SOIL Discuss., referee comment RC2
https://doi.org/10.5194/soil-2020-98-RC2, 2021

Reply on RC1

Anonymous Referee #2

Referee comment on "Aluminous clay and pedogenic Fe oxides modulate aggregation and related carbon contents in soils of the humid tropics" by Maximilian Kirsten et al., SOIL Discuss., https://doi.org/10.5194/soil-2020-98-RC2, 2021

General comment:

The paper by Kirsten et al., assesses the role of Aluminous clays and pedogenic Fe oxides regulating aggregation and OC in tropical soils under different land uses. Overall, this manuscript is well written and I enjoyed reading it. The database generated is interesting and robust and I join reviewer1 in congratulating the authors for such interesting work.

In general, I think that the story of the manuscript, the hypotheses, and objectives need to be further improved. The use of highly specific jargon in the text makes challenging to understand the manuscript without enough context for some of the technical terms used. Being the scope of this journal so broad, I suggest reducing the jargon, use the same terminology across the manuscript and explain it briefly where possible. Finally, I agree with reviewer1 that this manuscript needs to include enough information to be a standalone manuscript and needs to explicitly state how it builds up from the previous study.

The Introduction does a good job exposing the gaps in knowledge and presents enough information to support the proposed hypotheses. However, it lacks context regarding some of the factors assessed. For example, why is it relevant to measure the response variables at different depths (0-5/5-10cm)? Including a paragraph where it is stated how this manuscript builds up from previous studies would also aid to better highlight the novelty of this study. The materials and methods also need to include more information regarding the experimental design and sampling protocols. In this version, it is challenging to follow how the database for this study was built, how many samples per plot were taken, and how they were processed. The author references a previous paper (Kirsten et al., 2021) for more details about the experimental design and this paper is also cited in the results section, which is quite confusing. I'm rather unsure of what was measured in this study and what results came from the previously published paper. For the discussion, I would suggest the authors be more concrete and build up a stronger argument that links the results with the proposed hypotheses.

Specific comments:

Abstract

Lines 30-32: Please split this sentence in two as it is hard to follow the argument.

Line 34: insert "land uses" after "cropland"

Line 41: It is not clear from the statement above about the methods and measurements done, how was the persistence of OC was measured?.

Line 41: "after the change in land use". Not clear what this means. It makes me think that this study is a Chrono sequence in which impacts on land-use change across time were assessed rather than comparisons done between plots with different land uses.

Introduction

Line 58: "aggregation depends strongly on inorganic cementing agents", like those mentioned in the previous line? Please better link these two sentences if that is the case, or give some examples of the inorganic cementing agents of relevance for the tropics.

Line 99: remove "into"

Line 102: "hypothesize"?

Line 103 to 104: "after conversion of forests into croplands" sounds like it was assessed in a Chrono sequence. Also, I'd suggest splitting this hypothesis in two, one focused on the *"mineralogical combination resulting in the largest aggregate stability also results in largest OC persistence"* and the other one regarding the impact of land-use change. Are there any hypotheses/predictions related to the depths included as factors?

Also, what do you mean by "combination", the proportion of clays vs Fe oxides?

Line 103: Here and from the introduction, is still not clear to me what the authors refer to by "OC persistence". This OC property tends to be associated with measurements over time, which makes me wonder again if this study is done in a Chrono sequence of land-use change but I couldn't find enough information in the M&M regarding this.

Line 104 to 105: This sentence reads disconnected from the paragraph.

M&M

Line 116: Could you please provide more information about the characteristics of the soil profiles at the site? I'm guessing 0-5 organic layer and 5-10 is mineral soil?

Line 132: It is not clear how these groups (of what? …plots? samples?) were determined, please be more specific

Line 139: Why is this relevant? Was the soil sampling done during this season?

Line 165: please state here, the n of the experiment and your treatments (land-use and the "mineralogical combination"). Also from results, depth was also a factor? Why?

Line 168 – 169: Could you be more specific about what were you looking to find with these correlations? What specific hypothesis were you aiming to solve?

Results

In general, this section needs to be better synthesized and focused only on the results from the present study that are relevant to the proposed hypotheses.

Line 174 to 176: maybe something to include in the introduction instead? This is not part of the results of this study.

Line 180 to 181: ibid

Table 1: two soil increments were measured but it's not clear to me why. This table contains a lot of information that is not discussed or mentioned in the text aside from a broad description of the site characteristics. If not that relevant, maybe it belongs to supplements? I would be interested to read a short description of the impact of the treatments: land use, depth, and mineralogical combination on the OC and other variables in this table…

Line 192 to 194: Awkward sentence structure.

Line 228: This analysis was not

Line 250 – 257: This is a great paragraph that really helps to put in context all the above results. Previous paragraphs were too dense so I suggest trying to use more of this sort of narrative to describe the results of the study, given all the variables analyzed.

Line 287 and 291: Please focus on the results of your study, this is an example of when it is not clear what was done in this study vs the author's previous publication

Line 300 to 301: Not fully certain what is the support for this statement

Discussion

Line 316: respectively? Which value belongs to what? Not clear

Line 335-338: Neat!

Line 357: replace "elsewhere" to like reported in Rabbi et al., 2015 (without the parenthesis)

Line 358 to 359: I was not under the impression, from the introduction, that confirming this was the purpose of this study.

Line 398: taken into account… in the models?

Line 401: *fewer* changes

Line 408 to 412: This is for example a way in which the fractionation and aggregate characterization did in this study build up from the previous paper by the authors.