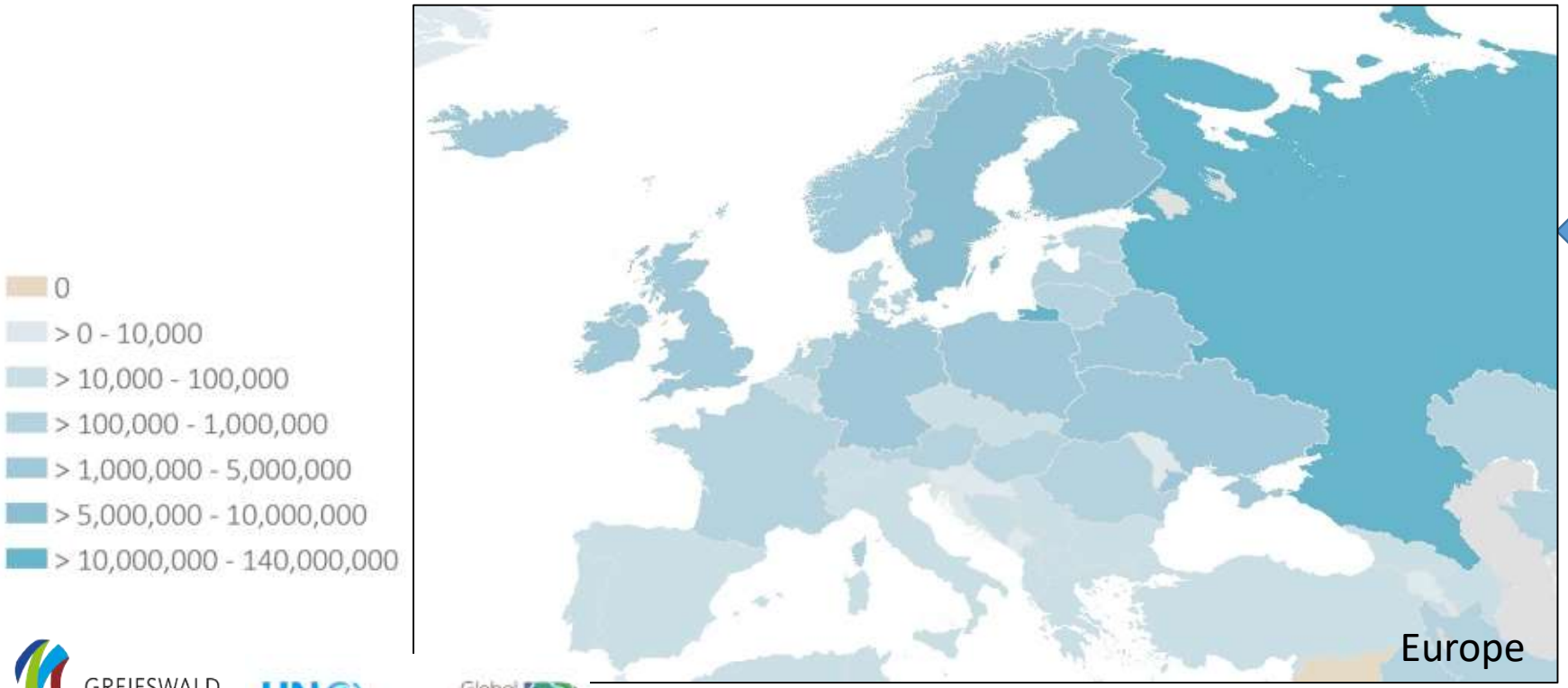
Thematic maps

peatland extent per country (ha)



continental and regional area statistics

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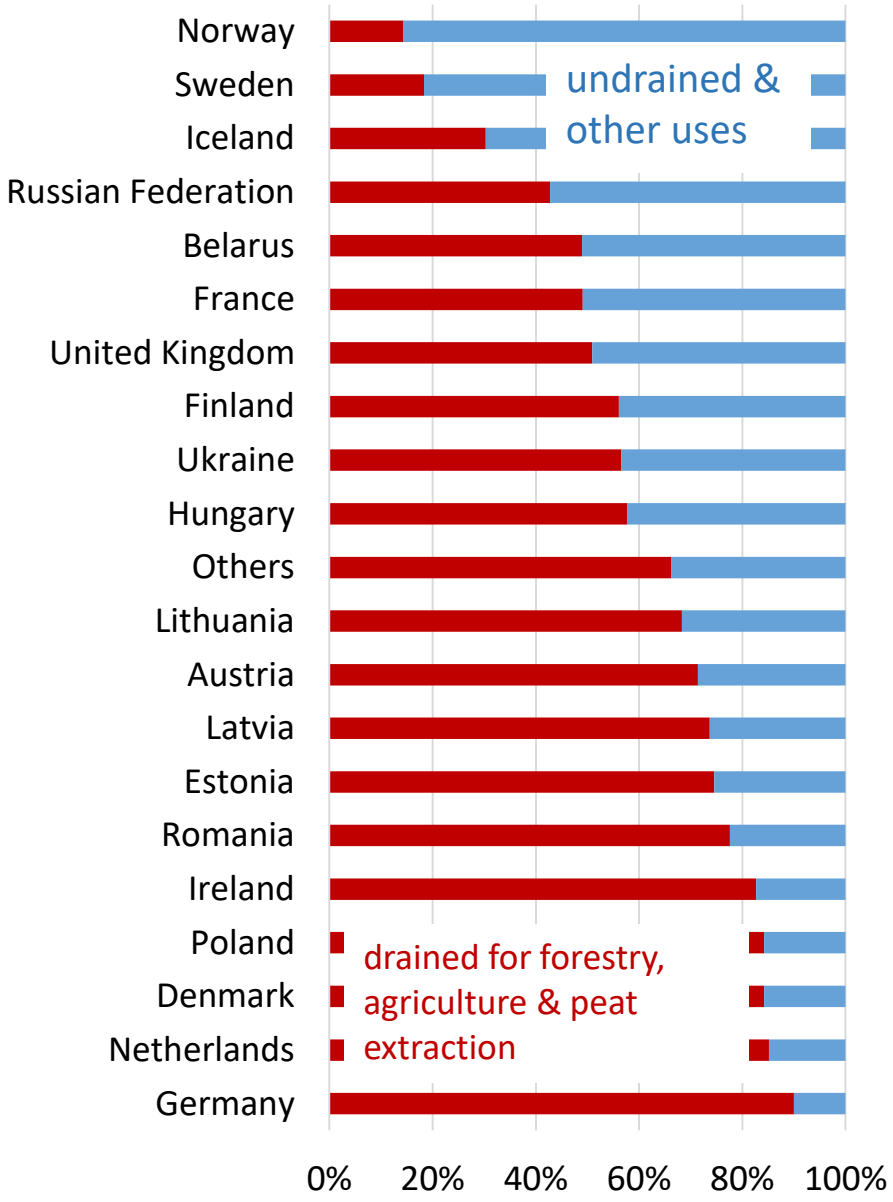
Statistics

