

Interactive comment on “Identifying and quantifying geogenic organic carbon in soils – the case of graphite” by Jeroen H. T. Zethof et al.

Anonymous Referee #1

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I have read with interest the draft untitled "Identifying and quantifying geogenic organic carbon in soils – the case of graphite". Overall, I have found that the draft is very clear. To be published in SOIL, I consider that the authors should provide a proper description of the soils they used in the study. I have also several (rather minor) concerns and questions that have to be answered before I can recommend the publication of this draft in SOIL.

1° Graphitic C can be found in rocks. Depending on P and T conditions experienced by the sediments, we do not get necessarily pure graphite. I am therefore wondering if the graphite standard material (Merck) is similar to the graphite found in the soils developed in micaschists. I would appreciate to see Raman signatures of the graphites used in the study. We can also imagine that some graphitic C with lots of defaults may evolved

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before the final oxidation step. In this case, such graphitic C would not be recovered in the ROC fraction. Can the authors discuss or rule out this hypothesis?

2° Pyrogenic C (pyOC) can also resist to high T under anoxic conditions. In this case, some pyOC may be recovered in the ROC fraction. What would happen if the studied soil contains both graphite and pyOC? It may have been interesting to add charcoal in the tested mixtures. If the presence of pyOC is a limit to the method, it should be discussed.

3° 10 samples for calibrating a model is definitely a too low number of samples. It would have been highly surprising to get nice results with such a low number of samples. It may have been interesting to use all the samples to design calibration models. We can't exclude that with a nice sample set containing 500 samples with known graphite concentrations, a convincing IR-based model can be designed.

4° The authors hypothesized that ROC content would match graphite content. It is not too far but not perfect. Why don't the authors try to design a model based on ROC results as they did with IR and TGA results?

5° I do not understand the Figure 5. I suggest improving the explanations on this Figure or removing it

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