



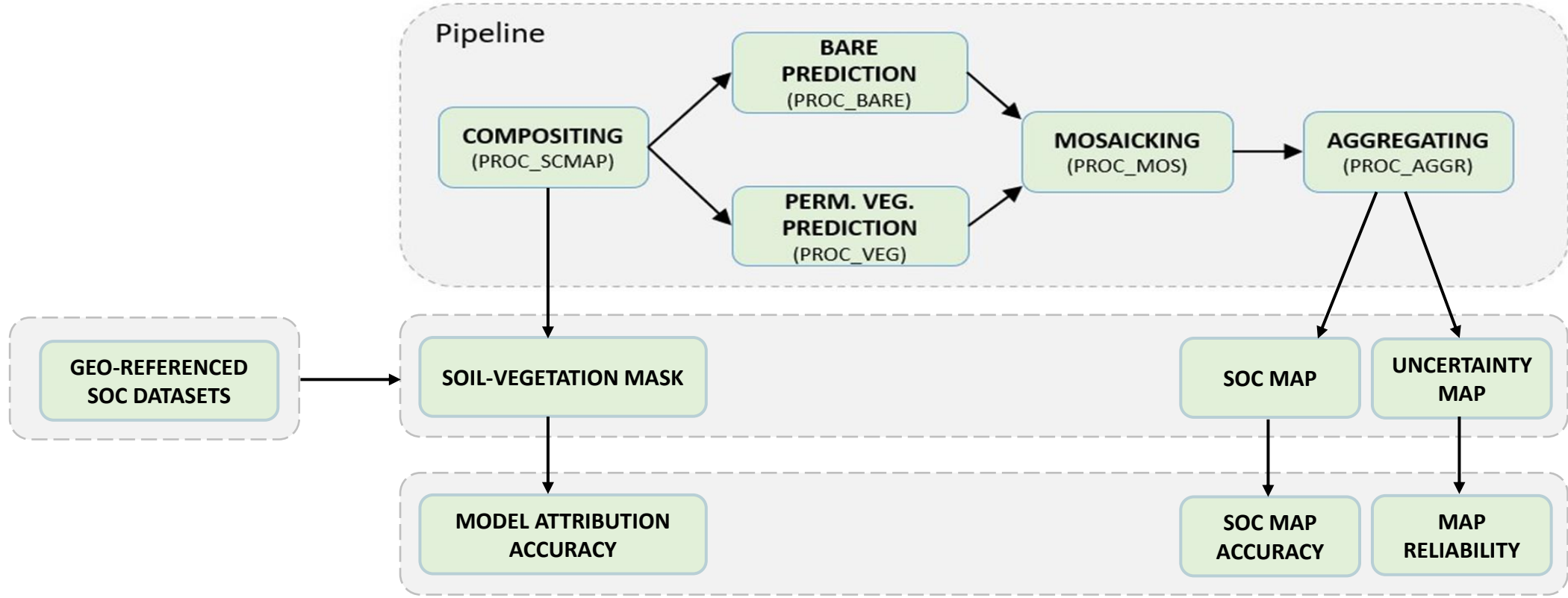
Session 3 –SOC prediction maps; results for Wallonia