drainage status of peatlands



continental and regional area statistics

+

land use data

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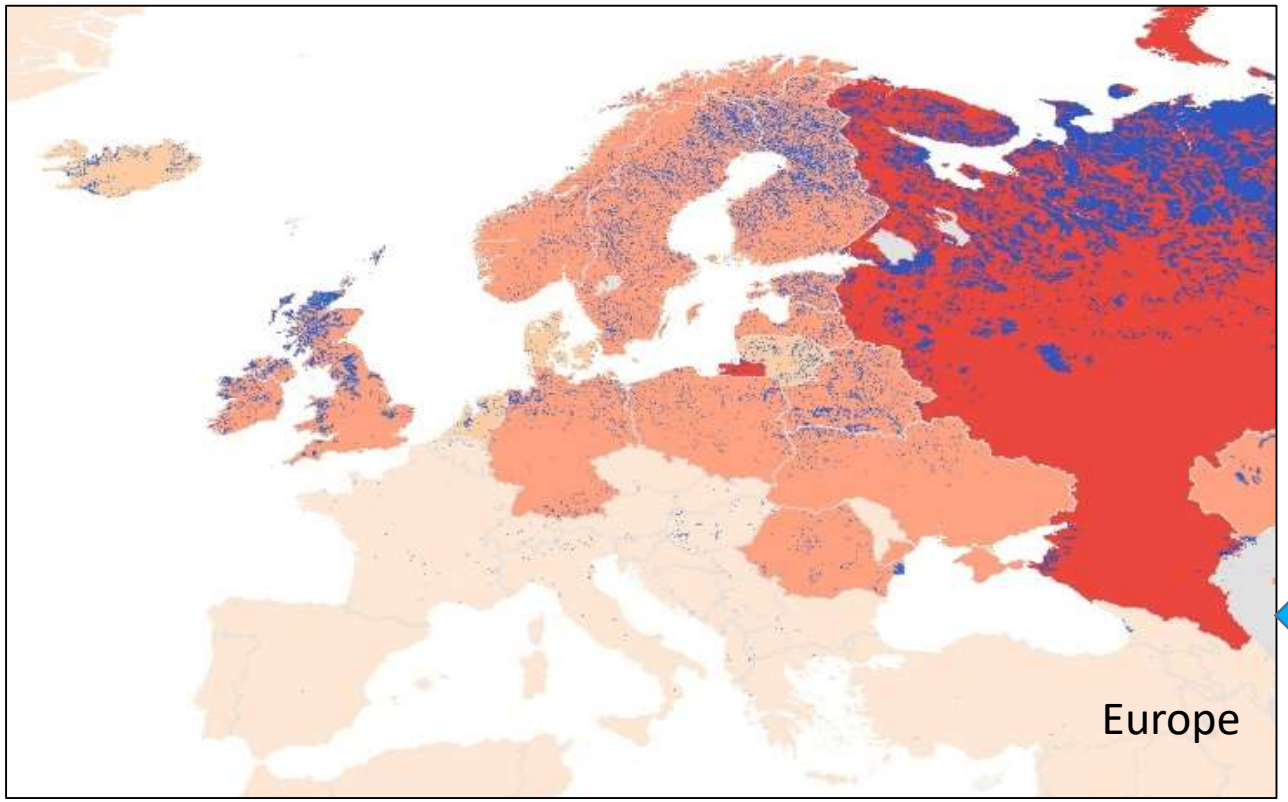
Thematic maps

GHG emissions from peatland per country (Mt CO_2 e / yr)



0
> 0 - 5
> 5 - 10
> 10 -50
> 50 - 100
> 100 - 300
> 300 - 668

peatland distribution

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continental and regional area statistics

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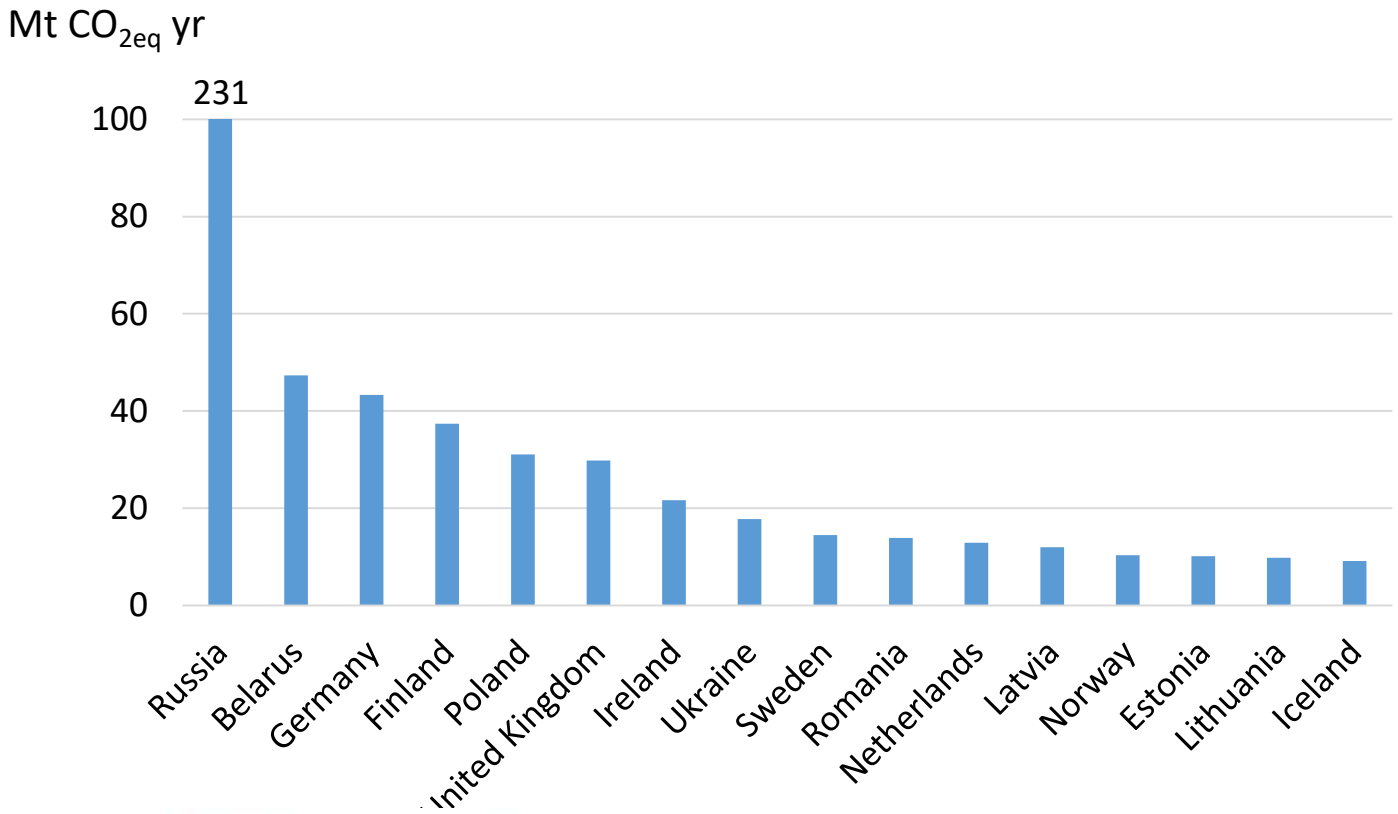
land use data and GHG EF's

