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

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1   "This paper addresses a current knowledge gap with forest soil respiration research: how important is the presence of vegetation for helping to explain some of the variability in soil respiration over space? We often treat forests as homogeneous when designing field studies. However, there is an accumulation of research that suggests that the spatial arrangement, size and density of trees can affect soil respiration measured in a particular spot. It's important to be able to characterize this effect for many reasons, which the authors point out - designing the spatial arrangement of measurements, interpreting relationships of soil respiration with environmental variables and seasonality, to name a few. I appreciate the authors' study design, especially their decision to sample sub-monthly and not just focusing on the growing season but also reporting results from the dormant season. The paper has some weaknesses that dilute the impact of the study, I believe, that can be improved. There are also some omissions that should be included, and some of the statistical approach should be re-considered. The paper is generally well-written but (like most papers) could use some further clarification in places."

Thank you for the thoughtful comments and assessment.

2 "I have concerns with the title of the paper that affects some of the text in the paper and the way the problem is framed and studied. 'Tree proximity' implies that the research is focused on understanding how the degree of closeness of trees to soil respiration measurement influences respiration. This is not what the study is doing. Rather, I think a more accurate title would be something like "localized basal area affects soil respiration dynamics in a coastal temperature deciduous forest". This is because the only variable included in the models that involves trees is basal area within a 5 m radius, and the focus of the statistical modeling was on determining if localized basal area had an effect in addition to temperature and moisture. Based on the title, I was expecting a different kind of analysis, such as kriging or a spatial regression. 'Tree proximity' could be interpreted to mean different kinds of things. 'Localized basal area' is more specific to the actual variable that was examined."

This is a great point and also noted by Reviewer 1. Your title suggestion is a good one; we will change the title to something that reflects the overall Rs variability in the context of localized basal area affect/vegetation.

3 "Parts of the discussion and conclusion involve making assumptions about autotrophic and heterotrophic respiration based on their findings. It is tempting to make these statements (I've been there before), but you have to be careful here. Trees do not just influence autotrophic respiration - they provide fresh substrate for heterotrophic respiration as well. I think it is okay to include some speculation of how tree presence/absence might influence respiration rates, but try to avoid the assumption that trees only affect the autotrophic side of things."

This is a fair point - upon revision, we will clarify that these are broad assumptions but may not reflect the complex real-world links between Ra and Rh. We also believe that (as pointed out by Reviewer 1) a further discussion of phenology will allow us to acknowledge other processes that may influence Rs.

4 "The statistical methods used to determine whether variables were stronger or weaker and to compare dormant season model fit to growing season model fit should be re-examined. Differences in R2 and AIC between models that use different input data do not necessarily indicate that the fit is better or worse. You could look into using an effect size analysis or examining relative importance of regression parameters (package relaimpo in R). Overall, this is an interesting study that investigates the influence of localized basal area on soil respiration - with some improvements, this should be an impactful contribution to the literature. Keep up the good work."

This is absolutely correct; our initial approach here is vulnerable, as you note, to differences in dataset size and other factors. We appreciate the introduction to the 'relaimpo' package, and will use it, or an equivalent approach, to robustly examine the

relative importance of model terms in our linear regression analyses.

5 OVERALL RESPONSE:

Thank you for the critique. To best address your suggestions, we will (1) create a new title that better reflects the purpose of the study, (2) clarify assumptions being made, especially in regards to Rh and Ra drivers and the links between them, and (3) change our statistical analysis to more robustly compare models of differing sample sizes, especially between our growing and dormant season models.