Comparison of LUCAS and national monitoring networks

WP6 – Task 6.3

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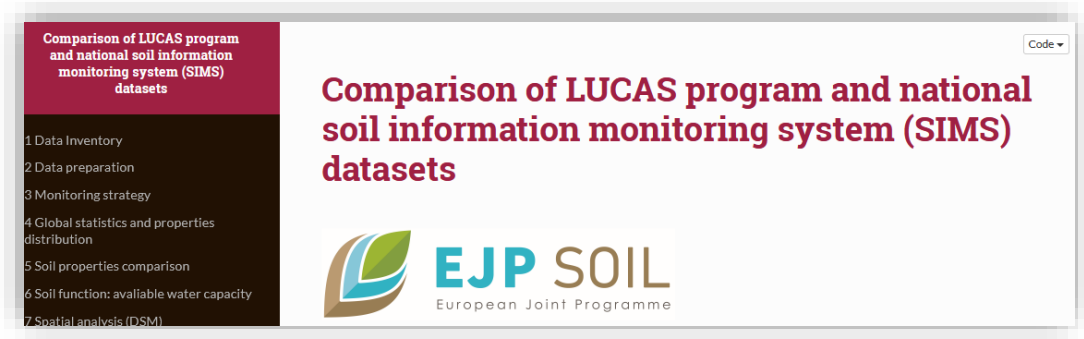
Objectives and last update

- Objectives
  - Comparing datasets and monitoring strategies
  - Advice on the use of the limits pros/cons of using LUCAS or national data
  - How to combine the best of both?



- Updates
  - New script release the 2nd of May 2023
  - More sections and features:
    - Monitoring strategy (representativity of dominant soil types and land uses)
    - Soil textures triangle

Objectives for the partners:
→ Compare monitoring strategies
→ Compare soil properties (no DSM for now)

Soil monitoring strategy

Site density

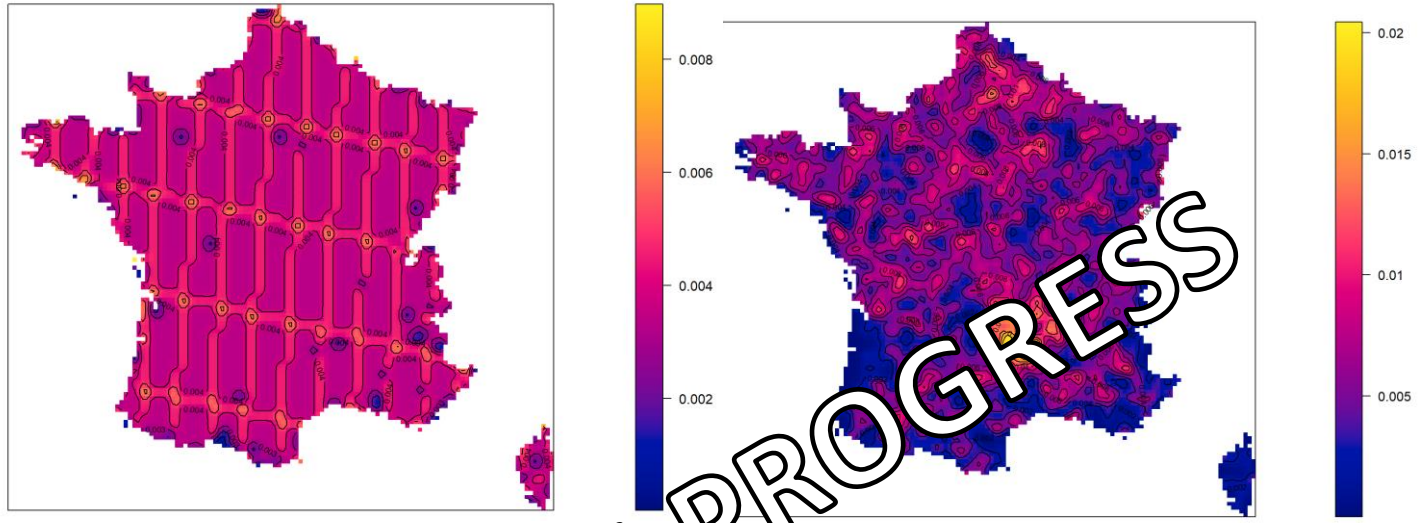
Nb sites	National	LUCAS	*Campaign year*
France	2154	3050	*2009*
Germany	3102	1247	*2015*
Italy	15098	1330	*2009*
Wallonia	6895	40	*2018*
Slovakia	318	175	*2009*

Germany and France :
→ SIMS covering more territory
→ LUCAS hotspots: **heterogeneity**

