Geoscientific
Model Development
Discussions

Interactive comment on "Representing life in the Earth system with soil microbial functional traits in the MIMICS model" *by* W. R. Wieder et al.

M. Smith (Referee)

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Weider at al. present further details on the performance of their MIMICS model which will be appreciated by the research community. Namely: they illustrate the performance of the model in terms of the predictive accuracy at different sites around the world, it's ability to capture the impacts of N enrichment experiments and it's equilibrium and transient global predictions. I agree with the authors that this should be published as a research report.

I only have minor corrections to recommend: P2012 L2: Projecting biogeochemical -> projecting realistic biogeochemical

P2012 sentence beginning L8: You mention "oligotrophic and copiotrophic" twice in

this sentence and it could be rewritten to make it read better

P2012 L12: animals -> animal

P2014 sentence beginning L6: should say "scale from".. to something, not just scale from. Hope that makes sense.

P2047: You don't say what the bracketted numbers are and you don't define all of the symbols. Either do so in the legend or refer to somewhere that definitions can be obtained.

P2017 L18: proscribed->"prescribed" ?

P2018 L1: I get lost in the paragraph before this (where you fix microbial biomass constant) and this one, where it somehow varies. I don't understand how the "original parameterization of MIMICS produced biased results,". You need to be clearer in your description of the experimental design - it's a bit grabled in this part of the manuscript - please somehow break it out into something more structured so it's easier to follow. Perhaps just a paragraph at the start of the section giving an overview of the experimental design.

P2019 L17: This does not "resolve uncertainties", this just explores sensitivity to parameter variation. I recommend you change this to "explored the sensitivity of MIMICS model global scale predictions to parameter variation" - also note comment below that you mention NOTHING of the results of this analysis in the rest of the paper

P2020 L20: I don't follow your logic. You suggest that because the 2models have similar performance to simple statistical models that somehow their predictions are "adequate"? Adequate for what? Adequate for replacing statistical models? Not really, they perform the same. Please explain better your judgement of the quality and value of these fits because it's not at all clear. I think the fact that you get a good fit is great - the addition of realism has not made the predictions worse - though you MUST explain somewhere (briefly) how you chose your parameters and how much tuning you

did. Adding a mechanism with full freedom to tune parameters almost certainly should increase predictive performance.

P2024 L7: then-> than

P2024 L6: please comment on the interannual variation apparent in Fig. 5b - why do the dynamics for both models have an irregular oscillation with regular periodicity superimposed?

RESULTS: I didn't see anything to do with the results of your parameter sensitivity analyses. That should be in there if you mention it in the methods!

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Interactive comment on Geosci. Model Dev. Discuss., 8, 2011, 2015.