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DSMS

The Digital Soil Map of Sweden

Data

Gridded point location data:
Texture and organic matter (OM) content in 15 000 soil samples taken in a 1 km^2 square grid, with a small random displacement

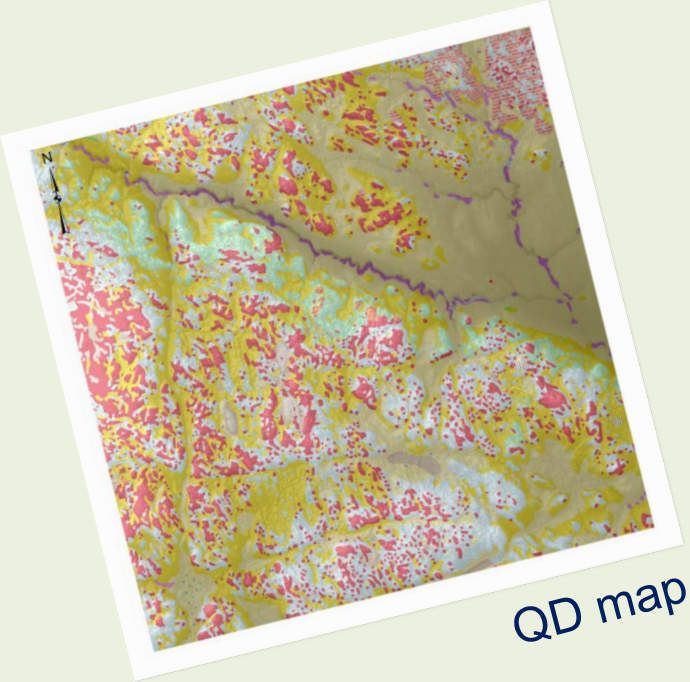
Clustered point location data:
Texture and OM content in 23 000 soil samples clustered at farms: 1 sample / 3 ha

Raster data
Interpolated point data from airborne gamma radiation scannings: ^{40}K, ^{232}Th.

Quaternary deposit map, simplified into 7 classes and simplified into 3 classes.