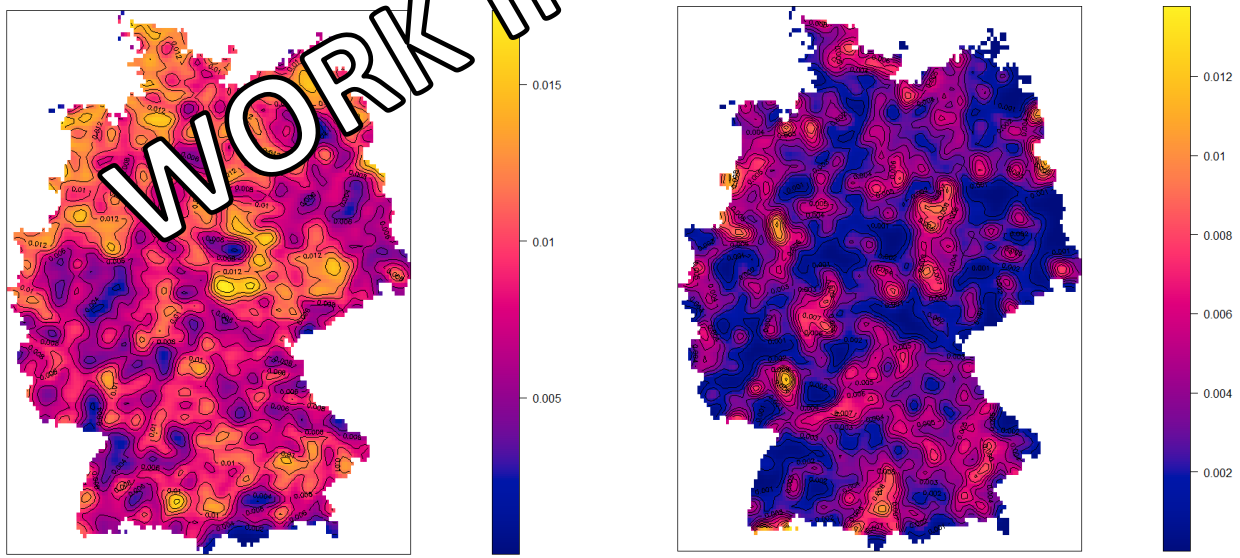
SIMS

LUCAS

France



Germany



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Soil monitoring strategy

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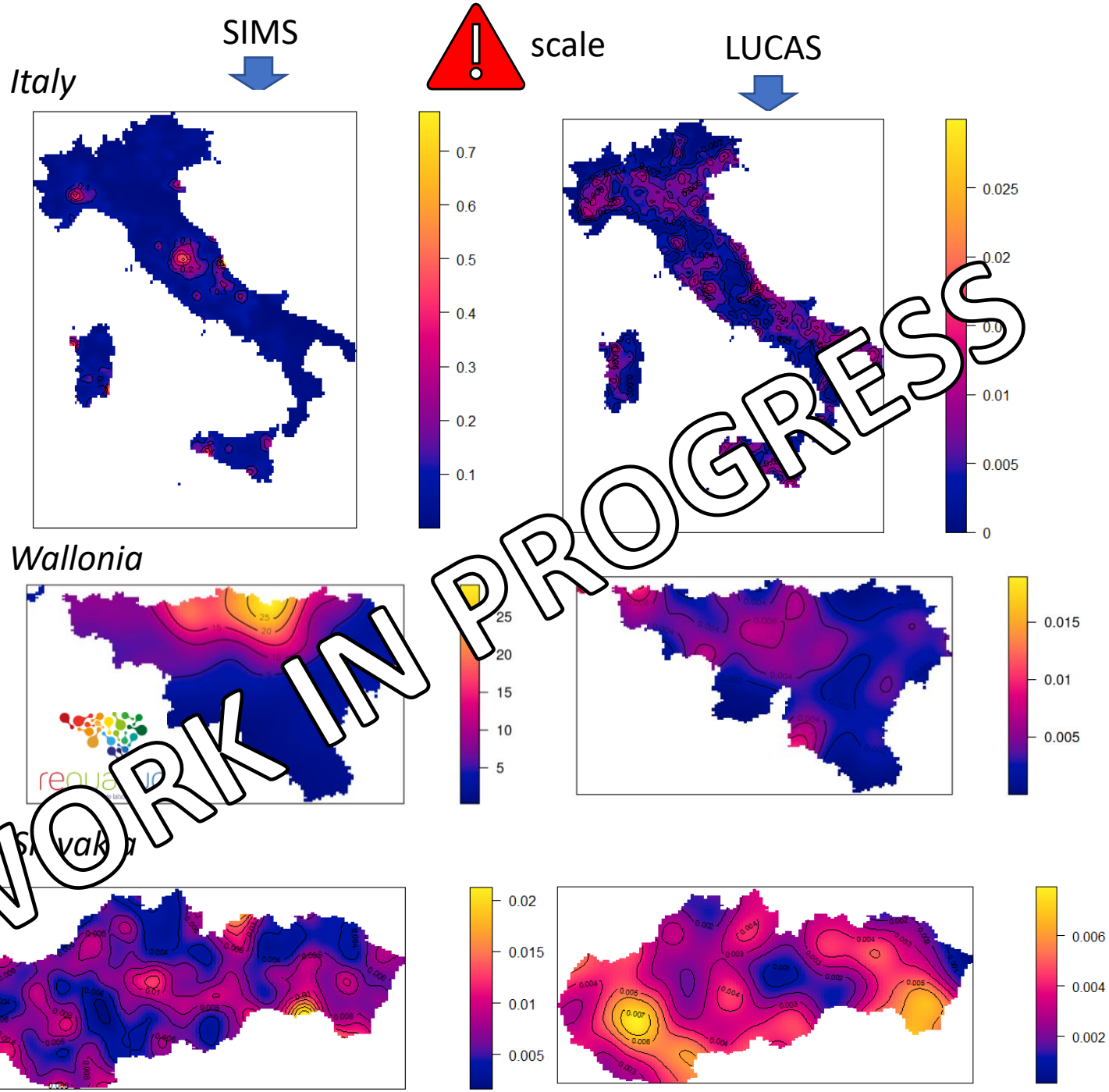
Italy, Wallonia and Slovakia:
→ Resolution of SIMS higher (10 to 1000 times more!)

