

SOIL Discuss., referee comment RC1  
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## Comment on soil-2022-13

Anonymous Referee #1

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Referee 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-RC1>, 2022

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This is a highly competent paper with very interesting content. The impact of landuse on OC stabilisation and storage is a major issue and volcanic soils have not been investigated intensively in this respect. The paper describes the comparison of forested and agricultural areas using quite sophisticated methods including <sup>13</sup>C labelling, soil fractionation and incubation studies. I find the manuscript highly interesting and professional.

Some issues should maybe addressed befor acceptance:

Line 51: Reading the cited reference it turned out that the comparison of agriculture and native forested land was performed after 15 and 5 years after conversion, not after centuries or decades. So you might revisit the cited paper.

2.1. can you exclude small scale climatic differences between the sites? Is the orientation of sites the same and the precipitation?

The yearly organic matter inputs into the agricultural soils by manures is massive. How does this influence the overall results as compared to sites receiving e.g. only mineral fertilizers?

Results section: I do wonder, why you did not include OC stocks of the profiles, as you estimated bulk densities of the soil horizons, this is not a big deal, but would add to overall conclusions? So absolute OC amounts per horizon could also be an interesting value, although, relating SOC to equivalent soil masses would be even better (Haden von, A.C., Yang, W.H., DeLucia E.H., 2020. Soils' dirty little secret: Depth-based comparisons

can be inadequate for quantifying changes in soil organic carbon and other mineral soil properties. Glob Change Biol 26, 3759–3770.)

Ad all figures. Letters are too small.

Line 253: Comma after "Relatively"

Ad 4.2.: Of course, the discussion of the impact of land-use on SOC in texture fractions is not easy. The measurement of  $^{13}\text{C}$  in texture fractions after the incubation would be highly interesting to show, where young SOC fractions end up. Sometimes the youngest material ends up in the smallest fraction (Gerzabek et al. 2001. Soil organic matter pools and  $^{13}\text{C}$  natural abundances in particle size fractions of a long-term agricultural field experiment receiving organic amendments. Soil Science Society of America Journal 65, 352-358). That means that in forest soils, where the mineralization often is hampered by less favorable situation for microbes, intermediates of the mineralization process could show up in the smallest fraction. Does this influence your interpretation?

Conclusions: Before drawing final conclusions that weathering is the major factor for differences between forest and agricultural sites, it should be clear what is the approximate net input of OC into the soils of the different sites. What is the impact of the massive organic fertilizer input on agricultural plots and how does the overall SOC stocks develop under forest and agricultural land, taking into account BD and, even better, the equivalent mass method?