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Can we calculate the value of Rock-Eval parameters for the 0–50 layer from the measured values on the layers 0–30 and 30–50 cm?

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CONTEXT

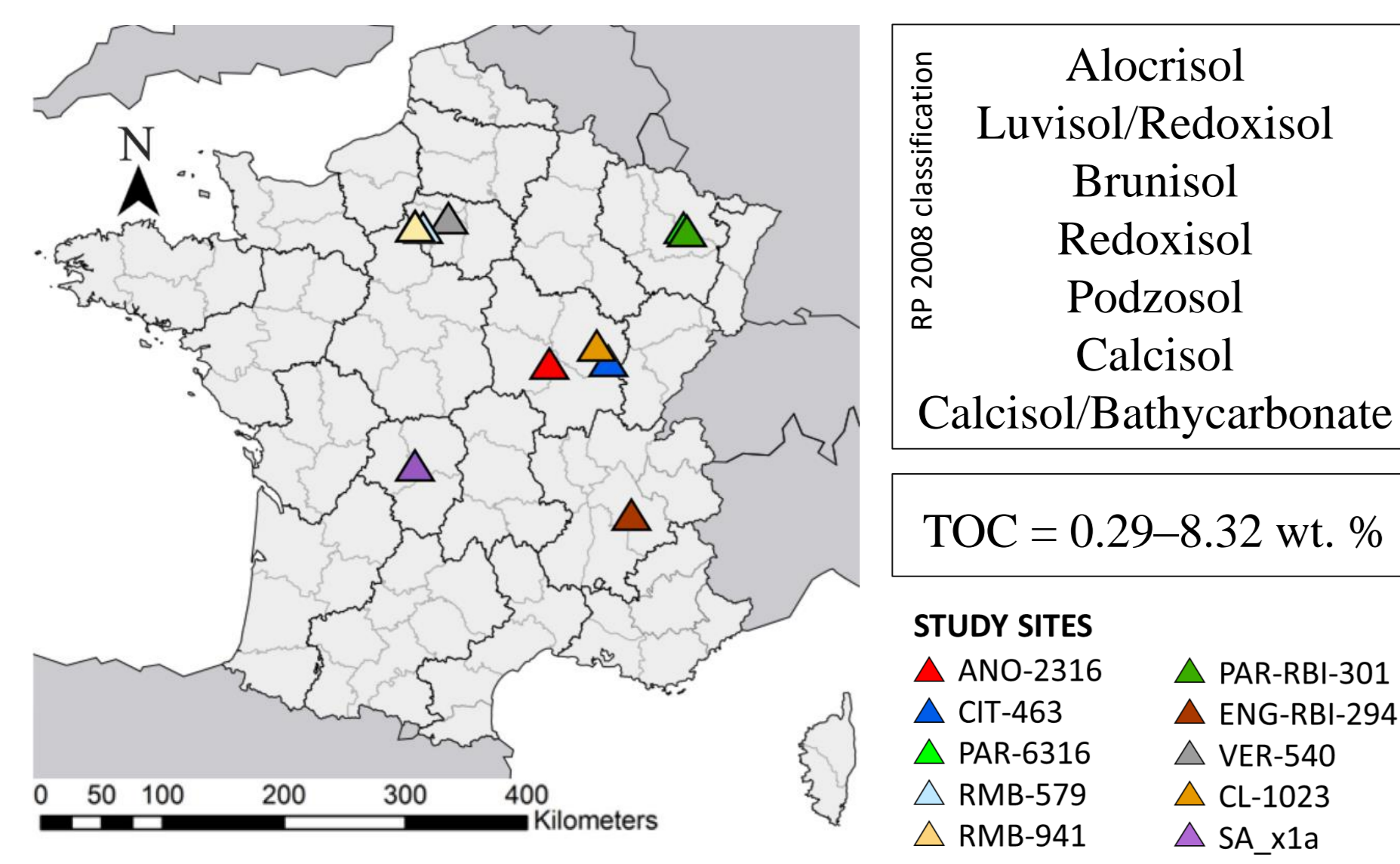
- Currently various soil sampling depths, different across studies.
- Organic Carbon (OC) content of a soil profile calculated as the sum of comprising horizons.
- Rock-Eval (RE), a valuable method to investigate soil organic carbon (SOC) stock and stability (Gregorich et al., 2015; Barré et al., 2016; Soucémarianadin et al., 2018).

