Session 3 – SOC prediction maps; Results for Central Macedonia

Nikolaos Tsakiridis, AUTh
Miltiadis Iatrou, ELGO
WORLDSOILS consortium

ESA Symposium on Earth Observation for Soil Protection and Restoration

Contract 400131273/20/I-NB

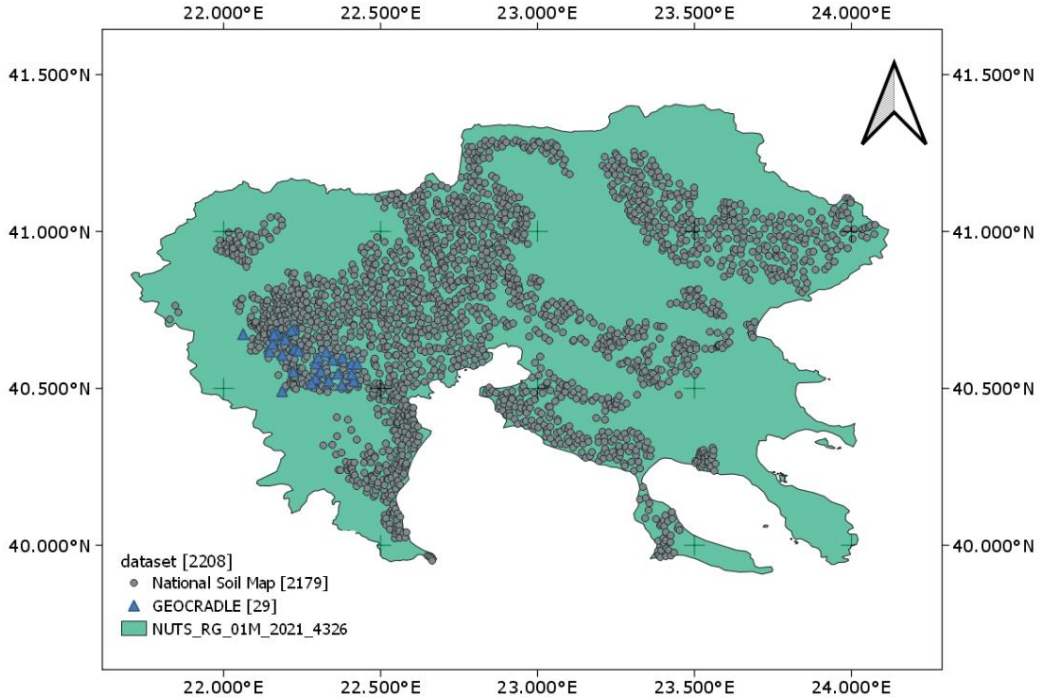
Central Macedonia, Northern Greece

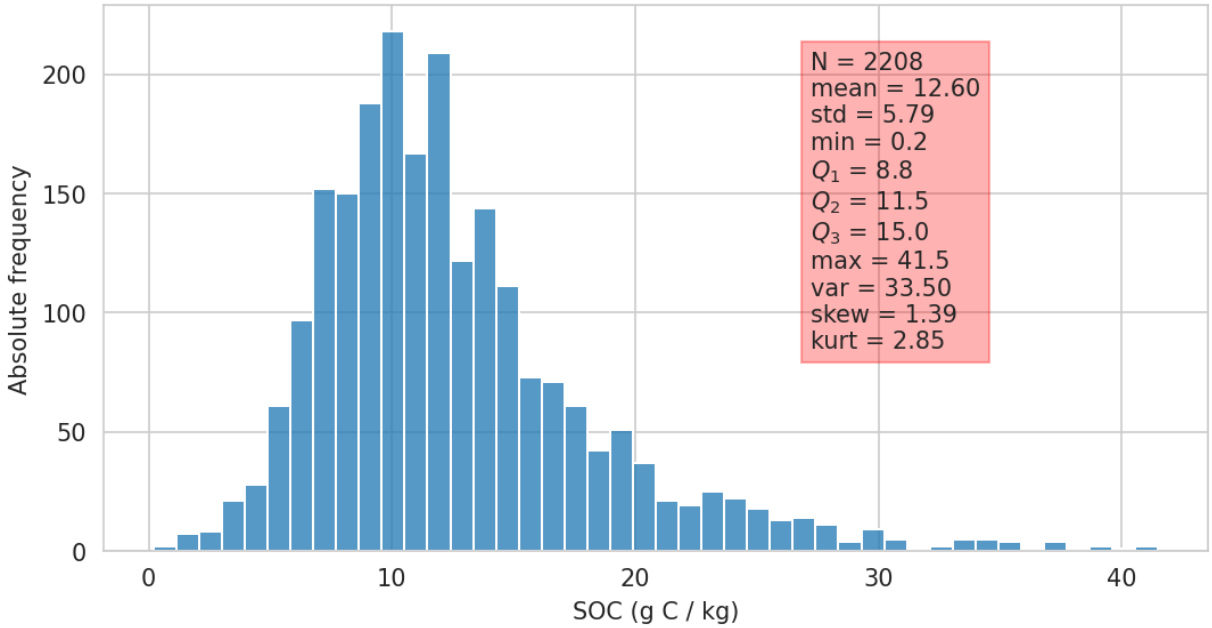
Regional characteristics

- Central Macedonia, in northern Greece, has a typical Mediterranean climate, influencing its status as an agricultural powerhouse.
- The region's climate features hot, dry summers and mild, wet winters, ideal for agriculture.
- The region's agricultural sector benefits from ample sunshine and long growing seasons, producing high-quality crops like olives, grapes, and cotton.
- The region's soil is dominated by Cambisols and Luvisols, with Leptosols and Fluvisols also present along river flood plains.