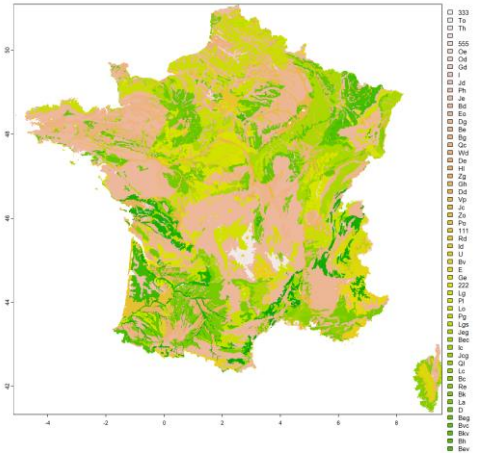


Soil monitoring strategy

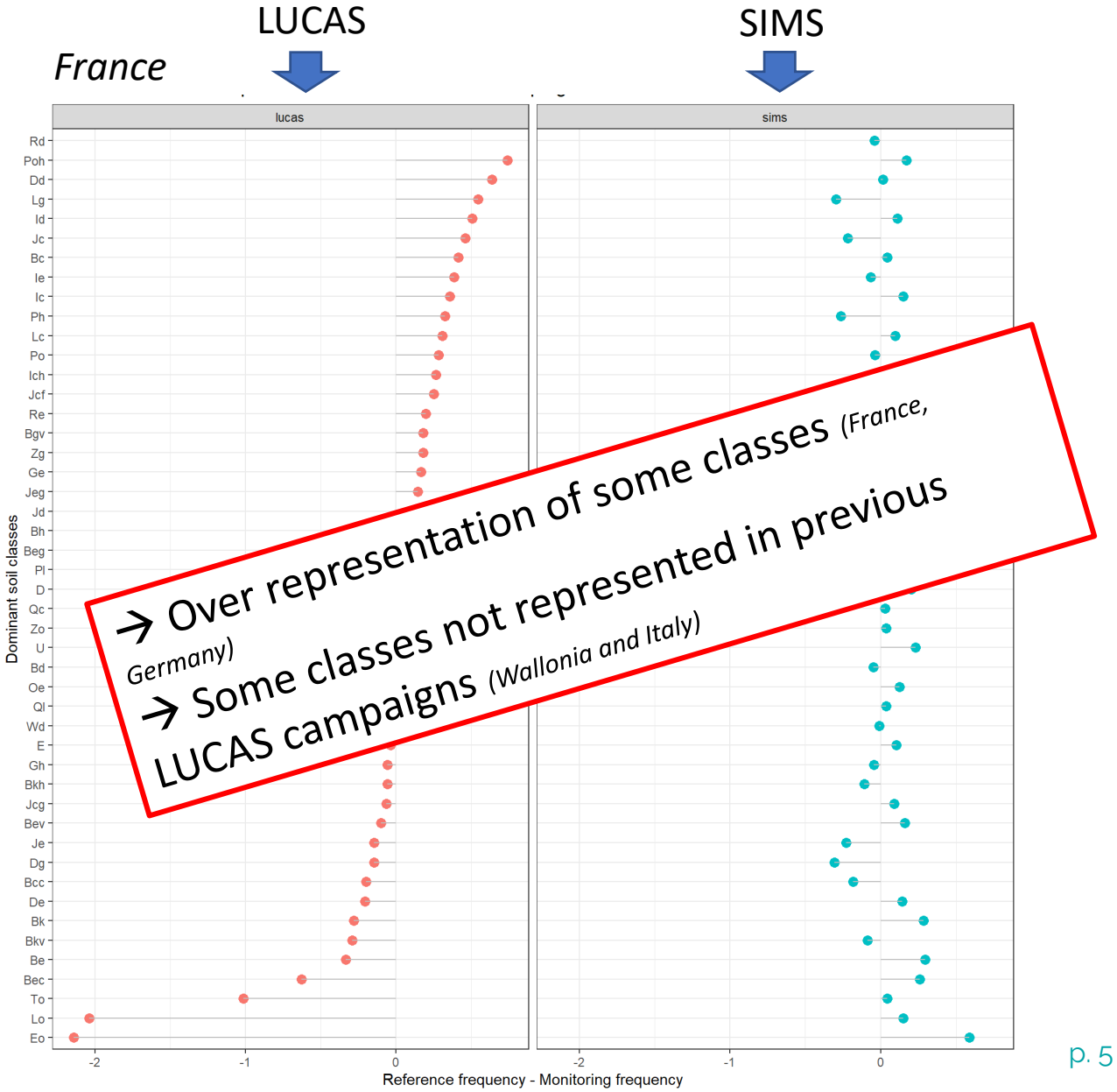
Dominant soil classes

- European soil classes
  - ESDB 2006 (raster 1km x 1km)

1. Extract dominant soil classes at LUCAS and SIMS point
2. Calculate frequencies with dominant soil classes distribution
3. Compare with frequencies for the country from the raster



Variation between the dominant soil distribution of LUCAS and SIMS and the reference



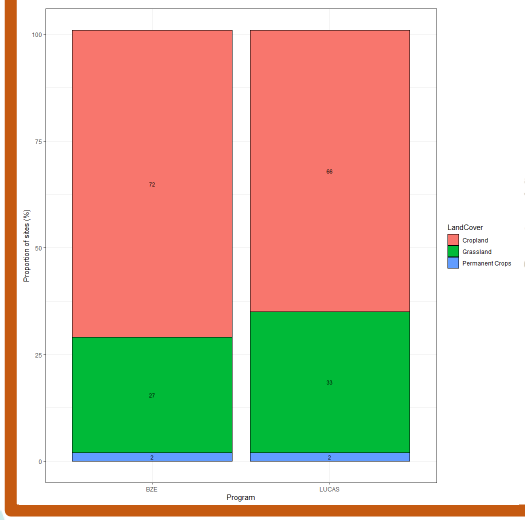
Soil monitoring strategy

Land uses

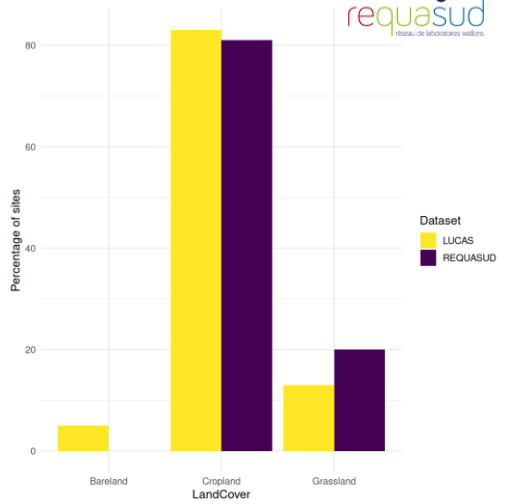
- Germany, Slovakia and Wallonia
  - Mostly croplands and grasslands in SIMS

→ LUCAS and SIMS distribution of land uses are quite similar

Germany



Wallonia

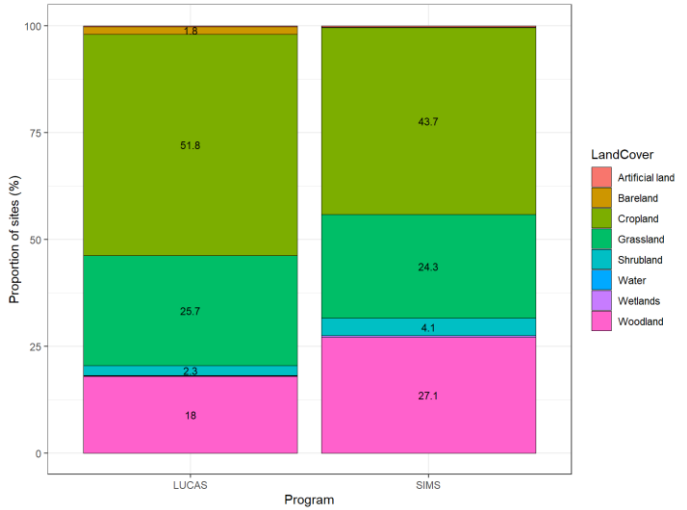


- France and Italy
  - Various land uses

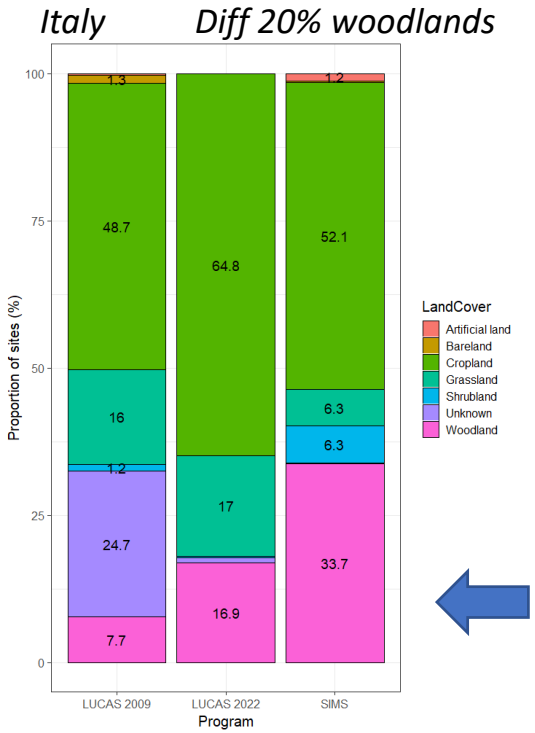
→Under representation of woodlands in LUCAS

→Over representation of grasslands (Italy)

