Earth System
Dynamics

Discussions

Interactive comment on "Appraising the capability of a land biosphere model as a tool in modelling land surface interactions: results from its validation at selected European ecosystems" *by* M. R. North et al.

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P224L11-13: Considering the high temporal resolution of the model, maybe this line describing the SimSphere that represents "various physical processes" is a bit vague, and it also repeats with P226L5-6. For instance, there are various physical processes going on in the soil-plant-atmosphere component, but the model simulates water and energy fluxes (the SVAT component) as well as CO_2 (but not C explicitly, neither nitrogen). The leaf stomatal conductance (i.e. resistance) is the key parameter in coupled H_2O and CO_2 exchange in SVAT models, which controls the diffusion rate of H_2O and

CO_2 between leaves of plants and the ambient air. As it is assumed that stomatal conductance depends on the bio-physico-chemical properties of the leaves (C3, C4, CAM), and on environmental conditions (e.g. solar radiation, air temperature, water vapor deficit), how is this accounted for in the model, especially the former one?

P224L16-21: In relation to the above comment, it is difficult to understand how the model takes into account the vegetation in the physical component? Vegetation is too broad term and as such, to my opinion, is not very useful in climate change studies that focus on vegetation types and species responses. So, can user specify the type of vegetation i.e. is that an input parameter to the model? Because that determines many other parameters and state variables (LAI, root i.e. soil water content, etc). Because again on P229L24-25 the vegetation component is not explained well. Also from tab. 1 it seems that the model have "PLANT" module, but this is not explained well in the text.

P228L1: which "above equation"?

P229L11-12: How the models' horizontal domain refers to an area of undefined size i.e. how then fluxes are converted to meaningful units for policy-makers, e.g. per m2 or ha? It would be good if authors have explained this better or reformulate the sentence.

P237L2: but this study does NOT evaluate any water budgets?!

P237L15-until end of paragraph: it seems from fig. 3 that the model is much less accurate to predict Rnet for places where more energy is going out than coming in (negative net radiation). Maybe a comment on this-why would it be so?

P240L1-2: Yes, but for the studied variables, we don't know if that is the case for CO_2 fluxes and also for the water within the SVAT system. Mention of the evapotranspiration has not been made, but that is the largest consumer of water and energy in the SVAT system (normally most water added to the (agricultural) system would evapotranspire from it).

I think the last two paragraphs in the discussion are too long and repetitive and may

be shorten on the cost of discussing other relevant points. e.g. how the present study contributes to regional-global climate change investigations, considering the model is detailed, point-scale, and requires hourly data that are arguably the most difficult to obtain. Also, how the simplicity in the representation of the soil reflects on the results? This is also in relation to the Kramer model criteria mentioned on P240L1-2. Also, I think the conclusion is too long and repetitive, it may be shorten to the point and finish with the existing future research.

I hope authors will find comments useful to improve or clarify their study for wider reader community.

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