

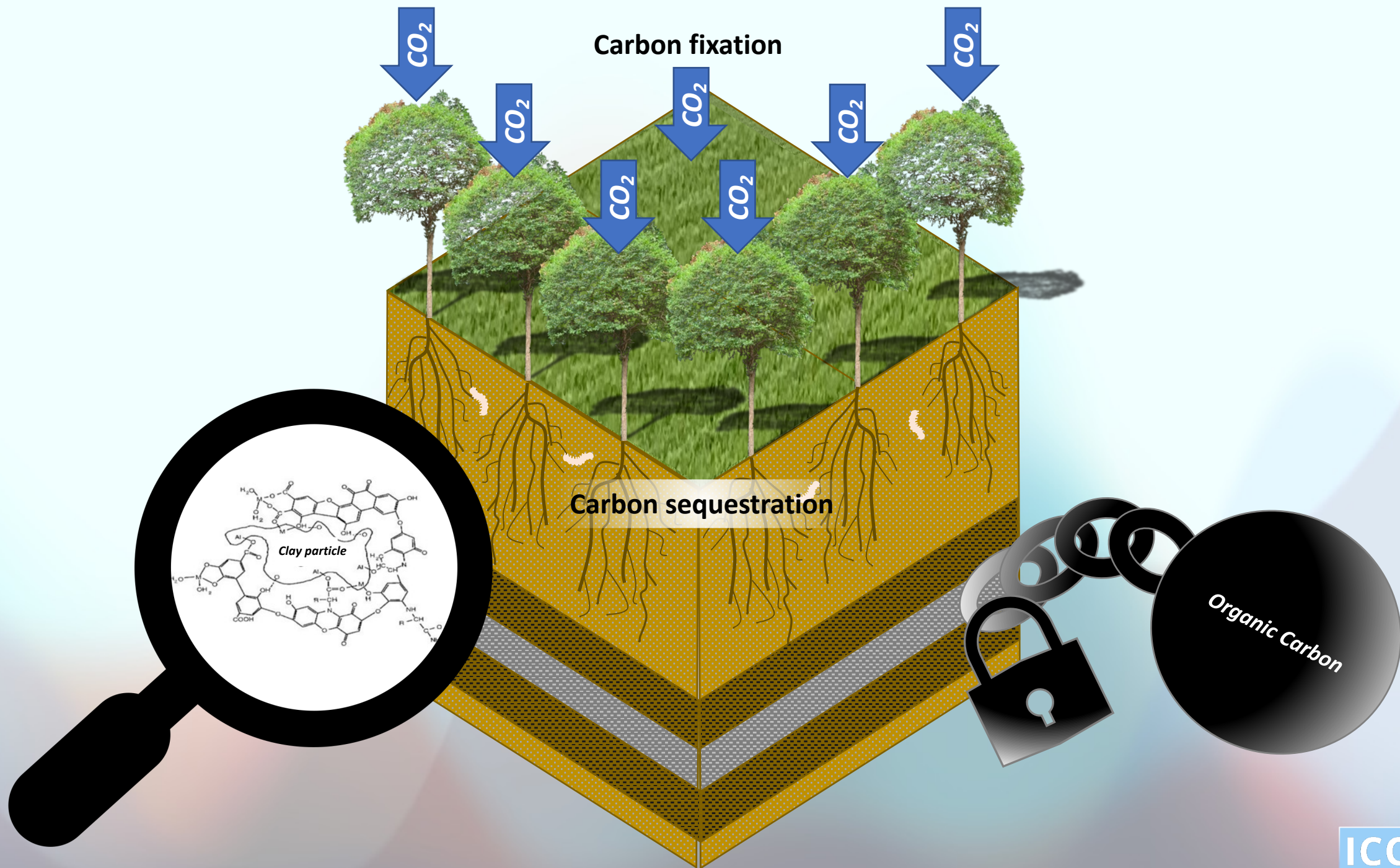
Monitoraggio del contenuto di carbonio organico nei suoli agricoli della Provincia di Ferrara

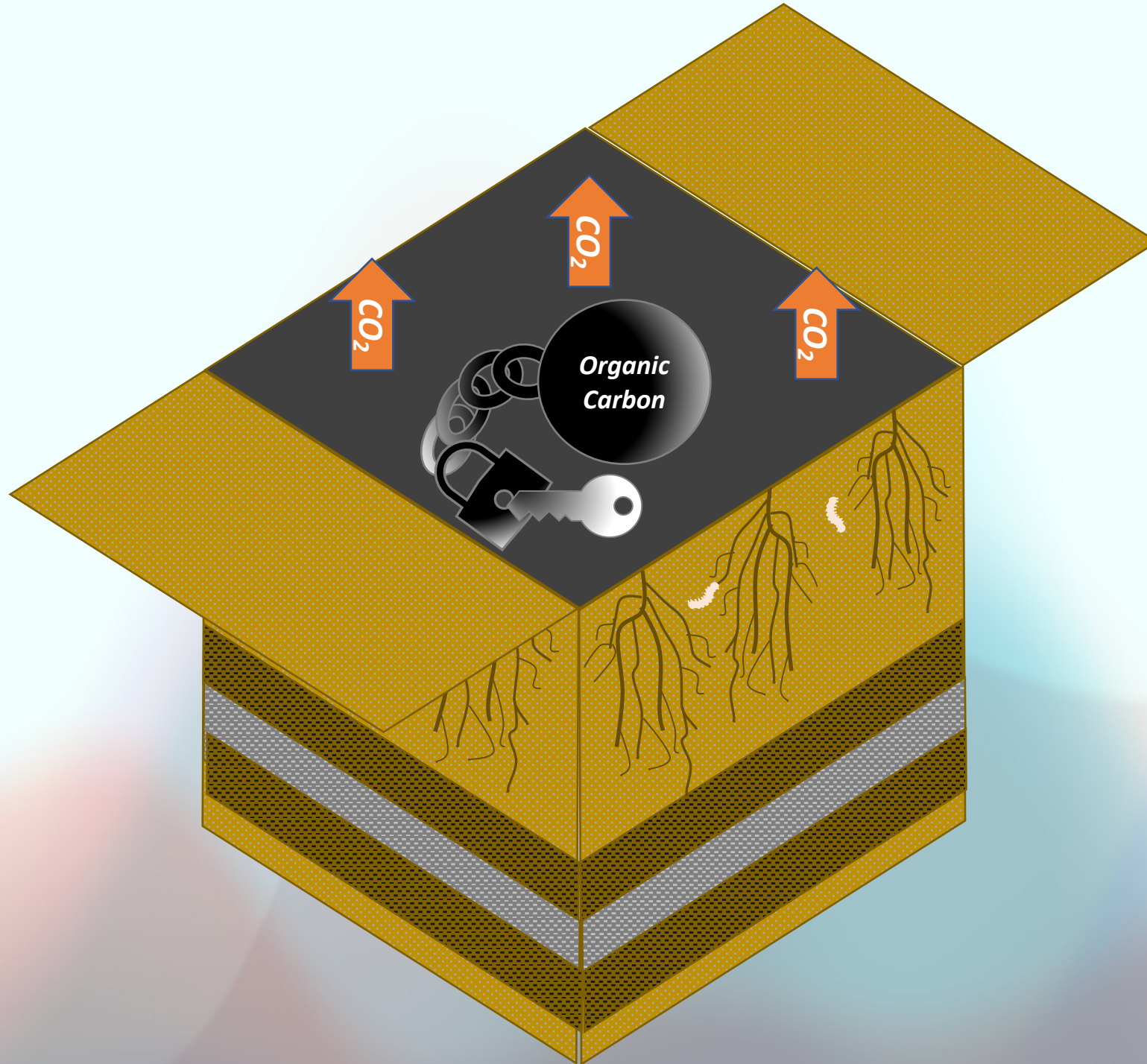
G.M. Salani^{a*}, G. Bianchini^a, V. Brombin^a, C. Natali^b

