Biogeosciences
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Interactive comment on "Tree proximity affects soil respiration dynamics in a coastal temperate deciduous forest" *by* Stephanie C. Pennington et al.

Anonymous Referee #3

Received and published: 15 August 2019

Pennington et al report on a well designed study of the effect of nearby trees on soil respiration, which finds that nearby trees increase the temperature sensitivity (but not the rate) of soil respiration except during dry periods and during the dormant season. The topic is important and appropriate to the journal, and the article is very well written. It was a pleasure to read.

My general criticism is that the article does not discuss what for me is the 'elephant in the results'. The authors take the effect of BA5 on the T sensitivity of Rs to mean that Ra is more sensitive than Rh to T. The logic is that when there is more nearby basal area (and hence, by assumption, root biomass), Ra is a greater component of

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Rs. However, BA5 was not found to be a significant driver of the spatial variability of Rs. It seems to me that the only way to reconcile those two ideas is to suppose that as root biomass increases, Ra increases but Rh decreases by the same amount in order to keep Rs the same, which as far as I know is not something that is believed to happen. If anything, the literature suggests that root exudates fuel soil respiration, rather than competing with it. I therefore think the discussion needs to acknowledge this paradox and tackle the question of how roots could plausibly impact the T sensitivity of Rs without impacting the magnitude of Rs. Could it be some kind of statistical artifact? The article doesn't necessarily have to have the answer, but it should at least lay out the key questions and suggest what kind of further work might be able to answer them.

Specific

lines 34-5: "We estimate that four RS observations were required to be within 50% of the stand-level mean, and 311 to be within 5%, at 90% confidence." After reading the article, the meaning of this sentence became clear, but when it is first encountered in the abstract, its grammatical ambiguity causes it to sounds like nonsense (who required your observations to be close to the mean, and what does it mean to be within 50% of a mean?). I would rephrase it to something like: "Due to that variability, we determine that four RS observations would be required in order to estimate the stand level mean to within 50%, and 311 would be required in order to estimate it to within 5%, at 90% confidence."

line 50: What is "leaf habit"? And does ecosystem-scale productivity really affect the sub-ecosystem-scale spatial variability, or do you mean to say something different?

lines 133-4: It seems to me that taking the log shouldn't turn heteroschedasticity into homoschedasticity: if the variability in Rs varies with Rs, then the variability in log(Rs) will also vary with log(Rs), no?

line 213: I think "temperature" should be "temperate".

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Figure 4: This figure's axes are swapped. Right now it is basal area vs residual (not residual vs basal area as the caption says). The residual is the independent variable that should be on the x axis. More importantly, it looks like the regression lines were calculated with this reversal of dependent and independent variables as well, so that all variability is attributed to the basal area measurement (which is actually quite precise I'm sure) rather than to the respiration (which is actually quite noisy). Also, there is a strange character in the x axis label.

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