



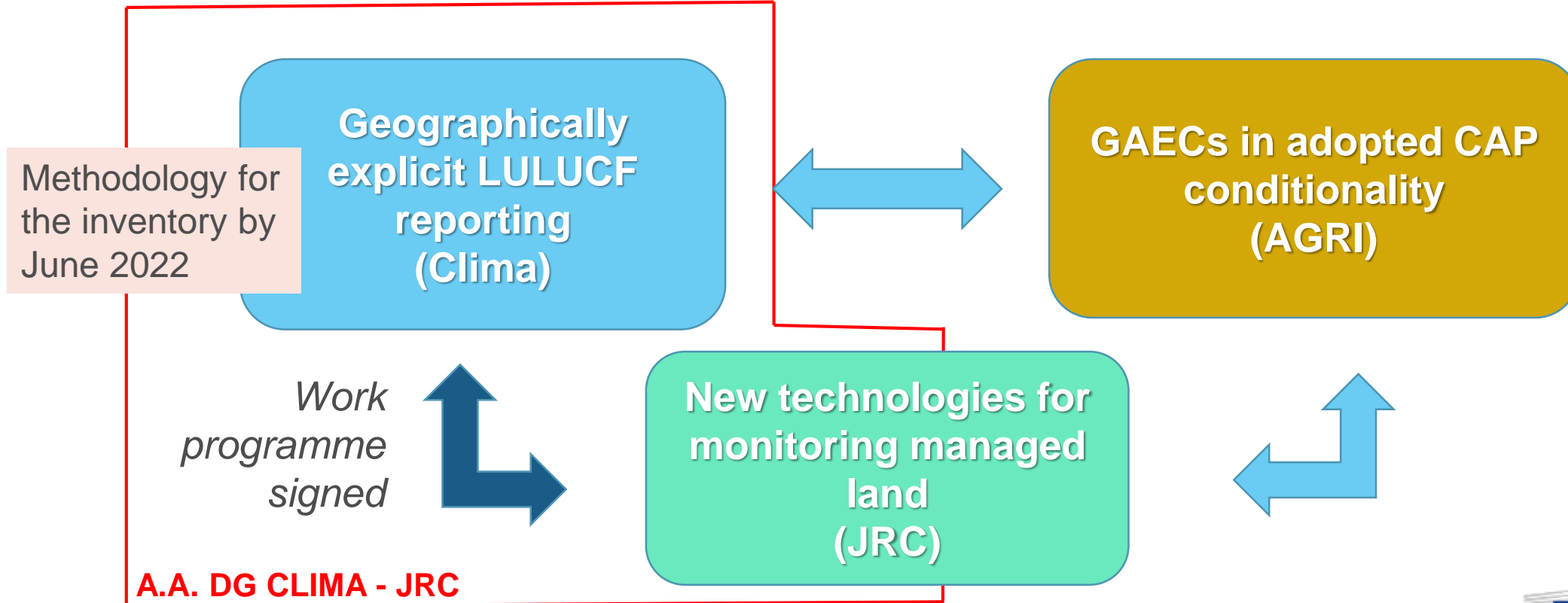
"Challenges and opportunities in improving peatland inventories: insights from the SEPLA project"

E. Lugato, P. Milenov, A. Sima, C. Puerta Pinero, V. Angileri, P. Loudjani, W. Devos
GTCAP Team, JRC D5 unit

LULUCF workshop 2022, Villa Borghi (VA)

The context of SEPLA project

“Ensure comprehensive inventory of wetlands and peatlands and address the monitoring of their preservation and restoration through the use of remote sensing and regularly updated geographically explicit datasets.”



Is the SEPLA project necessary?



GREIFSWALD
MIRE
CENTRE

ORGANIC SOILS IN NATIONAL
INVENTORY SUBMISSIONS
OF EU COUNTRIES

Martin, N. & Couwenberg, J.

Use data from 2020 submissions

- *Updated EF (2006 IPCC -> Wetland Supplement)*
- *Spatial data assessment (The peatland map of Europe)*

thereby ignore scientific advances. Within this study, we were able to show that consequent implementation of the IPCC Wetlands Supplement does not require a lot of effort, but increases EU wide emissions from agriculture on organic soils from 92.3 Mt to 166.7 Mt CO₂-equivalents per year. Roughly 40 Mt of increase are caused by corrections in the area assessment and the remainder 30 Mt are the result of updated emission factors and global warming potential.



Outdated datasets

Low stratification

Semantic problems

What is a wetlands?

