

Replies to reviews

“Towards robust seasonal streamflow forecasts in mountainous catchments: impact of calibration metric selection in hydrological modeling”

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We thank the three reviewers for their time in commenting on our paper. We provide responses to each individual point below. For clarity, comments are given in italics, and our responses are given in plain blue text.

Reviewer #3

Thank you for the opportunity to review this manuscript. The authors have clearly put substantial effort into this work to analyzing impact of calibration metrics, and providing potentially valuable insights in mountainous areas.

We greatly appreciate the reviewer’s positive feedback, as well as the time and consideration for providing constructive suggestions.

While the overall presentation of the content is satisfactory, some of the arguments need stronger scientific support and detailed information. As other referees have already pointed out, the structure needs to be improved, while the content needs also to be filtered by relevance to reduce redundancy.

In response to all the reviewers’ comments, we have re-organized and re-designed most of the figures, reducing the amount of results included in the original version of the manuscript.

In terms of specific comments:

Lines 20-25, please expand or explain abbreviations when they are first used to ensure clarity.

We have added a small explanation for these metrics:

- Split KGE, which gives equal weight to each water year in the calibration time series.
- VE-Sep, which quantifies seasonal volume errors.

The cited work "Troin et al., 2021" doesn't appear in the reference list.

We have deleted this reference from the manuscript.

Line 112, There is a typo error, should be "km²".

Solved. Thanks!

Line 123, could the authors expand on the underestimation they mention here? Is the underestimation from CR2MET or CAMELS dataset?

In response to the reviewer’s observation, we have added the following text in section 2:

“(…) Aconcagua at Chacabuquito (ACO) is the only basin with a mean annual runoff ratio larger than 1, which can be explained by (i) underestimation of catchment-averaged precipitation **from CR2MET or from the meteorological station records used to develop the gridded product**, (ii) **positive biases in streamflow records from the DGA’s stations due to uncertainties in stage-discharge relationships**, or (iii) glacier and/or groundwater contributions.

Line 123 and 126, similar as the previous comment: bias in runoff is mentioned in line 123, but it's unclear how this ties into the observed runoff mentioned in line 126. Further clarification would be useful.

Please see our response to the previous comment.

Could the authors clarify which dataset is used to conduct Figures 1 and 2?

These graphs were produced using data retrieved from the CAMELS-CL database. We have added this information to the figure captions.

On line 128, the manuscript mentions both basin-averaged precipitation from CR2MET and precipitation from CAMELS. Could the authors elaborate on how they are used? It would be helpful if they clarified the specific roles these data sources play in their analysis.

CAMELS-CL contains daily time series of basin-averaged hydrometeorological variables retrieved from different sources, including CR2MET for the case of precipitation. To clarify this, we have added the following text in section 2:

“We use daily time series of observed streamflow, and basin-averaged precipitation, mean air temperature and potential evapotranspiration (PET) retrieved from the CAMELS-CL database (Alvarez-Garreton et al., 2018), which compiles information from different sources: (i) streamflow observations are acquired from stations maintained by the Chilean General Water Directorate (DGA), also available at the DGA’s website (<https://dga.mop.gob.cl/>); (ii) basin-averaged precipitation and mean temperature data are derived from the gridded observational product CR2MET (DGA, 2017; Boisier et al., 2018) version 2.0, which provides information of these variables for continental Chile at a 0.05° x 0.05° horizontal resolution; and (iii) PET is calculated with the formula proposed by Hargreaves and Samani (1985) using basin averaged temperature from CR2MET.”

Line 240, I assume WY stands for Water Years? But this is not stated in the contents when they are first mentioned.

Thank you for catching this. We now define the acronym WY in section 2.

There are a large number of citations scattered throughout the paper, which makes it challenging to follow. Please consider revisiting these citations and remove any that may not be strictly necessary.

We have removed citations where possible, following the reviewer’s recommendation.

Again, thank you for the opportunity to review this work. With clarifications and improvements, I believe this paper has potential to make a valuable contribution to the field.

We are grateful to the referee for his/her thorough review and for providing valuable and constructive suggestions.

References

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