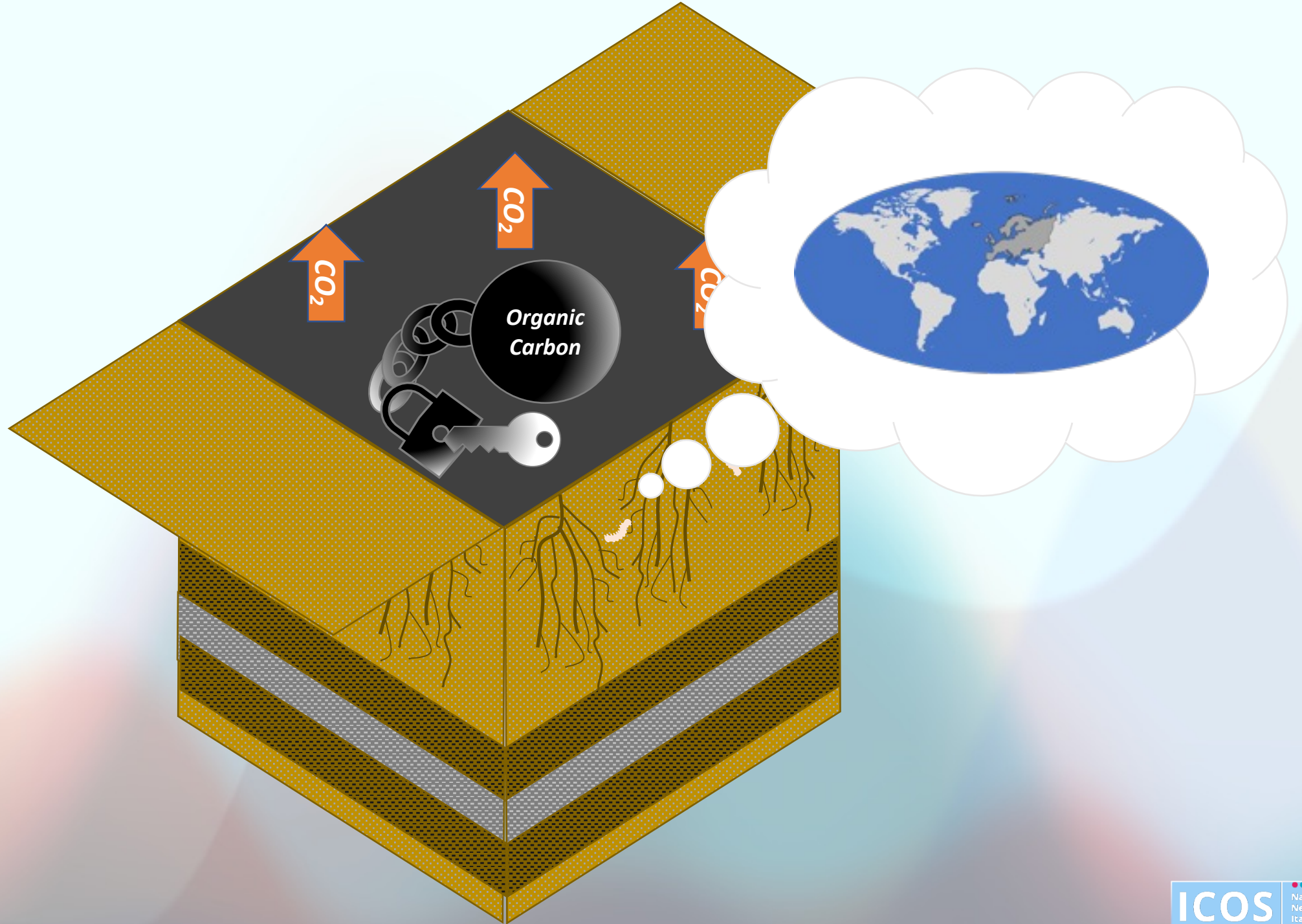
^a Dipartimento di Fisica e Scienze della Terra, Università degli Studi di Ferrara