Ecosystem that is flooded by water, either permanently or seasonally (Fresh, brackish, salt water)

Wetland



Accumulation of organic material (generally 30% OM in dw) different stage of decomposition (from fibric to sapric)



bog

- Ombrotrophic
- Acidic
- Mosses (sphagnum)

fen

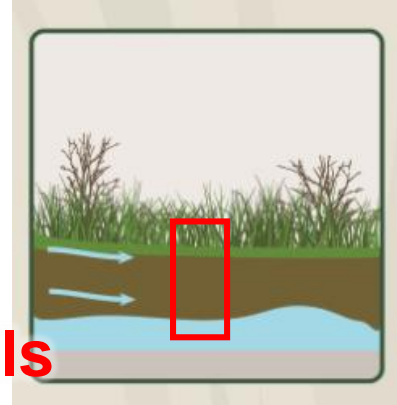
- Minerotrophic
- Less acidic
- Mosses, sedge



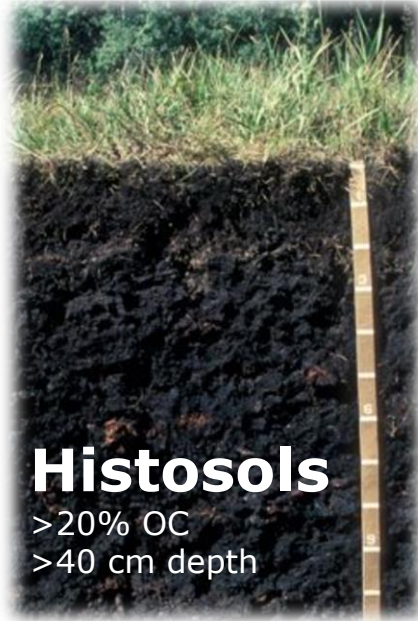
PEAT
ORGANIC-RICH



histosols



What is an organic soils?



What is an organic soil?



Is there a minimum depth?



Is an organic soil a peat?



Is a peat soil a wetland?

