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GLOBAL SYMPOSIUM ON SOIL INFORMATION AND DATA

MEASURE
MONITOR
MANAGE

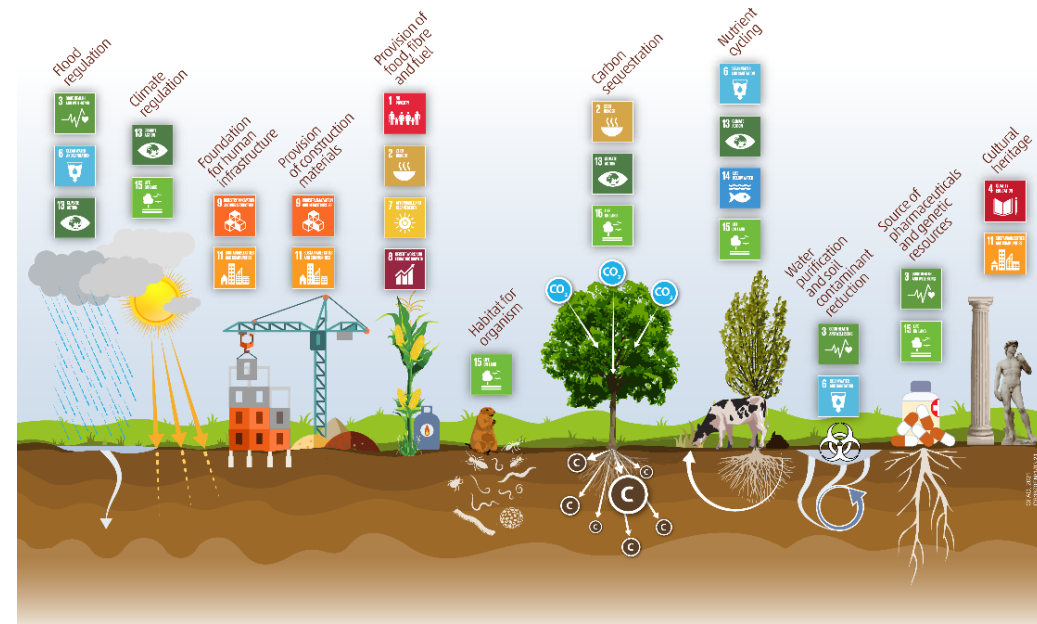
National soil data in EU countries, where do we stand?

Sophie Cornu, Saskia Keesstra, Antonio Bispo, Maria Fantappiè, Fenny van Egmond, Bozena Smreczak, Rafal Wawer, Lenka Pavlů, Jaroslava Sobocká, Zsófia Bakacsi, Kinga Farkas-Iványi, Sándor Molnár, Anders Bjørn Møller, Sevinc Madenoglu, Dalia Feiziene, Katrien Oorts, Florian Schneider, Maria da Conceição Gonçalves, Raquel Mano, Gina Garland, Rastislav Skalský, Lilian O'Sullivan, Raimonds Kasparinskis, Claire Chenu

Introduction

- Soil is **crucial** for our lives !
- Several **policies are being implemented** (e.g. SML in EU)
- **Need for data to**
 - implement those policies
 - adapt management to soil type
 - control their success
 -
- How are we with soil data in EU ?

Healthy soils a prerequisite to achieve the SDGs



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GLOBAL SOIL
PARTNERSHIP



SUSTAINABLE
DEVELOPMENT
GOALS



EJP SOIL: A European Joint research Programme

“Towards climate-smart and sustainable management of agricultural soils”

- **Co-fund action:** coordinated research and innovation programme EU & countries
- **Critical Mass:** 24 countries, 26 partners, > 1 000 scientists
- **Public-public funding:** 50% EC – 50% institutes, 80M€
- **Annual Programming:** 2020-2025
- **Wide range of activities**



Method

- Different **surveys** were launch across EJP SOIL countries to identify the national and regional soil databases (for agricultural land use)
- Questions were divided in **three sections**:
 - (1) the data source;
 - (2) information about the data (e.g. availability, spatial and temporal resolution, sampling strategy, format); and
 - (3) the list of soil parameters included in the datasets and the methods used to measure them.
- Data were collected using structured Microsoft Excel forms (see <https://zenodo.org/record/7956364>)

