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Biogeosciences Discussions

Interactive comment on "Autumn warming and carbon balance of a boreal Scots pine forest in Southern Finland" *by* T. Vesala et al.

Anonymous Referee #1

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Vesala et al. study the effect of autumn warming on ecosystem balance in a specific Scots pine forest in Finland. The study is very well justified in the introduction as a detailed follow-up study to the broader Piao et al. (2009) study. The study nicely addresses and disentangles the different confounding factors which contribute to a changed autumn carbon balance in this forest. The paper is well-written and certainly deserves publication in BG. A number of clarifications/modifications are suggested before publication:

1. In Section 2.1 the authors write that the thinning did not affect NEE. But since you are looking at GPP and TER separately this is not sufficient. Please provide a statement/analysis regarding the thinning as possible confounding factor for TER and GPP responses.

2. With the partitioning of NEE into TER and GPP I assume that Re,0 is variable with time. Otherwise TER would be a function of temperature by definition, which would confound the analysis. Unfortunately I (and maybe other readers) cannot access Kolari et al. (2009) easily. So please clarify this briefly.

3. In section 3.3 in the moving window correlation analysis the authors seem to mix interannual and day-to-day variability (not fully clear). Please clarify justify!

4. Also Section 3.3 would be clearer if the partial correlations were introduced from the beginning; it was the first thought I had, when I saw the simple bivariate correlations.

5. Also I recommend looking separately at night and day-time temperatures, since it might strengthen the evidence of the impact of cold nights.

6. GPP PAR correlations are 0.56 in the text, 0.53 in the Table 1. Also I wonder what the effect of soil moisture is. In Table 1 it also correlates negatively with both PAR and GPP, i.e. when this is partialized out the GPP-PAR relation should even become stronger.

7. The reader is sometimes left alone with the interpretation of the results in particular in relation to the Piao et al. (2009) study. From section 3.2 line 15 and more importantly from the process model application which disentangled the confounding effects of PAR, Tair and GPP it seems the conclusions of Piao et al. cannot be fully supported, because climate change does not involve the association of warmer days with cloudiness as for the contemporary variability. I would expect a little bit more explicit interpretation, since this is an important issue and does not deflect the value of the Piao et al. study.

8. Related to this, a discussion of how general or site specific the results might be is encouraged. Are there any indications from the other NECC sites?

9. On page 7069 you discuss that the increased respiration of warm autumns might not important for the overall carbon balance, since it might just change the distribution of respiration over the year. You would expect a decrease in respiration during the following spring for example. But do you see indication for this in the data?

Minor comment: Please revise Fig. 2 letter associations with the panels, they are partly wrong.

Interactive comment on Biogeosciences Discuss., 6, 7053, 2009.