

Interactive comment on “Changes in Köppen-Geiger climate types under a future climate for Australia: hydrological implications” by R. S. Crosbie et al.

Anonymous Referee #2

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This paper presents a range of future Köppen-Geiger climate type maps for Australia based on IPCC AR4 CMIP3 model runs. Projected changes in climate type forms the basis of a discussion about possible changes in vegetation distribution and associated hydrological implications for Australia. Overall, the results and discussion of implications make this paper worthy of publication.

My main concern with this paper is the lack of detail in the methods section about how information from the IPCC AR4 GCM runs is used to calculate the Köppen climate maps. Considering these maps are the main contribution of the paper, more detail

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about their construction is required than is given. A reference to two works (one of which is under review) is inadequate. In particular a detailed explanation of how the monthly precipitation and temperature scaling factors per degree of global warming are derived is required. A discussion is also required about why scaling factors are used instead of directly calculating Köppen climate maps from GCM output. The revised paper needs to be clear about why scaling factors are being used and how the scaling factors are derived. In the papers current form it is not possible to assess the appropriateness of the methods adopted.

One consequence of applying a scaling factor to the observed precipitation and temperature is that the future projections of Köppen climate type are presented in the spatial resolution of the observed data and not the resolution of the projection generating GCMs (which are much coarser). The authors need to acknowledge that information from coarse scale GCM projections has been downscaled to produce the high spatial resolution future Köppen maps.

Minor comments/corrections:

Page 7418 Lines 17-19: The second level of the Köppen system is not always determined by temperature as stated (see tropical and arid climates) and the third level is not always determined by precipitation as stated (see arid climates). This sentence needs to be revised accordingly.

Page 7418 Line 25: Are the anomalies from the year 1990 or the period 1961-1990?

Page 7419 Line 18: The reader is expecting six global warming scenarios (3 for 2030 and 3 for 2050) not five. Add a comment earlier that the +1.0oC scenario that occurs in both periods is not repeated and thus there are five global warming scenarios.

Page 7420 Line 19: Replace 'The most variability is seen' with 'The most variability between GCMs is seen'.

Page 7423 Line 25: Do you mean 'water limited' or 'energy limited' here? I suspect you

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mean energy limited.

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