

In the following we use R1C1 (etc) to refer to comment 1 (C1) by referee 1 (R1).

Anonymous Referee #1

R1C1: This is an excellent paper with major implications to our understanding of long term water balance and their climatic and landscape controls.

Response: We thank the anonymous reviewer for the evaluation and positive comment on the manuscript.

R1C2: This kind of work could not have been even just a few years ago, but as more and more reanalysis data become available the ability to do this kind of work and learn from it improves (given the caveat that this is ultimately model generated data, but the best we have).

I have no problems with the analyses that have been done, and the presentation. The authors use monthly data but the analysis is about inter-annual variability, although they do use the monthly data to estimate the storage capacity. I would like to see a categorical statement about this, I found it confusing. This means they only have 28 years of data (28 numbers) - they need to make an assessment/statement about the implications of this for their estimates of the various statistics, given potential non-stationarities etc.

Response: In this initial investigation, we use the CDR (monthly database) and as the reviewer has noted this is an entirely new field of research since global hydrologic reanalysis data has not previously been available. We chose to focus on the inter-annual variability to establish links directly with important earlier work on this topic (e.g., Koster & Suarez, 1999). We plan to extend this work to a seasonal time scale in future research. To eliminate the potential confusion, we will make a categorical statement/review in the revised version of manuscript as the reviewer suggested. Also, another statement about the potential implications of using limited time periods, e.g., non-stationarities, will be added in the revision. Thanks.

R1C3: The main issue that I have with the paper is that (as the authors themselves admit) is the preliminary nature of the discussion and conclusions. The results, to say the least, are quite interesting and intriguing. Without further analysis, one can only speculate. The dependence on storage capacity and temperature are potential clues. This is a concern for me - one solution is to delay the paper until further analysis is done to elucidate these results. It seems the main route to explanations is to use the monthly data that they already have, to see if there is an extension of the variances and especially cross-covariances into the seasonal regime. In other words, I am speculating if the causes of the inter-annual variability lie in the intra-annual variability of the fluxes and the storage, and in the role of vegetation (and soils) buffering the variability in the climate.

Response: We agree with the reviewer that the inter-annual variability will be related to the seasonal (i.e. intra-annual) variations of the fluxes, e.g., the vegetation/soil buffering. As we have noted above (R1C2) we plan to do this in a future work. However, given the initial stage for this type of research we were personally surprised by the complexity of the spatial patterns in the inter-annual variability and sought to publish those before proceeding to a more complex (e.g., seasonal) analysis.

R1C4: For now there is a decision to be made - I am comfortable with going ahead with publication of the current paper (in spite of its preliminary nature) in view of the fact publication of the paper may trigger follow-on research by other research groups as well.

Response: We appreciate the comments of the reviewer.