Digital Elevation Model derived by laser - scanning of the terrain

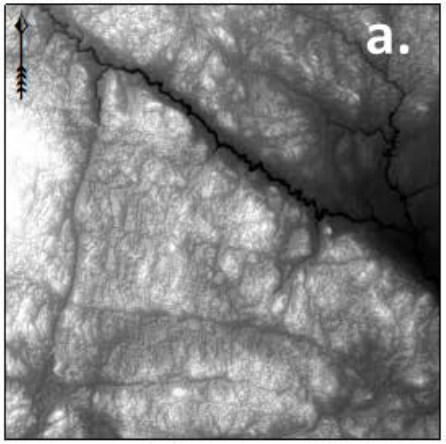
Data

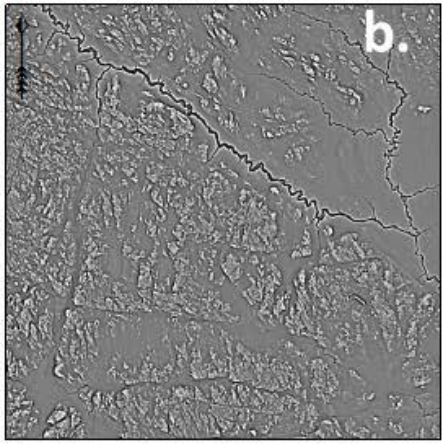


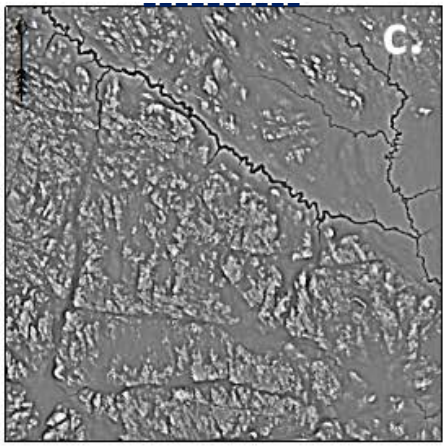
QD map

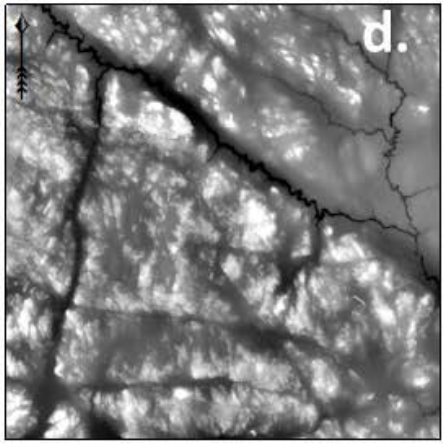
Gamma radiation scannings

Elevation ----------Relative elevation----------



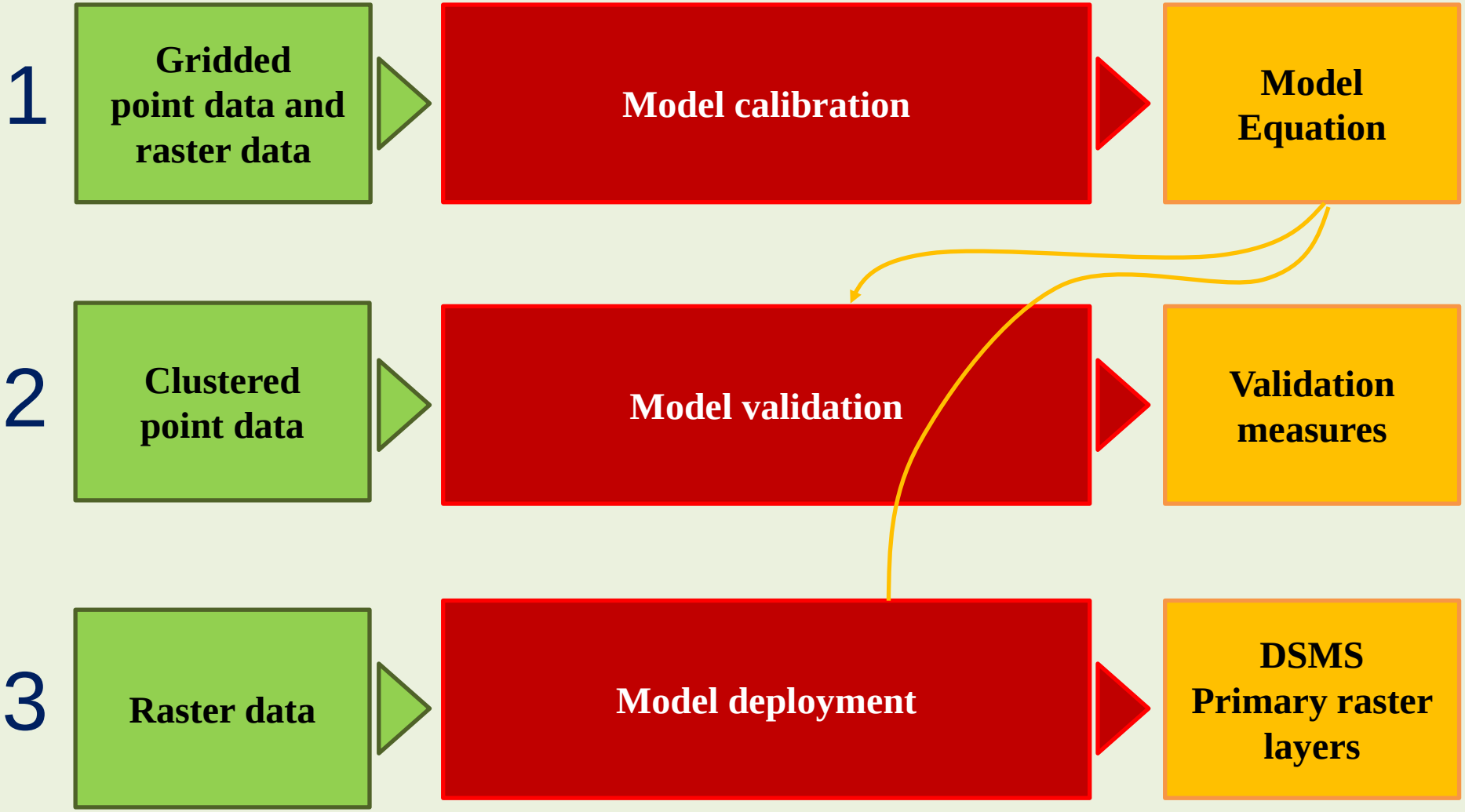


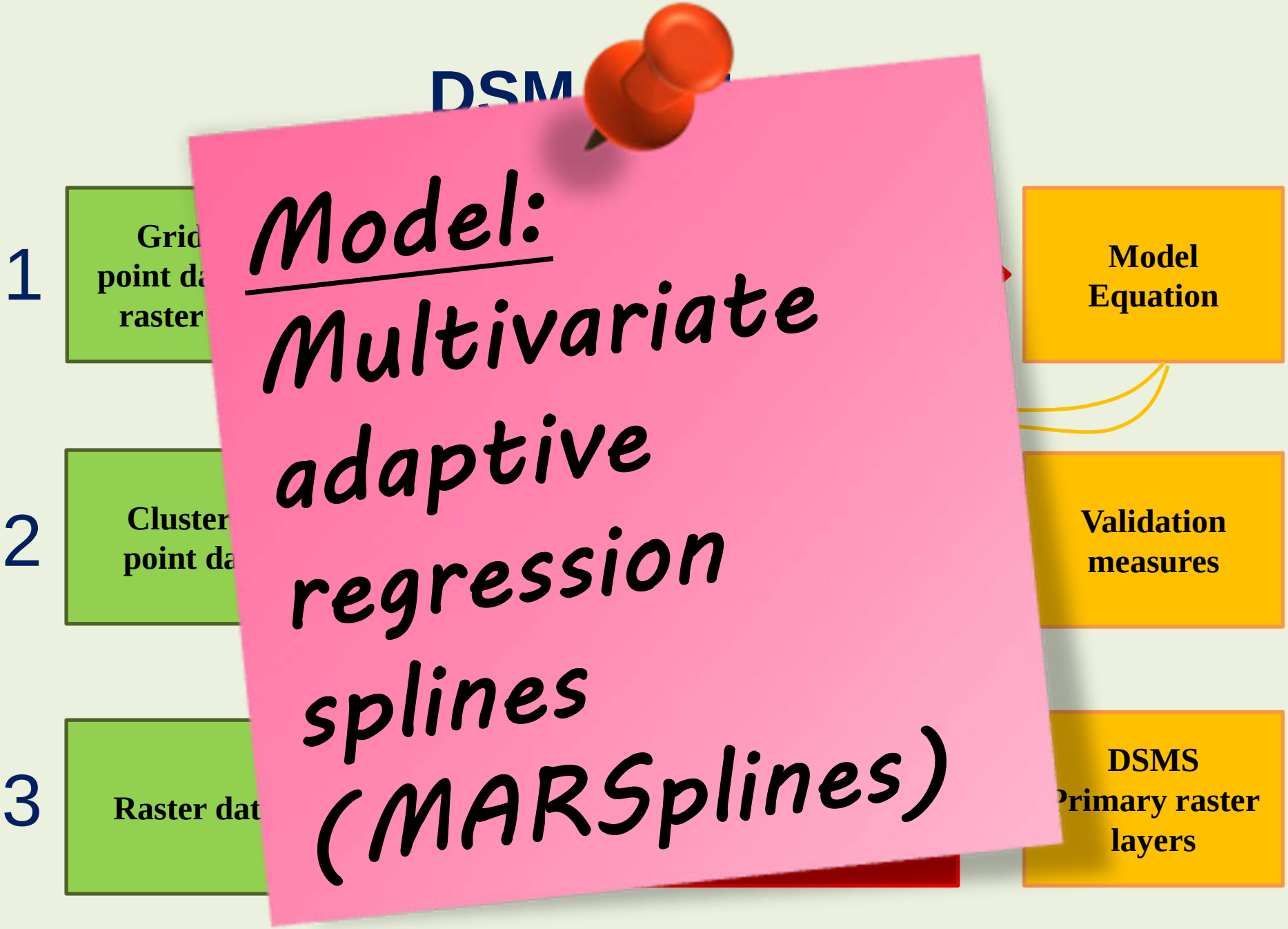