Methodological steps

Participatory approach with 4 MS in a development phase

DK, LV, BG, IE

Data Inventory

metadata review, lineage, product specifications, feature catalogue

Definitions and classifiers

semantic assessment, common vocabulary and meta-model

SEPLA year 1

Data integration

dichotomy, spatial analysis, processing flow, data quality

Peatland management

Land use categories, options, consequences, spatial context

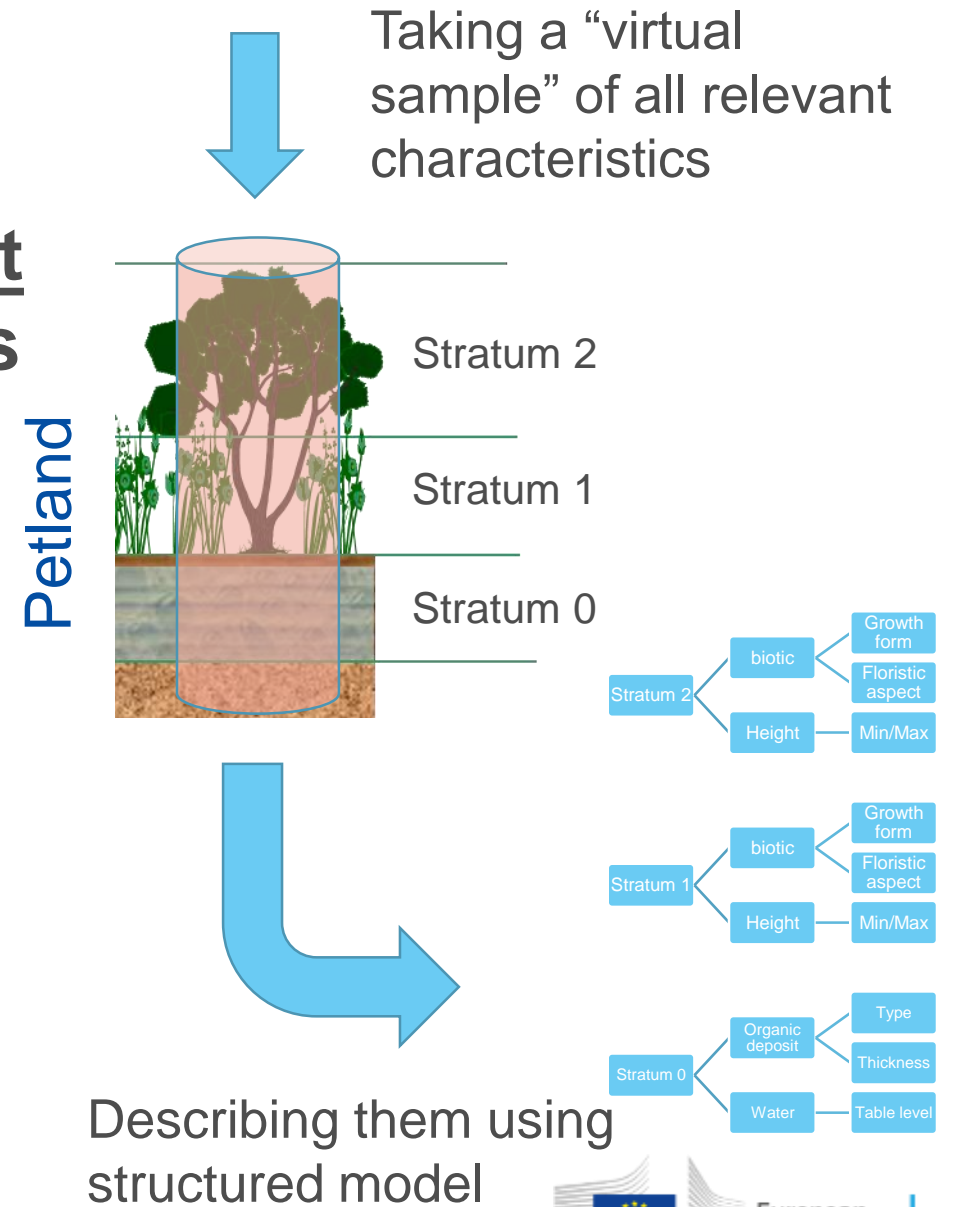
EO-based monitoring

observation methods, biophysical characteristics, Sentinel signals

Semantic Meta-Model

No common definition, but a common set of classifiers to describe local definitions

- Based on broadly accepted bio-physical characteristics
- Hierarchically structured by semantic logic
- From LCLCML, EAGLE, tegon and pedon
- Allowing the link between land cover and soil
- Retaining the relationship with land use



Documenting class definitions and attributes used in the national/regional dataset

SEPLA Template

Stratum 1	Vegetation	Growth form	Woody	Tree	
				Shrub	
				Leaf Phenology	Deciduous Evergreen
			Herbaceous	Graminoid	Reed
				Non-graminoid	
				Leaf Phenology	Annual Biennial Perennial
	Lichen and Mosses	Lichen Mosses			
	Floristic aspect	Group of Plants			
		Single Plant			
		Species name			
	Height	Max			
		Min			
Fixed					
Presence	Exclusive				
	Precluded				
	Optional				
Vertical Stratum 0	Organic Deposit	Type	Litter (O horizon - Folc)	Decomposition	Undecomposed Partially decomposed Fully decomposed
			Peat (H horizon - Histic)	Decomposition	Undecomposed Partially decomposed Fully decomposed
		Position	On surface		
			Buried		
		Thickness			
		Acidity	Less acidic Acidic		
	Organic carbon content				
	Water	Salinity	Fresh		
			Brackish		
			Saline		
		Water Table level	Brine		
			Max Min		
Periodic Variations		Atmospheric			
	Daily Tidal				
Persistent Period	Seasonal				
	Start month End month				
Hydrological connectivity	Impact on water level				
	No impact on water level				
Soil Horizon	A				
	B				
	C				
	R				