Bas van Wesemael



ESA Symposium on Earth Observation for Soil Protection and Restoration

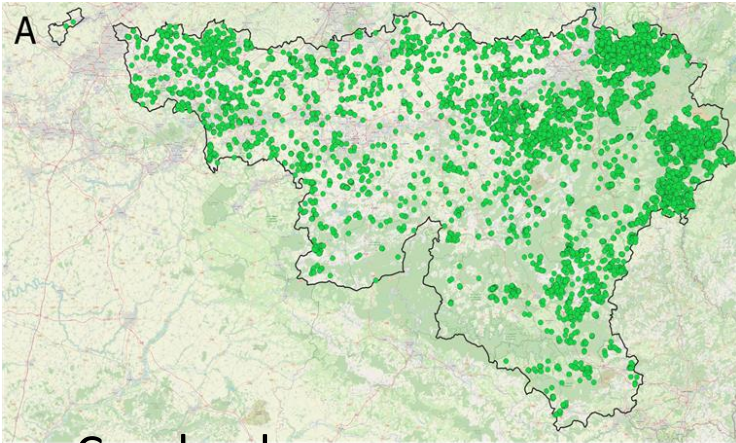
Work flow



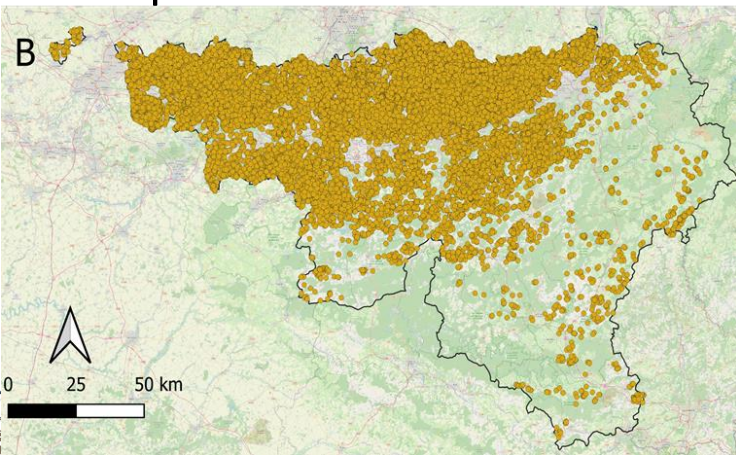
Geo-referenced SOC data set

Distribution of validation point dataset across Wallonia

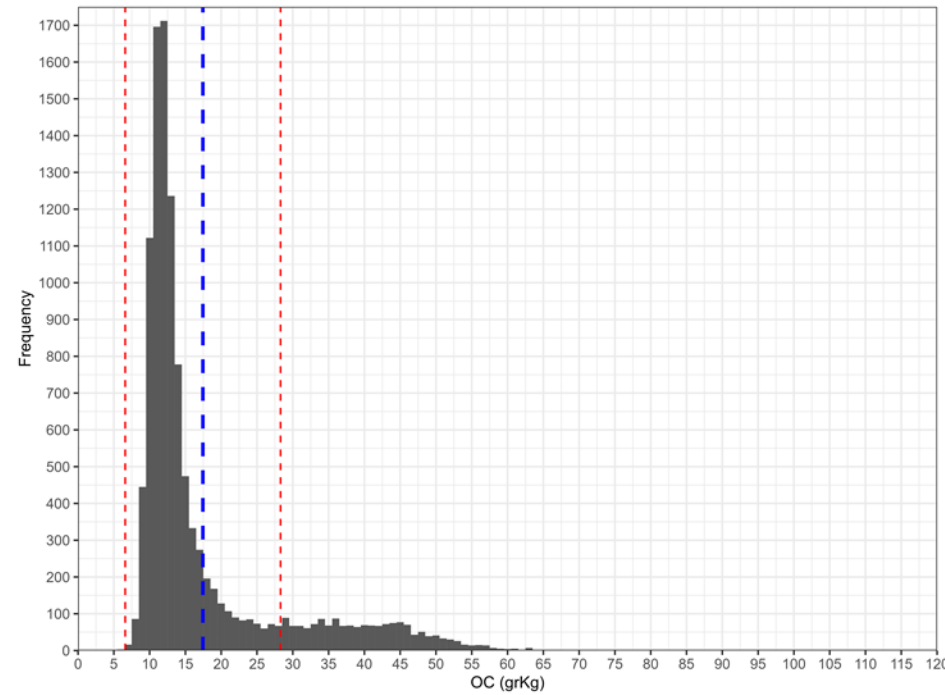
Grasslands



Croplands



Geo-referenced SOC data set in Wallonia (n= c. 10,000 per year)

