

Interactive comment on “Integrated Modeling of Photosynthesis and Transfer of Energy, Mass and Momentum in the Soil-Plant-Atmosphere Continuum System” by Yunfei Wang et al.

Anonymous Referee #2

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It was difficult to see what are overarching scientific question and findings (including development of a novel model) in the current manuscript. Although the authors mentioned “most of the current vegetation photosynthesis models do not account for root water uptake, which compromises their applications under water, stressed conditions (P1L15-),” it should be noted that there are numerous SPAC models that are successful in taking into consideration the root water uptake (the authors should look at the pioneer paper (Williams et al. 1996, PCE 19, 911-927)). I think all figures shown in this manuscript can be reproduced by most existing SPAC models including most DGVMs, and thus, I feel they are meaningless to be represented.

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Frankly speaking, because of the above reason I feel the current manuscript cannot be reviewed anymore, but I also feel this work is very potential. I acknowledge SCOPE has a huge advantage in terms of calculation of leaf-scale chlorophyll fluorescence. Thus, as the authors mentioned at the end of the manuscript (P21L392-), SCOPE_STEMMUS can be very state-of-the-arts SPAC model that can simulate the effect of plant water stress via soil moisture status on leaf-to-canopy scale chlorophyll fluorescence.

Thus, I will reject the current manuscript temporarily, but I strongly encourage the authors to resubmit this work with adding modelling results and discussion about the effect of plant water stress via soil moisture status on leaf-to-canopy scale chlorophyll fluorescence, which might be easily simulated using SCOPE_STEMMUS. For this, the authors should note: Obviously SCOPE_STEMMUS failed to reproduce the root developments (Fig. 12), but is successful in reproduction of transpiration and NEE. This is a serious inconsistency that prevents sound simulations of the effect of water stress on leaf gas exchange, and must be solved for resubmitting this work.

Though this is trivial point compared to the above-mentioned, I assumed the first author is an inexperienced scientist. For example, there was an ambiguous definition between “Results” and “Discussion” sections and were many wrong wordings. So I recommend to resubmit your paper to academic journals after thorough checking by the other experienced authors.

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