2022 UNEP GPA

Statistics

GHG emissions from peatland per country (Mt CO_2 e / yr)



continental and regional area statistics

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land use data and GHG EF's

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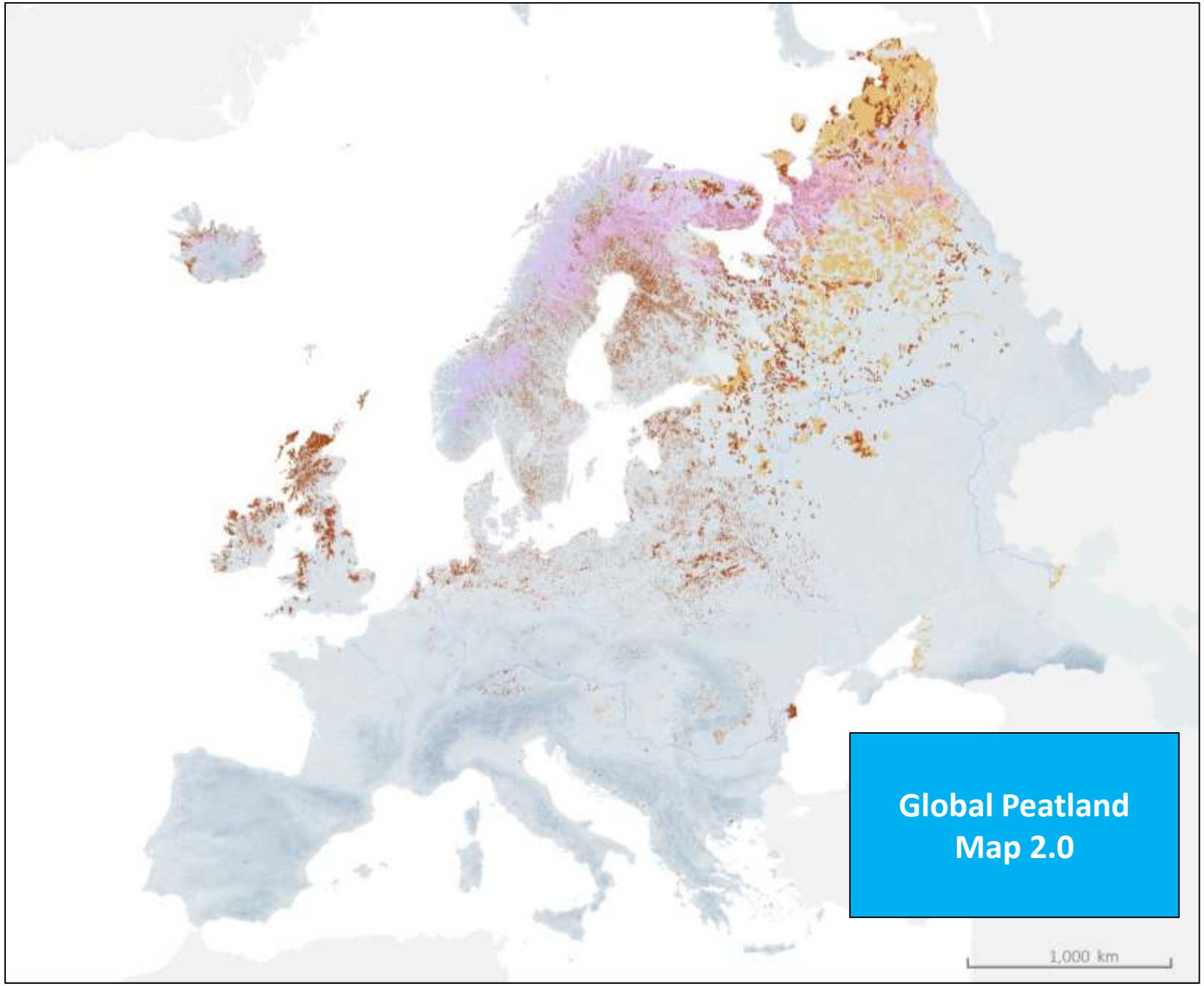

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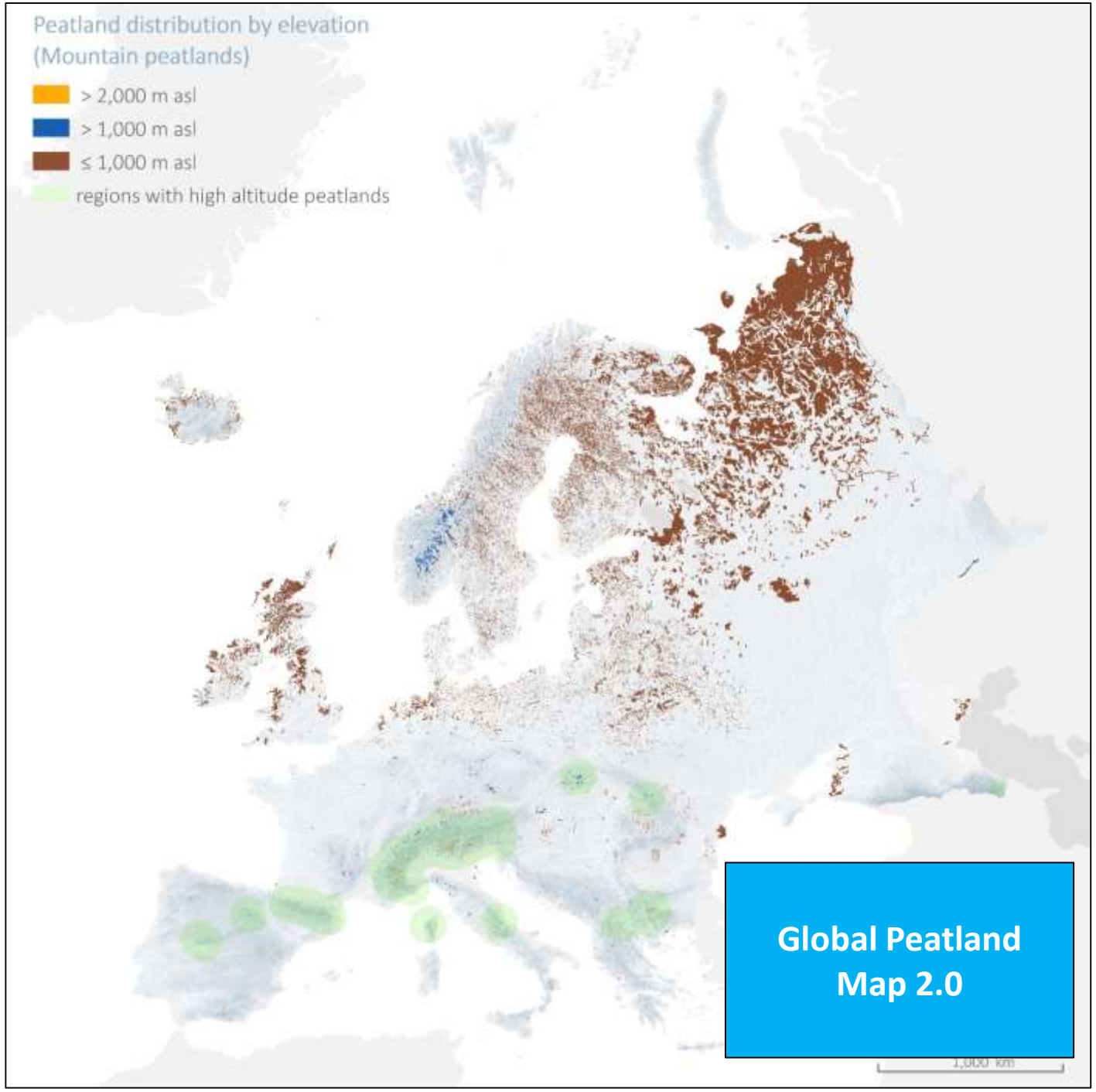
Thematic maps