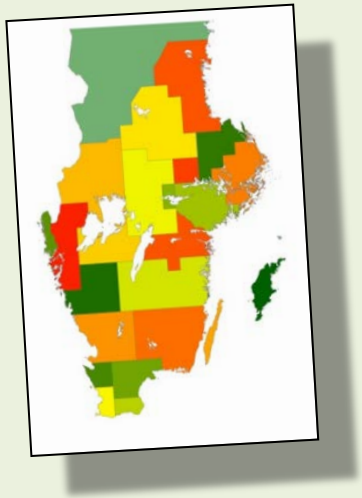
10 km × 10 km

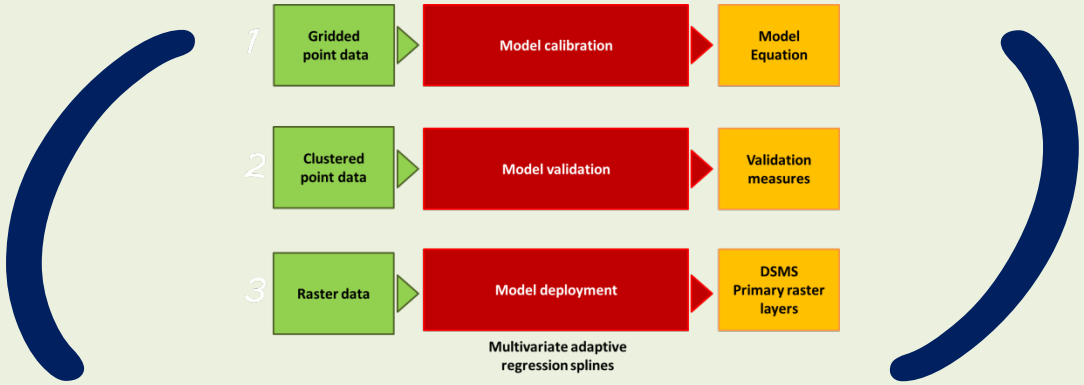
DSM strategy:




DSM
1
Grid
point da
raster
Model
Equation
2
Cluster
point da
Validation
measures
3
Raster dat
DSMS
Primary raster
layers
Model:
Multivariate
adaptive
regression
splines
(MARSplines)

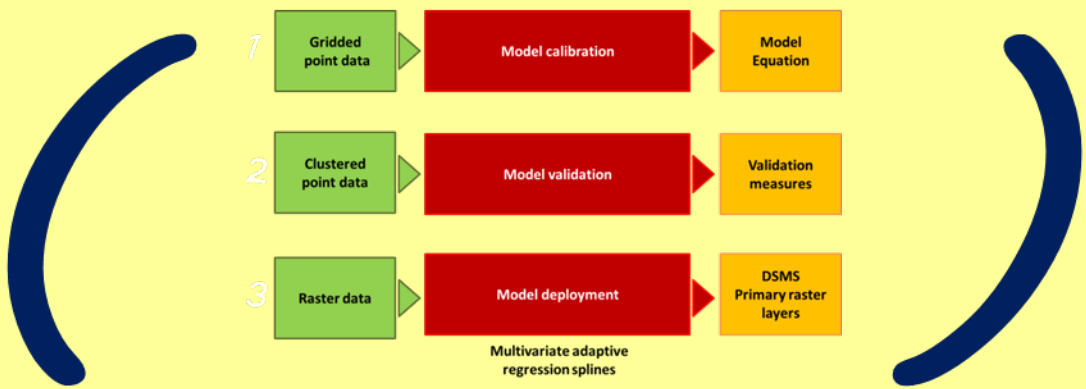
DSM strategy:





x 23

DSM strategy:



x 23

4 **Applying pedotransfer functions** → **DSMS Secondary raster layers**

Raster properties

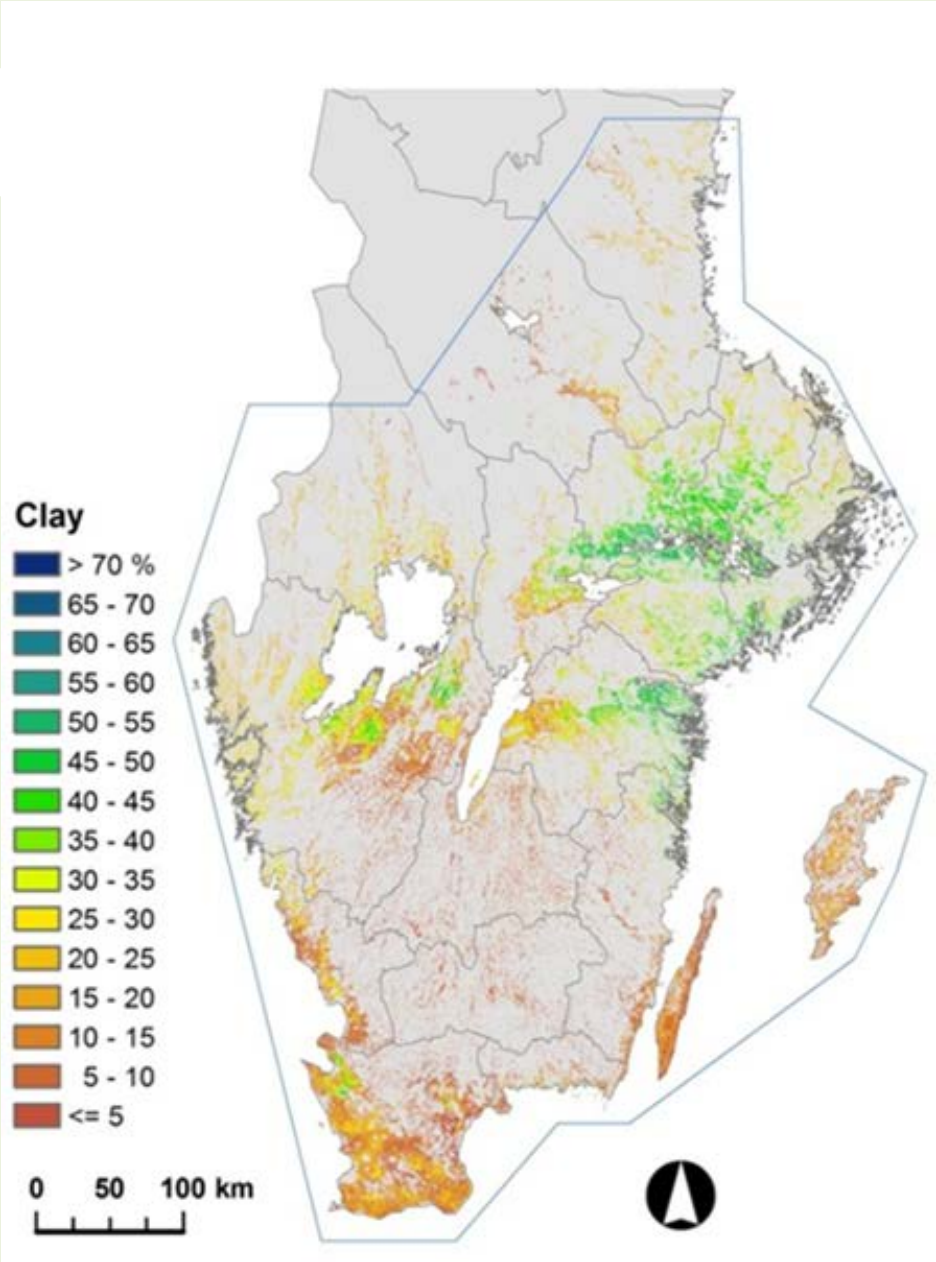
Extent

Arable land (2.5 million ha) according to the block database

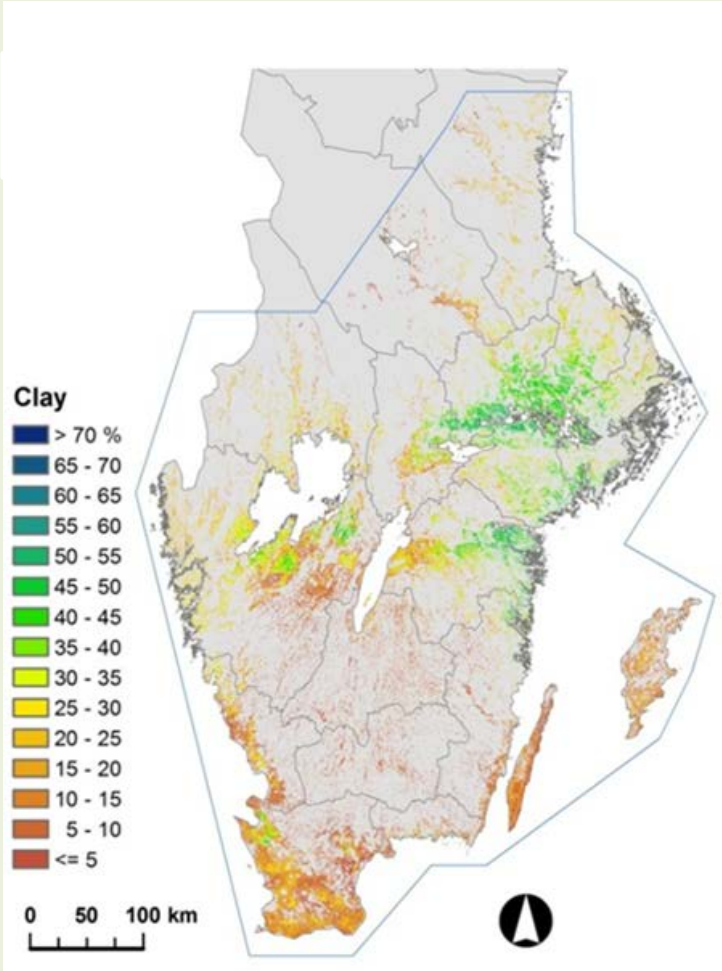
! Except organic soils
! Except the Northernmost part of Sweden