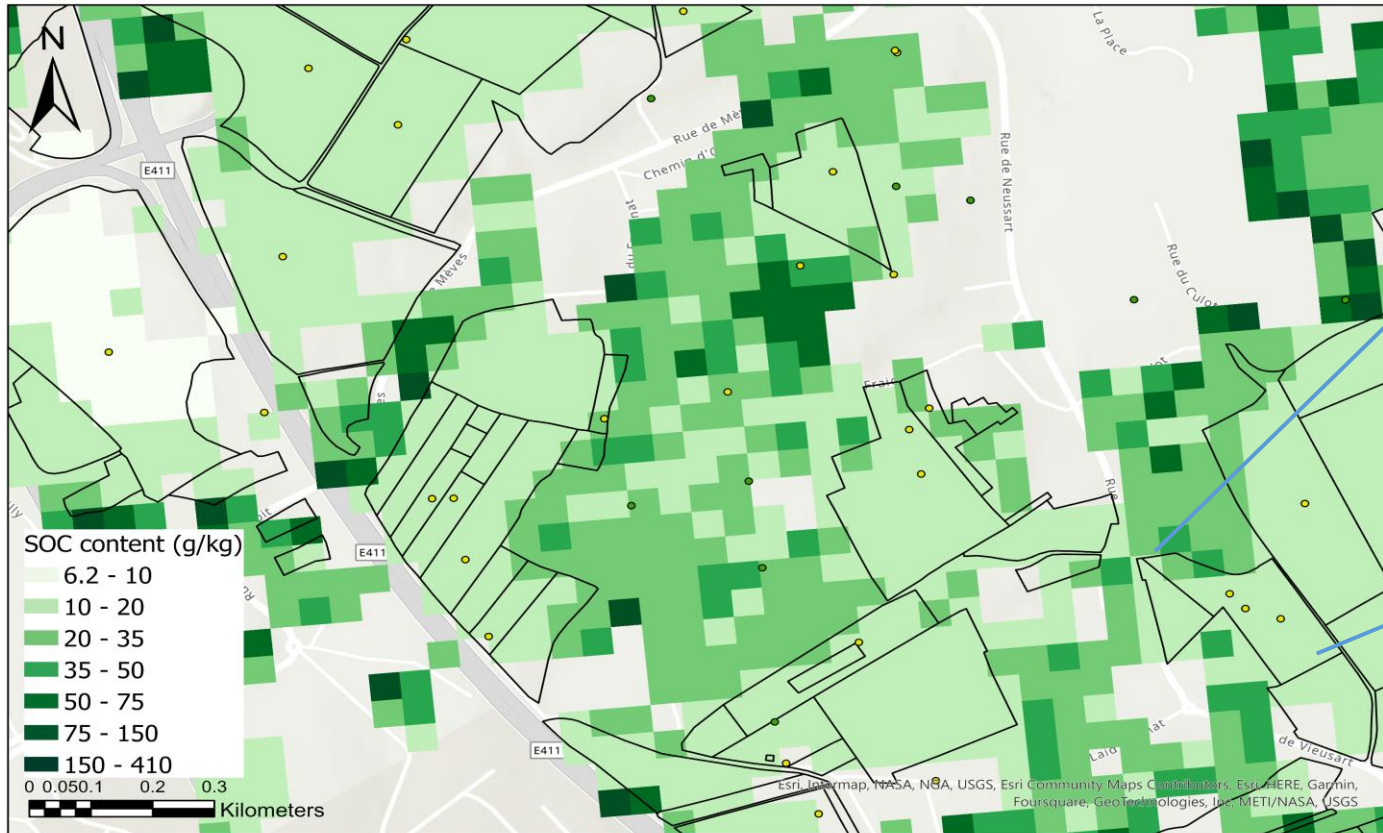


Network for routine soil fertility analysis in agricultural soils

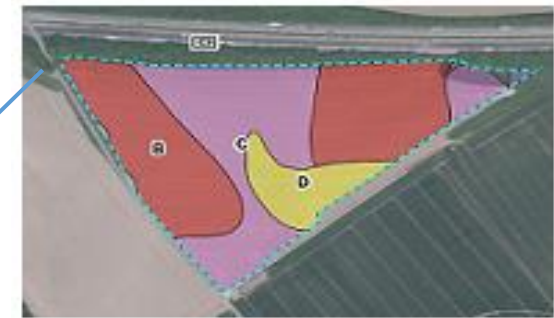


Geo-referenced SOC data set

Linking reference data set to predicted pixels



Composite samples (0-20 cm) based on soil series

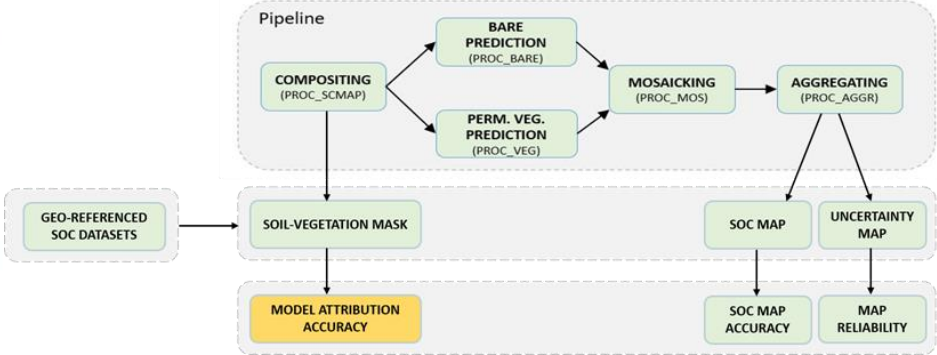
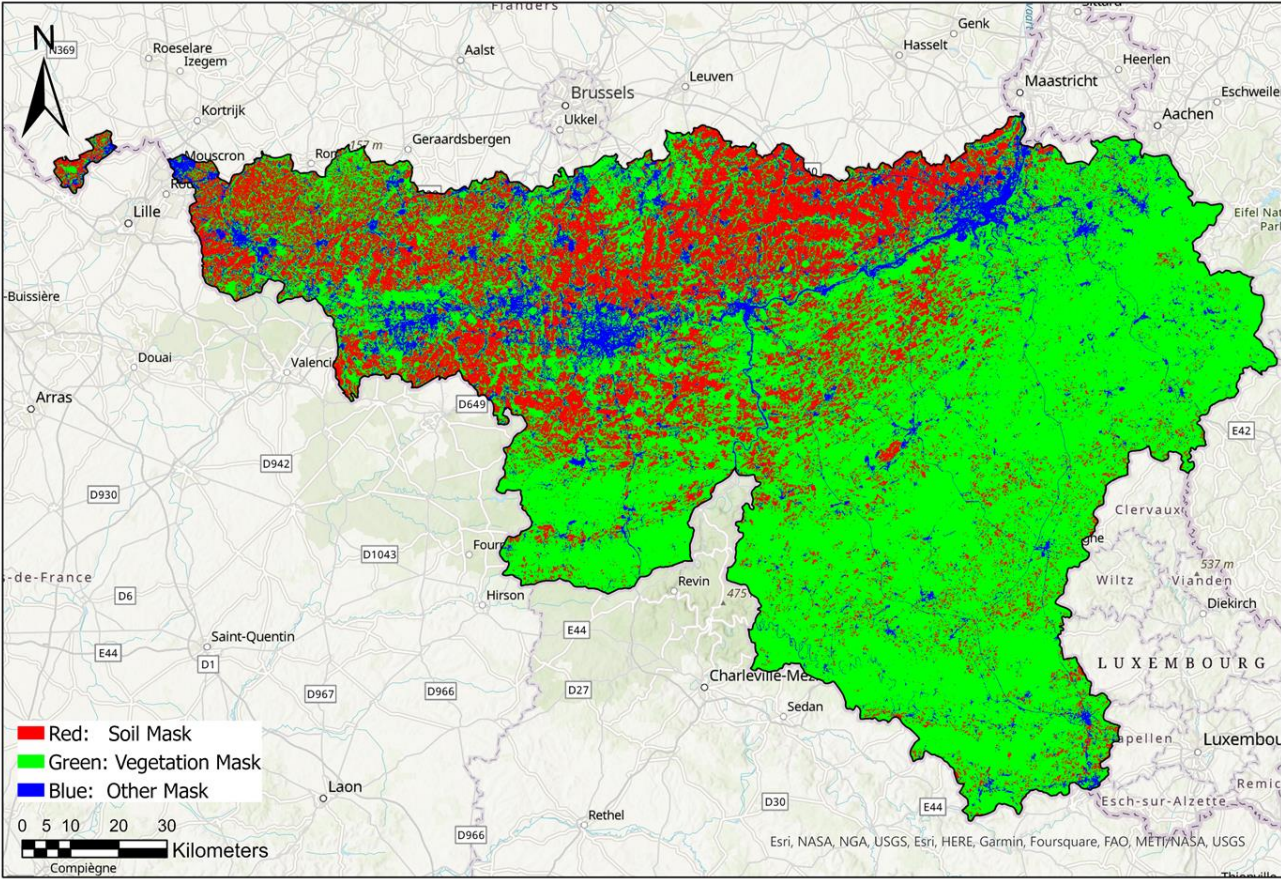


