

Interactive comment on “The weather@home regional climate modelling project for Australia and New Zealand” by Mitchell T. Black et al.

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This paper describes the experimental setup of an atmospheric modelling system for examination of extreme weather over the land territories of Australia and New Zealand in the context of anthropogenic climate change. It is well designed, well described in this paper, and various aspects of the output of the modelling system are adequately summarised. I recommend the paper for publication. I have some minor comments and suggested edits below, but I do not consider any of them to be required.

General:

You examine DJF and JJA values, and some SONDJF values. The onset/cessation seasons for temperature and (I think) rainfall occur during the SON and MAM seasons, and I believe extreme early/late onsets/cessations can be at least as important e.g. for

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water resources and agriculture. Have you done these analyses for those seasons and are you able to summarise them? It probably does not have to be in the sort of detail done for DJF and JJA, but could just highlight any cases where e.g. the model might happen to be rather late (as proxied by the mean during the onset).

Technical:

page 1, lines 6-7 "more robust estimates of uncertainty" than what? You are using a single modelling system, so I am not sure how you can e.g. robustly estimate the uncertainty due to approximations in model design.

page 1, lines 12-13 Where or how? I do not see the URL of any data portal listed in the document, for instance.

page 1, line 16 I suppose wildfire might be considered a "climate-related" process, but I usually think of it as an ecological process.

page 1, lines 16-20 Are there any reports that document such "loss" and "tasks"?

page 2, line 1 Reisinger et alii (2014) (IPCC AR5 WGII Ch25) might be an appropriate reference here, as it is in this chapter of the IPCC AR5 that trends in Australian/New Zealand climate are assessed specifically.

page 2, line 10 "Distinguishing between internal" -> "Distinguishing between the responses to internal"

page 2, line 12 While the magnitude of the response is more or less the same at regional and global scales?

page 2, lines 20-22 Are these "drivers" or mechanisms? For instance, atmospheric blocking over Australia is a manifestation of climate variability over Australia, not a driver thereof.

page 2, line 31 "respond to anthropogenic" -> "respond to the absence of anthropogenic" This discussion concerns estimation of the counterfactual climate, correct?

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page 6, line 9 Might the observations have any deficiencies?

page 6, lines 10-11 How do DJF and JJA project onto the wet, dry, onset, and/or cessation seasons over these regions?

page 8, lines 3-4 This is not clear to me for T_{min}. The uncertainty on the median should be $\sim\sqrt{75}\sim 8.7$ times smaller than the range of the whiskers: are the respect T_{min} median values larger than this? I cannot tell from the plot.

page 8, line 27 Maybe a 360-day calendar?

page 8, lines 32-33 How is "model uncertainty" estimated with just the single model?

page 9, lines 4-5 I am not sure, the observations lie within the spread of the simulations.

page 9, lines 9-10 The observations lie within the spread of the simulations for 11d, and are pretty much bang on for 11e.

page 9, lines 30-31 Re the sea ice extent, does this make sense for the Antarctic, where the recent trend has been toward slightly larger extent?

page 9, lines 32-33 You did not mention when describing the simulations if anything is done concerning land use/cover change. Is this included and, if so, how is this treated in the counterfactual simulations?

page 10, line 18 "quantified" -> "characterised" I do not see any reason to believe that these 10 estimates can be assumed to be uniformly sampled from a plausible posterior distribution. Rather than producing a posterior distribution, I think you are testing robustness against plausible alternative estimates.

page 10, lines 29-30 Where and/or how?

page 11, line 3 "allows extreme events" -> "allows certain types of extreme weather events"

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