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Interactive comment on “Dynamics of canopy stomatal conductance, transpiration, and evaporation in a temperate deciduous forest, validated by carbonyl sulfide uptake” by Richard Wehr et al.

Anonymous Referee #2

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This is an excellent paper that I enjoyed reading, which shows novel application (!) of COS flux measurements to estimate canopy scale conductance. This is a welcome deviation from the current focus on using COS as tracer for CO₂ uptake and GPP, to address another critical uncertainty in ecosystem research.

The paper is well written and provides a rigorous treatment of the topic. The results on the seasonal patterns in conductance and the ET partitioning, including the "counter-intuitive" trends is interesting and intriguing. I have a few comments that can be addressed in minor revisions before formal publication in BC, which is fully warranted.

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– while the estimates of total canopy conductance with COS is straight forward, estimating stomatal conductance is more tricky and is not necessarily well constrained by COS alone. It seems the uncertainties in the modeling of the wide range of the additional parameters is somewhat played down and more indications of the uncertainties involved should be made.

–In that sense, the statement that agreement between two methods validate both is a bit strong. I think its "reassuring" (but we should remain cautious)...

–In particular, I found the discussion on the estimation of the biochemical conductance interesting, but perhaps incomplete. There is little reference to the literature available on the topic, both COS (e.g. Berry et al 2103, Stimler et al 2011, etc.), in much of the CO₂- 18O literature where similar aspects had to be addressed, and other physiological studies. Ultimately, perhaps CA poses little resistance to COS uptake at all...

–Although the focus on conductance is commendable, the total ignorance of CO₂ exchange (e.g. Fig. 1) is problematic and should clearly be addressed. This are important constraints on COS estimates, and information on COS/CO₂ relationships from such study will be very valuable to other COS studies. In fact, it could also be interesting to check if the COS-based g is valid for CO₂ exchange, and perhaps to use results on COS-based T , and CO₂ to look at seasonal trends of WUE.

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