France *Diff 10% woodlands*



Italy *Diff 20% woodlands*

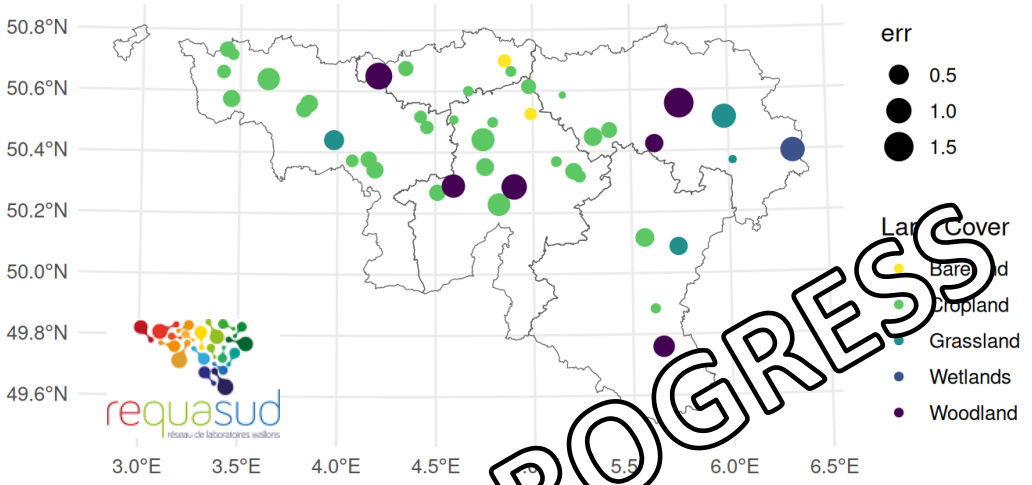


Soil properties (some example)

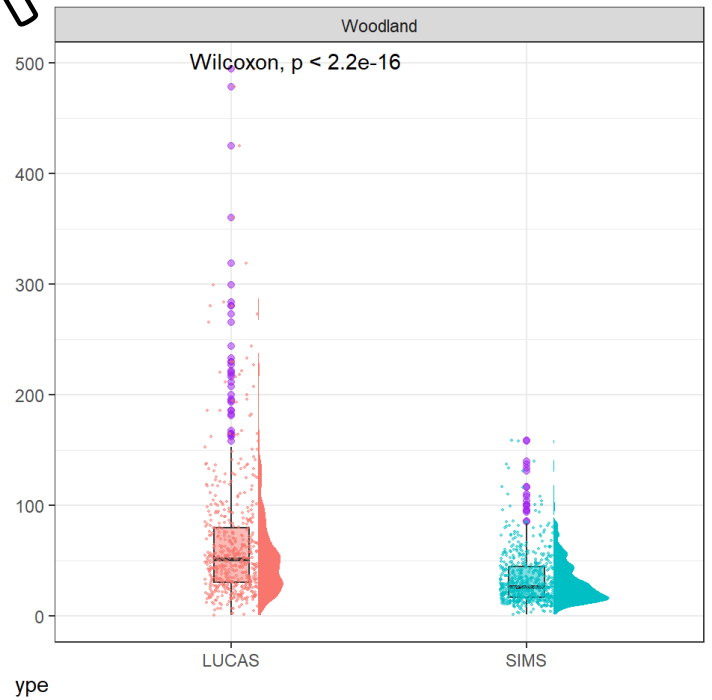
Organic carbon

- Similar distribution for croplands
- Over estimation of carbon content
  - Woodlands: France and Wallonia
  - Permanent crops: Germany

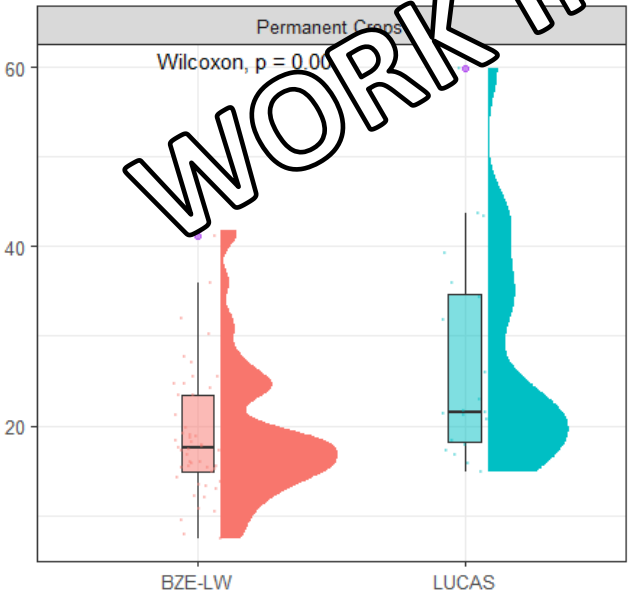
Wallonia



France



Germany



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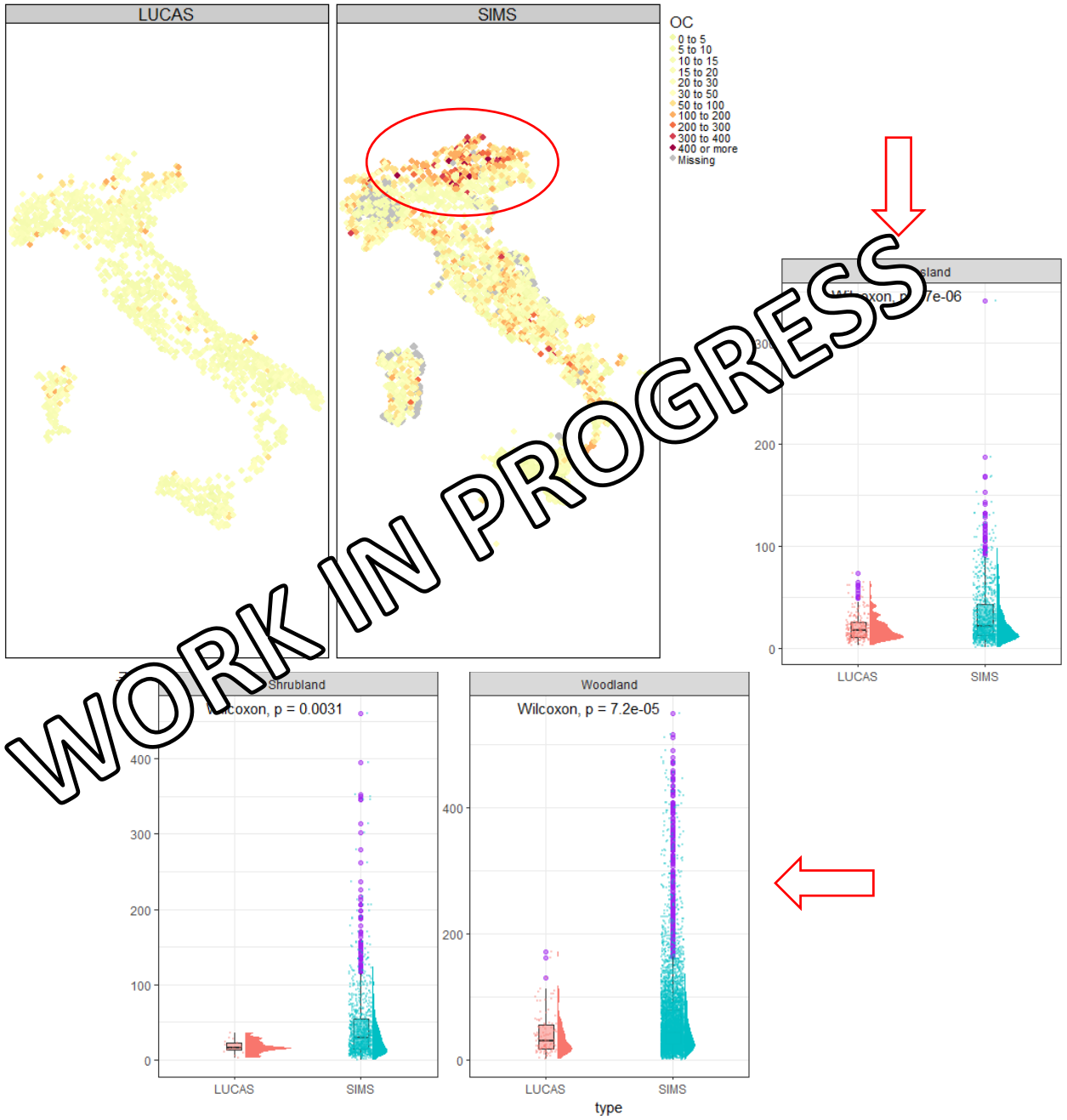
Soil properties (some examples)