Requacarto



Model attribution accuracy

Worldsoils composite mask for Wallonia (2019-2021)



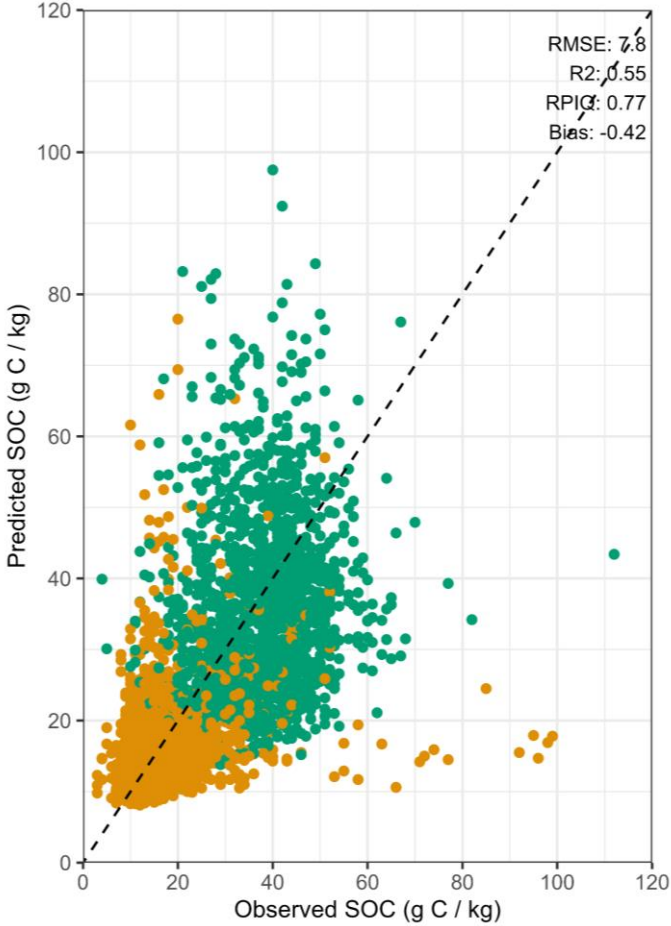
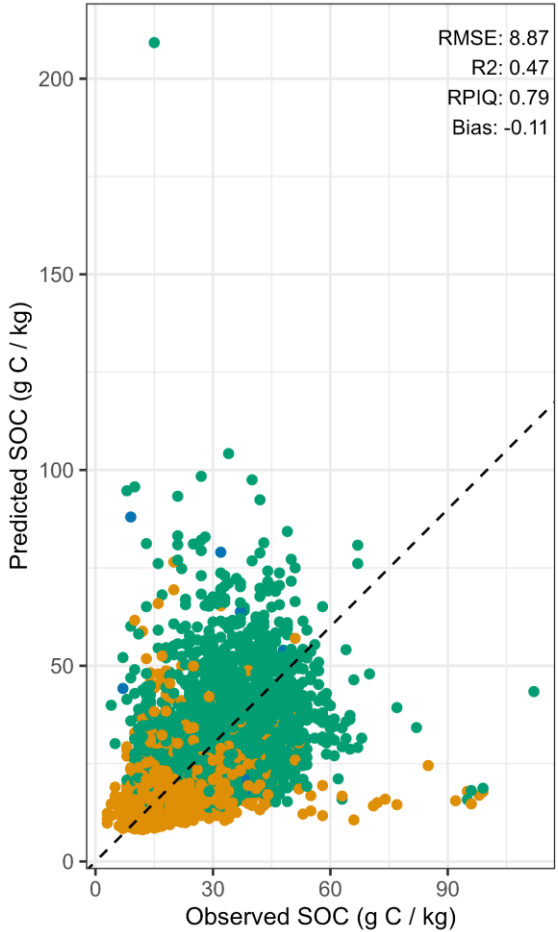
Model attribution accuracy