Geo-referenced SOC dataset

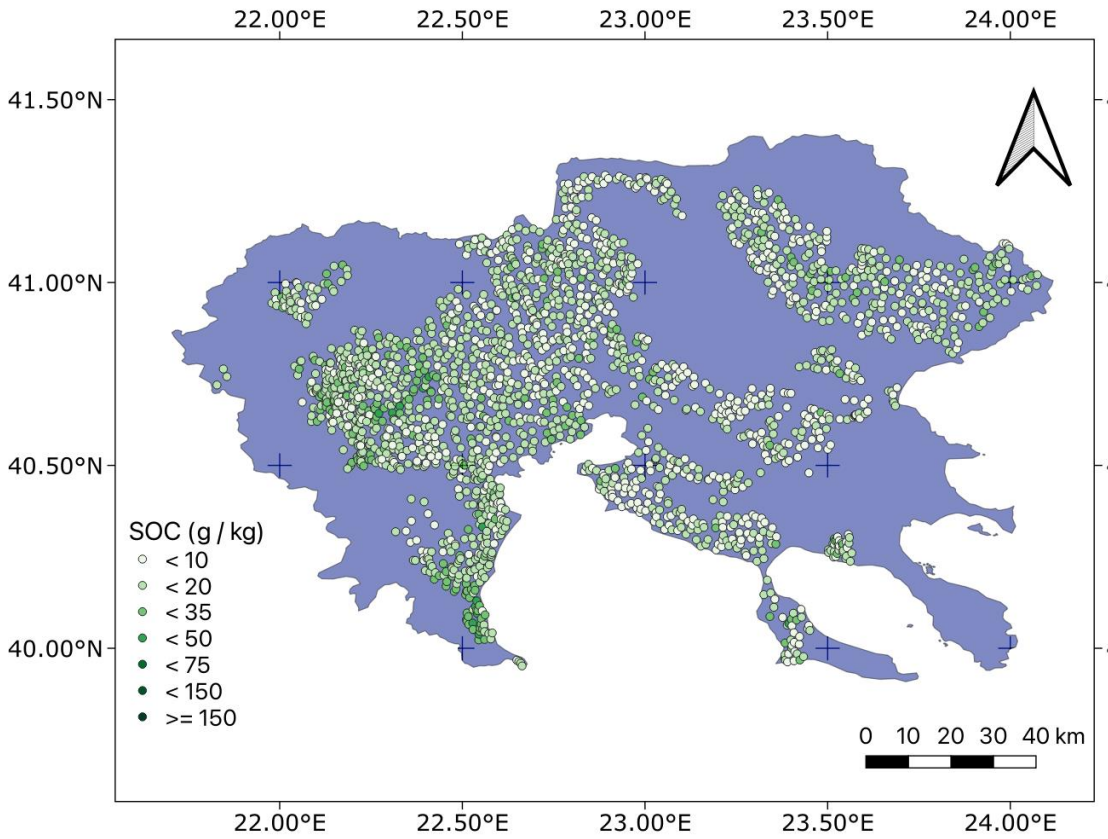
Regional dataset under consideration

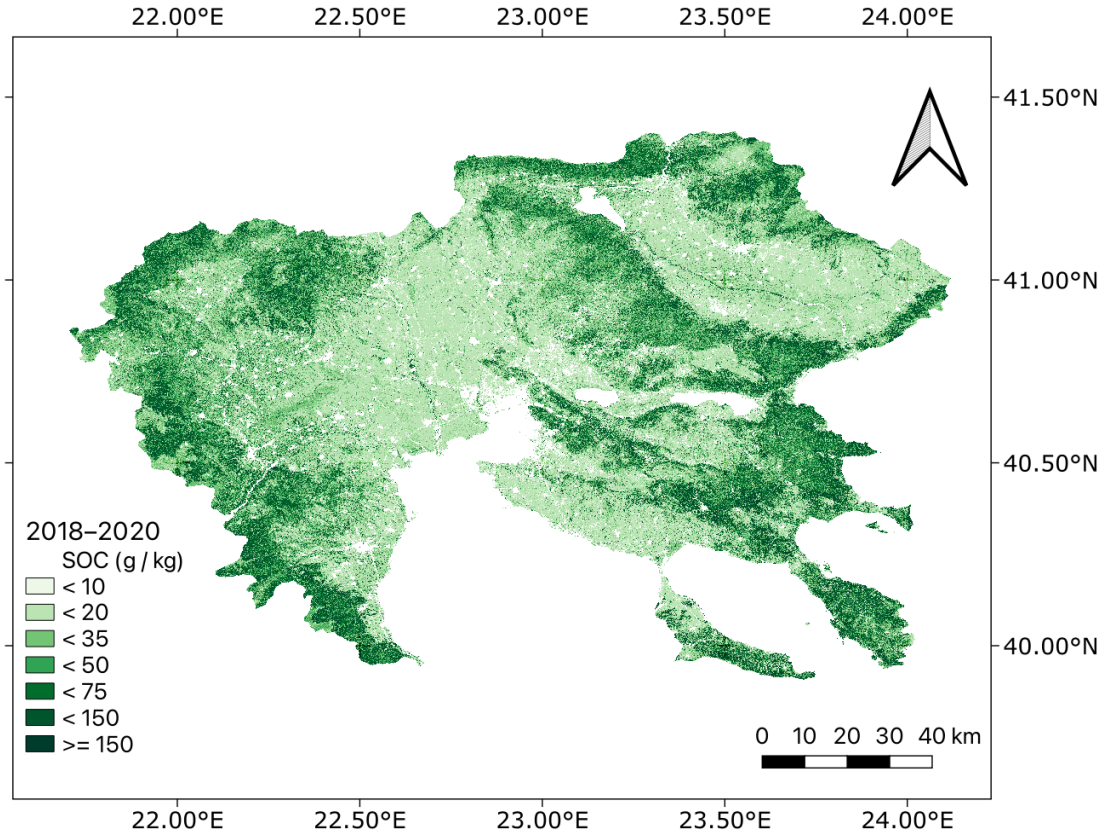




Geo-referenced SOC dataset

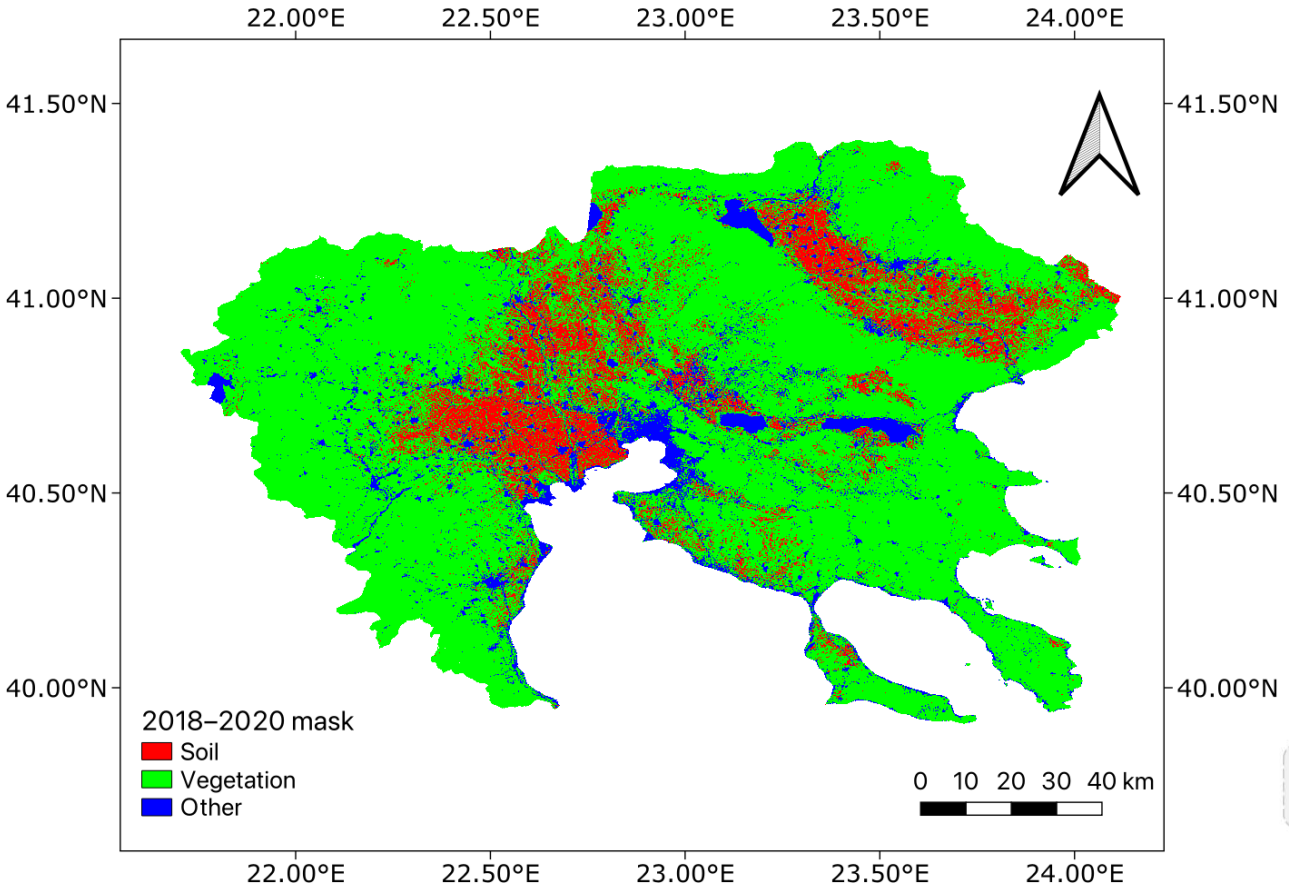
Macroscale analysis of spatial trends

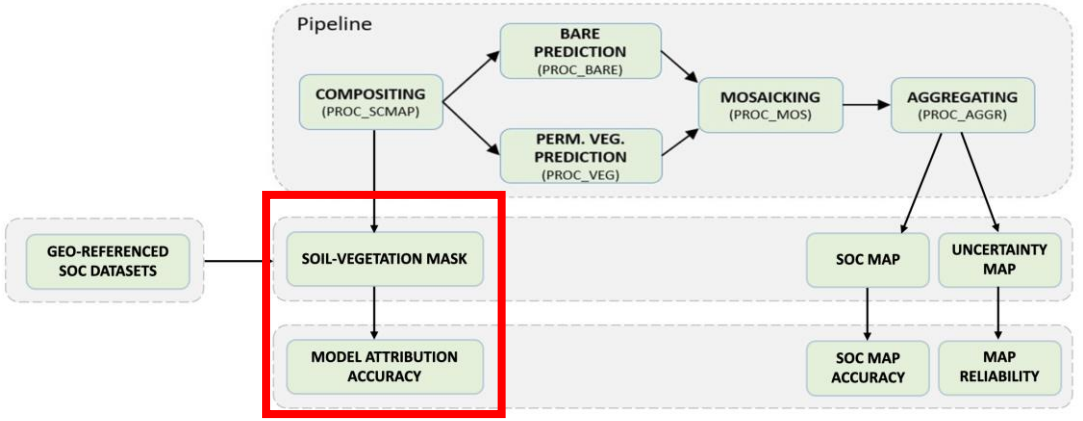




Model attribution accuracy

WorldSoils mask for Central Macedonia (2018–2020)





Model attribution accuracy

Confusion matrix (2018–2020)

		Point data (validation set)	
		Tree crops	Non-tree crops
Prediction	Bare soil	141	719
	Permanently vegetated	830	463
	Others	24	31

- Accuracy is relatively low due to the large number of tree crops (e.g., olive trees, peaches, etc.) which are classified as permanently vegetated
- This is intuitively correct as tree crops are perennial, however the wrong model is attributed
- Still, some annual crops are still detected as permanently vegetated (presence of cover crops?)