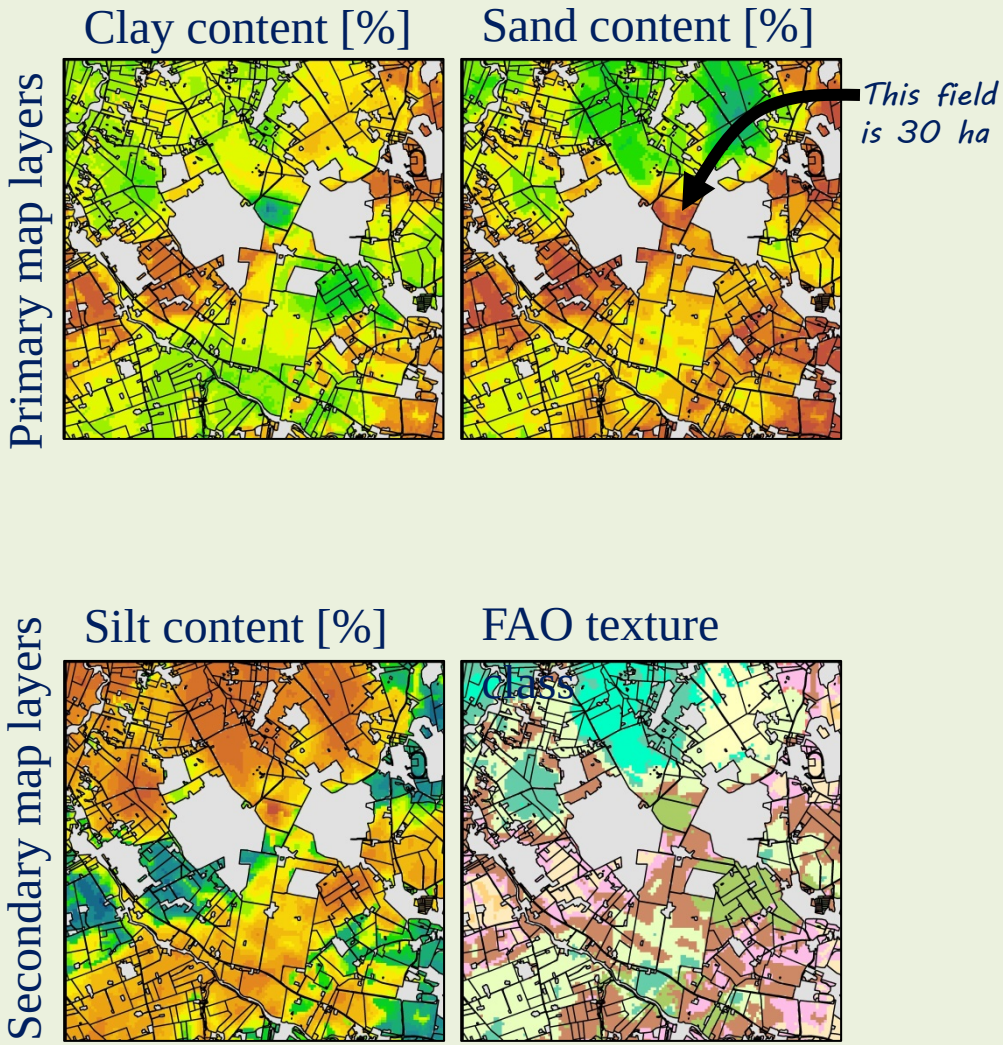
Grain:

50 m x 50 m (subjectively chosen)



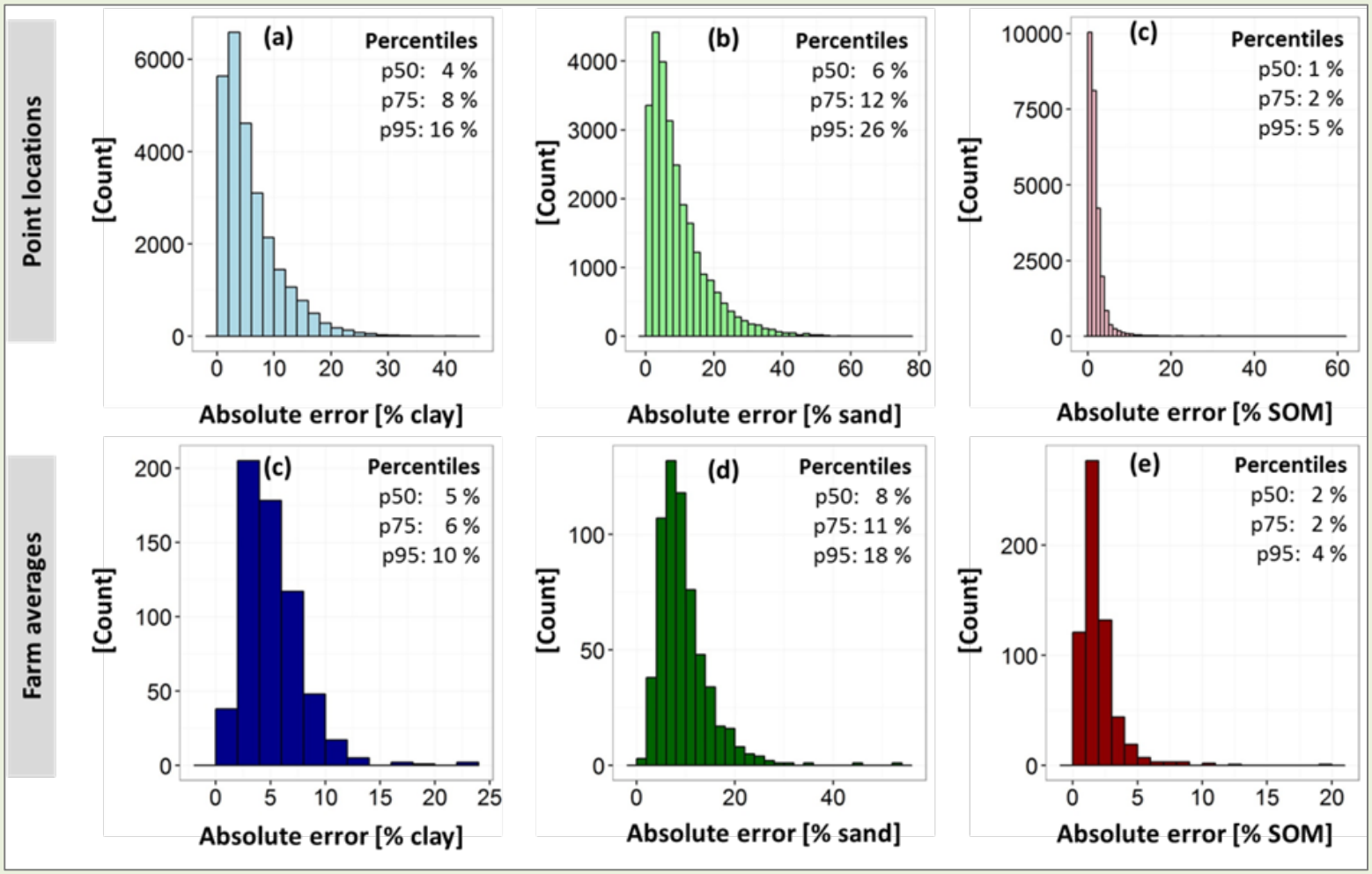
The DSMS


Clay
> 70 %
65 - 70
60 - 65
55 - 60
50 - 55
45 - 50
40 - 45
35 - 40
30 - 35
25 - 30
20 - 25
15 - 20
10 - 15
5 - 10
<= 5
0 50 100 km