Corine Land Cover (CLC) class 4.1

4.1 Inland wetlands

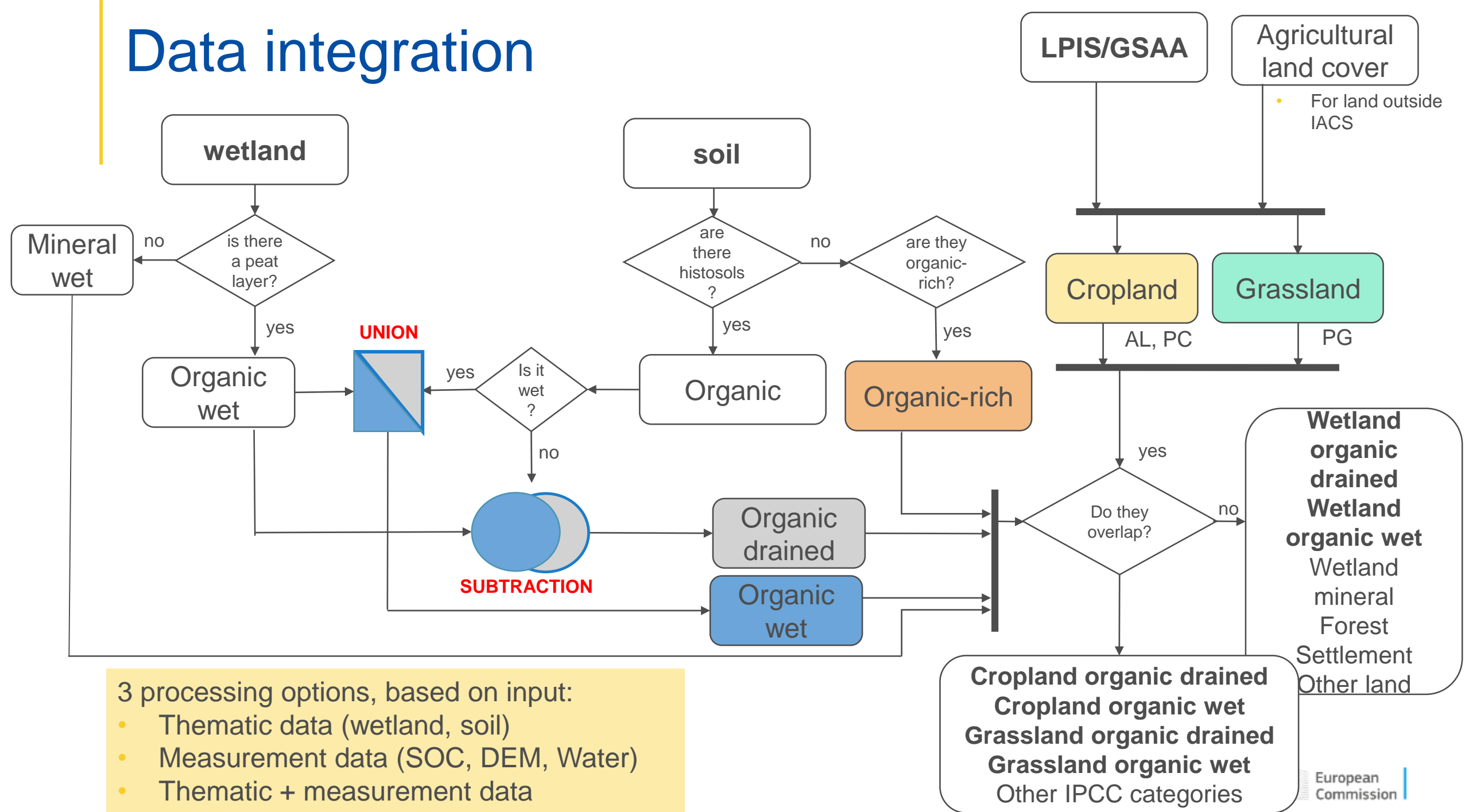
Areas flooded or liable to flooding during the great part of the year by fresh, brackish or standing water with specific vegetation coverage made of low shrub, semi-ligneous or herbaceous species. includes water-fringe vegetation of lakes, rivers, and brooks and of fens and eutrophic marshes, vegetation of transition mires and quaking bogs and springs, highly oligotrophic and strongly acidic communities composed mainly of sphagnum growing on peat and deriving moistures of raised bogs and blanket bogs.

Collecting qualitative information

Corine Land Cove (CLC) 4.1 "passport" L1

Stratum 1	Vegetation	Growth form	Woody	Tree	
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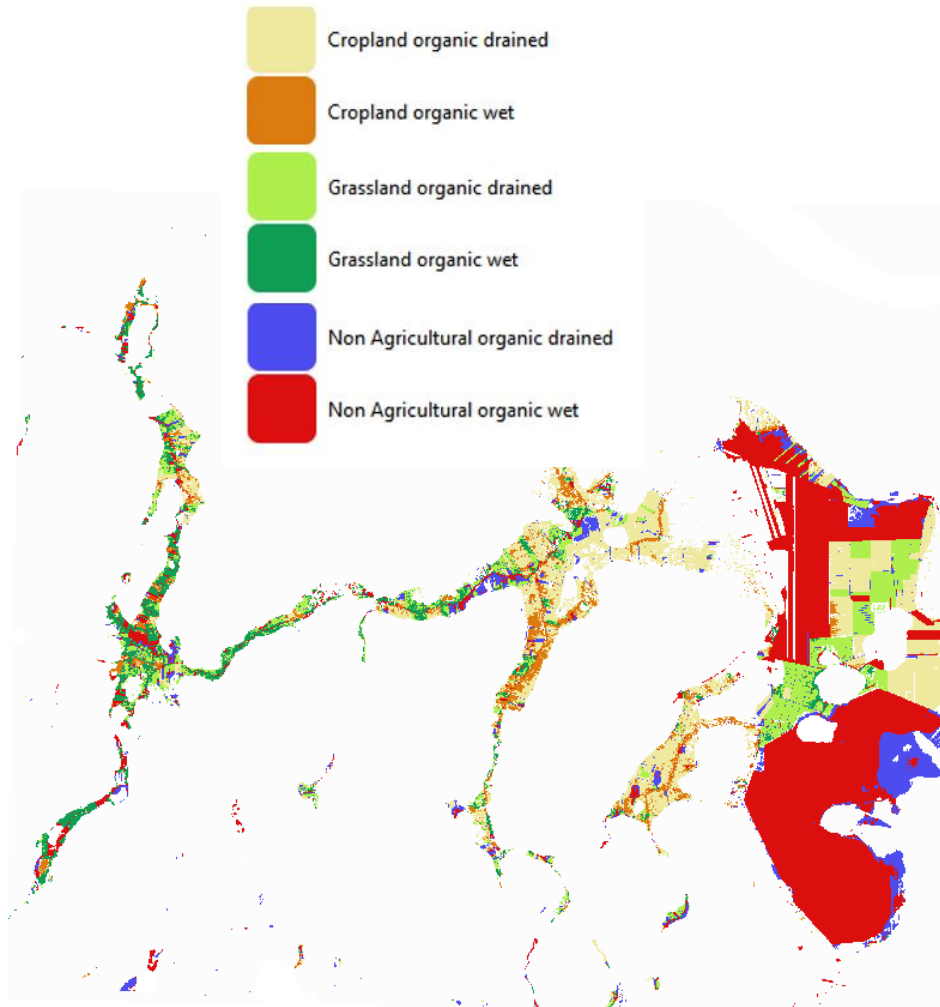
Data integration