altitude classification in GIS



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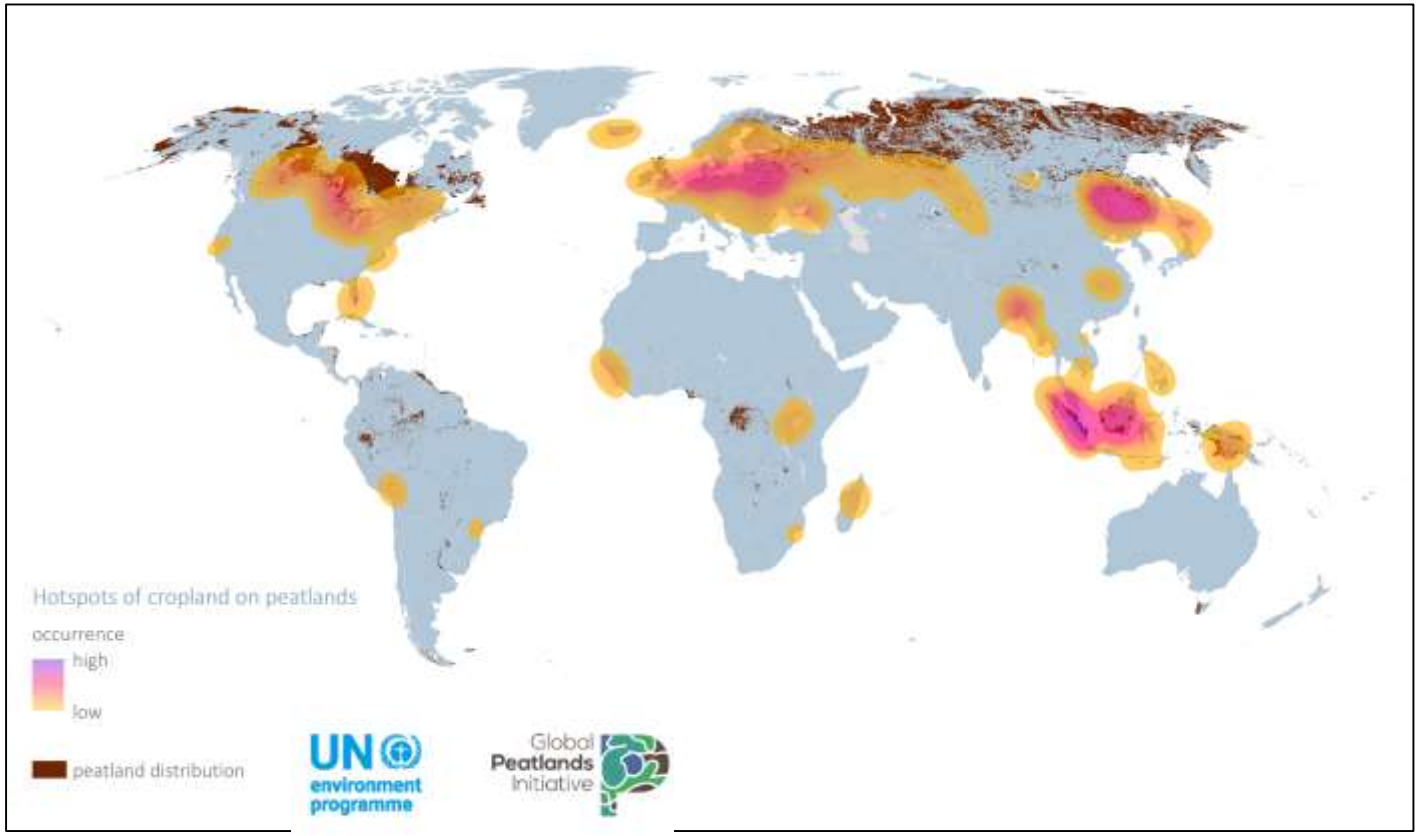
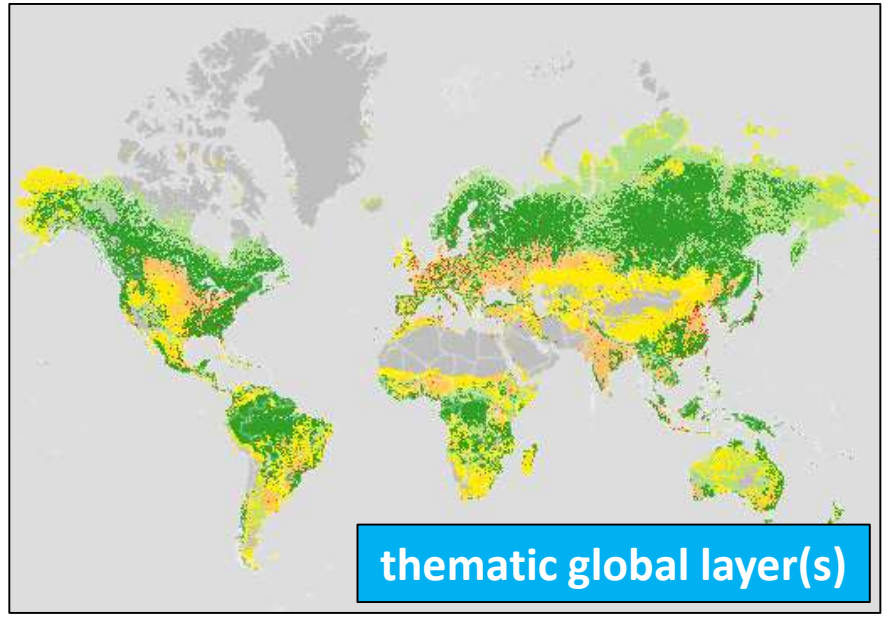
Thematic HOTSPOT maps