Results

A total of **170 datasets** were collected and included in the analysis

Responses from countries were grouped into **4 geographical zones**



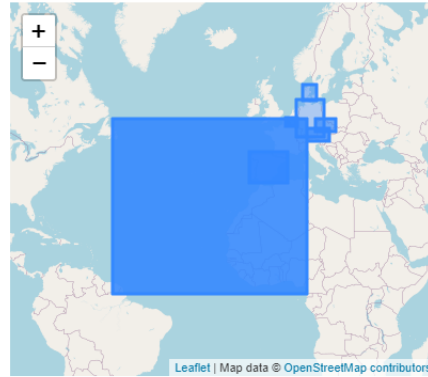
- Soil parameters were grouped into **5 groups**:
 - **Main soil characteristics according to Global Soil Map specifications:** profile depth and depth for plants; SOC, particle size distribution; coarse fragments; pH (H₂O), CEC; bulk density (with gravel and of fine earth fraction), AWC
 - **Other chemical parameters:** pH (KCl), EC, CaCO₃, SOC stock, organic matter quality, base saturation, salinity; macroµ-nutrients, potentially toxic elements, organic pollutants (OCPs; PAHs; PCBs);
 - **Other physical parameters:** porosity, water field capacity, wilting point, infiltration, soil resistance to penetration, soil structure stability, saturated hydraulic conductivity
 - **Other soil characteristics:** soil type, clay mineralogy, NIR/MIR analysis
 - **Biological parameters:** biological activity (soil respiration or enzymes), microbial biomass, abundance of specific groups of organisms (earthworms, nematodes).

Information available in the EJP SOIL Catalogue



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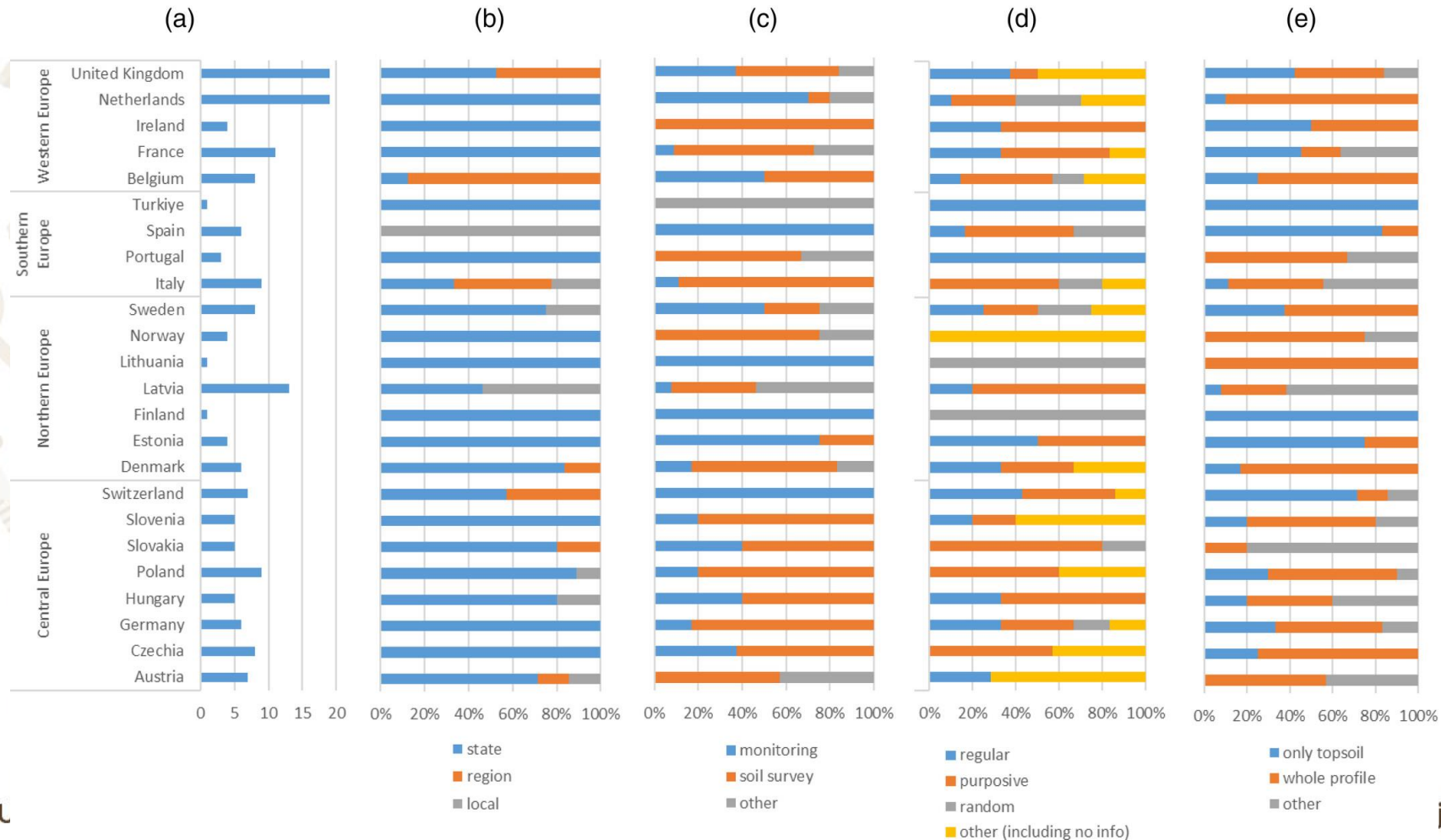
Country