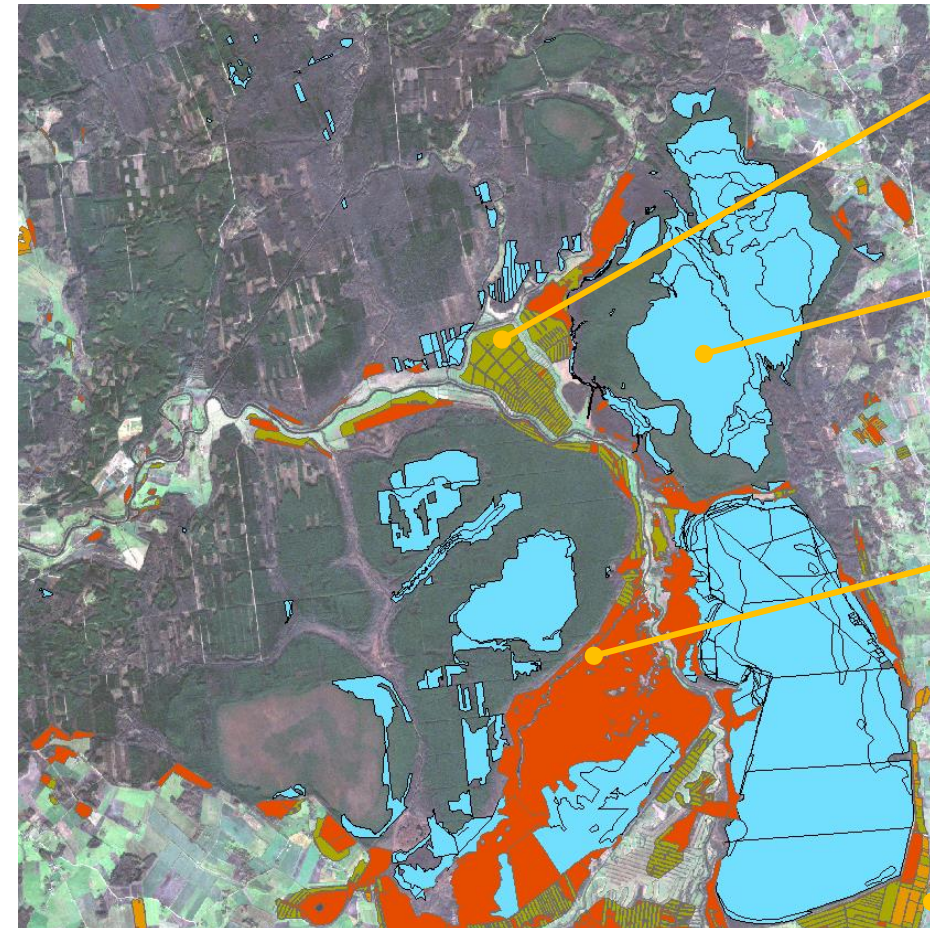
- 3 processing options, based on input:
- Thematic data (wetland, soil)
 - Measurement data (SOC, DEM, Water)
 - Thematic + measurement data