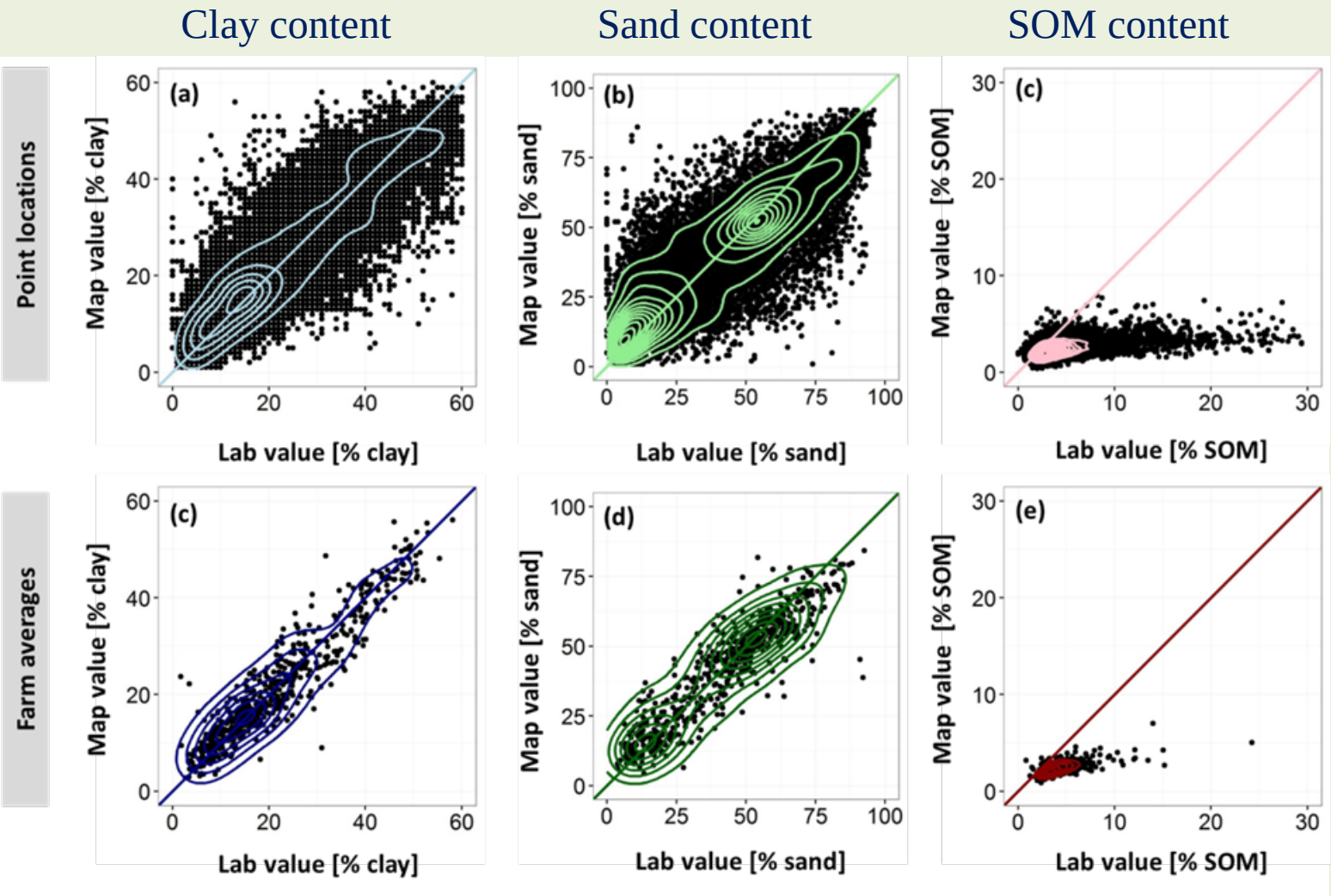

Clay content [%]
Sand content [%]
This field is 30 ha
Primary map layers
Silt content [%]
FAO texture
Secondary map layers