- > [Austria](#)
- > [Belgium](#)
- > [Bulgaria](#)
- > [Czech Republic](#)
- > [Denmark](#)
- > [Estonia](#)
- > [Europe](#)
- > [France](#)
- > [Germany](#)
- > [Greece](#)
- > [Hungary](#)
- > [Ireland](#)
- > [Italy](#)

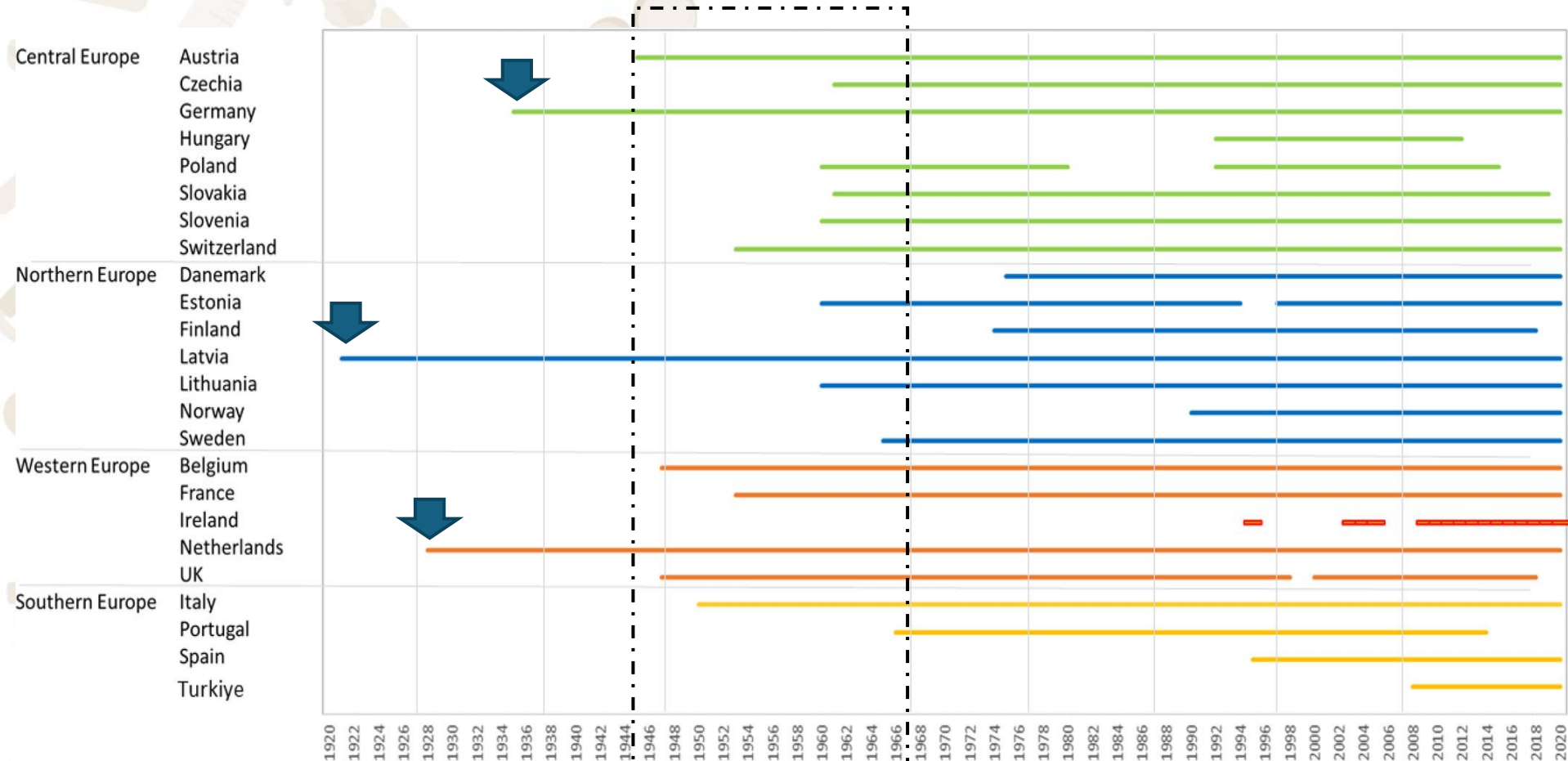
Title	Type	Date
AGES - farm data & long term research sites research sites, till 0.9 m (for Nmin); farmers, top soil (arable land); top and sub-soil (vine yards) at AGES research sites, data is collected after a certain time span (e.g. investigating fertilization measures); farm data, farmers may send soil.....	dataset	2024/03/06
BAW - specialized project data & long term research sampling intervals, depending on the project; sampling depth, single sampling sites till 1m, at monitoring sites till 1.5m or 2m depth frequency of data collection, single survey and monitoring, both is done depending on the individual project requirements;...	dataset	2024/03/06
IfÖL - long term research site top soil and sub soil; most parameters measured only till 30 cm depth; mineral nitrogen measured till 90 cm depth; continuous soil water measured in 10, 20, 30 and 50 cm; 0-30cm, 30-60cm, 60-90cm; sampling strategies applied; regular, random, purposive;...	dataset	2024/03/06
eBOD - Digital Soil Map of Austria depth of sampling, depends on number, depth and thickness of genetic horizons and soil depth, generally 1 m...	dataset	2024/03/15
Gevoeligheid voor grondverschuivingen De gevoeligheidskaart voor grondverschuivingen geeft een eerste indicatie van de gevoeligheid voor grondverschuivingen op zeer lokaal niveau in een studiegebied gelegen ten westen van Brussel, in het zuiden van de provincies West-Vlaanderen,.....	dataset	2024/03/15
BORIS - Soil Information System top soil/sub soil/whole profile..all is done, depending on the campaign and needed methods; Beside the soil surveys in Austria in some areas permanent observation plots are measured every 10 or 15 years (soil inventory); depth intervals, fixed soil.....	dataset	2024/03/06
Invekos - Agricultural Data	dataset	2024/03/06

