

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).

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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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