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Reply on RC3

Sastrika Anindita et al.

Author comment on "Tropical Andosol organic carbon quality and degradability in relation to soil geochemistry as affected by land use" by Sastrika Anindita et al., SOIL Discuss., https://doi.org/10.5194/soil-2022-13-AC3, 2022

Thank you for the comments and suggestions. Our responses are listed below in the same order as the referee's comments.

- **Regarding different parent materials between sites:** Our previous study found that the selected soils were comparable based on the weathering degree and the estimated mineral content, except for the NF. For a detailed description of the minerals and soil properties, we referred to our recent publication in Geoderma (Anindita et al., 2022, https://doi.org/10.1016/j.geoderma.2022.115963). **If the editor finds it necessary**, we can ask permission from Elsevier to reproduce part of these data, such as (i) weathering index: $SiO_2/(Al_2O_3+Fe_2O_3+TiO_2)$ and (K+Ca)/Ti, (ii) estimated amount of mineral, (iii) texture, (iv) volcanic glass%, (v) code for soil classification from our previous research. According to literature and historical map, the areas near Tangkuban Perahu and Burangrang mountains were forests and most of the areas were converted into pine forest and agricultural sites. Only the NF site represents an original forest. However, this site is located within the 1.5 km distance from the crater, so there was a possibility presence of new ejecta in the topsoils and we confirmed this difference from the total oxide content (Anindita et al., 2022, on request we can ask for reproduction in the revised version). On the other hand, the weathering index and the estimated amount of minerals of **pine forest and agricultural soils were comparable, thus we did a comparison between these two land-use types** (please see also our response to an alike comment by referee 2). We apologize for apparently not having made this sufficiently clear in our original manuscript.

In Anindita et al., 2022 we concluded that only NF has a deviating geochemistry of the top one meter of soil, the other soils have similar parent materials and similar age as well. Other studies reported oxides content below one-meter depth which possibly has different parent materials.

- **Regarding the overlaps between S+A and s+c fractions:** We agree that the 22 J mL^{-1} >63μm S+A fraction contains mineral-associated OC as well and propose to remediate this by adding an extra fractionation step. This would then allow specific quantification of POM occluded in the S+A fraction. After rechecking, we can indeed acknowledge the presence of undisrupted microaggregates in our S+A fractions. We also now tested the successfulness of the dispersion procedure by subjecting the S+A fractions of three of the soil samples to 400 J ml^{-1} ultrasonication and this led to full dispersion of >63μm aggregates. In these three test samples, the %of SOC of the S+A OC lowered by

8-31% vs. the original S+A OC. **If the editor agrees,** we propose to further subdivide the S+A fraction into a sand + occluded-POM fraction and into s+c OC for all soils (3 replicates x 6 sites x 3 depths). The amount of C in the latter fraction could be added to the already separated s+c. **Relevant discussion parts will be revised accordingly** with these updated S+A 400 J ml^{-1} and s+c OC data.

As explained in our responses above, a detailed comparison of mineralogy and weathering stage presented previously (Anindita et al, 2022) does demonstrate the alikeness of the included pine forest and agricultural sites in terms of parent material, validating to use these sites to investigate the impact of land-use on soil mineralogy and soil carbon quality. With some modification to the text and tables, this first major concern could be accommodated. With respect to referee 3's second main comment, we are convinced that ambiguity in the current interpretation can be resolved by introducing the new data on OC in sand + particulate OC in the S+A fraction and s+c therein a moderately revised version of the current manuscript.