

Ruzzante and colleagues presented a very interesting and original work and have done major revisions according to what was requested before. The manuscript deserves to be published in HESS, but with some small minor details that should be addressed before.

We thank the reviewer for their insightful comments, which have improved the manuscript.

Introduction:

L67 – 77: From many examples of papers published in HESS and other places, I find a bit more elegant to finish an introduction with a paragraph rather than with bullet points. Could the authors think about not mixing sections with research questions, but rather first place the RQ, and then write (in chronological order) what is done in each section?

We have made this change.

L87 and elsewhere: I think that when using the exempli gratia ("for example") authors should use always: e.g., with periods after each letter (and the comma in American English). Please revise it.

We have made this change.

L132: Please could you add the reference to the test?

Added.

L150-152: I feel that these sentences should be place at the results.

We have moved this paragraph to Section 4.3.2

3.1. Streamflow data first paragraph: Could you maybe place the references after each country instead of all mixed?

Done.

L284: Not also for irregular?

Or are you calling interannual for both: interannual and irregular? If yes, it is confusion.

Yes, also for irregular. We have added 'and irregular' here.

Figure 4: so, it means that NSE seems significantly better in highly seasonal catchments, but generally the signatures are worse? If yes, I feel that this should be even more framed in

the paper. I know that in the introduction you mention that, but I feel that you could make more emphasis on that too.

We discuss this point in the paragraph starting at L379:

*'We show that high NSE values often hide **inferior simulations of interannual variance, including changes in ecologically relevant hydrologic signatures**'.*

We have also rearranged two sentences in the abstract to better highlight this point:

We find that these models consistently achieve the highest NSE and KGE in highly seasonal catchments where they are worse at simulating interannual variability, compared to less seasonal catchments. Simulated year-to-year changes in ecologically relevant hydrologic signatures are less accurate in highly seasonal catchments, and the NSE of the interannual variance component is usually lower.

Discussion: did you also add something about arid and semi-arid catchments? At least a sentence would be interesting given their recurrent lower performance using either model architecture in many studies.

We agree that this is an interesting area of research. However, we did not investigate model performance specifically for arid and semi-arid catchments and would prefer not to speculate on this point.