^b Dipartimento di Scienze della Terra, Università degli Studi di Firenze

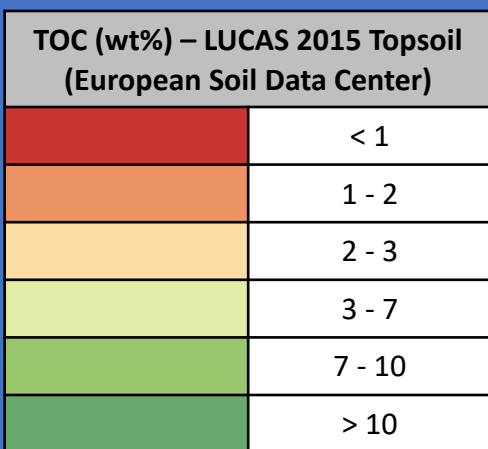
*slngrmr@unife.it

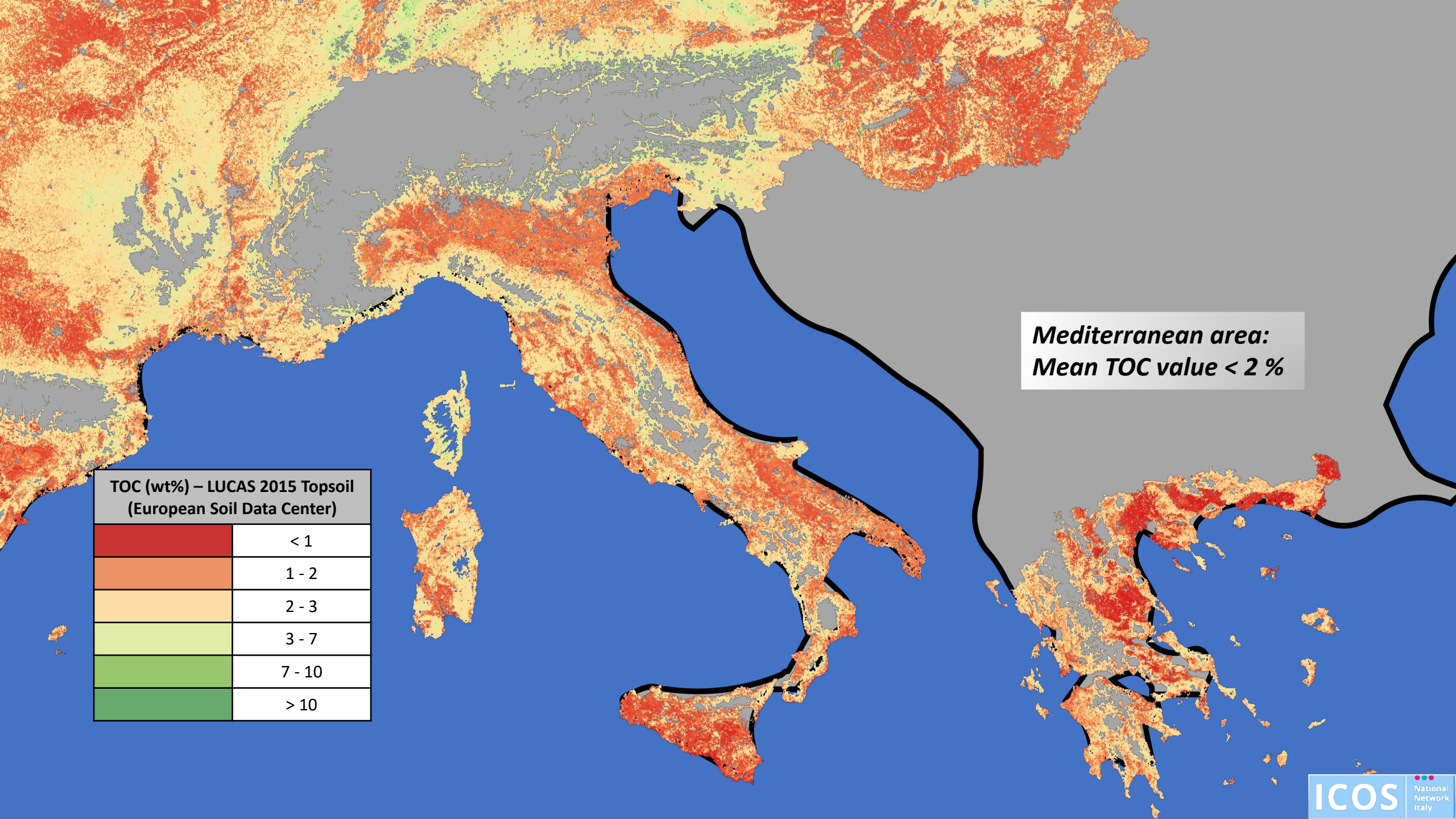










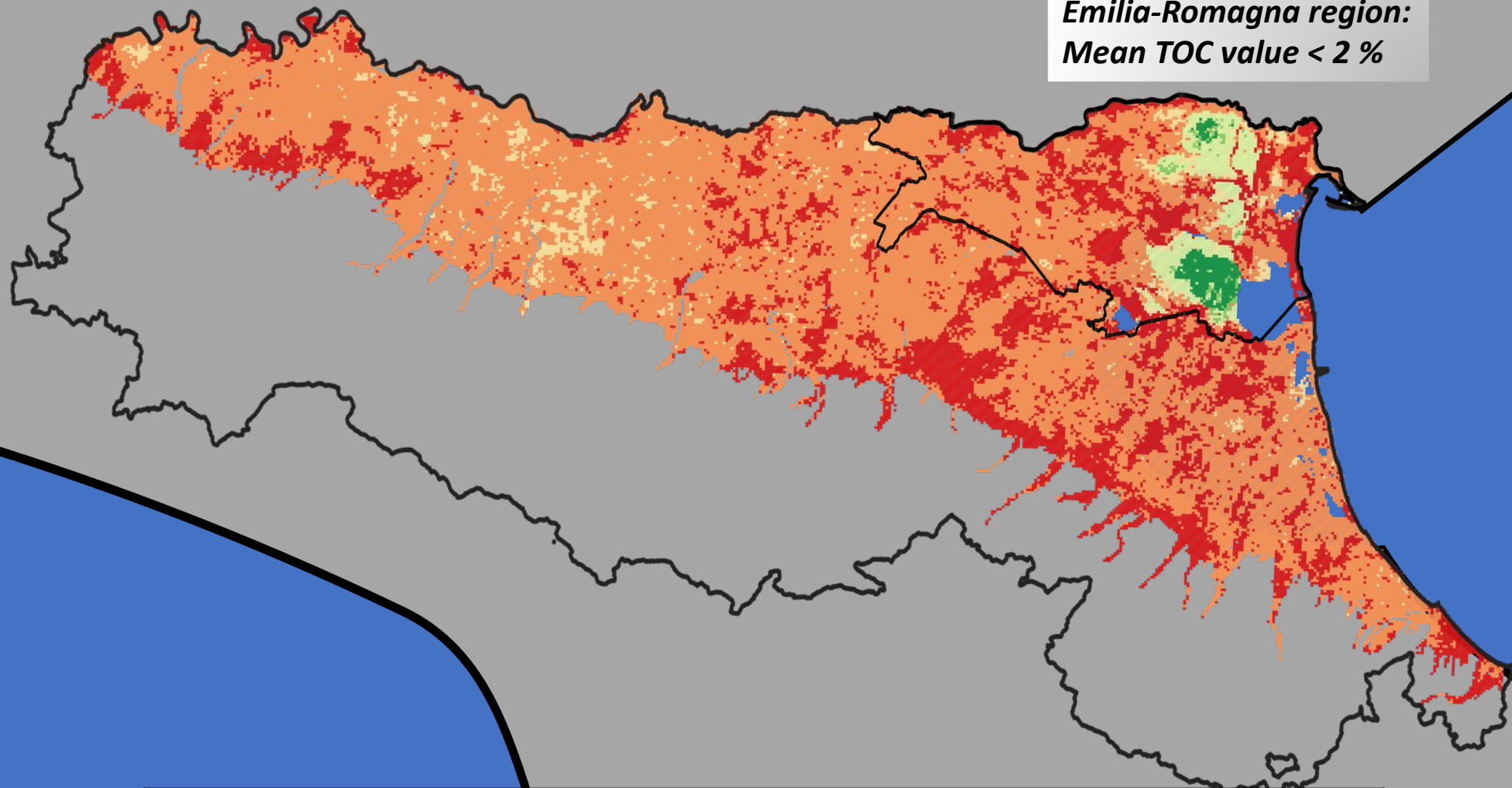


TOC (wt%) – LUCAS 2015 Topsoil
(European Soil Data Center)

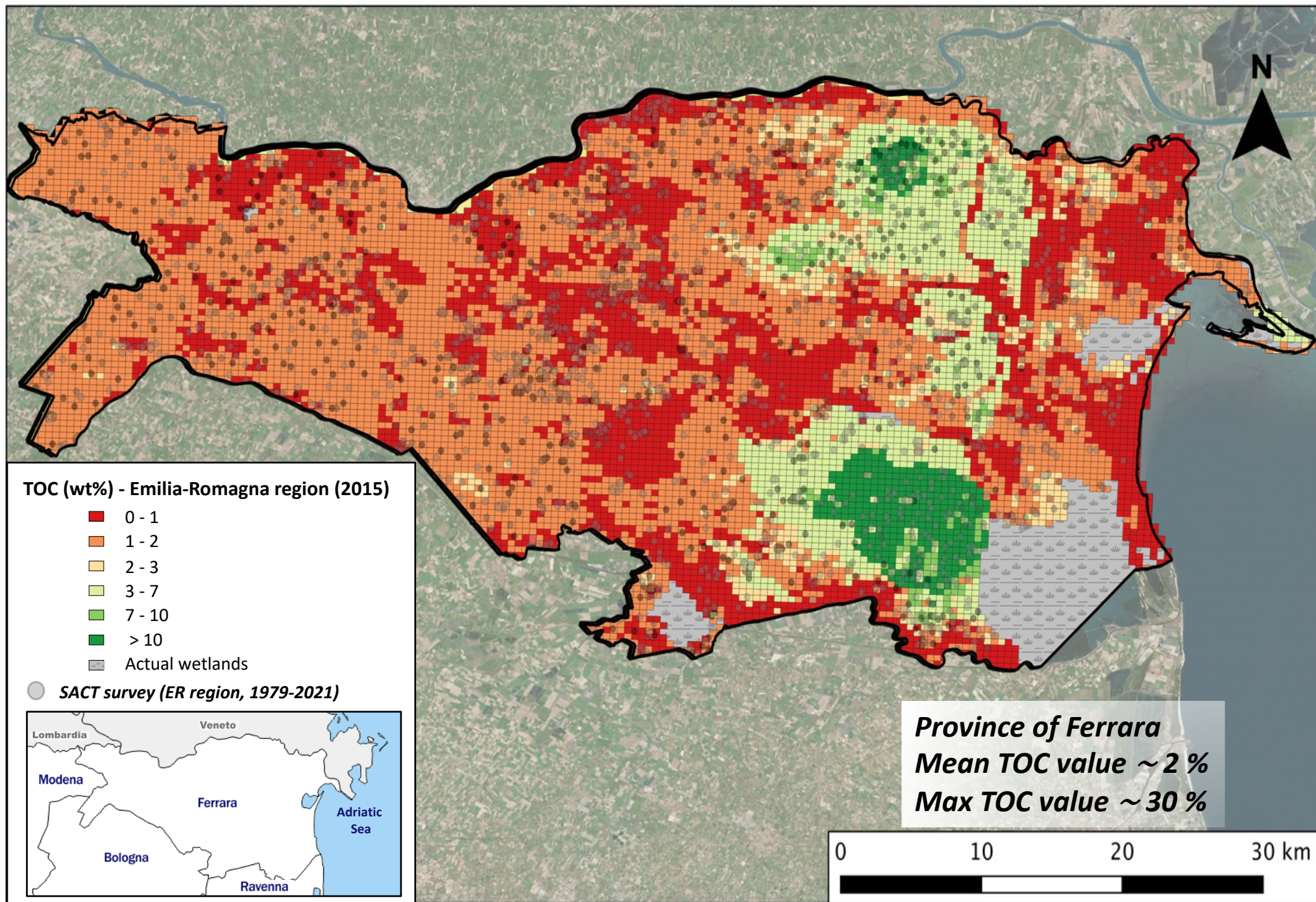
	< 1
	1 - 2
	2 - 3
	3 - 7
	7 - 10
	> 10

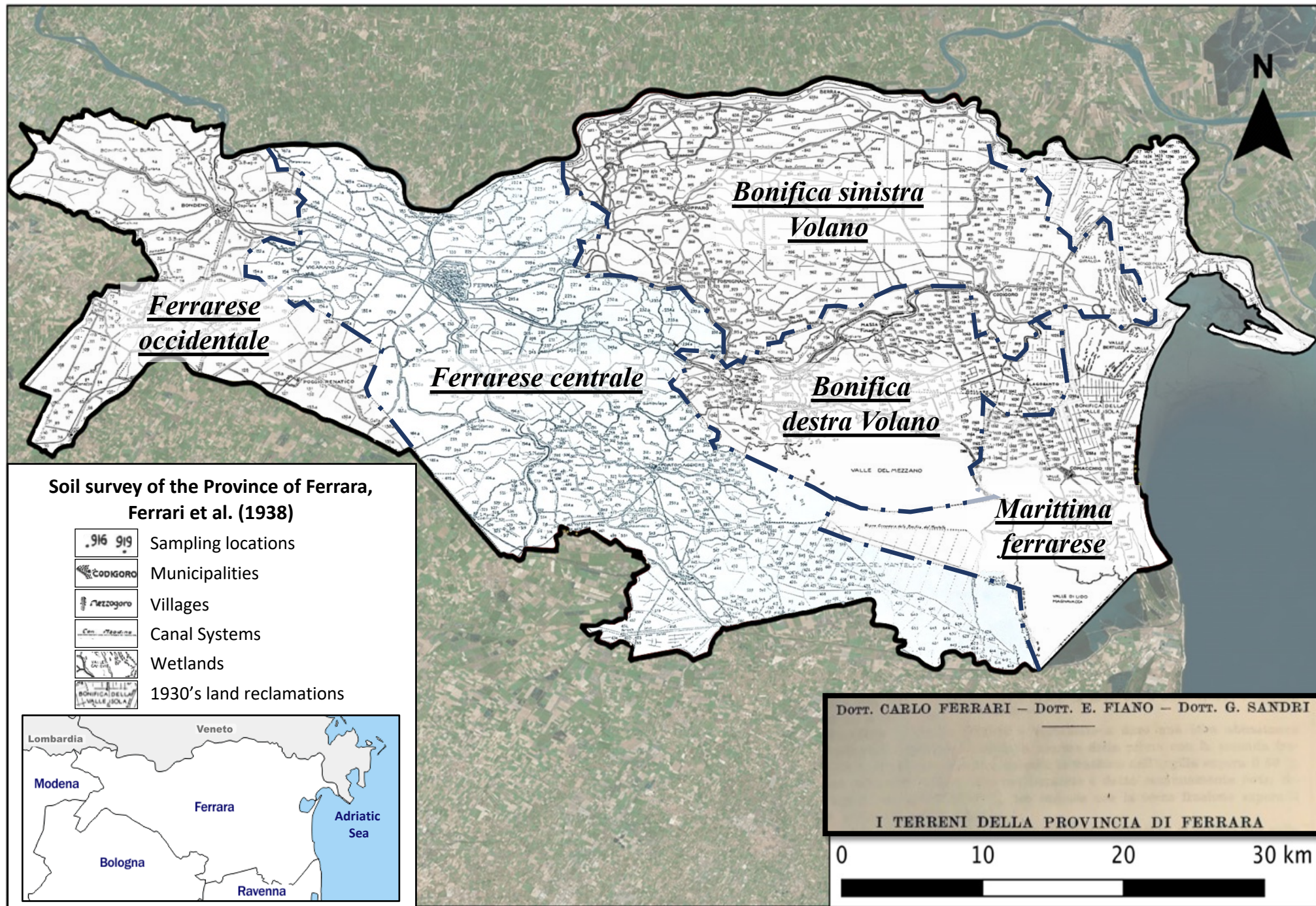
*Mediterranean area:
Mean TOC value < 2 %*

