Biogeosciences Discussions

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Comment on bg-2021-359

mark chatting (Referee)

Referee comment on "Sedimentary blue carbon dynamics based on chronosequential observations in a tropical restored mangrove forest" by Raghab Ray et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-359-RC2, 2022

Overarching comments: The study investigates the carbon dynamics in mangrove stands of differing ages. This study provides useful information on the differences in carbon stocks and potential source of input throughout a mangrove stand's maturation. In general the study is well thought out and presented. Authors frame the study well and provide sound reasoning for various data collected. My main concern is the number of soil cores taken from different mangrove stand ages. A total of eight samples are used to compare between 4 different age classes and between 2 seasons. This is only one sample per unique experimental condition. That is not enough to perform the rigorous statistical comparison this study deserves. Also, the English language has many minor grammatical errors and should be edited by a native speaker.

Line 21: Drop the word "the". It should read "estuary in Panay Island, Philippines"

Line 21: I have never come across the term "endmember source apportionment." What does it mean?

Lines 27 to 29: This sentence does not convey the importance of the study or the wider implications of the findings well.

Line 32: Drop the word "the". It should read "Mangroves, located around tropical and…"

Line 34: Should be plural when referring to “carbon stocks”. Please change here and throughout.

Line 35: The proportion of sediment organic carbon found in mangroves can vary much more widely than 73-79%. I suggest the authors use a few more citations for this sentence to clarify this to the readers.

Line 39: Organic matter mangrove soil depths can extend much deeper than 3m. I suggest the authors include that information here with a citation

Line 44: “2 to 8 times lower” doesn’t make sense. It should be one eighth or one half.

Line 58: SFT has already been defined one line previously, the authors don’t need to do it again

Line 75: I’ve never come across the term “end-member” what does it mean?

Lines 114-116: Are the authors assuming that all the trees in each section of mangrove (PM, YM, AM and MM) are the same? If so I suggest they are explicit with that assumption.

Lines 124 to 134: It is not clear what these cores were taken for. Was it to perform isotopic analysis or to measure soil C stocks? I suggest the authors mention the purpose of these cores like they have on line 135 for porewater sampling cores.

Lines 125 to 127: Is my understanding correct that one core was taken from each forest age type during each season? This is not enough replication to conduct adequate statistical comparison between forest age groups. Especially as the soil thickness is only 50cm, OM and C concentrations are known to vary significantly in shallower soil horizons.

Line 127: what about BS and PM sites?

Line 130: Average depth and soil depth in all sites should be reported in the results section.

Line 178: Why did authors only measure soil C stocks in the top 50cm depth?

Line 190: Where are *a* and *b* derived from? Are they coefficients from calculating a line of best fit? If so, I suggest the authors make that clear.

Equations 2 and 3: Do the authors have figures for these curves that were fit? It would be good for this info to be included somewhere in the supplementary info for readers to see.

Lines 230 to 240: This paragraph is very data dense and mentions a lot of ranges of data between forest age groups, hence is difficult to follow. I suggest the authors create a summary table for the data explained in this paragraph, it will be much clearer and condense the text in the results section.

Line 245: Doe this value carry any uncertainty? How many measurements was this based off?

Lines 284 to 285: I would not call the BD values in this study different to those reported by Donato et al. 2011. To me these are comparable, especially as in some other (low OC) mangroves BD can reach up to 2.00 g cm-3.

Line 785, Fig. 2: The information in the upper left most panel is a repeat of what was explained in the text. I don't think it is needed. Also it is interesting that pioneer and young mangrove have comparable OC stocks. How many replicates was this data based on? Does the YM for this panel have any error bars? Was it just one replicate?

Line 790, Fig. 4: Do these values carry any uncertainty? It should be included in this figure. Also, why are there only 3 mangrove categories in this fig, what about pioneer and young mangrove?

I suggest the authors have a native English speaker red the manuscript and make edits. There are many minor grammatical errors throughout.