Organic carbon and land use

- Similar distributions for croplands
- Over estimation of carbon content
  - Woodlands: France and Wallonia
  - Permanent crops: Germany
- Under estimation of OC
  - Woodlands and grasslands in Italy

Italy



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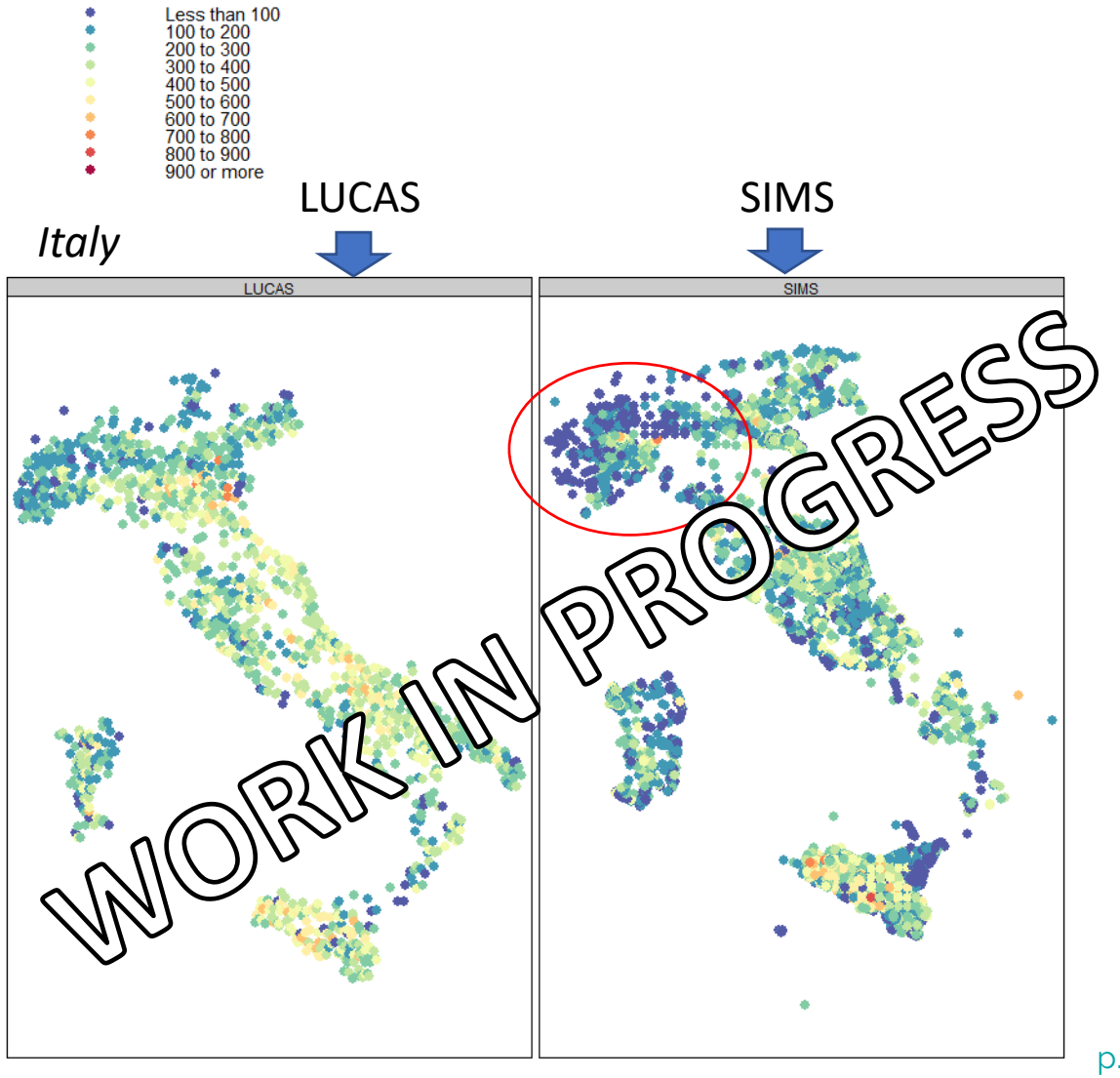
Soil properties (some examples)

Clay: spatial differences

- Similar distribution (boxplots) but differences in spatial variations
  - Italy: over estimation in the Northern part