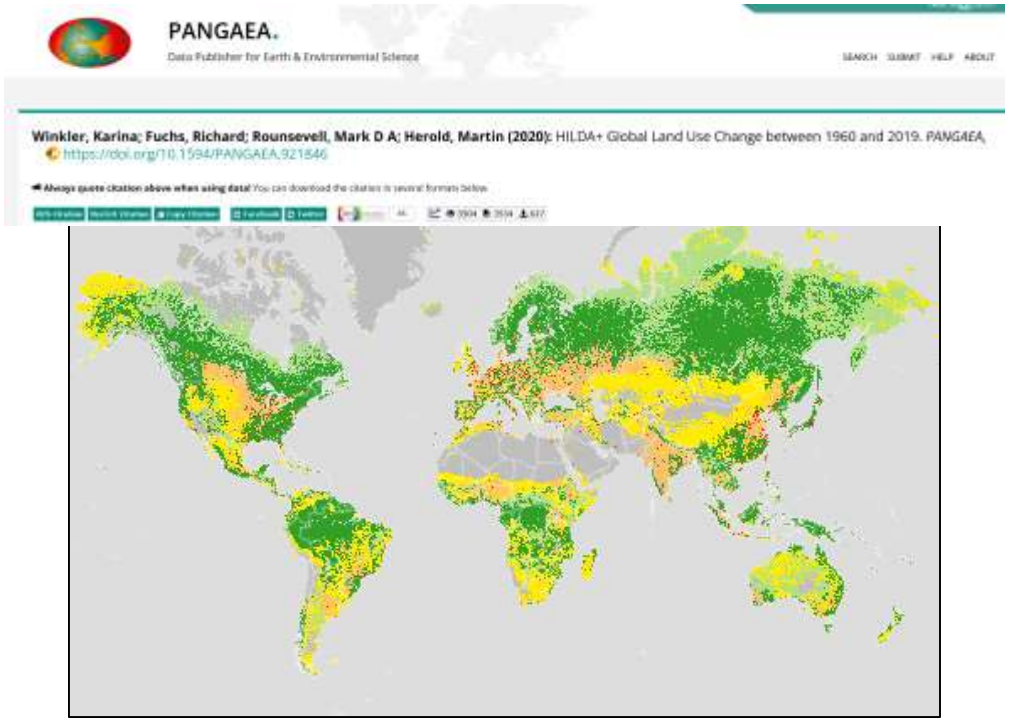
peatland related thematic hotspot maps



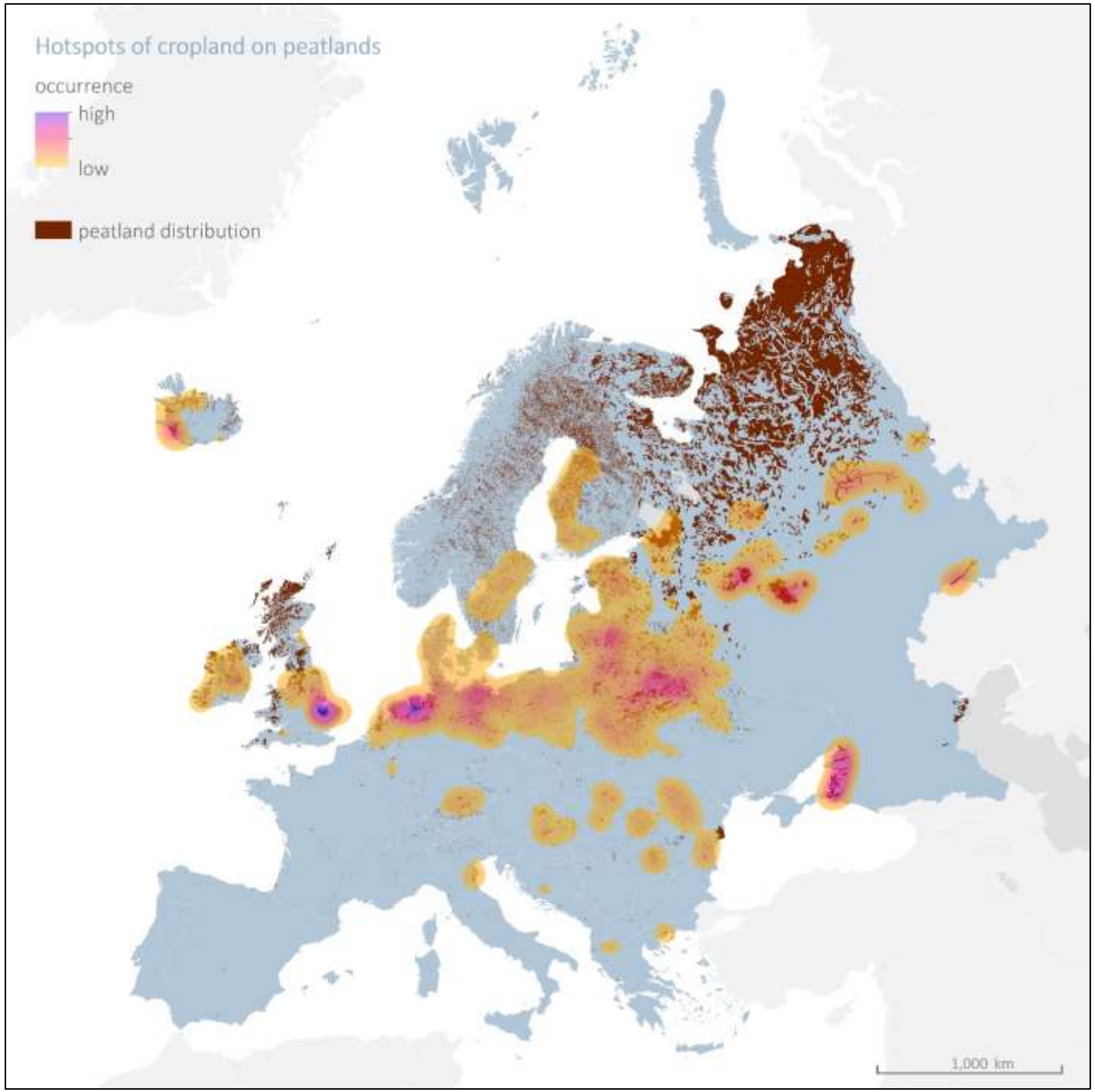


2022 UNEP GPA

Thematic HOTSPOT maps



Hilda+ dataset on LULC globally 1960-2019



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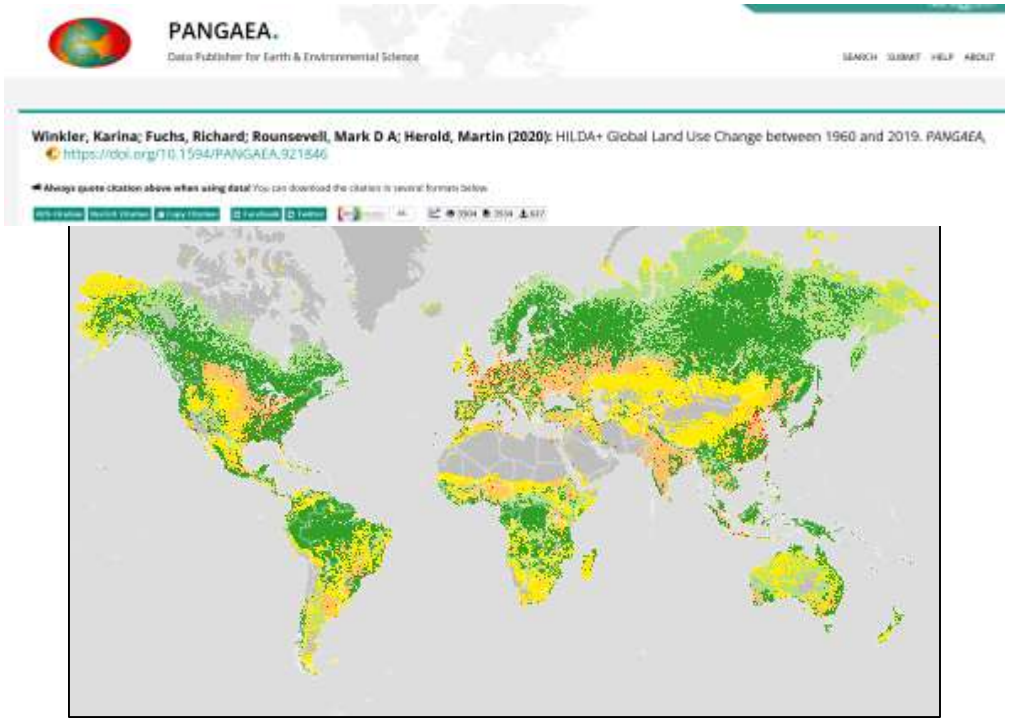
Thematic HOTSPOT maps



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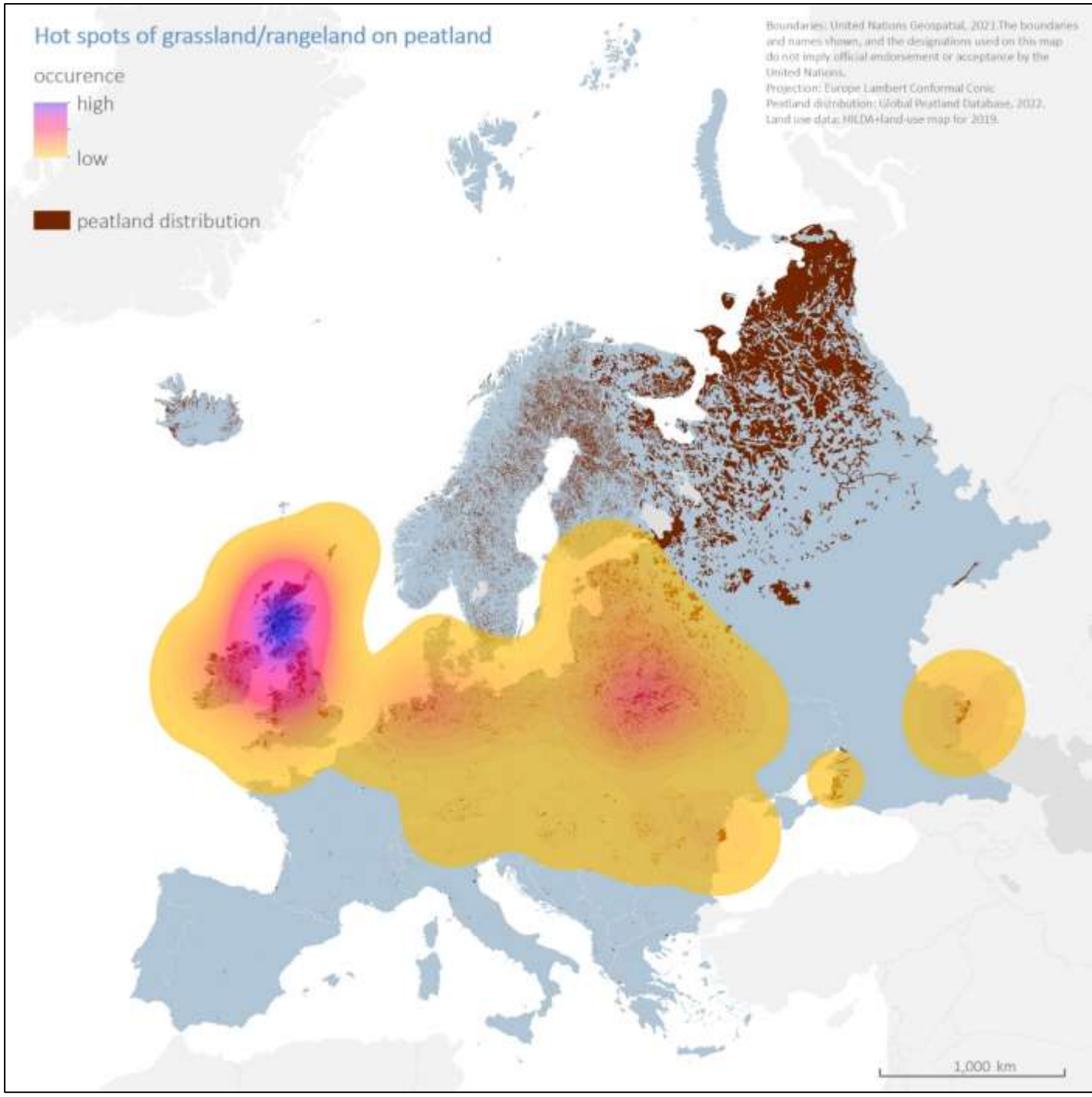