<https://catalogue.ejpsoil.eu/collections/metadata:main>

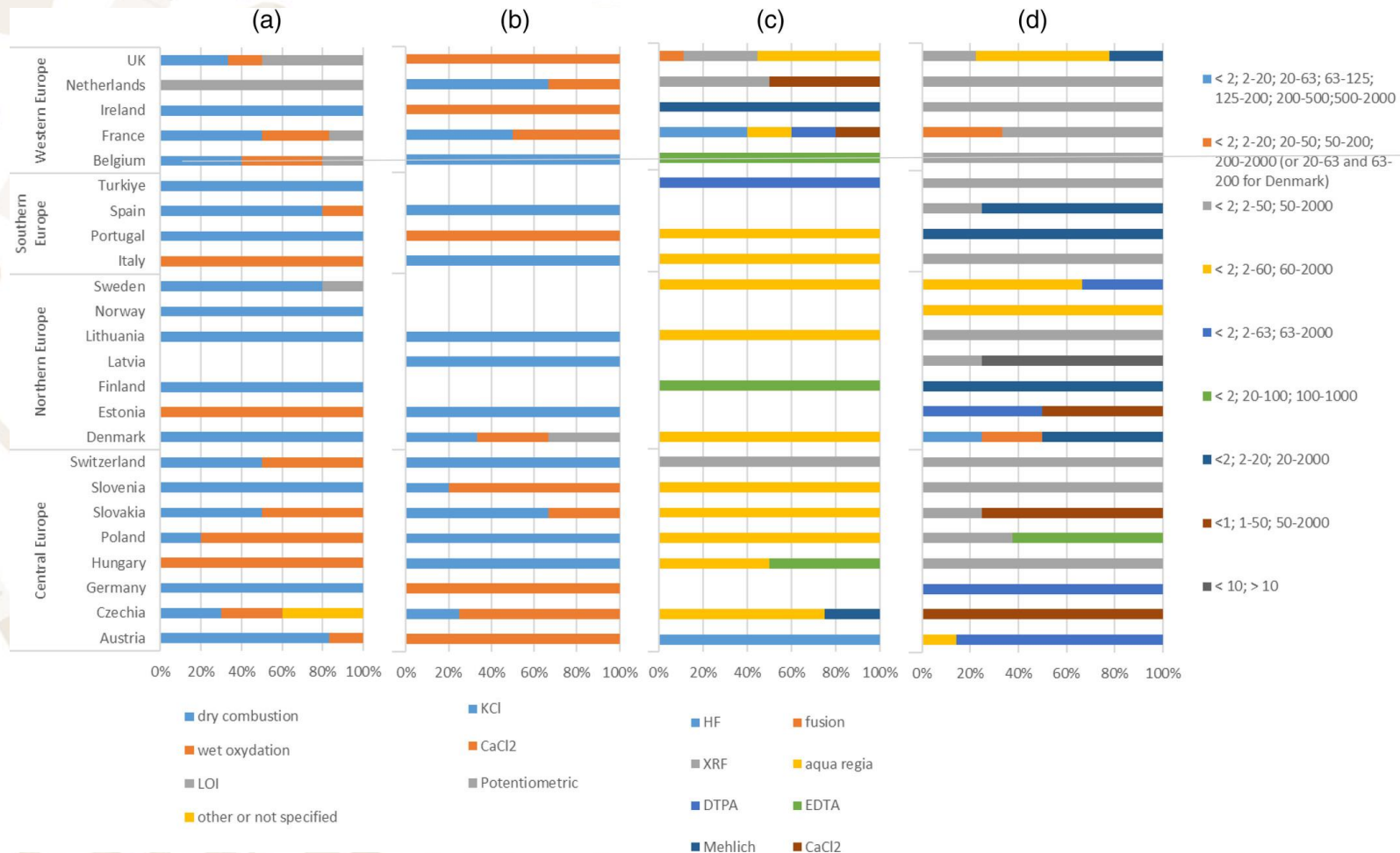
Main characteristics of the soil databases identified