Confusion matrix of reference point data for model attribution

2019-2021		Point data (validation set)		Accuracy	0.94
		Croplands	Grasslands	95% CI	(0.93, 0.94)
Prediction	Bare soil	7886	108	No Information Rate	0.83
	Permanently vegetated	495	1666	P-Value [Acc > NIR]	2.2e-16
	Others	26	21	Kappa	0.80

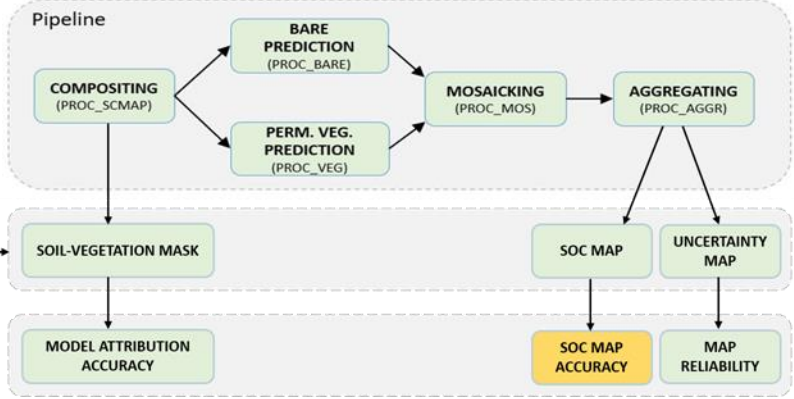


SOC map accuracy



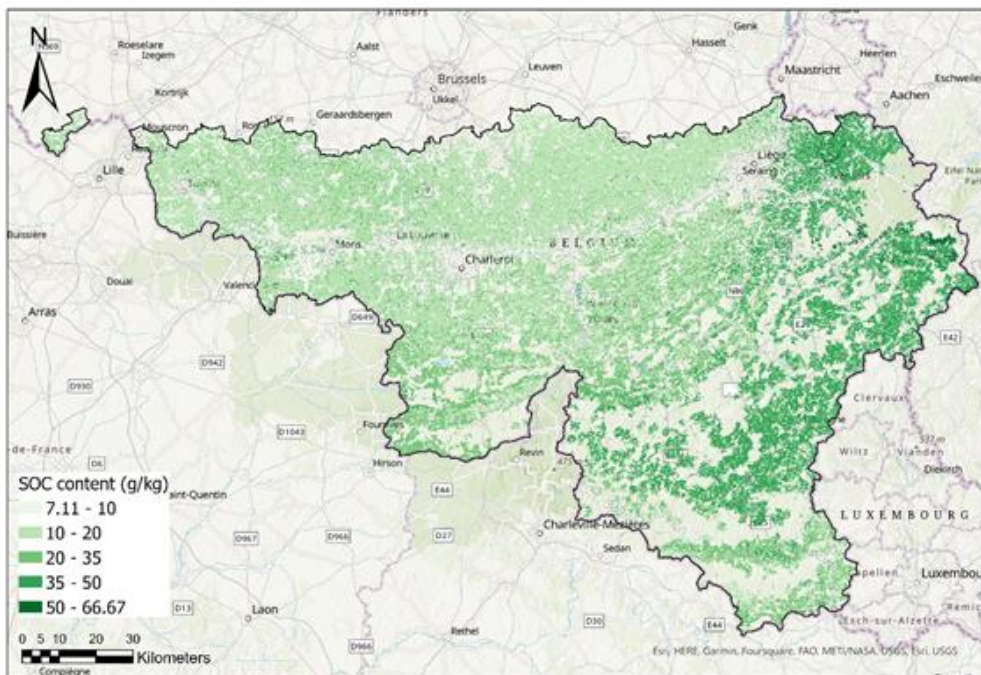
Model attribution ● Bare soil ● Permanently vegetated