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2022 UNEP GPA

Thematic HOTSPOT maps

Many others have been prepared in the UNEP GPA process, e.g. for biodiversity, infrastructure, flooding, subsidence, permafrost…

Many have been revised in context of the upcoming Global Peatland Hotspot Atlas!

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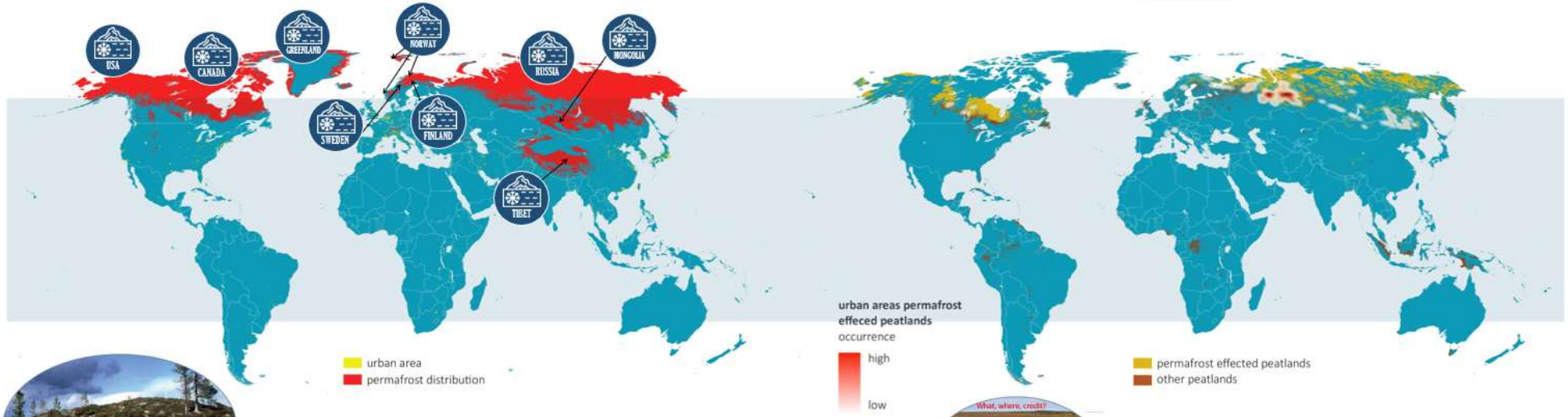
Hotspot Atlas