History of soil data acquisition in the different surveyed countries



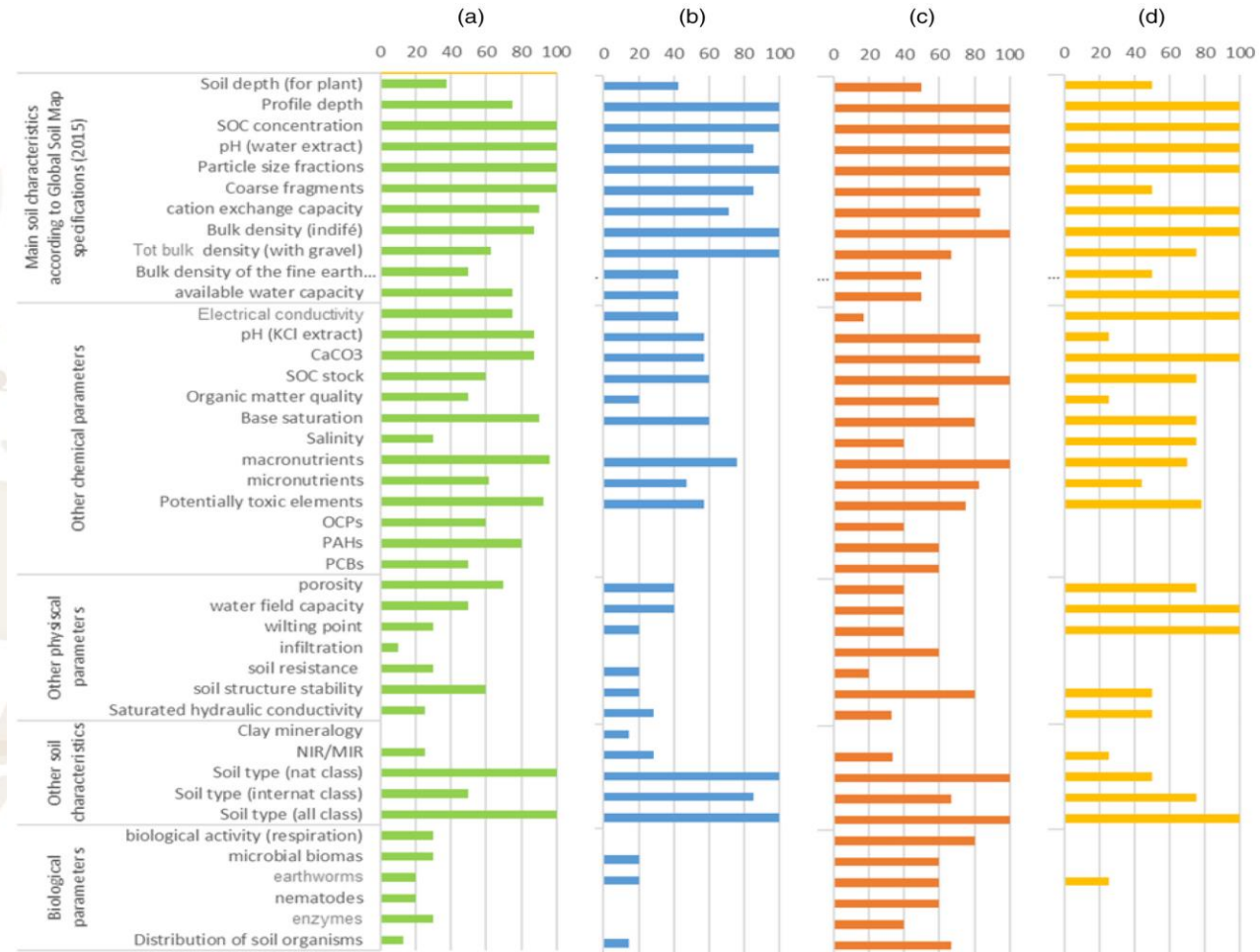
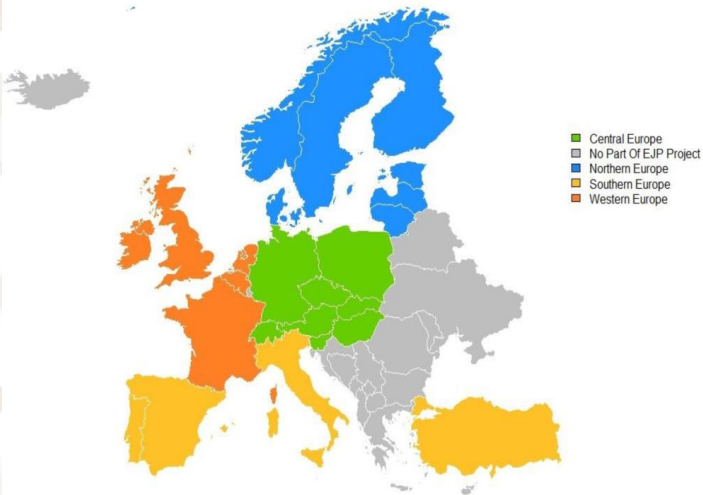
Variability of the methods used in the different databases of the different European countries



- (a) soil organic carbon
- (b) soil pH measured in saline solution
- (c) trace elements
- (d) particle size distribution

Percentage of countries including the different soil parameters in the soil databases

- (a) Central Europe
- (b) Northern Europe
- (c) Western Europe
- (d) Southern Europe including Türkiye



Main conclusions and recommendations

- Richness of EU countries in terms of soil data, data collection started in the 50ies
- Data is available across EU but :
 - not always publicly available (due to legal issues)
 - not covering all Soil Mission objectives (e.g. carbon stocks, soil structure/soil biodiversity, soil pollution)
 - different methods cross EU, data may not be easily comparable/usable
- How to go further:
 - Need to collect new data on soil properties and functions
 - Compare existing datasets between and within countries
 - Develop/validate either transfer functions (between methods) and pedotransfer functions (to estimate soil functioning based on soil properties)

Want to know more ?





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SURVEY ARTICLE

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