Biogeosciences
Discussions

Interactive comment on "Changes in soil organic carbon storage predicted by Earth system models during the 21st century" *by* K. E. O. Todd-Brown et al.

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Reviewer comments are in italic and our replies are not.

The introduction section presents a good overview of our current understanding of possible effects of climate change on soil carbon stocks. However, I feel it still needs to introduce better the manuscript and the analyses presented. For example, I think it'd be helpful for the reader if you explain better what is CIMP5 and why it is important to compare the output from these different models? Why do we need to compare the numerical output and not the implementation of the models themselves? What is new and different in this manuscript in comparison to the analysis previously presented in

Todd-Brown et al. (2013)? What is RCP8.5 and why is it relevant to compare the model output form this scenario? I feel the introduction should give a little more weigh to the context and motivation of the analysis.

We've added a new paragraph extending the CMIP introduction and extended discussion of the previous findings from Todd-Brown 2013. RCP 8.5 is also introduced and justified.

There is a simple issue about terminology on page 18978. You use the terms temperature and moisture sensitivity to describe the functions of temperature and moisture that modify the decomposition rate. I think the correct term here is 'dependence' and not 'sensitivity'. Sensitivity is better understood as the derivative of the function with respect to either temperature or moisture, while dependence is the function itself. Many people treat these two terms equally, but there have been some attempts to homogenize terminology in this respect. See Sierra (2012) for a discussion on the topic.

Excellent point. We've replaced 'sensitivity' with 'dependency' where appropriate.

Tables 1 and 2. Can you given a measure of variation across models? I think it'd be good to see either the standard deviation or the range accompanying the multi-model mean in the last column.

We've added multi-model standard deviation to the two tables.

A recent paper also analyzing model output from CIMP5 found an important contribution of turnover times on the variability of predictions across models (Friend et al. 2013). Although these authors only looked at vegetation carbon, I think it places a good reference framework for discussion in this manuscript. Maybe you could discuss this study as well.

We've added this reference to the discussion in the context of SOC turnover times.

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