

Interactive comment on “Effects of land cover change on temperature and rainfall extremes in multi-model ensemble simulations” by A. J. Pitman et al.

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Thanks for your comments.

Roger Pielke raised 3 major issues:

1. lack of discussion of irrigation and urbanisation.

Response: The models we used did not represent these land cover change types. We have revised the paper to make this clearer. We have also added significant text and references to highlight these types of land cover change. This includes additional caveats in the Discussion that note that we might well underestimate the impact of land

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cover change as a consequence.

2. A suggestion to calculate moist air enthalpy.

Response: we cannot do this without re-running all the simulations. In addition, we purposely analysed our results in the context of the indices used by others in the community - the ETCCDI indices. We think our results stand coherently without this additional analysis though we acknowledge that using enthalpy has merit and could be the subject of additional analysis. This suggestion is useful in highlighting variables that need to be output and saved at a higher time resolution in subsequent experiments.

3. Robustness of conclusions

Response: LUCID was all about robustness in results. In terms of the experimental design, whether individual models do / do not show remote changes was not the point - one would expect 10% of the globe to show remote changes at a 90% statistical significance level. The question is not whether there are remote changes; the question is whether these are real or not. Pielke is right that remote changes may be real and highlight non-linear responses. His suggestion on how to analyse this is interesting too but is really an area of future work. We could not do this with the data we have and would need to re-run.

The basis of the comment by Pielke was our statement that in general impacts on means and extremes were restricted to areas of intense land cover change. We have modified this statement to add the word "consistent" - this does not address the broader questions by Pielke but does highlight that we are talking about results that are consistent across multiple models.

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