

Interactive comment on “High-resolution projections of surface water availability for Tasmania, Australia” by J. C. Bennett et al.

J. C. Bennett et al.

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Responses to anonymous referee #1

Thanks to anonymous referee #1 for this considered review. We respond to the main points in the review (numbered, and in double quotation marks) as follows:

1. Comment: "Within the discussion on quantile mapping reference is made to the moments of the frequency distribution. I assume that this is referring to the cumulative frequency distribution and perhaps this should be more clearly stated? It might be better to simply say that the factor is set to 1 when the RCM outputs are zero, rather than saying a factor is not calculated."

Response: 'Frequency distribution' changed to 'cumulative frequency distribution' as
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suggested. '...we do not calculate a quantile mapping factor ($F_i = 1$)' changed to '...the quantile mapping factor is set to 1 ($F_i = 1$)'.

2. Comment: "Reference is made on page 10 to the poor replication of low flows in hydrological models as being a common problem. No reference is given and I would argue that this problem applies to those models that have structural weaknesses with respect to the processes governing low flows. Other models are more than adequately capable of simulating low flows. It seems to be that the low flow problem becomes worse (Fig. 5) when the RCM data are used. Although the authors may be correct that many of the deficiencies stem from the hydrological models, there also seem to be some additional impacts associated with the RCM data. This is not really mentioned in the paper."

Response: The reviewer correctly points out that a different calibration method or objective function could have been used to improve hydrological performance at low flows, and this was not discussed in the manuscript. We have restated the last paragraph of section 4.2.2 to emphasise that our findings are specific to the models as calibrated for our study, and that a different calibration method or different hydrological models may give a contrary result. We have also acknowledged that some the bias-corrected RCM inputs contribute to poor low-flow replication. The general comment about low flow replication being a common problem in hydrological models has been removed.

3. Comment: "I have something of a problem with the way in which the authors seem to mix different definitions of percentile runoff."

Response: We have changed all the definitions of percentile runoff so they are consistent, as suggested. We now express all flows as exceedance probabilities.

4. Comment: "Within the discussion reference is made to 'produce realistic stream-flows', however, that is not the case with some of the catchments where poor simulations are achieved regardless of the climate inputs used."

Response: While we argue that most catchments did produce realistic streamflows, it is true that a number did not. We have now acknowledged this problem in paragraph 1 of the discussion (section 5). The poor performance is explained largely by the bias-corrected RCM rainfalls not being sufficiently similar to observations, especially in areas with more variable rainfall.

5. Comment: "The discussion also refers to 'sequences', while the results do not really address sequences of rainfall and streamflow, only the frequency distributions and seasonal distributions."

Response: We have removed references to sequences in the discussion.

6. Comment: "I am not convinced that small dams would be able to buffer the existing annual variability..."

Response: 'Small dams may not be able to buffer,' changed to 'Small dams may be less able to buffer'.

7. Comment: "The flow duration curves in Figure 8 suggest that many of these rivers are seasonal or ephemeral (i.e. close to zero flows for approximately 50% of the time). I find the numbers given in Fig 7 incompatible with Fig. 8."

Response: Unfortunately it seems that this reviewer received an earlier version of the manuscript in which Fig 8 was erroneous. The streams are not ephemeral, as can be seen in figure 8 in the manuscript on the HESS discussions website. The revised fig 8 agrees with fig 7 (e.g. the maximum flow in the Black river in the revised fig 8 is >2500 ML/d).

8. Comment: "Specific comments and corrections..."

Response: We have addressed all specific comments and corrections as suggested.

Changes not requested by reviewer: To keep the paper as brief as possible we have abbreviated the abstract and some elements of the introduction and discussion in an at-

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tempt to compensate for additional text included to address both anonymous reviewers' comments. These abbreviations do not substantively alter the content or arguments in the paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 1783, 2012.

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