Validation of 2019-2021 pixel values against corresponding reference data

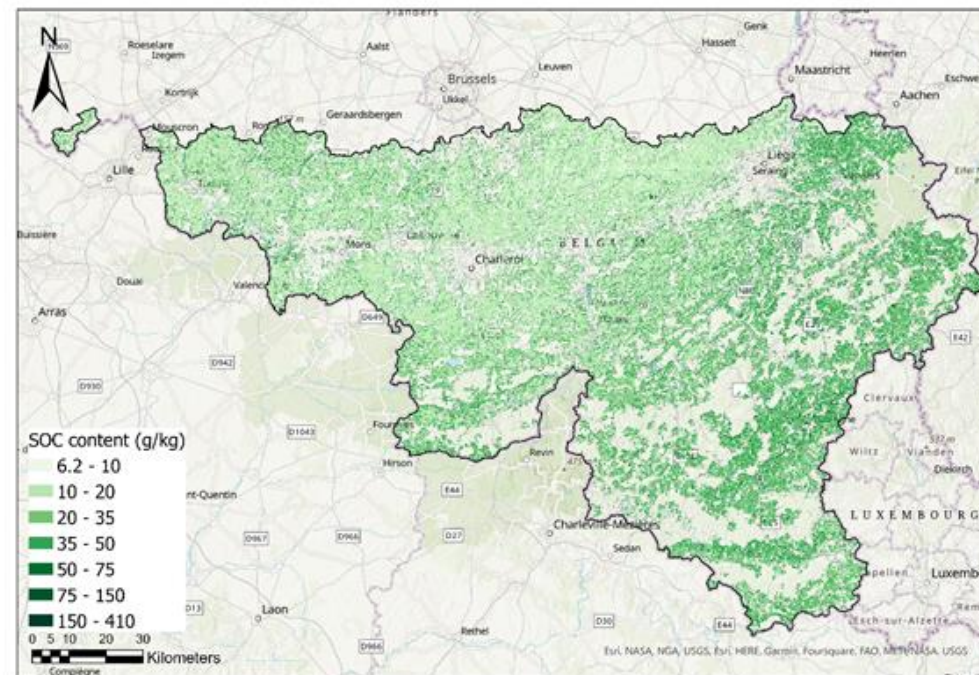


Model attribution ● Bare soil ● Permanently vegetated ● Other

SOC map accuracy



SOC map 2015-2019

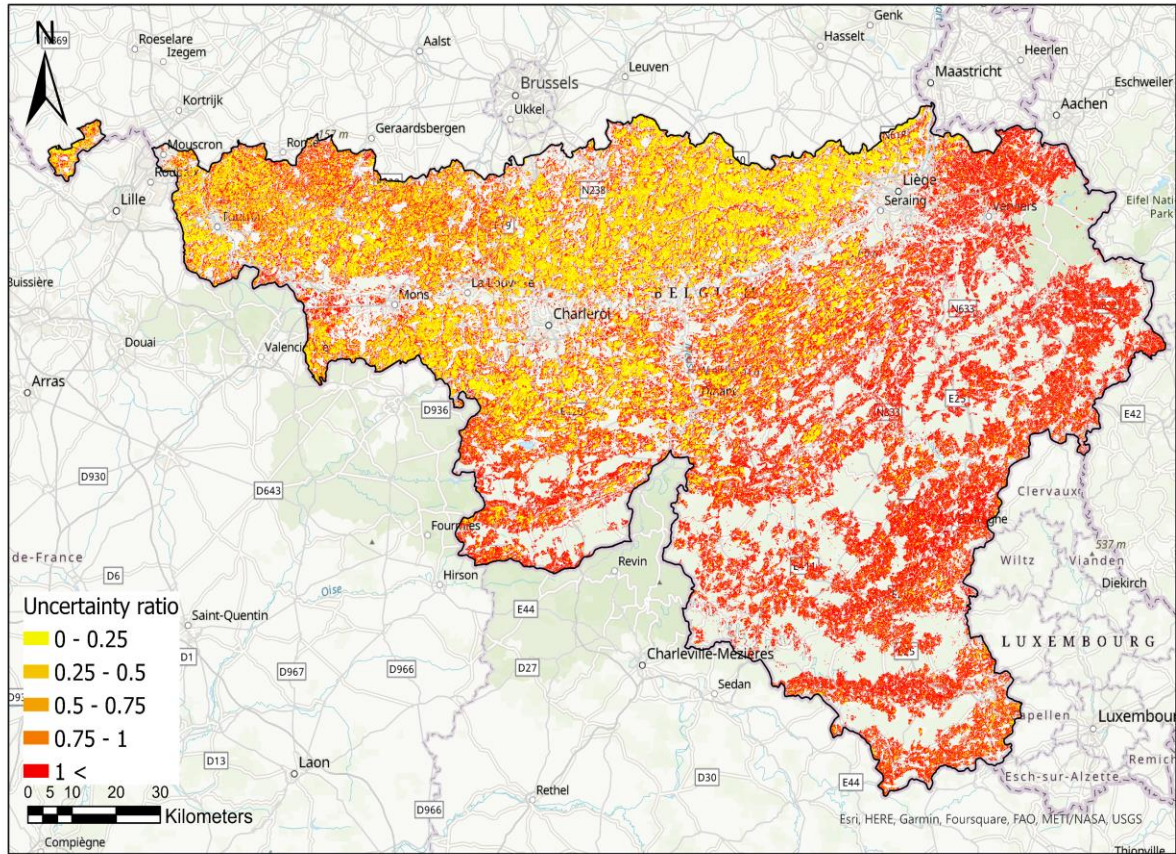


Worldsoils SOC map 2019-2021

<https://geoportail.wallonie.be/home.html>

