

Interactive comment on “Assessing biogeochemical and human-induced drivers of soil organic carbon to inform restoration activities in Rwanda” by Leigh Ann Winowiecki et al.

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Received and published: 2 March 2021

Dear Reviewer #1,

Thank you for these comments. These were very helpful and will guide us in improving the paper. We have gone through each one of your valuable comments and agree that a comprehensive re-write and expansion will greatly improve the paper. We have addressed each one of your comments below and have taken action on the same in the updated version of the manuscript.

Yes, we will better integrate the indicators of soil and land health, beyond soil erosion.

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This point is well taken. We are now working to better expand the section on drivers of SOC. This includes a better thread from the introduction through to the results and discussion. This includes an assessment of the controls of SOC.

We will include a more thorough and detailed analysis on the differences of the extent of soil degradation and consequences for restoration.

Regarding your comments to the specific sections:

Abstract: Yes, we will better highlight the major conclusions around drivers of SOC and its connection to restoration activities.

Yes, we will fix the format for reporting ^{13}C ratios.

We agree, and will remove the mention of "low" SOC in the abstract.

Introduction: We will modify the focus and shorten the more general aspects and include more detail on indicators and SOC as suggested above.

Methods: We will include a more comprehensive site description, including soil types etc. We will expand the explanation of the LDSF sampling design, and specify the soil collection, e.g., soil augering. We did include the location of the laboratories, but can perhaps make this more clear. We will also expand the description of the MIR database, and how many samples were included in the calibration and validation datasets. We agree that this section is currently general and can be expanded. We will also expand the soil mapping approach used and the statistical analysis. These areas will be elaborated greatly.

Results: Agreed, we will stick to using just one measure, median, for example and not use both mean and median. We will further explore the differences between land uses, as suggested. The difference in tree densities was due to Eucalyptus plantations, but this was not explicitly mentioned in the text.

Yes, we will expand the soil mapping section, both in the methods and results, including

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the data used in Figure 9. These sections will be greatly expanded.

Discussion: We are completely expanding the discussion section as per your suggestions. With more attention and focus on drivers of SOC and how they are related to restoration. We will also better discuss the differences in the measured indicators and the implications for soil health and restoration. We will also include more international references.

Thanks for the suggestion to combine the data and look at the effects of texture, pH and bases on SOC. We will expand on the interpretation of the hotspot map as well.

We thank you again for the thoughtful and thorough comments.

Interactive comment on SOIL Discuss., <https://doi.org/10.5194/soil-2020-67>, 2020.

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