

Interactive comment on “The effect of organic matter (OM) quality on the redox stability of OM-Fe association in freshwater sediments” by Nana O.-A. Osafo et al.

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We thank the reviewer for his/her valuable suggestions for improving our research report. At this point we would like to clarify to the audience of BG Discussions a few aspects:

The preprint under consideration evaluates previous work on both synthetic and natural samples in terms of the association of organic matter (OM) and iron (Fe) oxyhydroxides (OM-Fe). From those studies, there were disparity in concluding remarks on OM quality selectively preserved by Fe. In consequence, we implemented a simplified extraction scheme and analytical protocol that allowed us assessing OM quality associated to

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the corresponding metallic oxide, and discriminate Fe in terms of its redox lability and stability as we believed the redox stability of Fe plays a role in the preservation. Our approach is intended to gain further insight on the role in the selective preservation of OM-Fe and bridges the gap existing in the current literature.

An aspect that seems to be a misunderstanding, however, is that our dataset is not discussed to the light of spatial gradient, or other specificities of the site where the cores were retrieved. Slight variations in [Fe] could arise from the site' configuration and hydrochemical gradient, and as such, it was mentioned. We will punctually expand the text to better explain the reasoning behind our deductive approach on how it is not affected by the specific site hydrochemical gradient.

In terms of the conclusions and their relevance to results presented, the main results refers to non-humic quality of OM being preferentially preserved on a longer time scale compared to humic components and this can be seen when a sequential extraction scheme is used instead of a bulk extraction, which does not necessarily differentiate redox labile Fe from redox stable Fe in natural environmental samples. We will highlight this results and its implications.

Other aspects that are unclear, as kindly noticed by the reviewer, are the pH at which the extraction of the reactive oxide phases (i.e., circumneutral; see Table 1), or the relevance of speculative statements regarding global environmental change and the role of OM-rusty sink in connection with GHG. The text will be edited for clarity and statements rather speculative and not sustained by the data will be removed in the next iteration of the report.

Again, we thank the reviewer for kindly highlighting flaws in the report, her/his the relevant suggestions for improving the discussions, and for pointing out the instances where the text needs to be edited for the sake of clarity or to prevent speculation.

Sincerely,

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