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Biogeosciences Discussions

Interactive comment on "Microbial dormancy and its impacts on Arctic terrestrial ecosystem carbon budget" *by* Junrong Zha and Qianlai Zhuang

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Dear Drs Zha and Zhuang,

Thank you for responding to the referee reports. Work on the manuscript has addressed many of the concerns by referees, and I am content with these (e.g. the issue of equifinality). However, I am not convinced that you have managed to alleviate the main point of referee 1, which is that the uncertainty associated with both models compared here is so large that it is not possible to judge any potential improvement from incorporating dormancy. I would therefor like to ask you to revise the manuscript further to address the issue of modelling uncertainty. I include some further specific explanations below.

I agree with referee 1 that model uncertainty is key for this comparison, and this is not well illustrated also in the revised paper. Figures 2, 4 and 5 show that in some instances the new model follows temporal dynamics better, but the improvement over the non-dormancy model is not that clear, and in absence of explicit uncertainty associated with either model, the reader can not judge whether this is a significant improvement. This then leads to similar problems when making regional predictions – Are stated differences for the contrasting models within the model uncertainty?

You also don't address fully the point that the dormancy model increases modelling uncertainty owing to the larger number of parameters. As no modelling uncertainty is quantified at present, I think that this fundamental limitation of constructing a more complex model (i.e. with more parameters) is not reflected appropriately.

Figure 11 seems to show the wide band of uncertainty (but this is not clearly explained in the figure caption). Can the apparent difference/improvement of the model prediction be justified, given the considerable underlying uncertainty?

Some of the figures are still very hard to read. Axis labels and numbers are generally too small. Fig. 3, for example, is improved as far as resolution is concerned, but font size is far too small. The same applies to other figures.

Best regards, Jens-Arne Subke

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