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Biogeosciences Discussions

Interactive comment on "Individual- and stand-level Stem CO_2 efflux in a subtropical *Schima superba* plantation" *by* L. W. Zhu et al.

Anonymous Referee #2

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This manuscript investigates seasonal and vertical patterns of stem respiration in a subtropical forest. Overall this seems like a useful and well-conducted study. The methods appear to be robust and there are some interesting results. There are a couple of areas that use some reorganization. The introduction and discussion could be improved through better use of the literature. In the introduction there are too many examples of one study being used to draw a broad conclusion, while in the discussion there are too many references that are not fully relevant. Additionally, the manuscript could benefit from review by a native English speaker; there are a number of spelling and grammar issues. Please see the more detailed comments for further information.

Abstract Line 8: The term "scaling scalar" is a little awkward. Just "... the scalar..." would be better.

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Lines 13-15: It is not clear (until reading farther into the paper) why the values here are (or could be) underestimated, since it is not stated here that these values are calculated based on assuming that the respiration at breast height is representative of the entire stem.

Line 16: The temperature response is determined at the tree scale, rather than stand scale.

Introduction While the introduction is generally well organized (in terms of what topics are covered), much of the background material is not well supported or referenced. Surely there is more than one study that determined the proportion of ecosystem carbon used in stem respiration (lines 0-2, page 3291). More than one study should be referenced in order to conclude that foliage respiration has no seasonal trend or that stem respiration does not vary interanually (lines 13-17, page 3291).

Line 9-11, page 3291: Seems like a stretch to say that it is hard to estimate stand stem volume.

Line 15, page 3291: “annual” should be “interannual”.

Lines 0-3, page 3292: I am leery of using the argument that something should be measured, simply because it hasn’t been measured before. It would be informative to suggest why subtropical forests might have a different, or more complex respiration response than boreal or tropical forests. Something to address why this is interesting or useful research to undertake in this particular type or forest (or if it is suggested that the results are independent of forest type, how do the measurements contribute to more fundamental understanding of stem respiration).

Materials and methods What is the size of the study plot (the area in which the trees in Figure 1 were measured)?

I don’t think it is mentioned, but I assume the chambers were ensured to be airtight? Lines 12-21, page 3294: Here and in the corresponding parts of the discussion, I think

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two issues are being combined: 1) the best way to scale respiration to the stand and 2) what part of the stem tissue contributes most to the total stem respiration.

Line 24, page 3295: What is “under-branch height”? Height to crown base?

It would be helpful to see the tree volume equations.

I would strongly recommend adding a section describing the statistical analysis performed on the data. It is very hard to tell from the (later) results text what kind of stats were done.

Results One thing that is not totally clear to me in the results is how the upper (2m) stem respiration measurements were used. Do these results only appear in Table 2, and all the rest of the tree and stand averages are based only on the breast height measurements?

Lines 14-15, page 3296: Is Figure 4 accurate? It looks like (a) shows a non-significant relationship, while (b) is significant.

Line 20, page 3296: Temperature shows a strong diurnal pattern, but stem respiration does not appear to.

Discussion The clarity of the discussion could really improve if it were shortened. There is a lot of extra information that doesn’t really seem necessary to put the study in context, and is not very well integrated with the results. The discussion shouldn’t just be a long list of results from other studies, with an occasional sentence about the present study.

There are several sections that seem like they could be cut: Lines 0-14, page 3299: The issue of growth vs. maintenance respiration is beyond the scope of this study Lines 15-26, page 3299: Most of these studies do not provide any information on the effect of stem temperature on respiration, and many of them do not include total stem respiration, so they don’t seem very useful to discuss here.

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Lines 17-21, page 3302: Elaborating on this analysis would be very informative. It is not clear what kind of analysis this 85.9% value results from. Also, I am confused how temperature can explain so much of the variation, when E23 is so different between the two seasons.

It would be great to have a conclusion paragraph or section to summarize what this study has contributed to the understanding of stem respiration, and what kinds of future studies are needed (what is still unknown).

Figures Y-axes for different panels within a figure should be the same (as much as possible) to facilitate comparisons.

In Figure 5 and 7, should there be a break in the August data? If not, why do the ticks switch from being at 20:00, 4:00 and 12:00 to 23:00, 7:00 and 15:00?

Figure 6: With so much scatter (variation between trees) it might be better to analyze this relationship at the tree level, or include a variable which explains the tree to tree variability.

Table 2: Are these values averaged across August and December? Why not keep them separate and look for seasonal changes in the height patterns?

Interactive comment on Biogeosciences Discuss., 9, 3289, 2012.