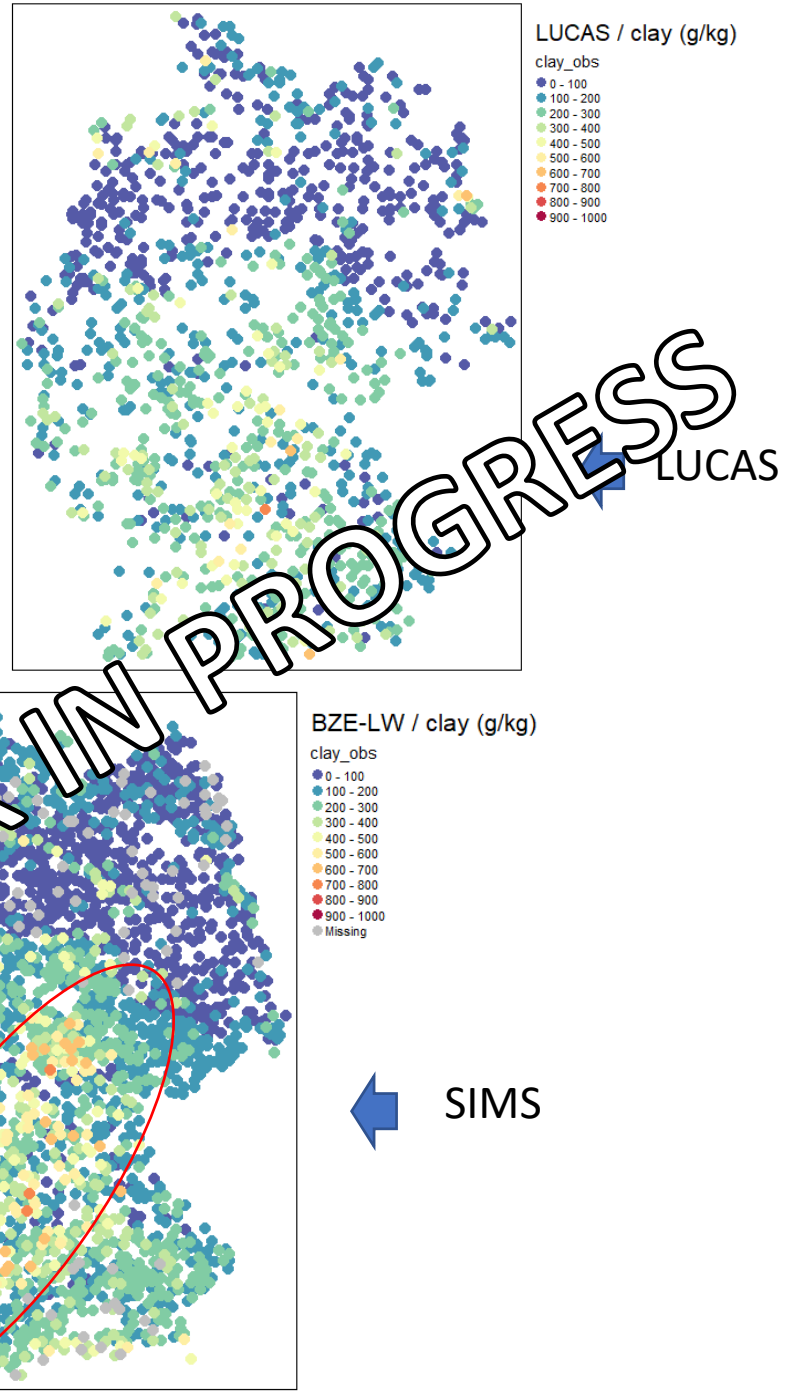


Soil properties (some examples)

Clay: spatial differences

- Similar distribution (boxplots) but differences in spatial variations
  - Italy: over estimation in the Northern part
  - Germany: missing higher values in Central regions

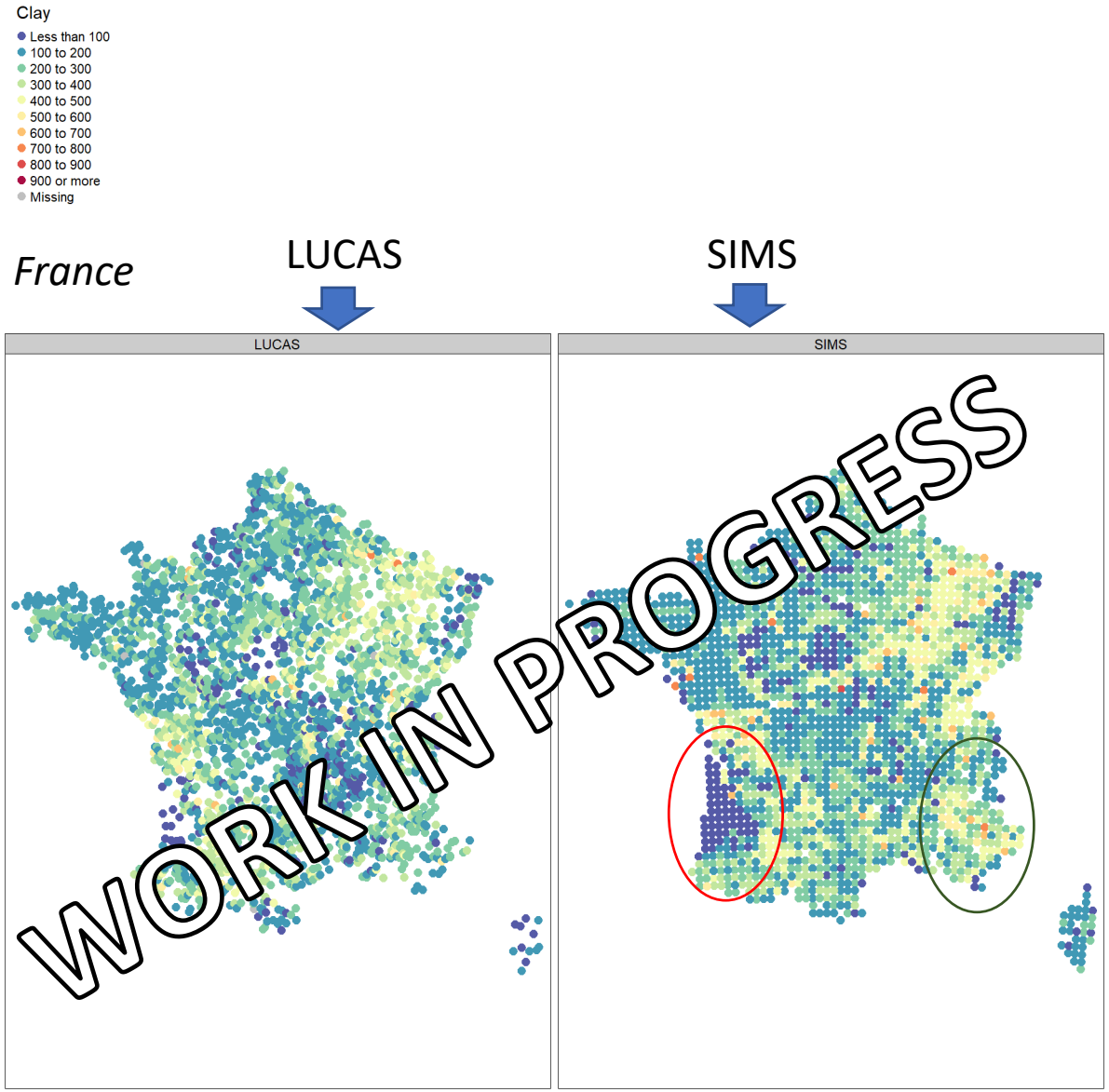
Germany



Soil properties (some examples)

