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Title: Annual memory in the terrestrial water cycle

Authors: Berghuijs et al.

Review

This manuscript describes an initial evaluation of autocorrelation in catchment water balance components on a global basis.

The topic is highly suitable for the journal.

The manuscript is interesting, very well written and easy to follow.

I had very few substantive comments and the paper can be published more or less as is.

Details

1. Line 53. I was pleased to see the caveat about inter-basin flows. I suspect this could be extended to land-ocean transfers as well. (If you are curious, google “wonky holes” and have a read. I have personally drunk fresh water over the side of a boat 50 km from land on the Great Barrier Reef. The local fisherman have known this for a long long time.)
2. Line 107. Typo? Should it be Sun et al 2018 (and not 2017) or is there another reference?
3. Line 114. Perhaps Thus ρ_y **roughly** expresses. Or “**approximately**” instead of roughly if you like but you need a qualifier here.
4. Figure 2e. Can you speculate on a likely physical explanation for the negative autocorrelation values, that occur in different climates, e.g. semi-arid South Western Australia, Botswana, bottom of South America, and in the cold parts of northern Russia and in other widely varying climates?
5. Figure 2eik. Focus on South Western Australia. You have autocorrelations as follows; -ve for rootzone (Fig 2e), -ve for evaporation (Fig 2i) and 0 for annual flow (Fig. 2k). Makes sense since in that region there is minimal streamflow and I would interpret this as a good plant growing year (enhanced evaporation) depletes rootzone moisture. But I could not imagine how that would work in northern Russia with the same spatial patterns as above. No change requested but I was intrigued. (I had personally imagined a study like this for years and am glad that it has now been done.)
6. Line 339. Typo? .. used **thus** far cause

Michael L. Roderick, 9/10/2024