teaser

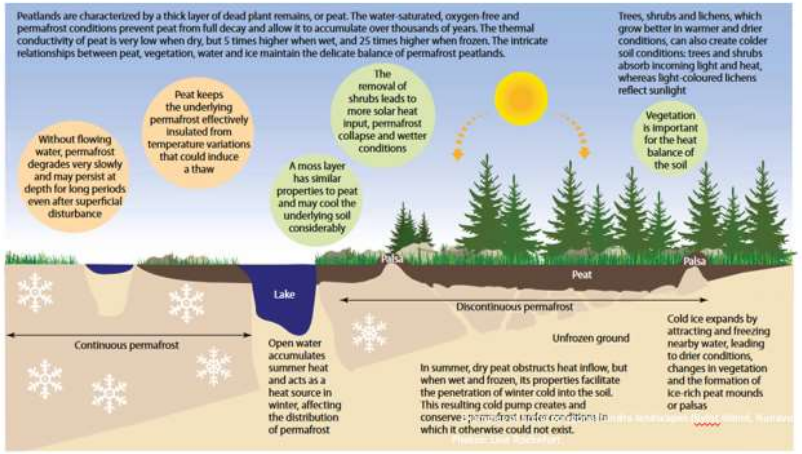
1.7. Peatlands and Permafrost

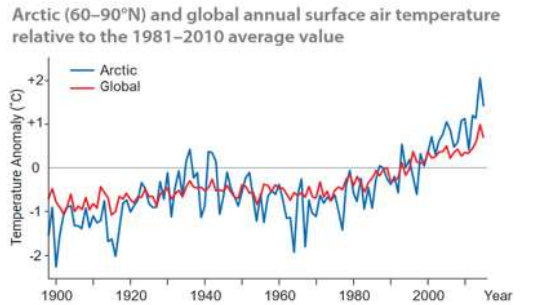
In polar/arctic and boreal regions, the dynamics and structure of peatlands are significantly influenced by permafrost conditions. These peatlands exist within the permafrost zones of several northern hemisphere countries and span over 1.4 million square kilometers with a peat layer thicker than 40 centimeters, and an even larger area has shallower peat. Additional, extensive permafrost peat deposits can also be found far outside the polar and sub-polar regions, for instance in Mongolia and on the Qinghai-Tibetan plateau, where mountain ranges prevent warm oceanic air from moving inland, and winter temperatures are very low. Hotspots of urban areas on permafrost peatlands occur in the Western Siberian lowland, and weaker on the Canadian shield, in Northeast China, and the East European Plain. Climate change and permafrost thawing probably will have a destabilising effect on the infrastructure there.



Permafrost and the role of peat, plants and water

The presence of a permanently cold climate with frost, natural thawing and freezing at the soil surface influences the hydrology, structure, peat formation and vegetation of peatlands. Peat formation here is on the one hand dependent on permafrost conditions, and on the other hand it also stabilises and favours permafrost conditions in the soil. The ice within the peat layer provides stability and prevents soil subsidence and erosion.





Source: Adapted from the Arctic Report Card 2018 of the US National Oceanic and Atmospheric Administration[11]

With global warming and the resulting rise in temperature, the permafrost in the soils and peatlands is increasingly thawing. This may lead to waterlogging, altered water flow patterns, drainage and eventually the decomposition of peat and the release of enormous amounts of greenhouse gases.

Sources: 1) Global Peatland Datatbase, 2022; 2) UNEP (2019). Frontiers 2018/19 Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi; Obu J., Westermann S., Kääb A., Bartsch A. (2018): Ground Temperature Map, 2000-2016, Northern Hemisphere Permafrost. Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven, PANGAEA, https://doi.org/10.1594/PANGAEA.888600.
4) Made with Natural Earth. Free vector and raster map data @; 5) naturalearthdata.com and using free files from www.freepik.com

Hotspot Atlas *teaser*

3.1. Global Peatland Drainage and Degradation

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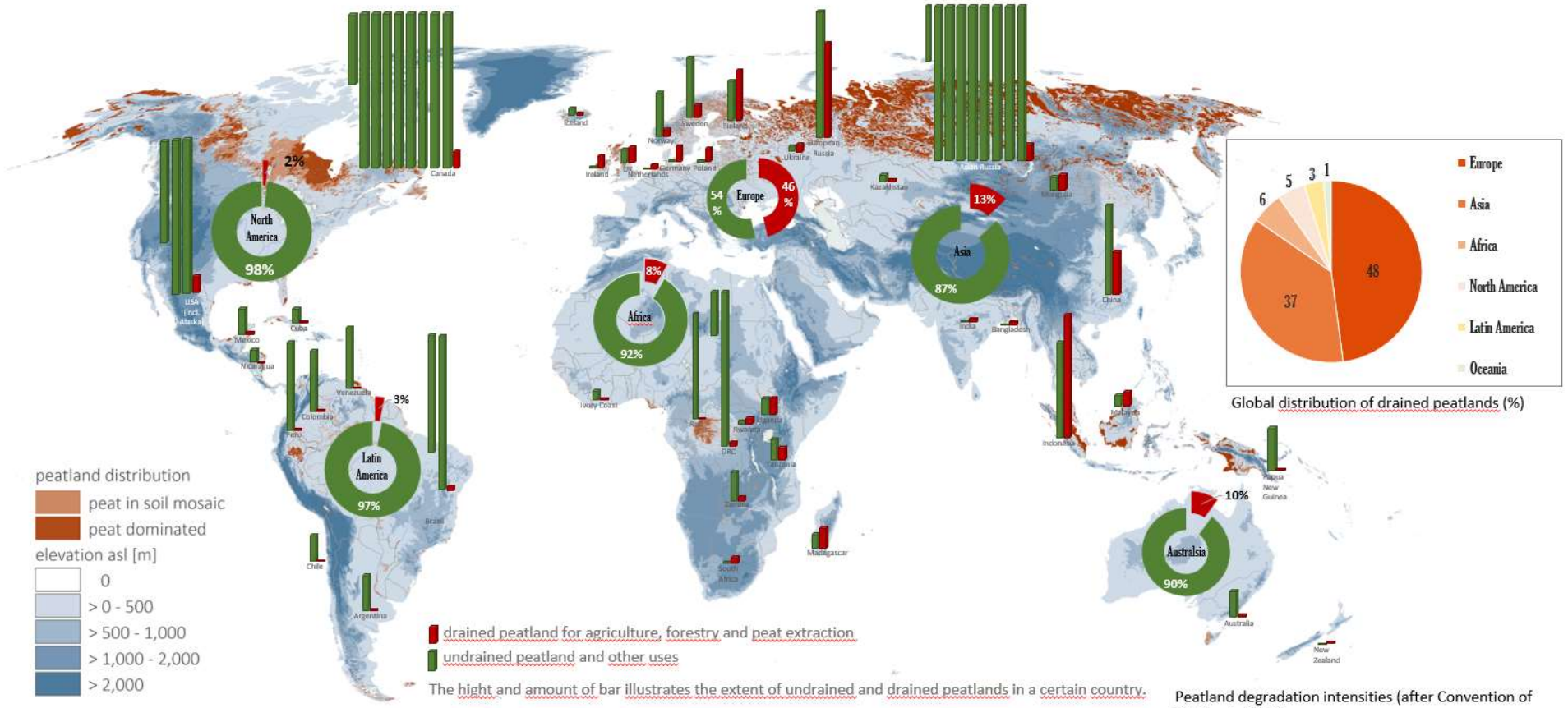
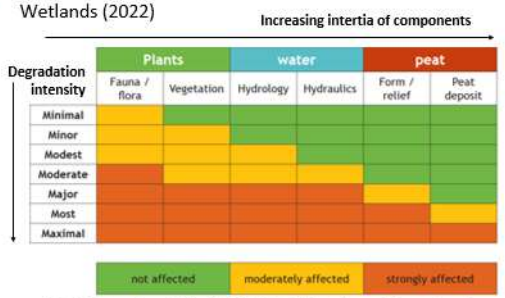