"IPCC wetland" sub-categories for GHG reporting

Test site 1



Test site 2



Organic Drained
grassland

Organic Wet
peatland

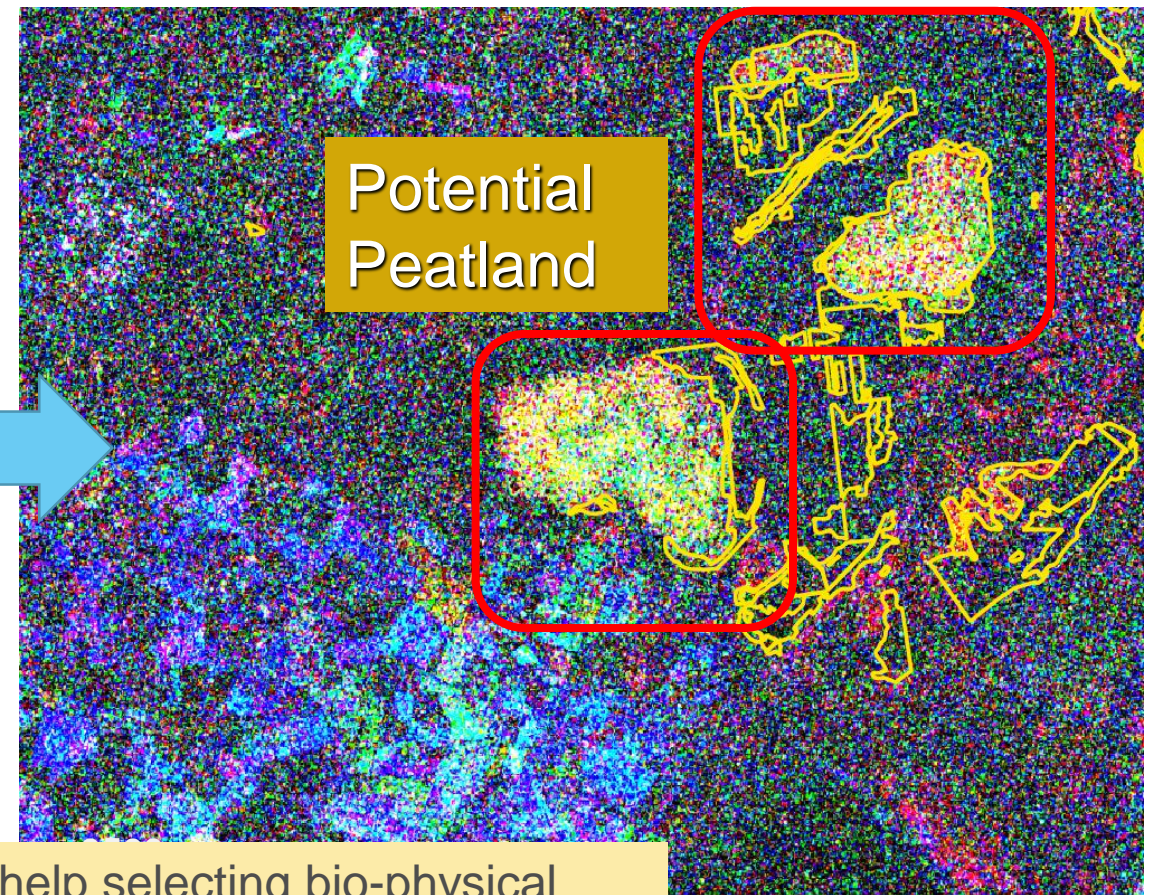
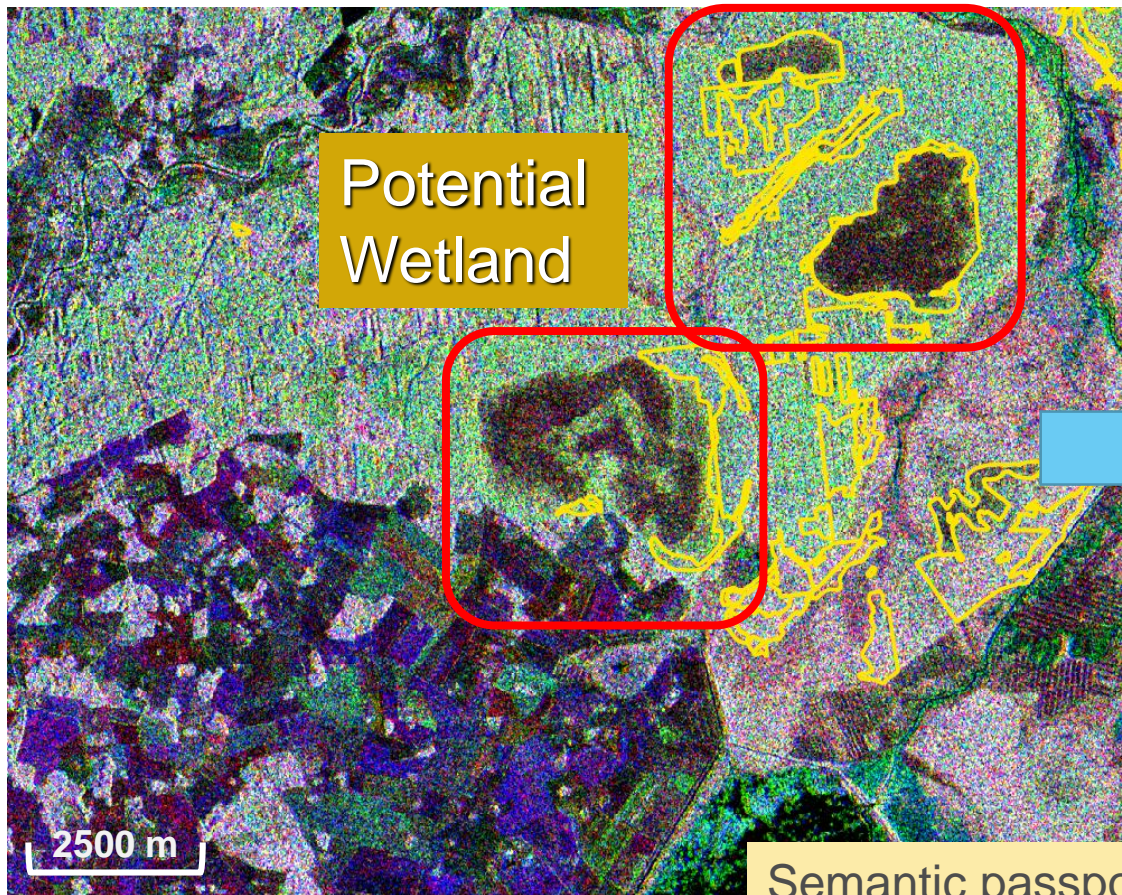
Organic Drained
non-agriculture

