

Dear editor,

we are very pleased about your positive assessment of the revised version of our manuscript and happily provide the final minor revisions. Thank you very much for the careful check of our manuscript and your helpful recommendations. Please find the point to point answers below.

Kind regards,

Marion Schrumpf on behalf of the authors

Dear Authors,

Thank you for your careful revision of the manuscript incorporating all the reviewer comments and suggestions.

I am pleased to let you know that your manuscript can be published after a final “minor” revision of the following points :

- Abstract: Please combine separate sentences into one paragraph. Though you could separate the long introduction and methods from the results and discussion, the multiple-paragraph format is unusual. I also thought you could reduce some redundant, long sentences, as illustrated below. In the current version, the length reduces the appeal of your hard work.

**We will reduce the number of paragraphs to two and agree that the abstract is pretty long right now. Therefore we are pleased to follow the good suggestion of merging some sentences and content as indicated below.**

- Line 19 “the midlatitudes”: Please indicate that your samples are only from Europe, not from other midlatitudes.

**Done**

- Lines 21-21: To reduce the very long abstract and make your points clearer, I would recommend combining these sentences, like “We expected that NaF/NaOH would extract less, younger MOC..., particularly in subsoils and soils with high contents of pedogenic oxides.”

**Done**

- Lines 38-41: ...the  $\Delta^{14}\text{C}$  values of oxidized OC ( $-50 \pm 110\text{‰}$ ) were similar to those of OC extracted with NaF/NaOH ( $-51 \pm 122\text{‰}$ ), but oxidation residues ( $-345 \pm 227\text{‰}$ ) were much more  $^{14}\text{C}$ -depleted than in the residues of NaF/NaOH extraction ( $-130 \pm 121\text{‰}$ ).

**Done**

- Lines 41-42: Please rewrite the weird expression “leaving increasingly older residues behind the more OC is removed”.

**Done, replaced by: Accordingly, both chemical treatments removed OC from the same continuum, and oxidation residues were older than extraction residues because more OC was removed.**

- Lines 45-47: Readers would also expect your conclusion on the employed methodological approaches (“fractionation schemes”). You wanted to “test if maximum desorption with NaF/NaOH is

a suitable indicator for the labile proportion of MOC" (line 124). Please add if you have any conclusion or recommendation regarding the extraction methods.

**We added the following sentence: Therefore, none of the applied chemical fractionation schemes was able to explain site-specific differences in  $\Delta^{14}\text{C}$  values.**

- Line 56 "oxi-hydroxides" or oxyhydroxides (?): Did you intend to use this term to cover all oxides, oxyhydroxides, and hydroxides? Please clarify or define this.

**The correct inclusive term would be pedogenic aluminum (Al) and iron (Fe) oxides, oxyhydroxides, and hydroxides. Since this is two long, we will refer to them as oxides as defined now in the introduction (summarily referred to as oxides).**

- Line 126 "across Europe": across central Europe?

**Changed to "central Europe"**

- Fig. 1 and Table 1: It seems inappropriate to show these published results here in the Methods section. If you want to provide extra information from the cited paper, you could move these to Supplementary Information (or to Results if you can report something new).

**We moved Figure 1 and Table 1 to the supplement.**

- Lines 135-139: Please indicate the soil classification system you followed. Is it the World Reference Base?

- Line 398: "differing" or different?

**Changed to "the different"**

- Line 403: The unique MOC composition in the podzol-type soil "is"

**Done**

- Line 405 "dissolved organic carbon": double check if DOC has been defined at its first use and consistently used throughout the manuscript.

**Now defined and checked**

- Lines 526-527: Please briefly describe how your alternative hypotheses differ from the original outcomes listed in Fig. 10.

**We added a description of the original hypothesis to make clear how the new hypotheses differ.**

- Figs. 7-8: It would be more "reader-friendly" if you indicate major spectral regions on top of the spectra.

**Done**

- Fig. 10 caption: hypotheses explaining "variations in"  $\Delta^{14}\text{C}$  values of MOC across sites and with depth

**Done**

Additionally, we completed the legend of the former Figure 3.