Map validation

Clay content | Sand content | SOM content



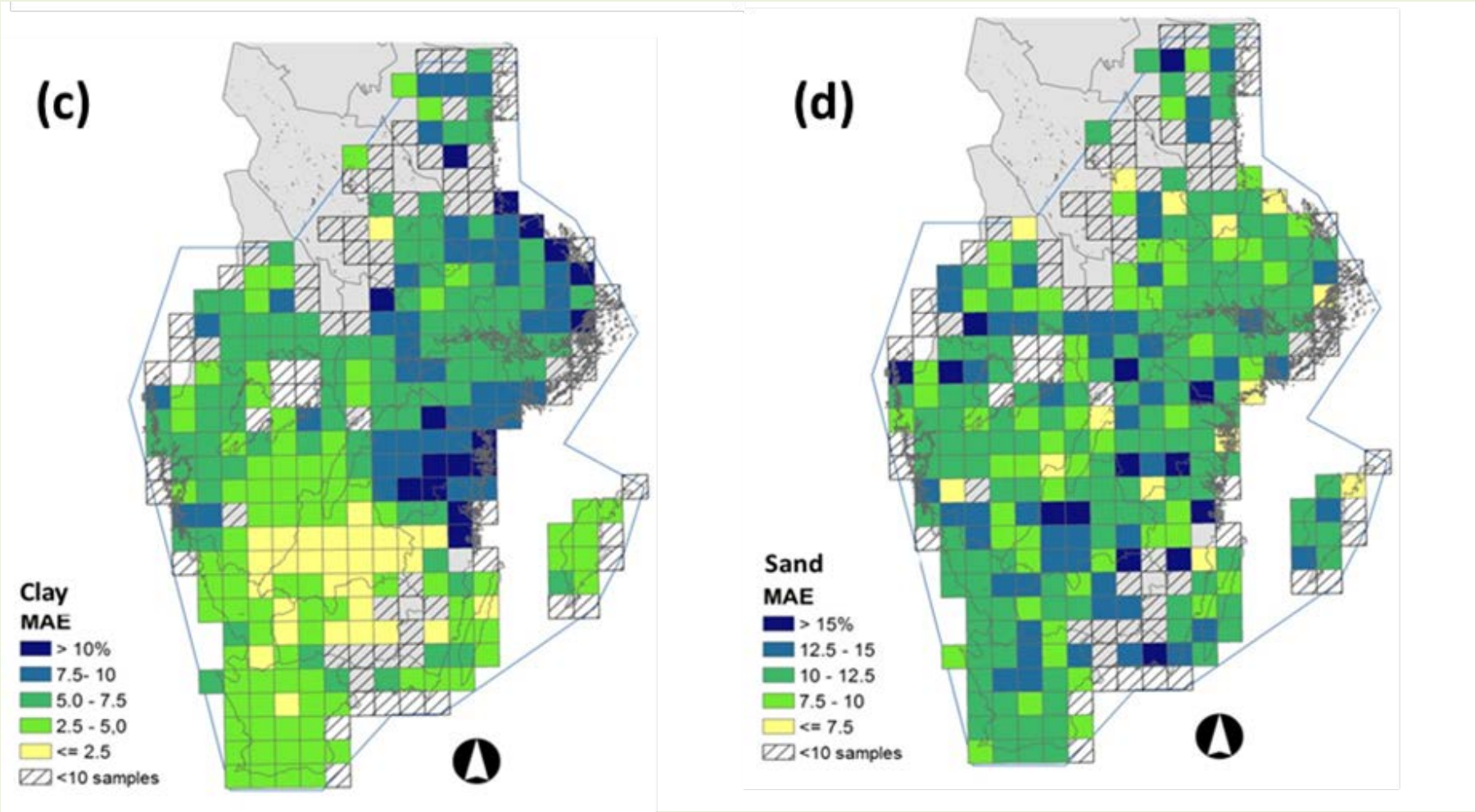
Map validation



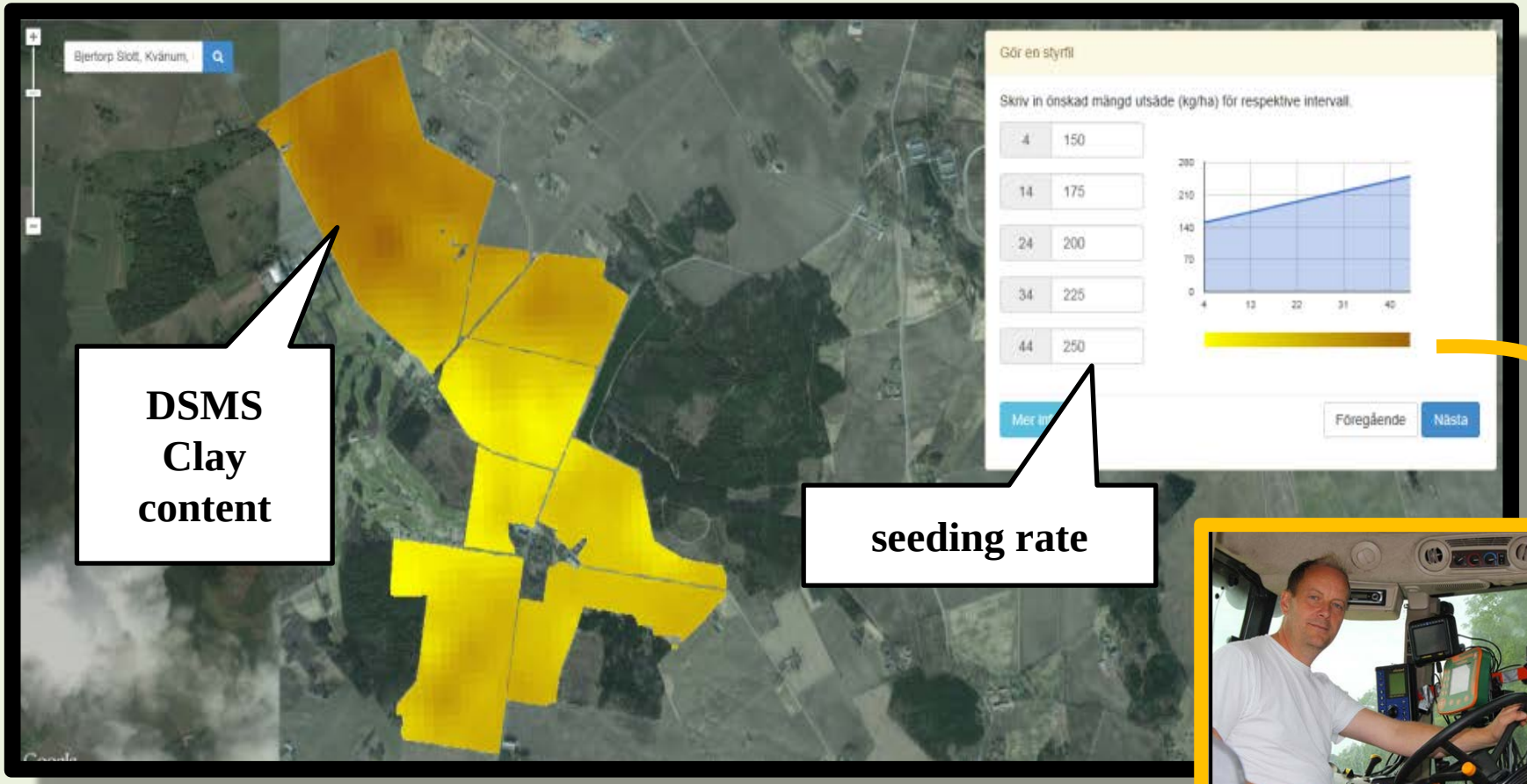
Map validation

	Z	RT_5	RT_{50}	RT_{500}	^{232}Th	^{40}K
Pearson r among the samples in the national dataset						
Clay	-0.27	-0.17	-0.25	-0.21	0.84	0.27
Sand	0.15	0.16	0.25	0.26	-0.77	-0.24
SOM	0.08	-0.14	-0.17	-0.16	0.04	-0.22
Pearson r among the samples in each model area (average for the 23 areas)						
Clay	-0.24	-0.04	-0.11	-0.18	0.60	0.13
Sand	0.19	0.01	0.09	0.21	-0.52	-0.09
SOM	0.07	-0.13	-0.15	-0.13	0.02	-0.30
Pearson r among the samples in each farm (average for the 607 farms)						
Clay	-0.16	-0.09	-0.16	-0.17	0.34	0.05
Sand	0.19	0.06	0.16	0.21	-0.32	-0.02
SOM	-0.16	-0.20	-0.23	-0.21	0.01	-0.26

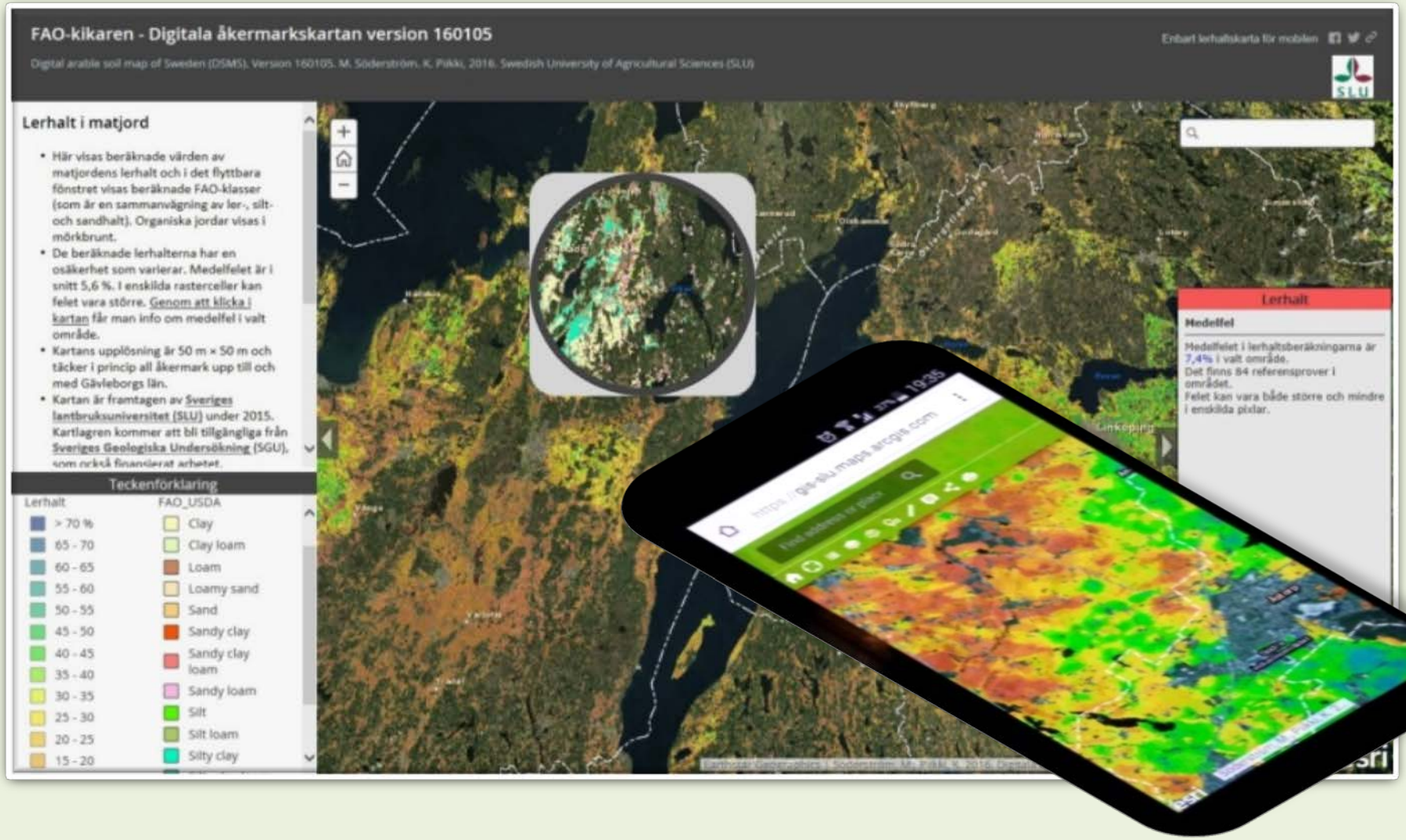
Map validation



Markdata.se


Bjertorp Slott, Kvänum,
Gör en styrfil
Skriv in önskad mängd utsäde (kg/ha) för respektive intervall.
4 150
14 175
24 200
34 225
44 250
Föregående
Nästa
DSMS Clay content
seeding rate

ArcGIS online



Summary

The DSMS is a spatial database consisting of:

- Predictor rasters
- Lab results for soil samples
- Primary map attribute rasters (sand and clay, not SOC)
- Secondary map attribure rasters (silt and FAO texture)
- Uncertainty estimations

The mapping vas possible thanks to national data sources, expecially important were:

- the data from airborne gamma radiation scannings
- the digital elevation model
- the large number of calibration soil samples

The DSMS is used by farmers for precision agricultre and by modellers for calcualting nutrient pollution loads to the Baltic Sea.

Acknowledgements

Financing:	The Geological Survey of Sweden (SGU)
Input data:	SGU, the Swedish Board of agriculture, The National Land Survey & Swedens Environmental Protection Agency
Web application:	Dataväxt AB