

REVIEWER #1

Author note:

Adjustments in response to the comments of Reviewer #1 are highlighted in yellow in the revised manuscript

Comment 1:

The study nicely integrates large datasets and modeling to elucidate the minor importance of those differences in Sr_{max} to hydrologic modeling. The paper is clear, well-written, and the figures are compelling.

In this revision, the authors have addressed the comments of the reviewers, and the paper is improved. The writing could use another pass to ensure appropriate grammar throughout, particularly subject-verb agreement and proper use of commas. I recommend acceptance, and I offer a couple of additional suggestions that may enhance the paper.

Reply:

We thank the reviewer for his positive assessment of our manuscript. In the revised version we have done a detailed grammar check and reworded incorrect expressions.

Comment 2:

Lines 362-366 - The authors note the large range of $\Delta Sr_{max,exp}$ for catchments with aridity indices between 0.75-1.0 and offer that it may be due to the large number of catchments within that aridity range. In looking at figure 10, it also appears that the catchments with large, positive $\Delta Sr_{max,exp}$ are also those with deep roots (300-400+ mm); thus, the relative difference is smaller and consistent with catchments that are drier and wetter. This may be worth a note.

Reply:

This is indeed a sharp observation. We have added a sentence to highlight this effect.

Comment 3:

A central claim of the work is that the variations in ΔI_E and ΔSr_{max} are small. To provide additional context for that claim, it might be helpful to report the variability in I_E and Sr_{max} across the catchments. That would help the reader understand how the variability through time (Δx) compares to the variability across space (i.e., the variability from catchment to catchment is much greater than for a single catchment through time). This would speak to the value/utility of using a constant ω (based on historic data) in the Fu-Budyko representation for prediction.

Reply:

This is a good idea. We have added an additional figure plotting ΔI_A against ΔI_E in the Supplementary Material to demonstrate that effect.

REVIEWER #2

Author note:

Adjustments in response to the comments of Reviewer #2 are highlighted in **green** in the revised manuscript

Comment 1:

I thank the authors for their detailed reply to the review comments and for the modifications made in the article. I think they clarify the points that were found unclear by the two reviewers.

I have a small disagreement with the authors on their reply on catchment selection based on water balance considerations. I think that there are many catchments which have an unusual water balance for natural reasons and which should not be discarded from the samples used to test modelling approaches. Keeping these catchments sometimes yields lower average performance but also gives information on the suitability of the tested methods on more varied types of catchments. However I think this would not significantly change the overall conclusions of this study, so I do not require further modifications on this aspect.

Reply:

We thank the reviewer for the positive assessment of our manuscript.

Comment 2:

Please just homogenize the way streamflow is written (stream flow or streamflow).

Reply:

We have homogenized the spelling and now use “stream flow” throughout the manuscript.