Clay: spatial differences

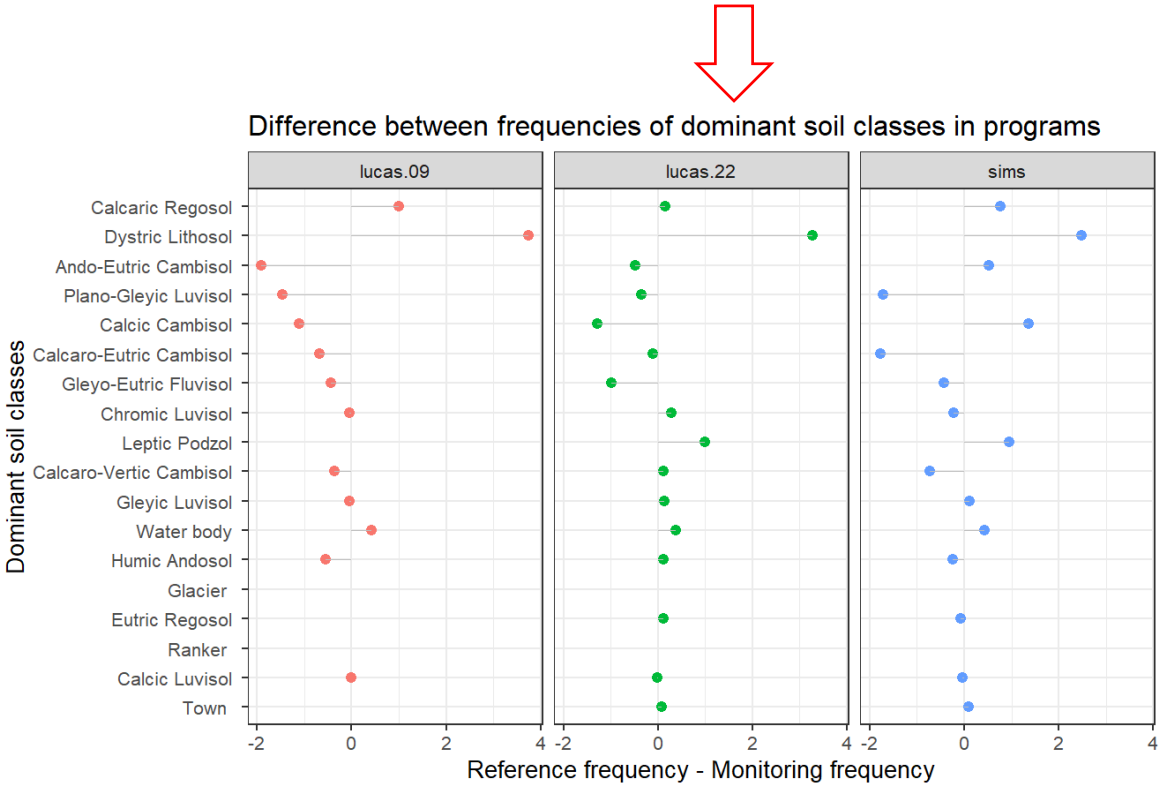
- Similar distribution (boxplots) but differences in spatial variations
  - Italy: over estimation in the Northern part
  - Germany: missing higher values in Central regions
  - France: missing spots of low clay content (red) and higher clay content (green)

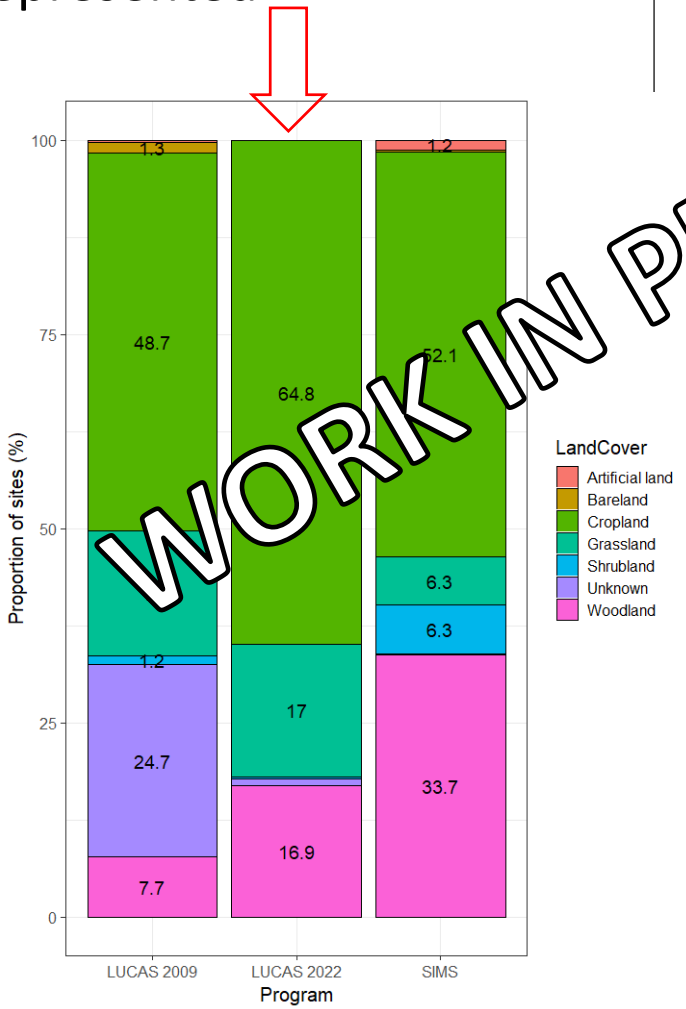


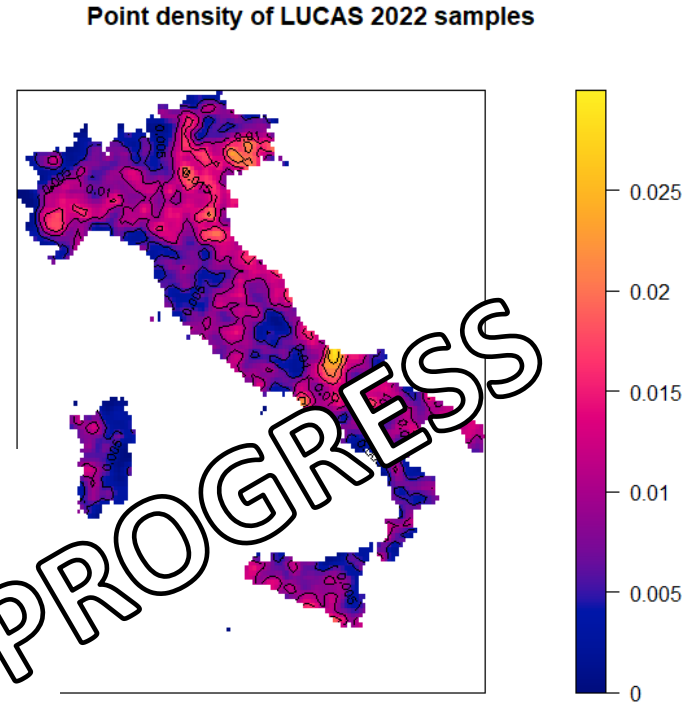
What about the new LUCAS campaign?

More points… more representative samples?

- For Italy… for dominant soils but not for land uses
  - Croplands and grasslands over represented







