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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.

G. Wohlfahrt (Editor)

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General: The authors invert a model of canopy photosynthesis using NEE measured over four coniferous boreal forests and thereby deduce the temperature response of two key model parameters, V_cmax and J_{max}.

While the objective of the paper was generally appreciated as novel and interesting by the two reviewers, the conception, structure and approach of the paper was consistently viewed as requiring major revisions before becoming acceptable for publication.

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I fully agree with the two reviewers - the paper needs a better focus and needs a better style and structure - currently it is difficult to read and confusing. A major omission is the lack of any information on how the model was actually inverted, as critiqued also by the reviewers. Conversely, some material may be omitted, e.g. the simulation of temperature/CO₂ scenarios - see also the appropriate comments by the reviewers.

In summary, I see a lot of potential in the paper, but it will require major revisions before becoming acceptable for publication.

Detailed comments: (1) p. 2708, l. 2: what is "biochemical seasonality" ? (2) p. 2709, l. 3: this sounds a bit like leaf-level data are not reliable; this is a problem of scale - if there is a mismatch, then it is to be attributed to up-scaling to the ecosystem level (3) p. 2709, l. 9: the model has more "important" parameters, e.g. R_d , some of them are assumed constant among C3 plants (K_c , K_o , τ) (4) p. 2711, l. 8-13: give some references for details on flux measurements (5) p. 2711 and 2712: the leaf model should be described in more detail; e.g. the equation for net photosynthesis (A), J , the stomatal conductance model; what about mesophyll conductance ? which parameters have been set to constant values and what are the consequences for the parameter inversion ? (6) p. 2713, l. 24: at which light level do leaves reach saturation ? if you use the light level above the canopy to decide whether you assumed photosynthesis to be limited by A_c , then it may well be that leaves deeper in the canopy are limited by light and thus A_j ; explain in more detail (7) p. 2717, l. 19: the approach of linking trying to model the seasonality is novel and interesting and could be a major result of this study

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