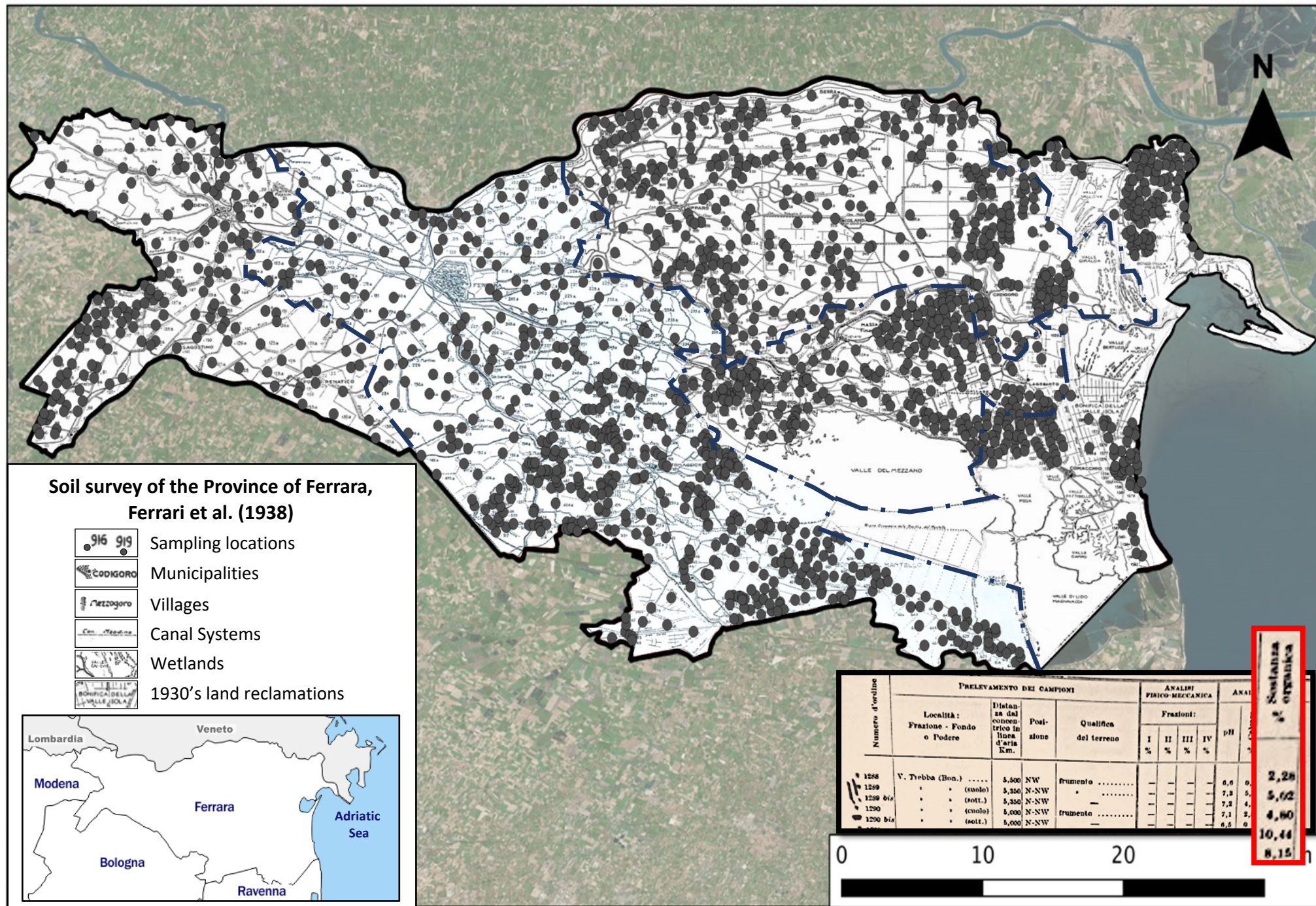
**Emilia-Romagna region:
Mean TOC value < 2 %**

