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5, S1877-S1878, 2008

Interactive Comment

Interactive comment on "Assessing seasonality of boreal coniferous forest CO₂ exchange by estimating biochemical model parameters from micrometeorological flux observations" by T. Thum et al.

T. Thum et al.

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We thank you for these constructive comments.

General comments: Information about the model inversion that was missing in the first version is now added to the Materials and Methods, section 2.4. To improve the structure of the manuscript several changes were made. Materials and Methods section has been shortened from the end and subtitles have been added. Discussion and Results sections have been reformulated. Section 3.2 was shortened and previous section 3.3 about simulations has been omitted, as suggested. Also section 3.4.2 has been omitted as suggested by J. Kattge.



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Detailed comments:

(1) p.2708, I. 2: *Biochemical seasonality* is certainly not a clear concept. We dropped the word *biochemical* from here. (2) P. 2709, I. 3: This sentence has been rephrased to stress that the problem lies within the upscaling procedure, not leaf-level measurements. (3) P. 2709, I. 9: This sentence has been rephrased to say that the model has several important parameters and that we are now concentrating on three of them. (4) P. 2711, I. 8-13: References about flux measurements are now given in Table 1. (5) P. 2711-2712: Equations for net photosynthesis, J and stomatal conductance are now given. The role of mesophyll conductance might be important (Juurola et al., 2005) but due to lack of data and difficulty of estimating it for the whole forest, it was not included in our modelling. This point is also added to the text. Theta, q, kc, ko, Gamma*, and o has been set to constant values in the parameter inversion. Estimating parameters Jmax, Vcmax and g is guite common method used in the literature, since they are the parameters with most variability. We added to Materials and Methods section which variables were kept constant during inversion and to the Discussion section that this might have some effect in the results. (6) p. 2713, I. 24: Needles reach saturation at light level 800 μ mol m-2 s-1. While we are optimising Vcmax the lower levels of the canopy can indeed be Aj-limited. This was allowed during the optimisation. A sentence clarifying this issue has been added. (7) p. 2717, I. 19: This perspective is appreciated and we tried to stress it in Discussion and Conclusions.

References

Juurola, E., Aalto T., Thum, T., Vesala T. and Hari, P.: Temperature dependence of leaf-level CO2 fixation: revising biochemical coefficients through analysis of leaf threedimensional structure, New Phytol., 166, 205-216, 2005.

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