Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Climate-dependent propagation of precipitation uncertainty into the water cycle" *by* Ali Fallah et al.

Anonymous Referee #1

Received and published: 14 February 2020

Summary:

The manuscript has evaluated different precipitation products to understand the uncertainty propagation into the water cycle, specifically streamflow and evapotranspiration. The manuscript evaluated the different products by forcing a lumped model with the different precipitation products and evaluating the outputs, streamflow and evapotranspiration in >200 catchments across Europe.

Overall I think the paper has a good language style and is rather easy to read. I think the study has to be improved in elaboration of the methodology and discussion on different assumptions and how it performs and complements other comparative studies. At this stage I do not believe this study is easily reproducible and this should be the aim of the methodology to a certain extent.

General comments:

In the introduction I would also include existing studies that compare precipitation products directly or indirectly and show explicitly need for this gap that you are filling.

I would include a discussion on how the results from this study performs with the existing studies you will mention in the introduction with comparative investigations. The discussion should also include some assumptions and why these where made and how you justify them with references to literature.

Evaluation or validation of the ET simulations with respect to the available gridded ET datasets may be quite interested to see. Several studies exist where different ET products have been compared for Europe at the basin scale as well as at the European scale and would be valuable to see what might come from this comparison to a 'reference'.

Which calibration method was used, what specific software or was it manual? There should be a certain level of reproducibility possible using the methodology described currently this is not possible as many things are not mentioned. Please elaborate your methodology to include for example:

- Description of how your catchments were selected

- A more detailed description of the model used or where we can find this description

- A description of the model setup, show a schematic of the model architecture.

- A description of the calibration methodology

o What method was used

o which parameters were adjusted

o maybe a map with NSE results from the different catchments…

Are your input precipitation datasets open accessible and available? Show in your table

1 where people can access these datasets.

It would also be a good idea to list the catchments and some of their details in the supplementary notes so that readers can identify these catchments. Where did you get the data for streamflow (GRDC?) This needs to be mentioned.

Maybe it would be interesting to see results of an ensemble precipitation product that could be used to possibly adjust for the differences in the different products. This could result in overall better performance. It would be nice addition to add an ensemble of your products and see how this performs against the individual products.

Specific comments:

P2L65 – what is the difference between this version of the model you are using and the one you describe initially?

P3L87 . . .'temperature is derived. . ."

P3L99 which month do the points represent? The same for each catchment or different? How did you choose the month?

Calibration is done for model forced with E-OBS precipitation data and you find the model forced with E-OBS data to be the most accurate when comparing streamflow simulated and observed results. Even though you conduct a calibration with small differences in the outputs I think it is important to compare the streamflow results from the second calibrated model (forced with GPCC precipitation data) forced with all precipitation products with observed streamflow results to see if you get similar rankings across catchments.

In the results section, a more detailed interpretation of the resulting graphs need to be made. I think it would be very nice here to show a graph with your NSE for all catchments (map with the values where your catchments are). Maybe then you can also group the results into good, medium and poor performance.

P3L101 you say there is a strong relationship between precipitation and runoff but the R^2 is only 0.39. Does this show a strong relationship?