Model attribution accuracy

Confusion matrix (2018–2020)

		Point data (validation set)	
		Tree crops	Non-tree crops
Prediction	Bare soil	141	719
	Permanently vegetated	830	463
	Others	24	31

- Accuracy is relatively low due to the large number of tree crops (e.g., olive trees, peaches, etc.) which are classified as permanently vegetated
- This is intuitively correct as tree crops are perennial, however the wrong model is attributed
- Still, some annual crops are still detected as permanently vegetated (presence of cover crops?)

Model attribution accuracy

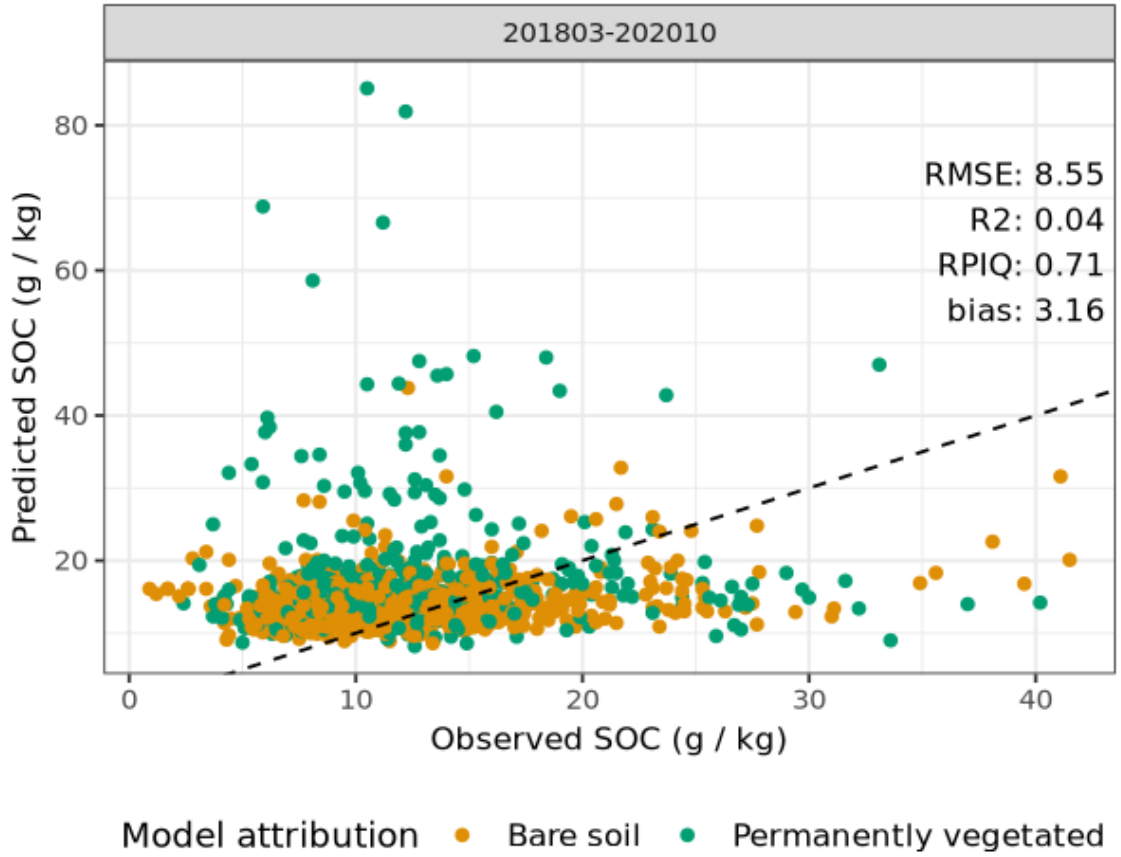
Confusion matrix (2018–2020)

		Point data (validation set)	
		Tree crops	Non-tree crops
Prediction	Bare soil	141	719
	Permanently vegetated	830	463
	Others	24	31

- Accuracy is relatively low due to the large number of tree crops (e.g., olive trees, peaches, etc.) which are classified as permanently vegetated
- This is intuitively correct as tree crops are perennial, however the wrong model is attributed
- Still, some annual crops are still detected as permanently vegetated (presence of cover crops?)

