

Hydrol. Earth Syst. Sci. Discuss., community comment CC1  
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## Comment on hess-2022-199

Conrad Wasko

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Community comment on "Regional significance of historical trends and step changes in Australian streamflow" by Gnanathikkam Emmanuel Amirthanathan et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-199-CC1>, 2022

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As someone who has been using this world leading data set, I very much welcome this contribution. I enjoyed reading this manuscript and hope my suggestions are useful to the authors.

Line 82 & 697: "However, it was not clear how these changes relate to change in rainfall", and "Further research is required to reveal the association of historical rainfall changes with observed streamflow". I would argue there is literature that addresses potential drivers, that is rainfall and secondly soil moisture (Wasko et al., 2021; Wasko and Nathan, 2019).

Line 88: I agree but would note that another manuscript focussing on Australia found flood peak timing shifting alongside rainfall peak timing for frequent floods (Wasko et al., 2020).

Line 92: The following manuscript may be relevant (Gu et al., 2020)

Line 166: When I followed the link and clicked on "water year" I got the following definition: "1 July to 30 June." This is different from what was used in this manuscript.

Line 195: Why was only mean/total streamflow considered when previously a range of percentiles was examined (Zhang et al., 2016)?

Line 230: The Pettit test is biased towards finding step changes in the centre of a time series (Mallakpour and Villarini, 2016) – though clearly the results presented here correspond well to drought periods.

Line 434: You mention the MK3test was used for short term persistence, for consistency should you mention that the MK4test was used for long term persistence?

Line 468: Were the magnitude of the trends (on a site-by-site basis) presented or are they just discussed in text?

Line 645: Does this mean non-bolded values in the table are decreasing? This could be stated here.

Line 715: A recent paper (Peterson et al., 2021) and preprint

(<https://hess.copernicus.org/preprints/hess-2022-147/>) suggest increased evapotranspiration per unit of precipitation as a driver.

Editorial:

Line 102: The reference here is missing from the reference list and was published in 2019 (not 2020).

Line 13: Insert "The" -> "The main objectives..."

Line 215: There are some additional spaces in this sentence.

Line 395: Missing 'l' in global.

I am not sure Figure 8 adds much and it could possibly be omitted?

References

Gu, X., Zhang, Q., Li, J., Liu, J., Xu, C.Y., Sun, P., 2020. The changing nature and projection of floods across Australia. *J. Hydrol.* 584, 124703. <https://doi.org/10.1016/j.jhydrol.2020.124703>

Mallakpour, I., Villarini, G., 2016. A simulation study to examine the sensitivity of the Pettitt test to detect abrupt changes in mean. *Hydrol. Sci. J.* 61, 245–254. <https://doi.org/10.1080/02626667.2015.1008482>

Peterson, T.J., Saft, M., Peel, M.C., John, A., 2021. Watersheds may not recover from drought. *Science* (80-. ). 372, 745–749. <https://doi.org/10.1126/science.abd5085>

Wasko, C., Nathan, R., 2019. Influence of changes in rainfall and soil moisture on trends in flooding. *J. Hydrol.* 575, 432–441. <https://doi.org/10.1016/j.jhydrol.2019.05.054>

Wasko, C., Nathan, R., Peel, M.C., 2020. Changes in Antecedent Soil Moisture Modulate Flood Seasonality in a Changing Climate. *Water Resour. Res.* 56, e2019WR026300. <https://doi.org/10.1029/2019WR026300>

Wasko, C., Shao, Y., Vogel, E., Wilson, L., Wang, Q.J., Frost, A., Donnelly, C., 2021. Understanding trends in hydrologic extremes across Australia. *J. Hydrol.* 593, 125877. <https://doi.org/10.1016/j.jhydrol.2020.125877>

Zhang, X.S., Amirthanathan, G.E., Bari, M.A., Laugesen, R.M., Shin, D., Kent, D.M., MacDonald, A.M., Turner, M.E., Tuteja, N.K., 2016. How streamflow has changed across Australia since the 1950s: evidence from the network of hydrologic reference stations. *Hydrol. Earth Syst. Sci.* 20, 3947–3965. <https://doi.org/10.5194/hess-20-3947-2016>