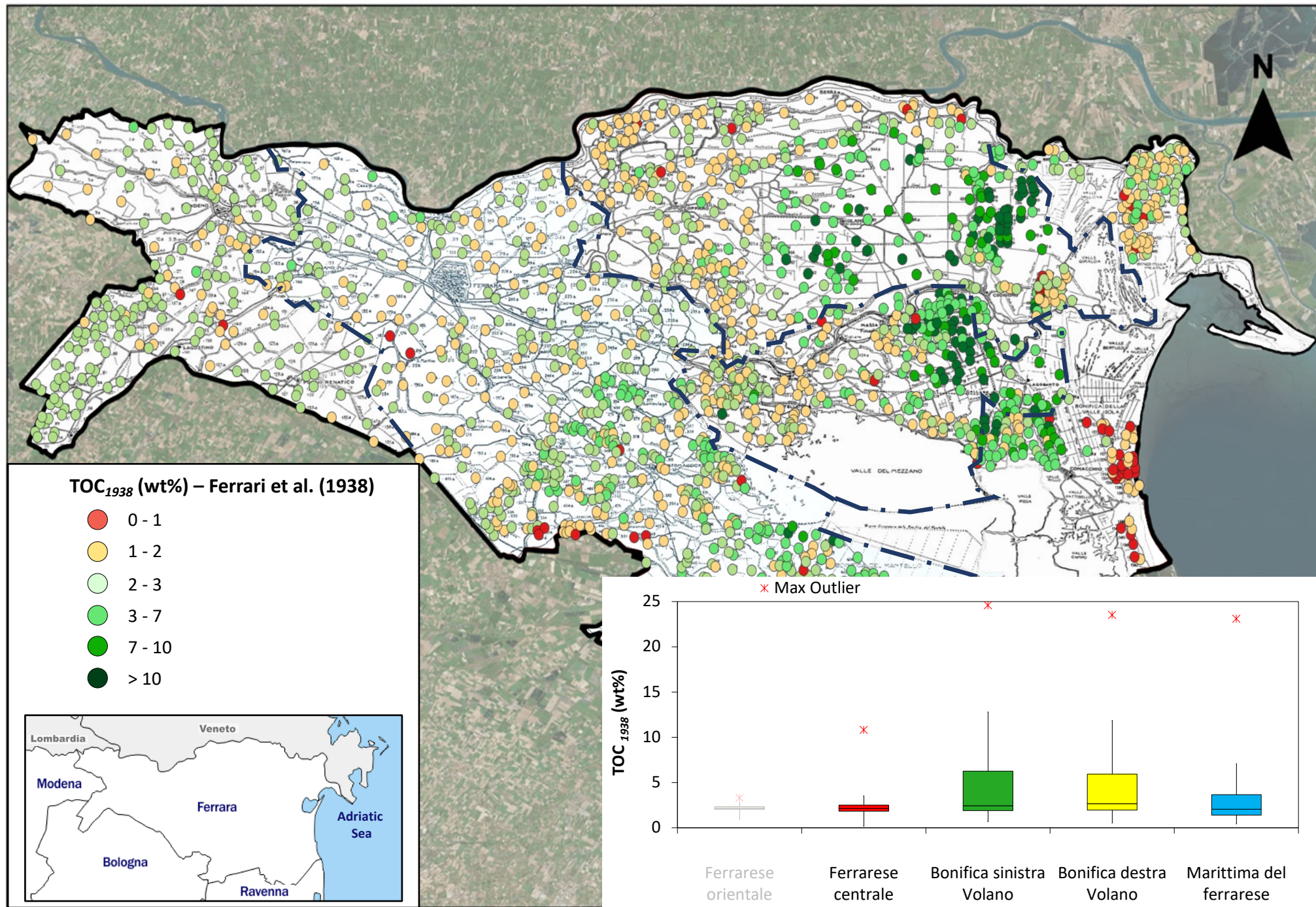


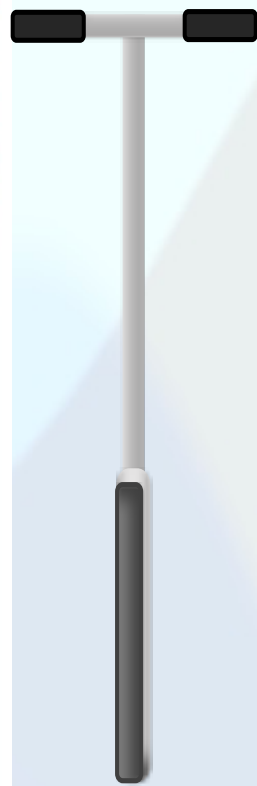
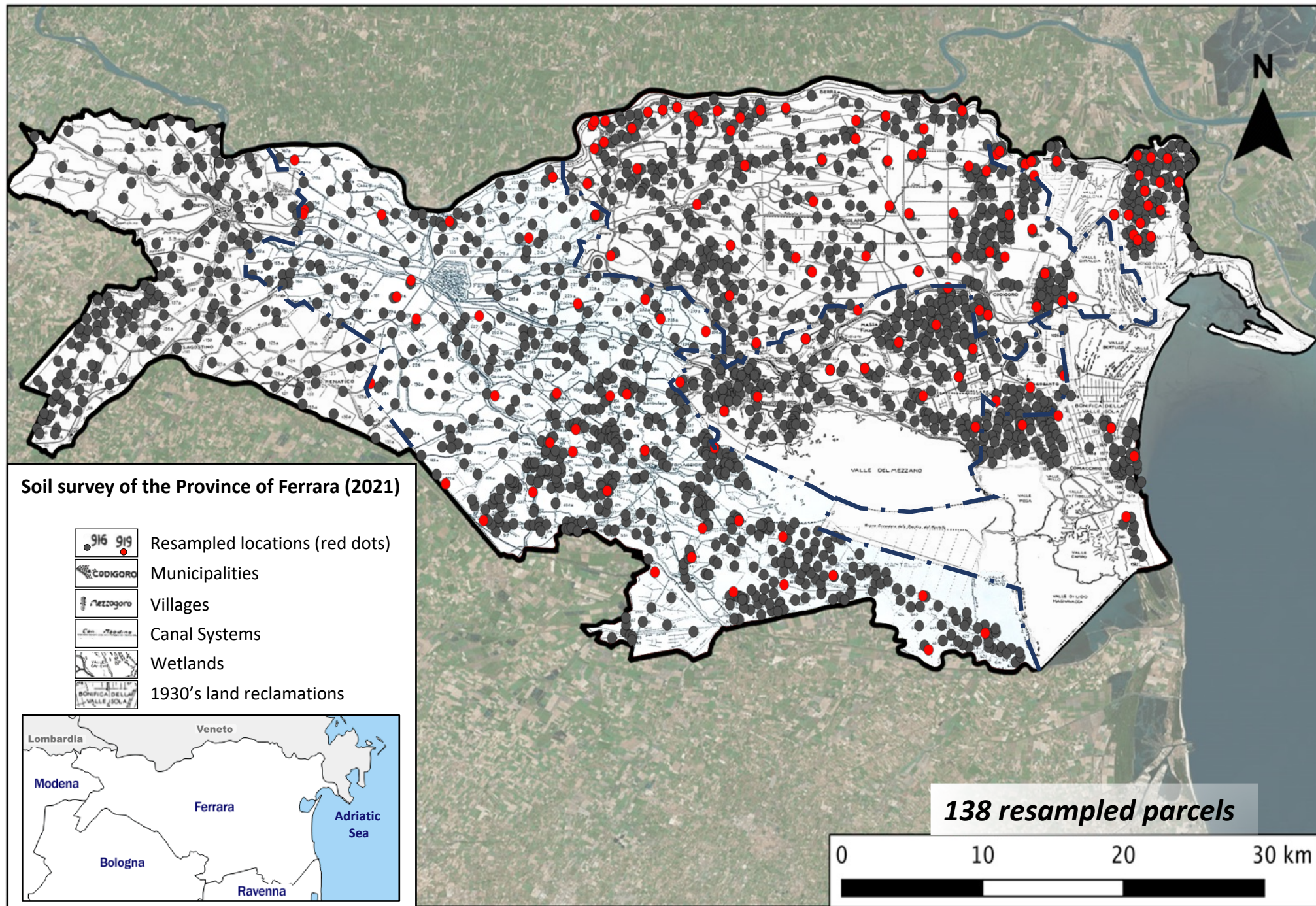
TOC (wt%) 0- 30 cm (depth) Padanian Valley – Emilia-Romagna region (2015)					
< 1	1 - 2	2 - 3	3 - 7	7 - 10	> 10









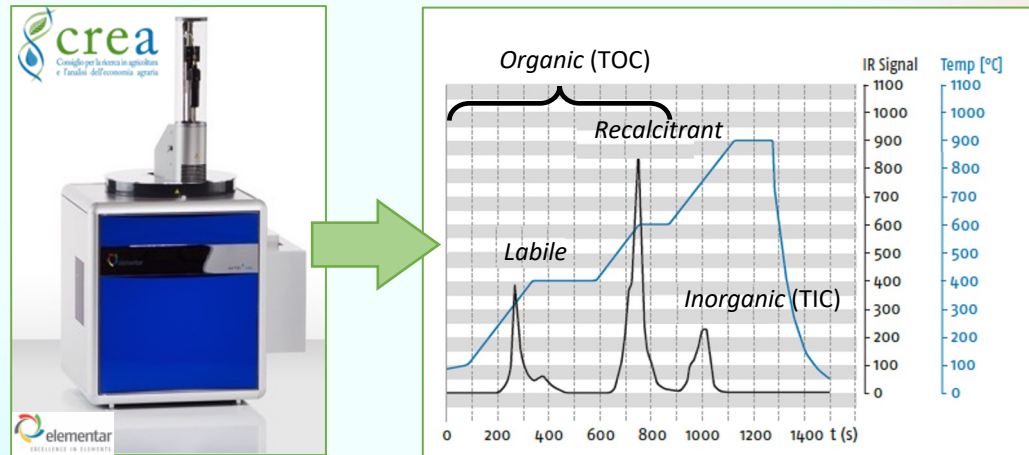


Treatment of samples

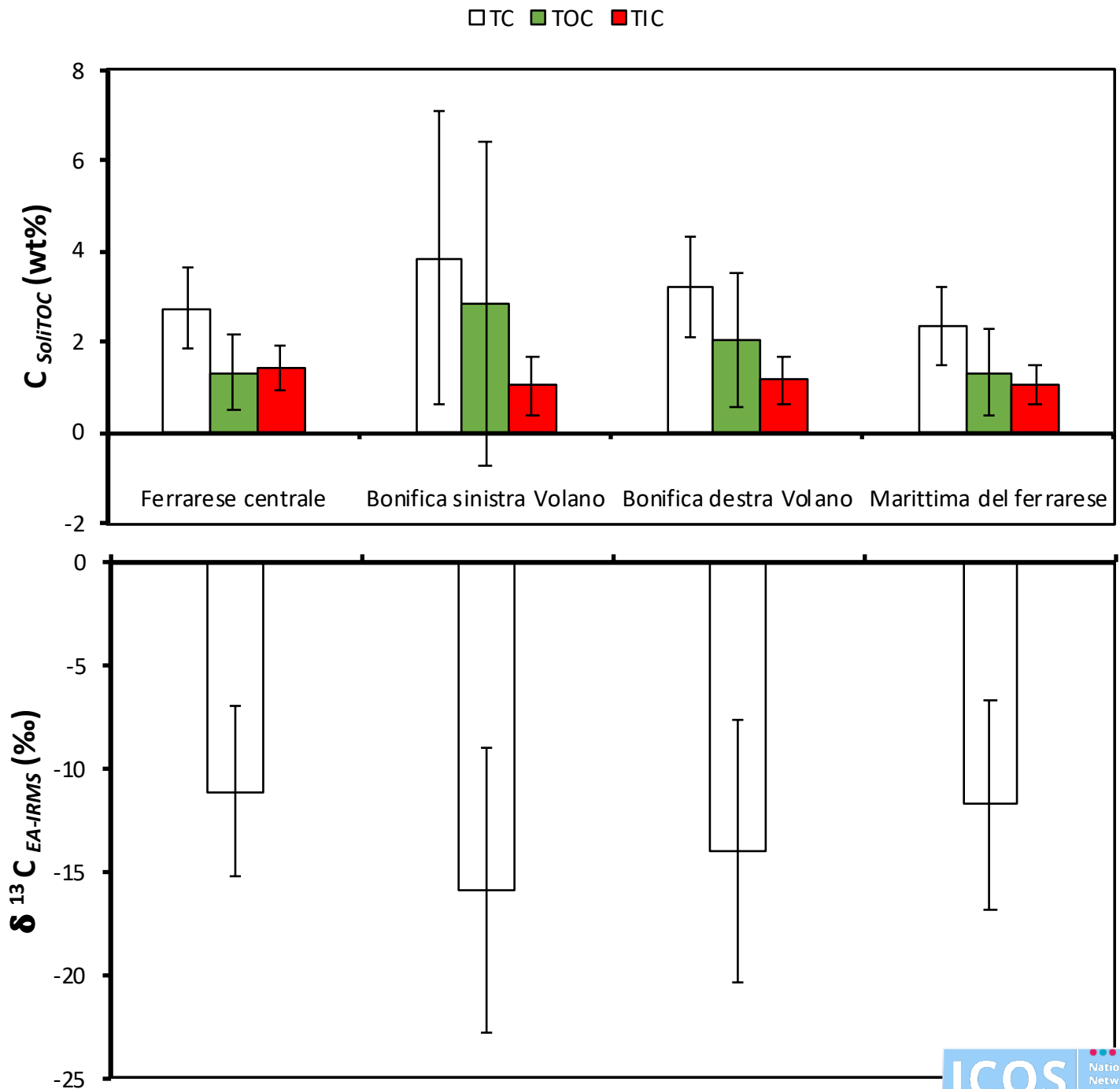
i) Air drying, ii) 2mm sieving, and iii) powdering.

