Biogeosciences
Discussions

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Interactive comment on "Do we (need to) care about canopy radiation schemes in DGVMs? An evaluation and assessment study" *by* A. Loew et al.

Anonymous Referee #2

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General comments ——————-

The present work is devoted to provide an evaluation of canopy RT schemes of different DGVMs. This work also shows the potential impact of the identified deviations on carbon production. The state of art is well reviewed in particular and present findings will bring new insights on the topic. However, I found the form of presentation to be sometimes confusing. The objectives of this manuscript are numerous and not clearly sound. The evaluations of each canopy RT scheme suffer from a lack of solid validation. RAMI4 virtual experiments allows to make evaluations of 3-D RT models according idealized cases. But these experiments do not represent real canopies in a realistic manner and are not compatible with the needs of these DGVMs that have

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global scale applications. This critical aspect of the paper is pointed out by the authors in the discussion section (4.2). In my eyes, the work is described as an evaluation but it is really more of a comparison and should not be considered a validation (or evaluation). Otherwise, ground measurements and satellite products of FAPAR and GPP should be considered. On the other hand, the discussion about the impact of albedo biases on the radiative forcing is very interesting. My opinion is that the paper should be shortened and the paper should deal with an unique objective (maybe less ambitious).

Specific comments —————

(Note that the 'Specific comments' section is not complete, since there is first an important rewriting to be made.)

Please could you justify the chose of the selected DGVMs? Would results be still valid using other models ?

A comparison of the FAPAR (and carbon net assimilation of the leave) from the different DGVMs at different levels within the canopy could be instructive.

I would suggest to add for each DGVMs a sensitivity study to the number of levels used? For example, is it possible to have an idea of the performance of JULES with 3 layers?

In equation 12, I do not understand LAI=12. Equation 13, is it the total surface albedo?

How multi-scattering effects between the soil and the vegetation layer are taken into account in section 2.1 ?

Please could you discuss the performance of the models under diffuse conditions?

In my eyes, the snow cases should be discarded from the study.

In Section 3.1.1, I would suggest to discuss the effect of thermal and water stress on plants. During these periods of year, canopy RT models are not so useful.

The authors show a deviation in net photosynthesis rate up to $10 \mu molCm-2s-1$. Is it realistic? Mali et al 1998 show that Amazonian rain forest has a rate of $8 \mu molCm-2s-1$.

In Section 3.1.2, could you explain why the radiative forcing effect increases if the LAI increases?

Interactive comment on Biogeosciences Discuss., 10, 16551, 2013.