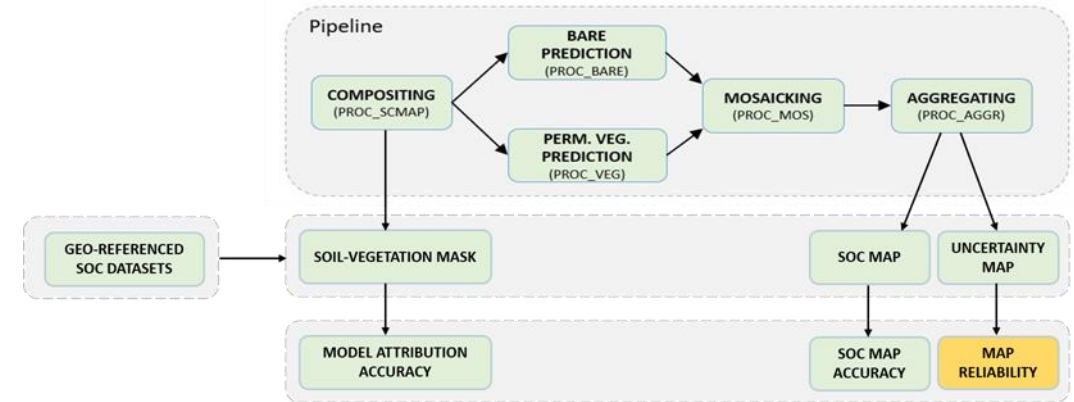


Map reliability



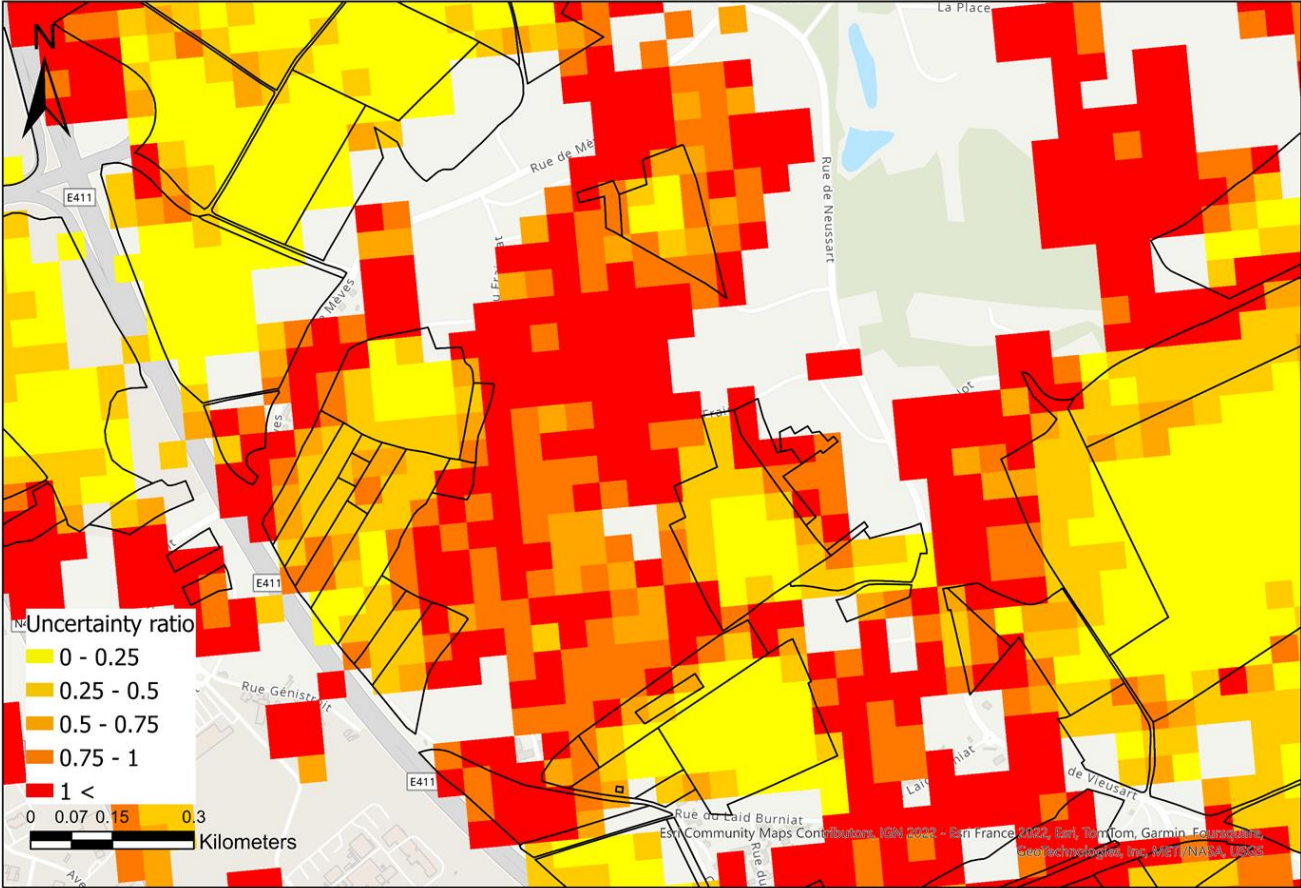
Andries et al. 2021: An accuracy of 90% means that out of 100 fields, the EO-based measurement would need to match (within uncertainties) the assessments of SOC obtained via traditional methods for at least 90 fields.