Organic Drained
cropland

Complementary role of Copernicus Sentinels

S1 backscatter
(3 CARD dates composite)

S1 coherence
(3 CARD dates composite)



Semantic passports help selecting bio-physical characteristics for EO monitoring

SEPLA insights after 1 year...

Challenges

- Variety of non-harmonized data
- Specific local context
- Lack on integration among “expert communities”

Opportunities

- Participatory approach and knowledge sharing
- Clarification of concepts, semantic analysis
- Harmonization of methods and ease management of these areas
- Alleviate the apparent complexity

Thank you



Natura 2000 code **ES6110001**



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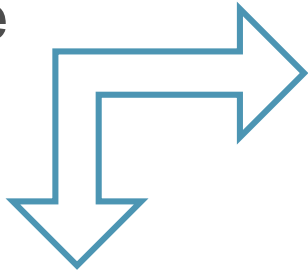
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Expert Engagement

Exchanging knowledge



SEPLA Team JRC

Development



EU MS

DK

LV

BG

IE

Research&Development

DESIRE

Terrain AI

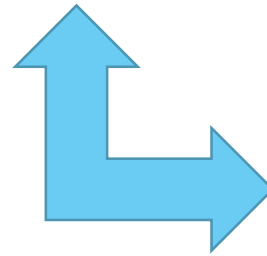
DG
Clima

Greifswald

COP4N2K

DG ENV

Testing



EU MS

AT

SI

CZ

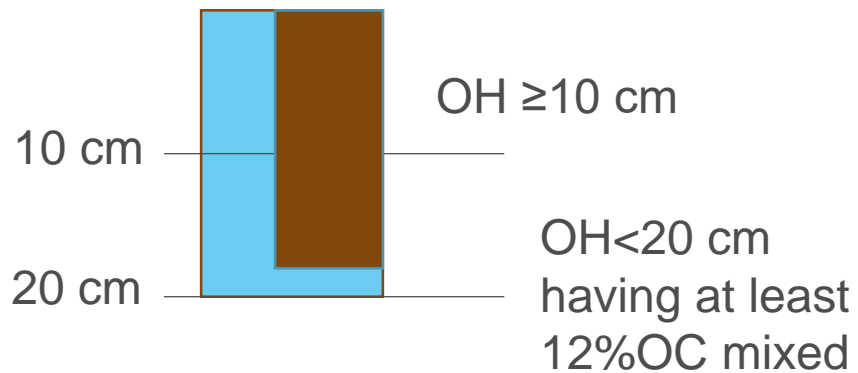
PT

SE

FI

SK

How thick should the peat layer be?

