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Hydrology and Earth System Sciences Discussions

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

Anonymous Referee #1

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In general terms the paper presents some interesting material in a clear manner and is suitable for publication with some minor changes.

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.

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.

I have something of a problem with the way in which the authors seem to mix different definitions of percentile runoff. Fig. 8 uses conventional flow duration curves (exceedence frequencies, where Q95 for example would be a low flow and Q5 a high flow), but the title should not refer to streamflow 'durations', but streamflow 'duration curves'. However, the discussion on page 13 refers to non-exceedence frequency curves where Q25 is a moderately low flow and Q99 a high flow. This is quite confusing.

Within the discussion reference is made to 'produce realistic streamflows', however, that is not the case with some of the catchments where poor simulations are achieved regardless of the climate inputs used. 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.

Page 17 refers to the lack of ability of small dams to buffer projected increases in annual variability. I am not convinced that small dams would be able to buffer the existing annual variability, but I suppose this depends on what is meant by 'small', as well as how much water is abstracted (and the patterns of abstraction) from the dams relative to the inflows.

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). However, this does not seem to be the case when you look at the seasonal distributions in Fig. 7. Is this related to a high degree of streamflow variability in the dry seasons, or is there some other effect that I have missed? I find the numbers given in Fig 7 incompatible with Fig. 8. The Black River has wet season maximum mean streamflow of greater than 1000 Ml/d, while the maximum daily streamflow is given in Fig. 8 as about 225 Ml/d.

The same applies to the other rivers and these diagrams either need to be corrected or a clear explanation offered.

Specific comments and corrections: Page 3, L11: Maraun et al., 2010 is not in the reference list. Page 4, L12: Perhaps replace with '..streamflows through to the end of . . .' Page 5, L11: '..east of <the> Tasmania..' Page 6, L21: '..according to Morton's (1983). . .' Page 15, L10: '. . .was the best performing model..' Page 16, L16: should be Post et al. (2011). Page 32: Modify the vertical axes labels of the Clyde River graph to be consistent with others.

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