SOC map accuracy

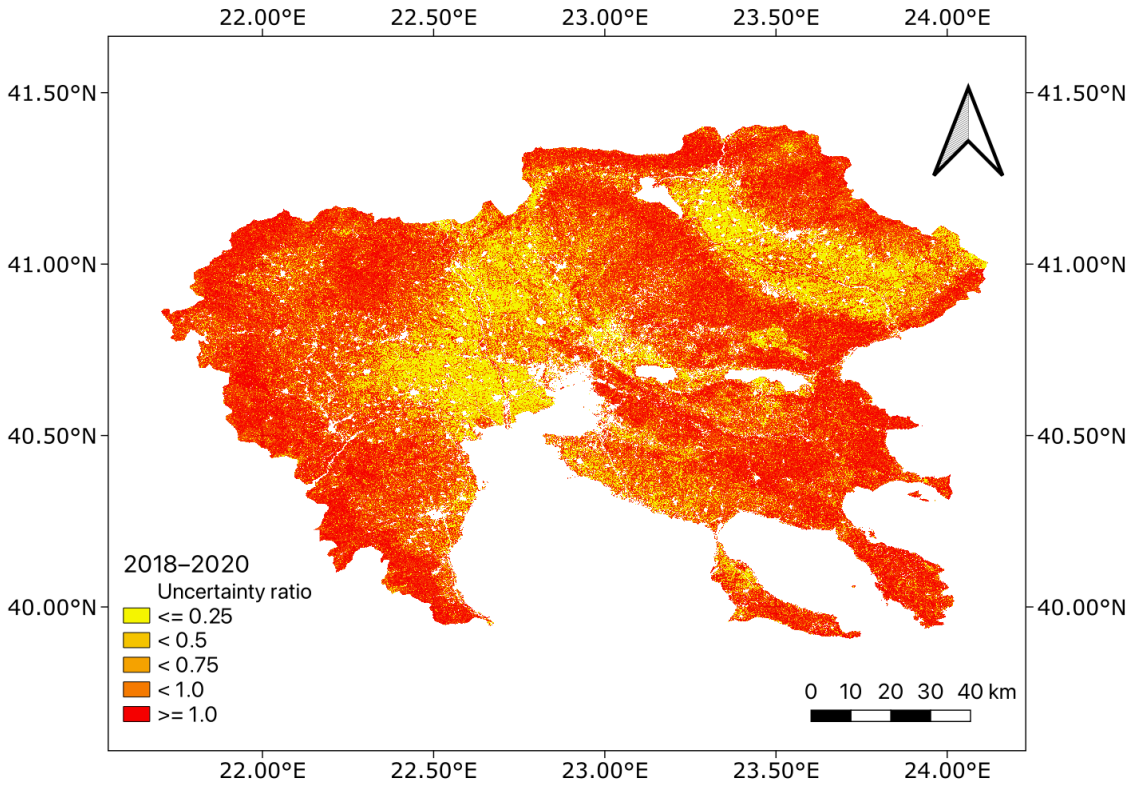
Scatter plot for 2018–2020



- SOC accuracy is relatively low (but influenced by few outliers)
- This is mostly due to the wrong model being used to predict a few croplands, even after accounting for the tree crops
- This could be a typical case for Mediterranean climate

Map reliability

Uncertainty ratio for 2018–2020



- Model uncertainty trend follows mostly the bare soil / vegetated mask.
- The vegetated model appears to have a higher uncertainty ratio.
- Percentage of samples within CI90 using the validation points: 54.08 %

Thank you!

Nikolaos Tsakiridis, tsakirin@auth.gr
Miltiadis Iatrou, miatrou@elgo.gr

ESA Symposium on Earth Observation for Soil Protection and Restoration

Contract 400131273/20/I-NB