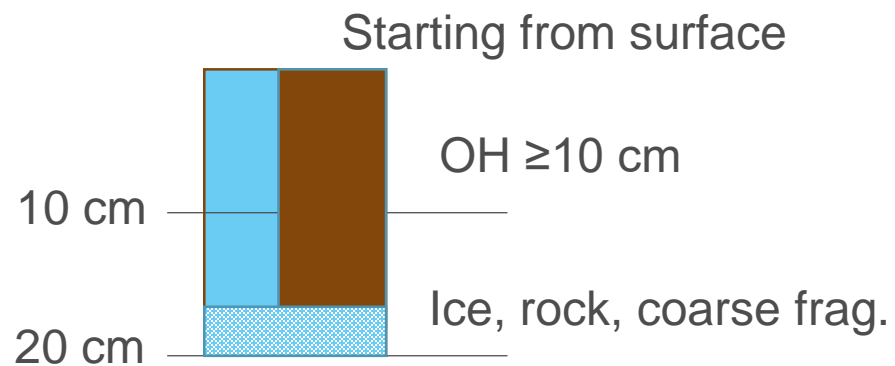


IPCC definition

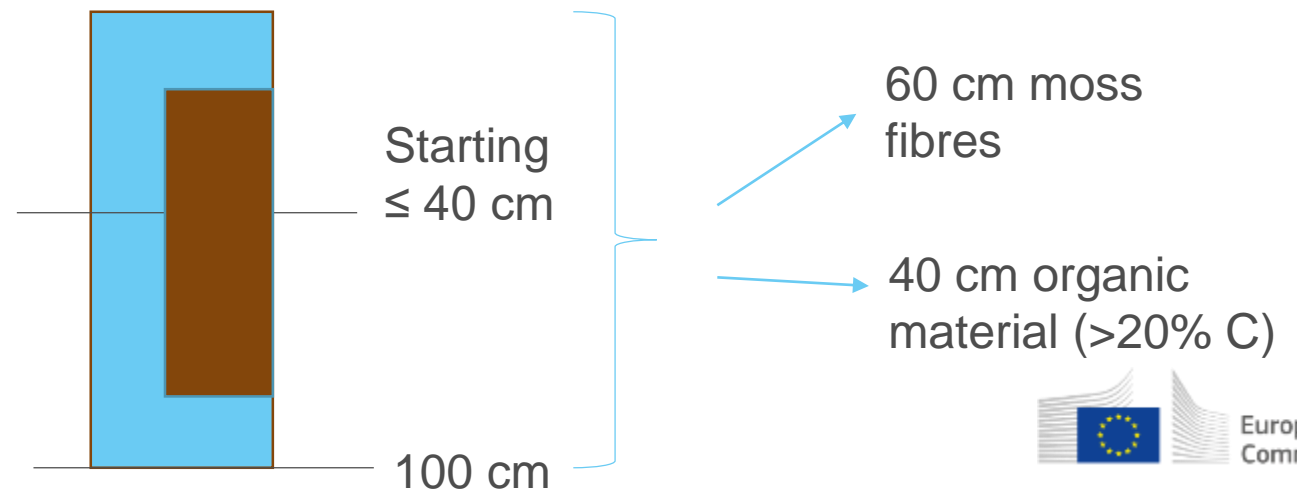
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- Not-saturated having 20% SOC
- Saturated having 12 to 18% SOC depending on clay (0-60%)

Soil having organic material (>20% C)

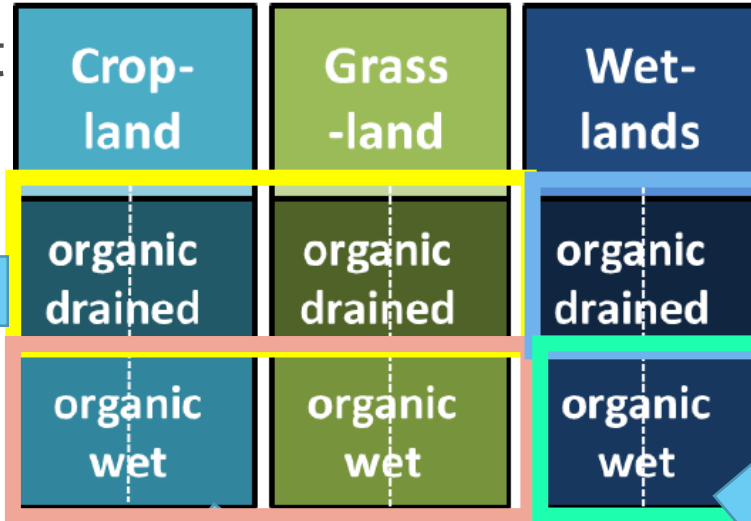


FAO Histosols



How could IPCC help GAEC2?

Unsustainable management
(conventional)



Peatland for
restoration



Sustainable management
(non-conventional)



Peatland for
protection