OBJECTIVE

Examine application of additivity to RE parameters from two soil horizons

MATERIALS

natural soils · 10 forest sites · various soil types

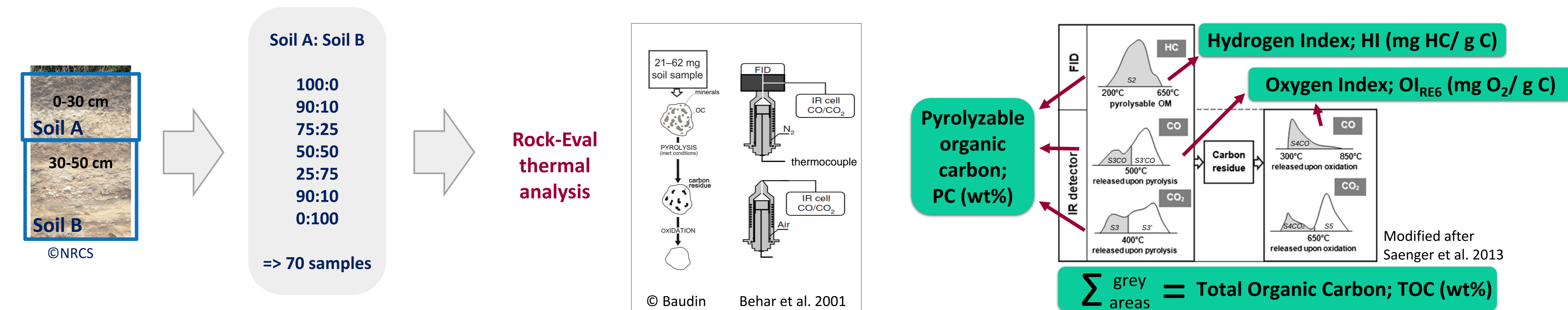


LITERATURE

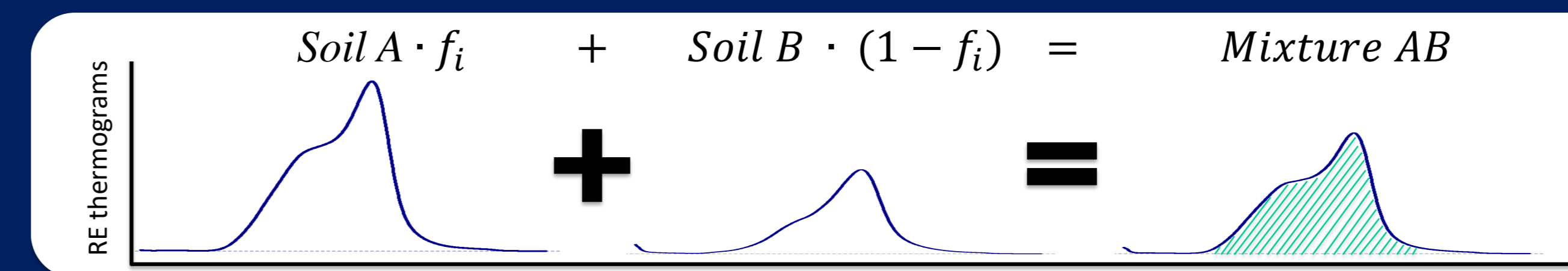
Barré, P. et al. (2016). *Biogeochemistry*, **130**(1), 1-12.
 Gregorich, E.G. et al. (2015). *Soil Biol. Biochem.* **91**, 182-191.
 Soucémarianadin, L.N. et al. (2018). *Soil Biol. Biochem.* **117**, 108-116.

METHOD

20 initial samples · 70 mixtures · RE6 analysis · obtained thermograms · RE6 parameters measured

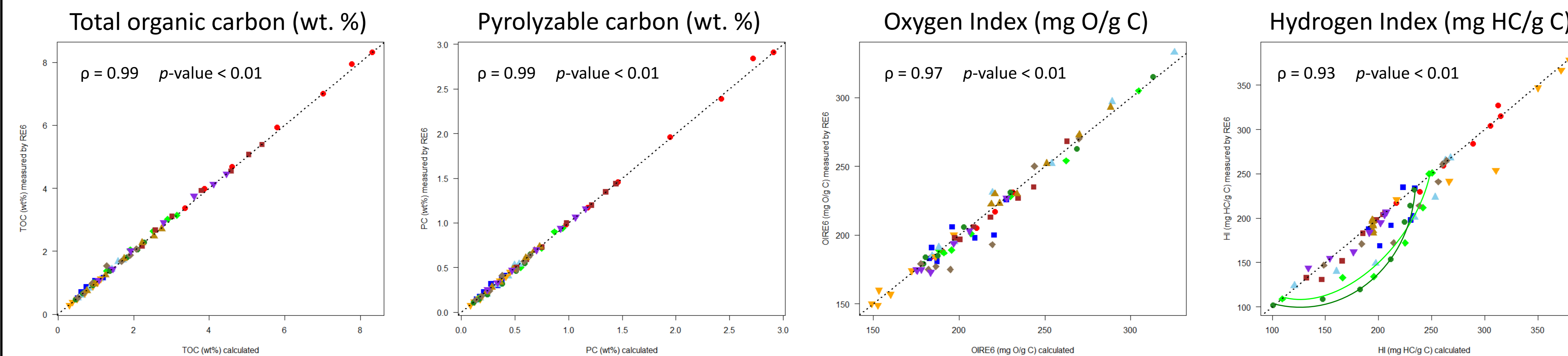


Calculation of theoretical values for the four classical RE6 parameters based on integration of surfaces of the added signals



RESULTS

Spearman correlation coefficient ρ and p -value



Comparison of Rock-Eval parameters

x → theoretical values calculated for each mixture based on end-member signals and mixing ratio

y → measured in two soil horizons and in composed mixtures

DISCUSSION

- Values of RE parameters measured on composite samples were in good agreement with theoretical values – calculation on added signal of end-members.
- This is particularly the case for the following parameters: TOC_{RE6}, PC and OI_{RE6}.
- For HI the relationship between measured and calculated values is unsatisfactory.
- Highest deviation was observed for sites with a heterogeneous vertical clay content profile.
- Retention of hydrocarbons by clay minerals could explain this observation.

CONCLUSIONS

- In temperate soils, most of the classical RE parameters of a soil profile can be calculated as a sum of its horizons.
- This implies that the comparison of results from studies using different sampling strategies is possible.
- Moreover, the natural mineral effect in temperate soils is negligible during RE analysis.

Further information

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