

## ***Interactive comment on “Meta-analysis of high-latitude nitrogen-addition and warming studies imply ecological mechanisms overlooked by land models” by N. J. Bouskill et al.***

**N. J. Bouskill et al.**

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We thank Dr. Allison for his positive and constructive comments. We believe the manuscript has been significantly improved by his comments on this draft of the manuscript and a previously submitted draft.

Below are Dr. Allison's comments followed by our response.

That said, I think there are two key messages from the nitrogen analysis that could be more explicit or delivered more concisely in the paper discussion. One issue is that most addition rates are too high to represent what will happen with global change in northern ecosystems. So we are lacking in relevant data and manipulations. That said,

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the second message is that the models cannot replicate the (unrealistic) experimental manipulations. A good model should be able to replicate any observations if it has the right underlying mechanisms. The question here is whether we care about the mechanisms underlying microbial response to extremely high N addition in the tundra and boreal. Maybe we don't, but the analysis is still disconcerting because it means the models may fail in lower latitude systems with higher N inputs.

We believe Dr. Allison is right and in rewriting aspects of the discussion we have included a more explicit statement representing both of these points.

12383:24- Report the error on the soil moisture change

This has been added to the results section.

12383:16- I don't think it's a good idea to abbreviate litter decomposition, or microbial biomass for that matter. The whole manuscript seems to have gone a bit overboard with the acronyms—don't use them unless they are necessary and well-established in the community. Otherwise it makes it hard for readers outside our discipline.

We have revised the manuscript to minimize the use of abbreviations. Only GPP and SOM are left as abbreviated response factors.

12384: What was the surface soil moisture response to warming in the models?

Soil moisture increased, but not statistically significantly, in both models (CLM-CN:  $38\% \pm 42\%$ ; CLM-Century:  $7\% \pm 33\%$ ). We have added a statement in the results to reflect this point.

12386:21- “of” emergent responses.

We have changed this now.

12387:14- “result in”

We have made this correction

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12387:19-24- the writing on the priming mechanism is somewhat unclear here. There are also too many “however’s”

We have re-written this section to address this comment.

12389:9- I suggest avoiding the word “acclimation” or “adaptation” in this context because they have specific meanings that may not be intended here. Karhu et al. in a very recent Nature paper coined the term “community-level response” to describe these processes. I would use that.

We take Dr. Allison’s point on the use of different terms and have re-written this section to remove any terms that might be confusing, including instead the term ‘community-level response’.

12390:10- “published”

We have made this correction

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Interactive comment on Biogeosciences Discuss., 11, 12375, 2014.