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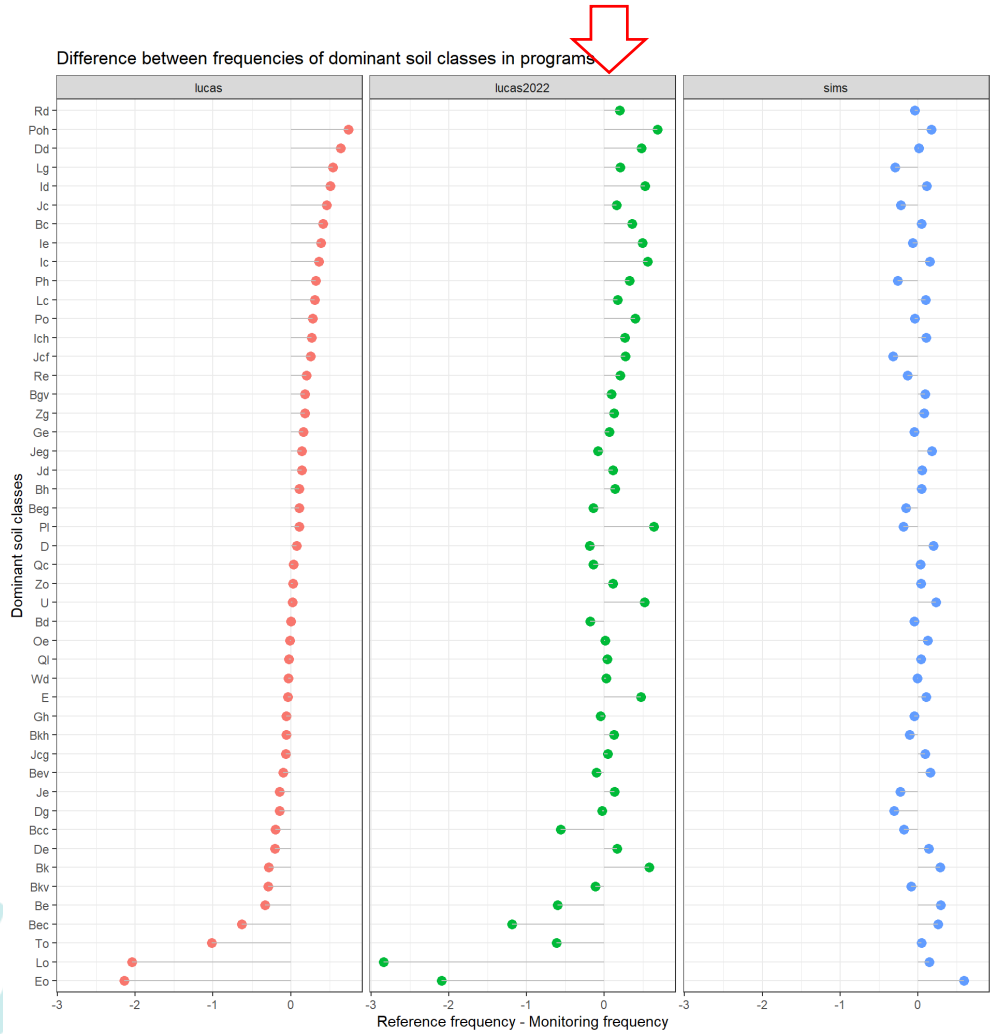
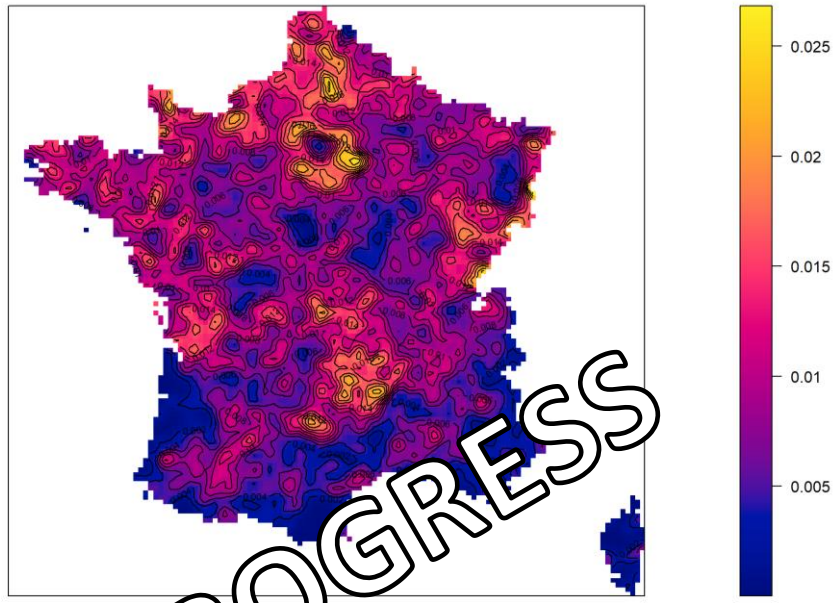
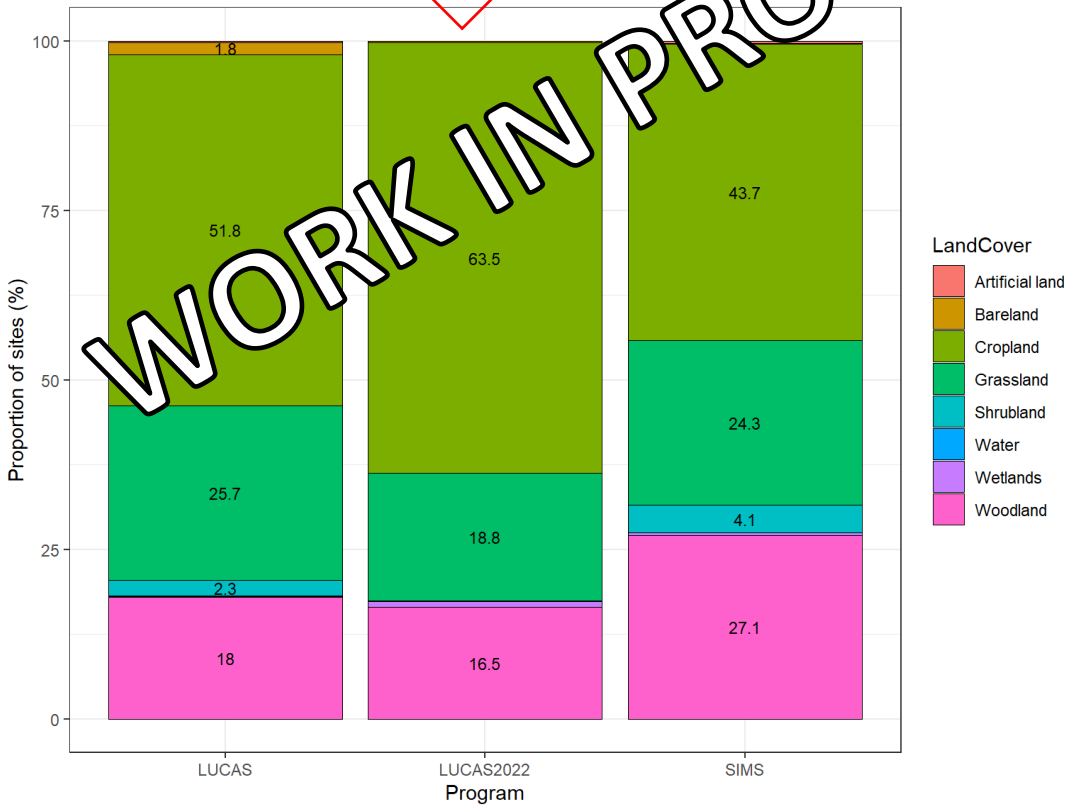
What about the new LUCAS campaign?

More points… more representative samples?

- For France… for dominant soils but not for land uses







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Conclusion and perspectives

- A lot of results !
  - Compile the comparison to make conclusions/advices about the use of the dataset (eg. Prefer national datasets of OC for forest soils)
  - Writing a paper on the monitoring strategies and how to combine/fill the gaps
- To be continued with digital soil mapping
  - How does it affect the final predicted maps? What are the main differences?
  - How can it affects soil functions and quality assessment (eg. Soil available water capacity) ?
  - How it may affect the calculation of indicators (e.g. % of degraded land, based on a simple threshold)