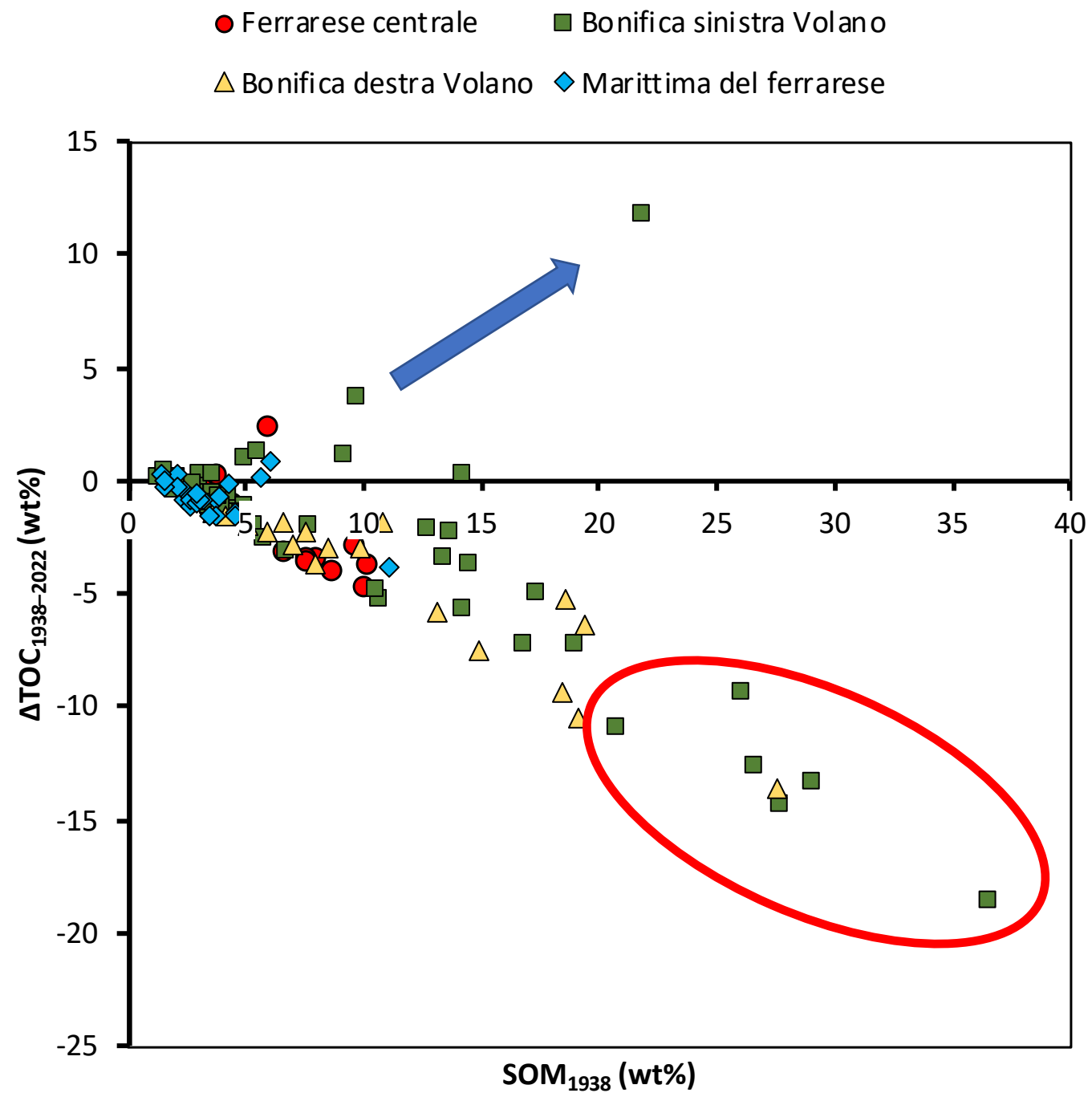
Laboratory analyses

a) Elemental speciation of soil Carbon (wt%).



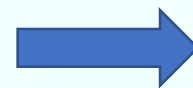
b) Isotopic analysis of $\delta^{13}\text{C}$ (‰).



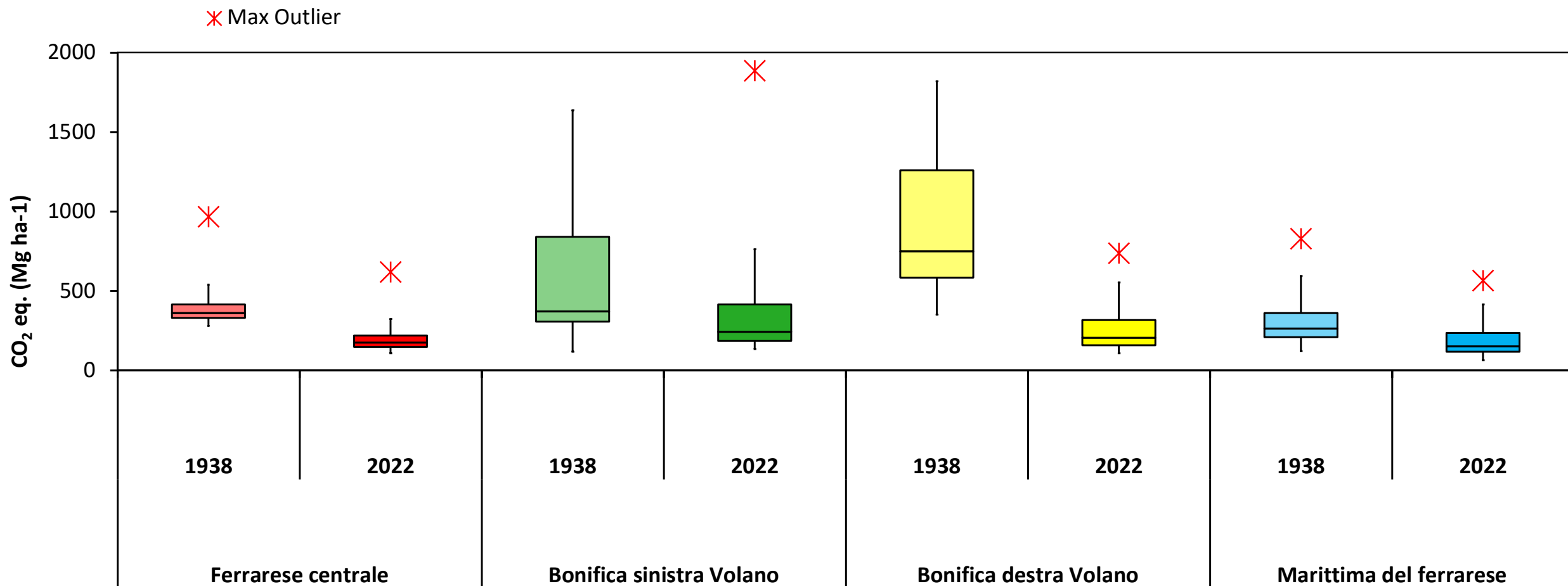




$$C \text{ Stock}_{0-30cm} (Mg \text{ ha}^{-1}) = TOC * Bulk \text{ Density} * 30$$



$$CO_2 \text{ eq.} (Mg \text{ ha}^{-1}) = C \text{ Stock} * 44/12$$



Conclusions

- New geochemical data and their comparison with historical data demonstrate that a general degradation of SOM contents has been registered for the topsoil of the Province of Ferrara.
- The systematic depletion of TOC observed after 84 years is ascribable to natural phenomena (global warming and subsidence) and human activities (land-use change and intensive farming).
- In *Bonifica sinistra Volano* and *Bonifica destra Volano* areas (where peat deposits are largely documented) after 84 years the evaluated emissions of CO₂ eq. exceeded 1500 Mg ha⁻¹.

Per approfondire:

Il caso delle torbe ardenti



GeoHealth

RESEARCH ARTICLE
10.1029/2021GH000444

Special Section:
Fire in the Earth System

Key Points:

Peat Soil Burning in the Mezzano Lowland (Po Plain, Italy): Triggering Mechanisms and Environmental Consequences

Claudio Natali^{1,2}, Gianluca Bianchini^{2,3}, Stefano Cremonini⁴, Gian Marco Salani⁵, Gilmo Vianello⁵, Valentina Brombin^{2,3}, Mattia Ferrari^{1,3}, and Livia Vittori Antisari⁵



ICOS

National
Network
Italy

Per approfondire:

Il caso delle torbe ardenti



Valle Mezzano – Ostellato (FE)