For 2019: 43% of the reference SOC data within the CI 90

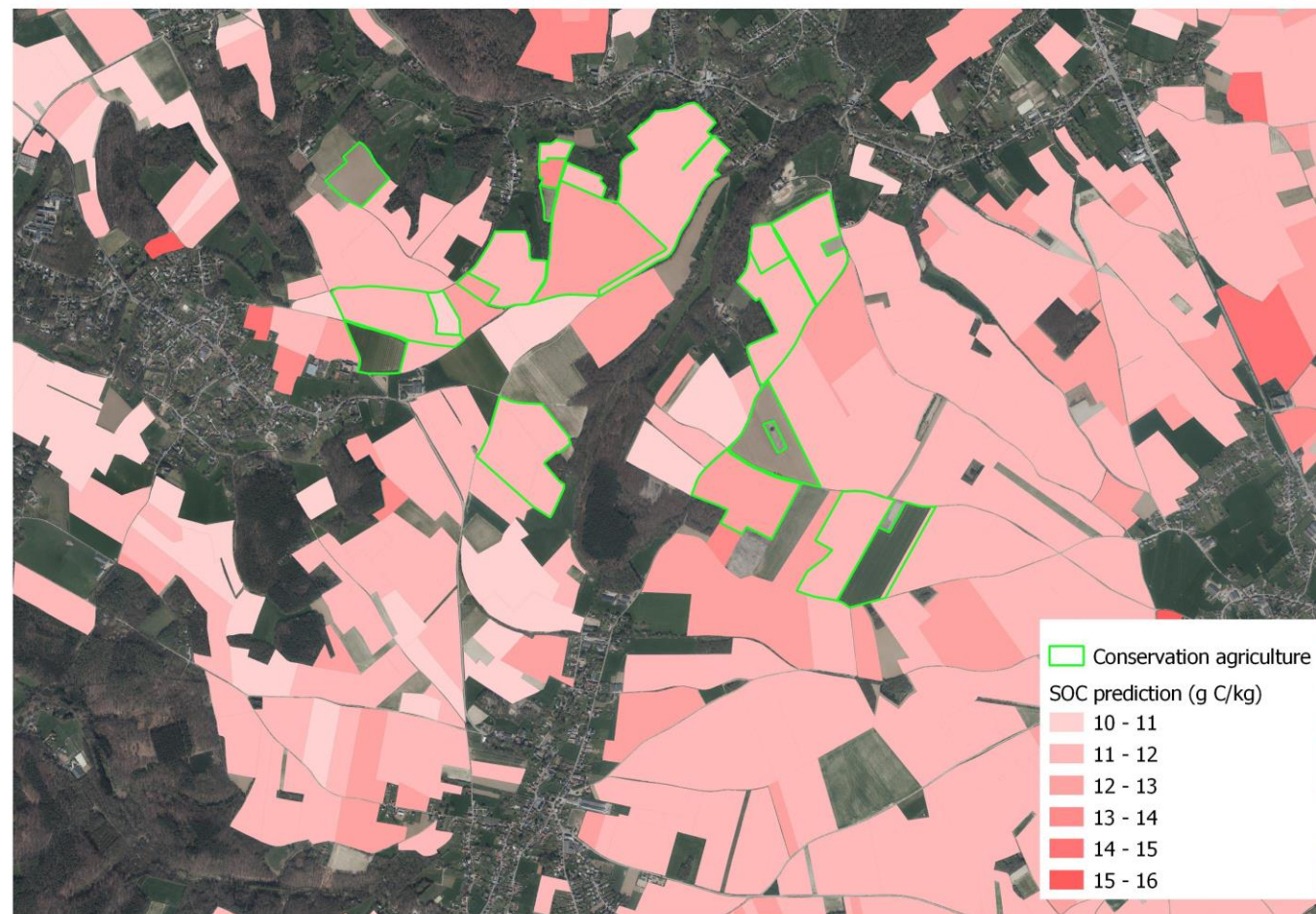


Map reliability

Uncertainty ratio map for croplands



Worldsoils protocol with regional data



RMSE 2,7 g/kg





Thank you!

bas.vanwesemael@uclouvain.be



ESA Symposium on Earth Observation for Soil Protection and Restoration



World Soil Information

UCLouvain



ARISTOTLE UNIVERSITY OF THESSALONIKI



GFZ Helmholtz-Zentrum POTSDAM



TEL AVIV UNIVERSITY תל אביב



Contract 400131273/20/I-NB