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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Bias in downscaled rainfall characteristics" *by* N. J. Potter et al.

Anonymous Referee #1

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The paper is well-written and concisely describes methods, results and conclusions. It analyses the effects of applying quantile-quantile mapping to precipitation data in Victoria, Australia, and exemplarily shows the method's possibilities and raises awareness of deficiencies. As addition to quantile mapping, lag-one transition probabilities are incorporated in order to account for rainfall sequencing. In the study, the results of quantile-quantile mapping are analysed for properly correcting the distribution of the data. It is pointed out that rainfall occurrences are represented only insufficiently not being able to properly represent patterns of consecutive rainy or dry periods that are crucial for the local water availability. Furthermore, the variability range of the raw and bias corrected RCM precipitation data and the relative magnitude of climate change signals are analysed. The article presents an interesting and valuable case study that needs revisions regarding the embedding of the study's findings in the scientific state of the art. Furthermore, the selection of figures should be reconsidered and finally

presented in a more elaborated condition.

MAJOR ISSUES

The discussion should be revised thoroughly comparing the study's results to other related studies outside the group and embedding them within the scientific state of the art. Maybe Cannon et al. (2015), Chen et al. (2013) or Maraun (2013) could be useful, as they also assessed the outcome of quantile mapping of precipitation data in Europe and Northern America or, for Australia, Agrüeso et al. (2013), Lockart et al. (2014) and Bennett et al. (2014), that you have mentioned in your introduction. Teutschbein & Seibert (2012) or Maraun (2016) could be useful for 'bias correcting climate change simulations' just to quickly name some suggestions.

MINOR ISSUES

p.1, l.21: '. . . any quantile mapping bias correction method is . . .'

p.1, l.26: '. . . Of most interest are possible changes. . .'

p.1, l.28: '. . . the spatial resolution of these models is too coarse. . .'

p.2, l.9: '. . .Teutschbein and Seibert. . .'

p.5, l.14: (Addor and Seibert, 2014) in brackets

p.5, l.18ff: Make sure to introduce all variables properly (Pr, P, p, upper/lower case D/d/W/w).

p.5, l. 26/l.29: Figure 1 and Figure 2. Later on you are often using the abbreviation Fig. only. Maybe you want to decide for one format consistently. Same inconsistency for Section/Sect.

p.7, l.7: 'Sect. 3.3.1'. Maybe 1 should be deleted here.

p.8, l.22: Close the bracket.

Maybe Sect. 3.1 could be moved closer to Sect. 3.4 or they could even be combined?

p.10, l.5: Charles et al., submitted meanwhile.

p.10, l.29: ‘seasonal changes are more like half of the bias in seasonal averages’. To me, using ‘like’ here, sounds a bit unclear and colloquial, please rephrase.

Some of the graphs and their placements are still in a quite raw condition. I assume this is going to be revised in the final version (e.g. labels and units of colour bars, legends, cut off axis labels, maybe adapting the range of x-axis (Fig. 14-16, 6-8?), full stops at the end of each caption). Generally, I think 16 figures is a lot. Do you really need all of them to convey the message of the paper? Maybe Fig. 2 could be skipped, as it is part of Fig. 13? Or Fig. 5 could be moved to the appendix as it is supportive to another point? Or Fig. 14-16 and Fig. 6-8 respectively could be combined in one figure?

Fig. 9: Is it necessary to add the smaller steps at the higher percentiles on the x-axis? I found it less intuitive at first glance.

Fig. 10/11: You could consider adjusting the colour bars, as no blue colour appears.

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