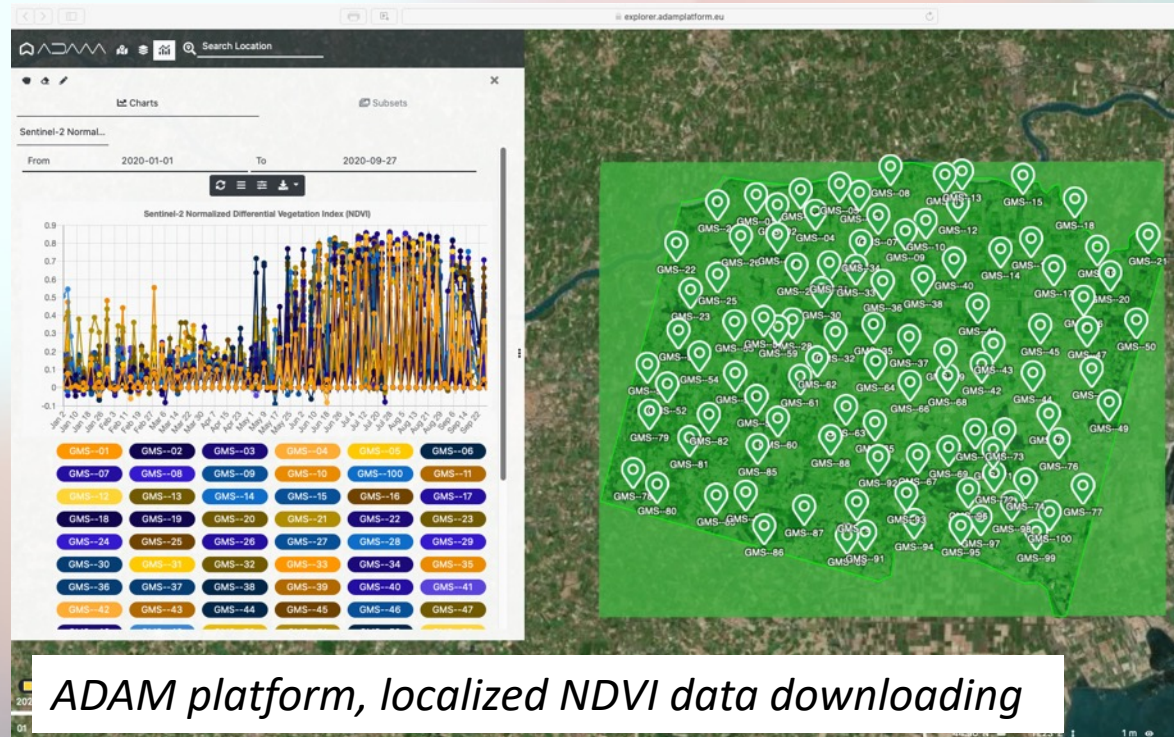
Caso di incendio, Valle Mezzano (03/07/2018)



100 points, and a vectorial mask of the PRISMA mask (without Regione Veneto and Mezzano Valley sectors) were uploaded on ADAM platform, to access at **LC1 products of Sentinel 2** for the period January 2020 – December 2021.

LC1 products handled: True color, NDVI, and Vegetation health images.

Data downloaded: localized values of the three products for the last 2 years.



NDVI:
Normalized Difference Vegetation Index

HEALTHY
 VEGETATION REFLECTANCE

50% NIR 8% RED



NDVI = 0.72

STRESSED
 VEGETATION REFLECTANCE

40% NIR 30% RED



NDVI = 0.14

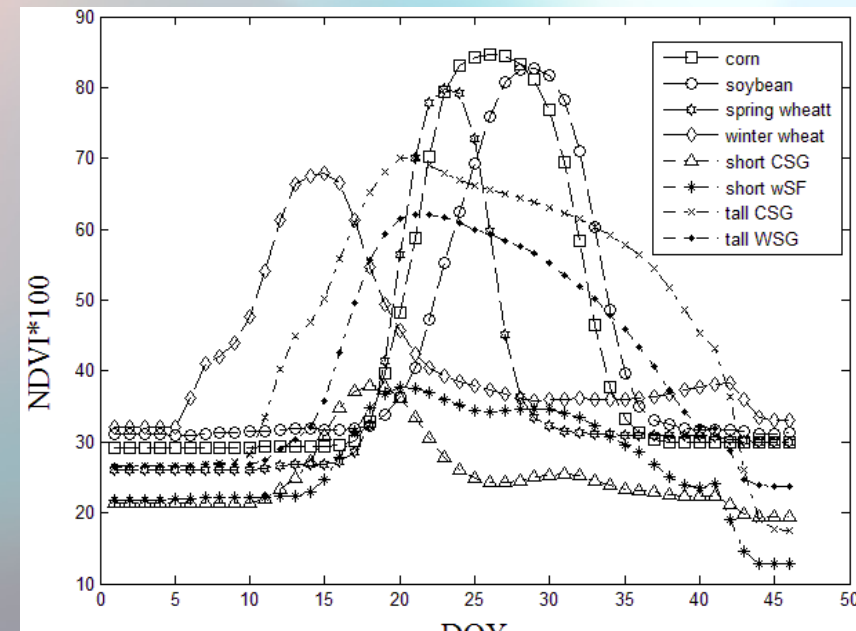
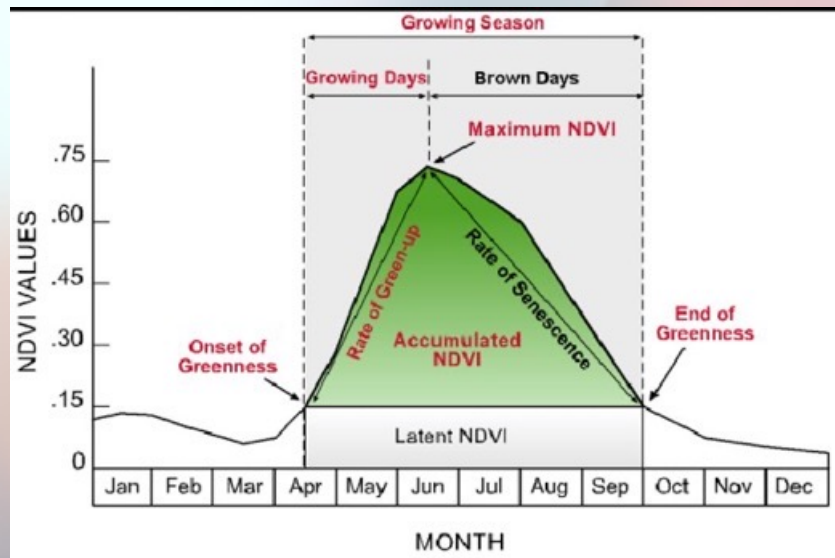
$$\text{NDVI} = \frac{\text{NIR} - \text{RED}}{\text{NIR} + \text{RED}}$$

Serie temporali NDVI dei 100 punti campionati per caratterizzare il tipo di colture (riconoscimento cicli fenologici).

Media e deviazione degli NDVI campionati dalle immagini Sentinel 2 registrate dal 12/2016.

*NDVI, caratterizzazione colture
(Zhong et al., 2015)*

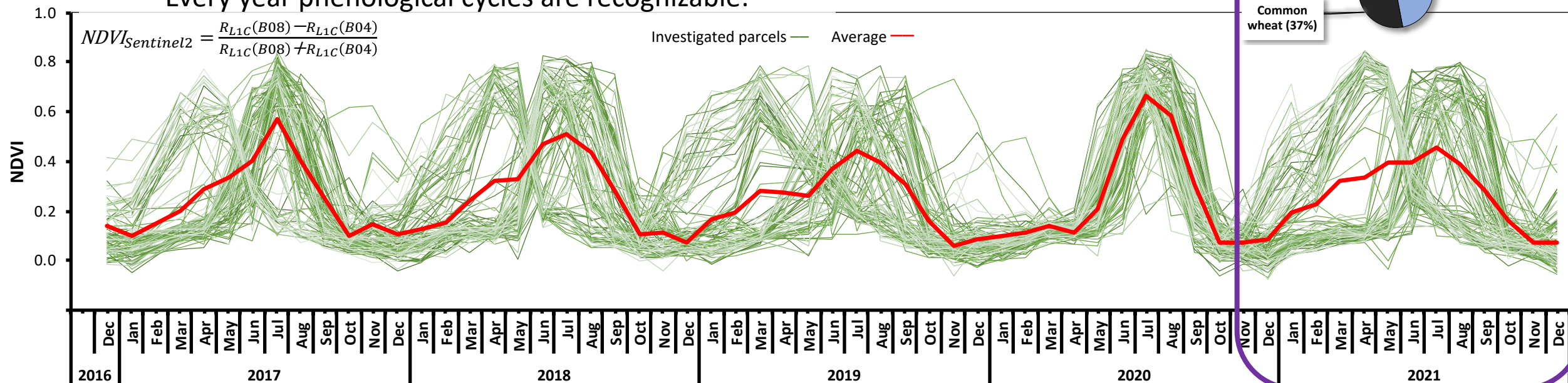
NDVI, ciclo fenologico (Griffith et al., 2002)



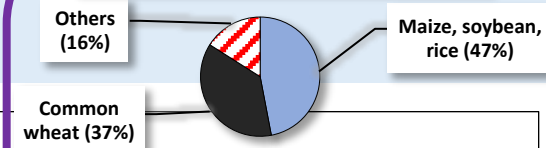


Time series of Sentinel 2

Every year phenological cycles are recognizable:

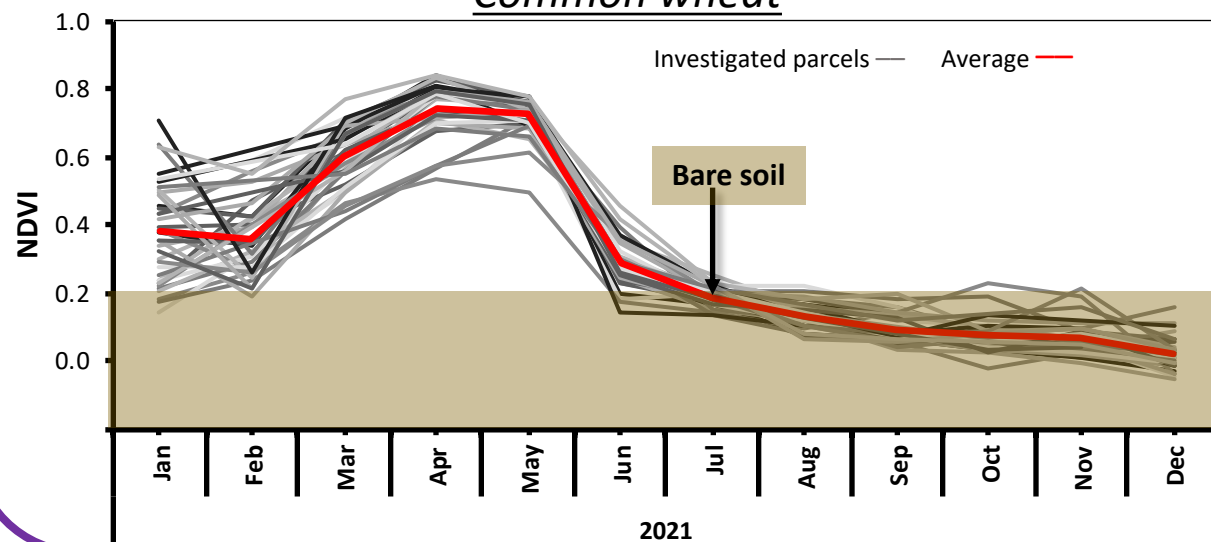


Investigated crops in 2021

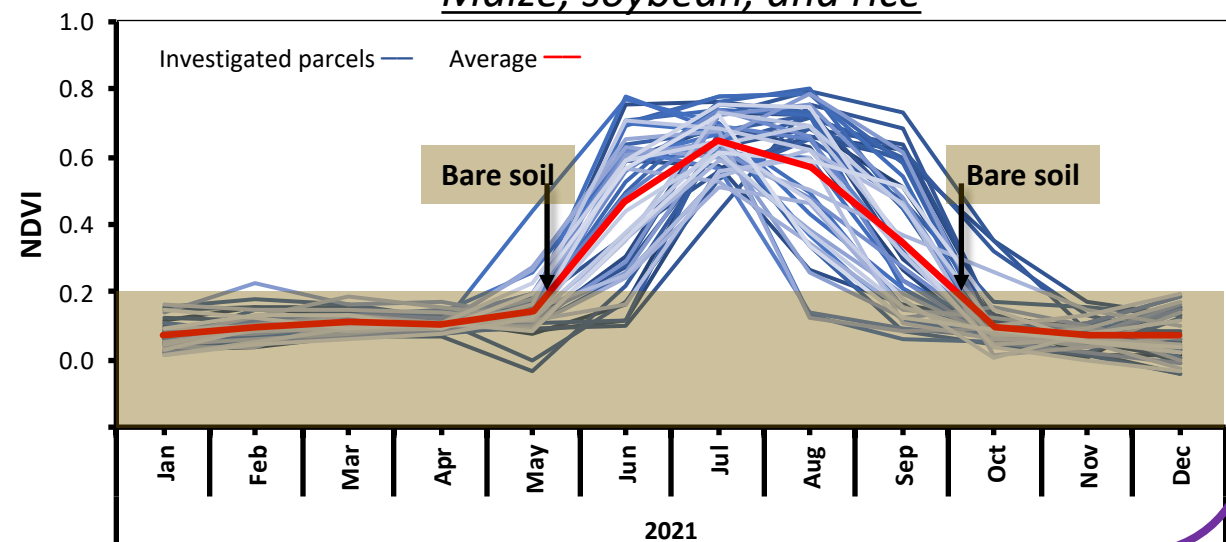


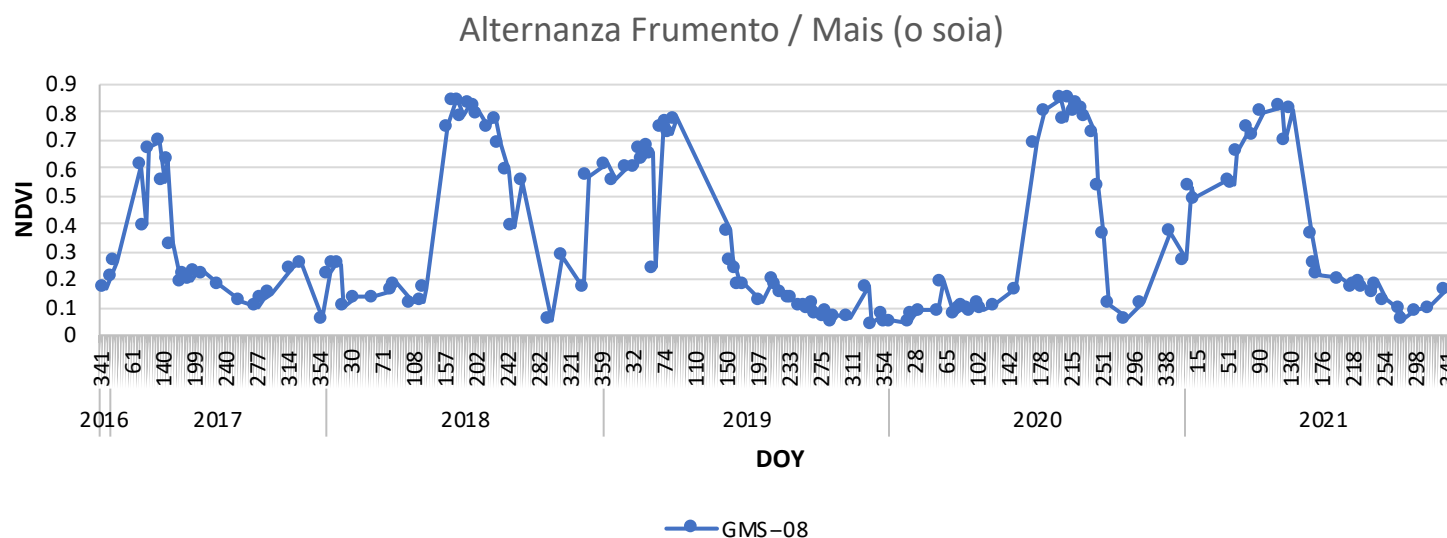
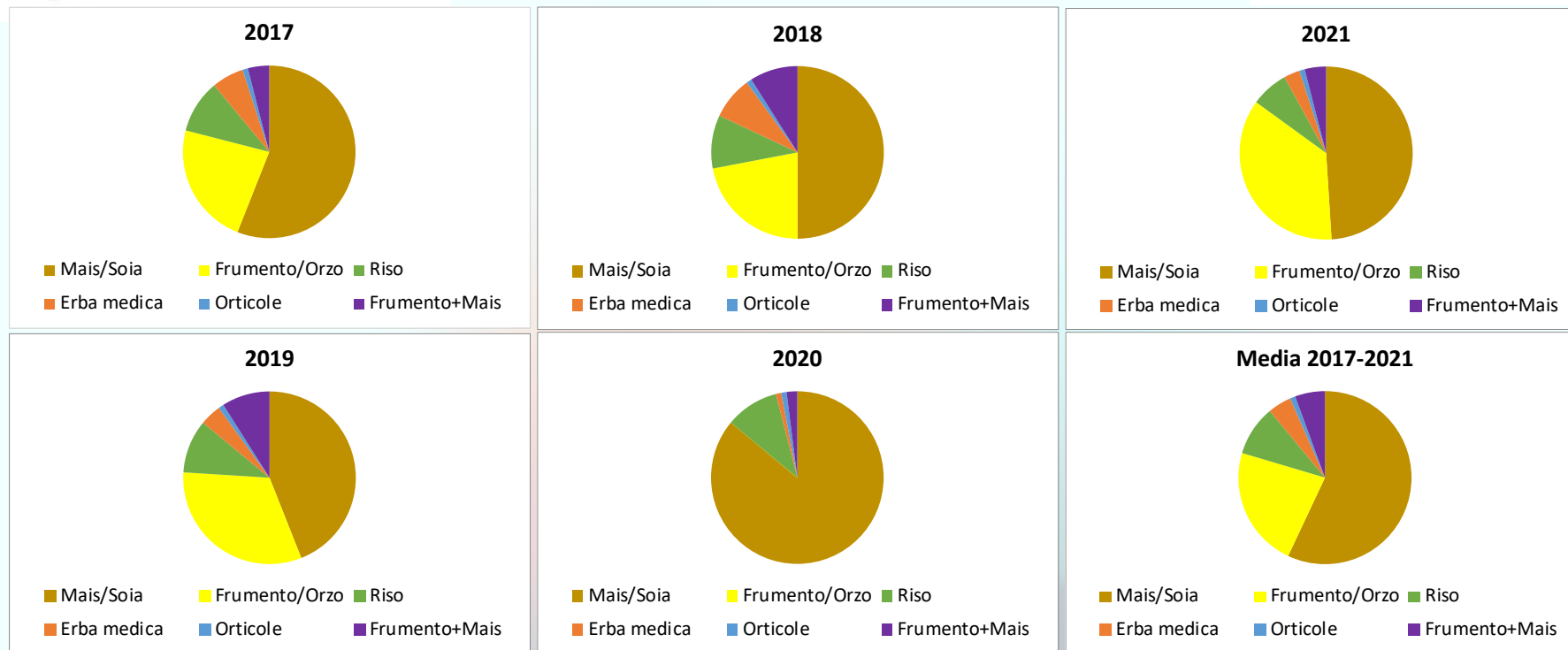
In 2021 84% of the crops were:

Common wheat



Maize, soybean, and rice





Grazie per l'attenzione!

singmr@unife.it