

Interactive comment on “Half a degree Additional warming, Projections, Prognosis and Impacts (HAPPI): Background and Experimental Design” by Daniel Mitchell et al.

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This paper provides a description of the HAPPI MIP simulation protocol. While the simulation design is ambitious, this is a very timely experiment as results from HAPPI MIP will inform the IPCC special report on 1.5°C and provide the community with a broader sense of the possible difference in impacts between 1.5°C and 2.0°C.

I have one comment about the protocol design concerning the land-use description. In particular, it would be useful to have an explicit statement on the treatment of land cover for both 1.5°C and 2.0°C experiments. Land use and land cover change has been shown to have a substantial effect on regional climate as demonstrated in LUCID (e.g. Pitman et al., 2009) and will be examined further in LUMIP (Lawrence et al., 2016).

Currently it is not sufficiently clear whether participants should use fixed land cover from RCP2.6 for the year 2100 or the decadal average (over 2106-2115) or whether the is land cover the same in both 1.5°C and 2.0°C experiments? This is implicitly implied towards the end of Section 2.1 (line 158) but perhaps having a clear statement would avoid any ambiguity.

References

Pitman, A. J., and Coauthors, 2009: Uncertainties in climate responses to past land cover change: First results from the LUCID intercomparison study. *Geophysical Research Letters*, 36, L14814, doi:10.1029/2009GL039076.

Lawrence, D. M., and Coauthors, 2016: The Land Use Model Intercomparison Project (LUMIP) contribution to CMIP6: rationale and experimental design. *Geosci. Model Dev*, 9, 2973–2998, doi:10.5194/gmd-9-2973-2016.

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