Global distribution of drained peatlands (%)

Artificial drainage of peatlands is the most common cause of peatland degradation. Peatland degradation can be described as the deterioration of functions and ecosystem services of living peatlands. In living peatlands, there are close functional relationships between plants, peat and water. When one of these components changes, the others also change, but at different rates: first the plants, then the water and later the peat itself. The table (right) shows different stages of peatland degradation that alters these peatland components with different inertia. When components with higher inertia are degraded (e.g. peat itself), restoration measures often need to be more sophisticated and labore intensive to be successful. For more information:
https://www.ramsar.org/sites/default/files/documents/library/rtr11_peatland_rewetting_restoration_e.pdf

Peatland degradation has its hotspots in Europe and Asia with 85% of damaged peatlands globally there under temperate and tropical climates – and in SE-Asia under tropical climate. The vast, untouched peatscapes of the boreal and arctic climates have survived to this day mainly because the harsh climate has not allowed for agriculture or forestry and many people settle there. And, future peatland mapping and condition assessment will probably reveal more degrading peatland in many countries, e.g. in South America, Africa, south-eastern Europe, central and northern Asia.

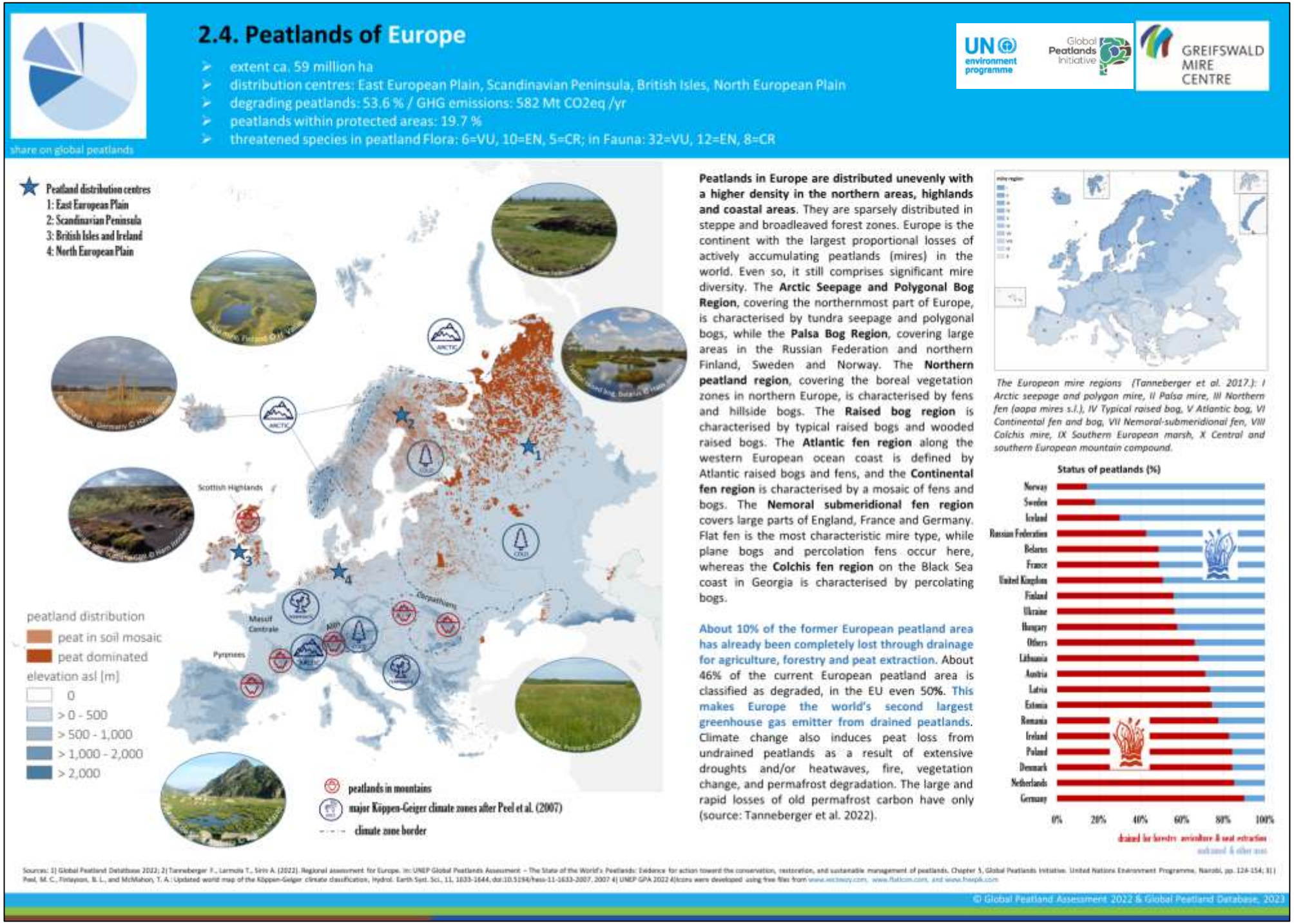
Peatland degradation intensities (after Convention of Wetlands (2022)



Sources: 1) Global Peatland Datatbase, 2022; 2) UNEP (2022). Global Peatlands Assessment – The State of the World's Peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Main Report. Global Peatlands Initiative. United Nations Environment Programme, Nairobi; 3) Convention on Wetlands. (2021). Global guidelines for peatland rewetting and restoration. Ramsar Technical Report No. 11. Gland, Switzerland: Secretariat of the Convention on Wetlands.

Hotspot Atlas

teaser



THANKS to the GPD-TEAM 2021

Thank you & looking forward to collaborate on European Peatlands!

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INTERNATIONALE KLIMASCHUTZINITIATIVE (IKI)

Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit

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