

# ***Interactive comment on “How streamflow has changed across Australia since 1950’s: evidence from the network of Hydrologic Reference Stations” by S. X. Zhang et al.***

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As an Australian, I have read the submission with great interest and was pleased to see the analysis undertaken. I highlight the substantial amount of work that has gone into curating and making sense of such a large dataset at this scale. This is important progress and important not only for scientific purposes but for shaping policy in Australia. I would like to make a few short suggestions that could be considered during the discussion/revision process.

â€“ I think there are some problems with the section headings. Aside from the fact the sub-sub-heading is larger font than the sub-heading, I also note that section 4 is “Results and Discussion” and section 5 is “Discussion” ... There is also a Section 6 with

“Conclusions”. I suggest these 3 sections and their sub-headings could be carefully looked at, and would suggest to split results and discussion into separate sections, with sub-headings used in the discussion to help navigate the reader to the significant findings.

Further from the above, the aim as stated at the end of the introduction is to provide a nationwide assessment of trends in streamflow which is achieved well. Of course one of the powers of compiling the dataset is to try tease out the science of why trends are occurring and it would be nice to see this as an aim. I notice a brief paragraph on this point (Page 13) highlighting general drying trend in the climate etc, but I felt the study would become much more powerful if there was a more significant attempt to explain the non-stationary behaviour. This could range from a quantitative assessment of changes in the rainfall-runoff coefficient (is the streamflow change amplifying or dampening the broad rainfall trends in each region?) or at a minimum could consist of a more detailed and focused discussion on Page 13 introducing and citing previous studies explaining mechanisms for the trends. For example, Smettem et al 2013 undertook an analysis on the forest response to drying trend impacts streamflow; Ummenhofer et al., 2009 on mechanisms for increasing drought; there are obviously many more papers relevant to different regions that could help readers understand the mechanism and significance of the trend. It is stated as being beyond the scope (in In376), however, I would suspect it would be of key interest to the HESS readership and I would suggest that space could be made by moving section 3 and Figure 3 to an Appendix; in fact I would encourage the authors to refocus the aims on the hydrological trends AND their explanations, rather than the focus on the web portal itself.

Lastly, whilst it is related to the above, it would be ideal for the discussion to cover the projections of climate change for the different regions to address the question of whether the past changes are likely to continue, and as justification for the ongoing monitoring and assessment at the nation-wide scale. This need not be an extensive addition, just some targeted references cited for interested readers, potentially within a

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dedicated sub-section in the discussion.

Thank you very much for the opportunity to comment on this great study, and I do hope these comments will be seen as constructive criticisms to help improve the overall paper and usefulness of the analysis.

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