Biogeosciences
Discussions

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Interactive
comment

Interactive comment on "Soil greenhouse gases emissions reduce the benefit of mangrove plant to mitigating atmospheric warming effect" *by* Guangcheng Chen et al.

Anonymous Referee #4

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Initial paragraph or section evaluating the overall quality of the discussion paper (general comments)

This paper explores greenhouse gas emissions from mangrove soils from an estuary in South China. The topic and content of this paper is relevant to Biogeosciences papers, though the paper could greatly benefit from having a native English speaker proofread for grammar and punctuation. The paper could also benefit from the addition of more graphs that illustrate the data that is discussed. I will consider evaluating the paper again after the issues raised by myself and the other reviewers have been addressed.

Section addressing individual scientific questions/issues (specific comments)

Introduction You hypothesize that mangroves (the plants or the ecosystem itself?) may be important for C sequestration and mitigating global warming. Tell us what you actually tested, not the implications of your study. It sounds more like a statement of your findings rather than a proper testable hypothesis.

Why were these sites chosen? How does this fit in with previously studied sites. Why is your research novel? Use your literature review to illustrate what this research brings to the table and why you needed to study where you did.

Methods

Study area: Why were the widths of the sampling areas not all 90 meters? Why were these sites chosen, and how representative of the entire estuary are they really? You state that you have one reclaimed and one natural mangrove. What is the third site? How does the close distribution of these three sites really represent the larger area and scale up to your 'global estimates'?

Page 3, lines 26-31: How many measurements were taken at each replicate plot? Do you really have enough data points to make conclusions? What was the variation in the time of day that samples were taken while at plots during each campaign? Can you attribute any of the flux variability to the time of day measurements were taken? What about relationship to soil temperature?

Page 4 lines 1-10: This is a lit review of why you chose your chamber method. If it is essential to this paper, it would belong in the intro. If not vital, leave it out and just tell us what you did and cite why. Extra paragraph does not add to our understanding of your methods.

Page 4, r12-13: The chambers had a (circular, square) area of x, a volume of y, and did not include a fan (source a, b, c). Leave out the justification or put it in the lit review. You can cite the previous research without discussing it in the methods, though I don't agree that you wouldn't need a fan. The purpose of the fan is to ensure proper mixing in

the chamber over time, so while you would indeed see an increase in gas concentration over time without a fan, it would not necessarily be a correct measurement of the flux. What were your chambers made of? Were they opaque or clear?

Page 4, r13-18: remove "They stated...is suitable for the sampling. Does not add to our understanding and is unnecessarily wordy

Page 4, r14-20: Did you use the exact same method for both CO_2 and CH_4? I would expect the CO_2 concentrations to change much more rapidly than the CH_4, and 30 minutes. My experience is with using an infrared gas analyzer in the field to measure change in CO_2 concentration over a short period of time (3-5 minutes) and then use the longer (30 minutes) sampling period for slower production CH_4. Can you explain why you did not do this more commonly practiced method?

Page5, Sampling and analysis of soils: Why did you only sample the soils in the summer?

Page5, r19: ...1/3 of mangrove? NPP is...

Page 5, r20: "A global extrapolation..." Is this your global extrapolation or a previous study?

Page6, Statistical analysis: Does your data fit a normal distribution? If not, then you should consider doing stats that aren't based on a normal distribution.

Results Page 6, r13: Figure 2, How did you calculate annual emissions? This should go in your methods, show an equation if necessary

Check your stats, F-statistics, and p-values

Show us a graph of how the fluxes changed over the course of the year and

Measurements of water table depth and soil temperature would greatly improve your insight to the heterotrophic production. We know that warm + wet = increased production, and saturation leads to anoxic conditions. How does this

C3

Table1: How did you calculate total production for literfall? Equation and explanation, please

Table2: The stats are important, but the main point is what you are presenting as the flux values. Present both flux and CO2-C equivalent flux if you believe it is important.

Table3: Why are you presenting a mean if you have three sites that are not necessarily similar?

Figure1: Can you put more detail into the map. A nice clean map is great, but there could be more detail that orients the reader to know what we are looking at. Maybe even a site photo to illustrate what the mangroves look like. This will help future readers know how your study is relevant to work they are conducting.

Figure2: Consider keeping 'flux' on left y-axis and adding 'CO2-C equivalent' flux to the right y-axis as you discuss in the text. Visuals are worth 1000 words!

Figure3: What season do the measurements represent? What is being shown in each diagram and table should be explicitly stated and the reader shouldn't have to refer back to the text to figure it out.

Discussion

I think your discussion will change, especially if you change your statistical analysis or the focus of what you are presenting in the results. It appears that the story you are telling is: "Mangrove trees sequester carbon, soils release gh gases to the atmosphere. What is the balance and in the long run are these systems actually sinks or sources of C to the atmosphere?" The discussion felt overly wordy for your take home message. I would recommend expanding on how we can improve our estimates of mangrove sinks/sources and the implications these improved estimates on our understanding of global carbon dynamics.

Compact listing of purely technical corrections at the very end (technical corrections: typing errors, etc)

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The majority of the grammatical and punctuation corrections can be corrected through having a native English speaker proofread the paper. There are several run on sentences and places where punctuation would improve the readability of the sentences/paragraphs. Below is a beginning list. I will be happy to read again after it has been proofread again.

P1, r11: comma after greenhouse gases P1, r16: "... among mangrove sites. Gas fluxes..." Gas fluxes not gases fluxes. I won't correct them throughout the rest of the paper P1, r18-19: and the ecosystem was a source of methane P1, r26: "contribute to the global warming problem". P1, r29: comma after "in the past ten years" P2, r3: What is the actual percentage of the 'limited area' you are referring to? Give us a visual P2, r13: anoxic conditions, which favors, microbial processes

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