

Revision notes for “Potential application of hydrological ensemble prediction in forecasting flood and its components over the Yarlung Zangbo River Basin, China” (hess-2018-179)

Dear Editor and referees,

Thanks a lot for your great efforts to read through this manuscript and give very valuable comments. We agree with your suggestions which will be of great help to improve the quality of our manuscript. Here we have addressed the comments from you and the detailed description is attached in this document.

Best regards,

Li Liu, Suli Pan, Zhixu Bai, Yue-Ping Xu

Response to main comments:

1. The main issue in this manuscript is that the authors need more efforts to outline the advantages and disadvantages by using multiple parameter sets (N-simulations in the manuscript). It seems that more attentions are focused on the influence of multiple parameter sets on entire streamflow. I would suggest the authors added more contents in discussion to clarify the merits of N-simulation for streamflow components forecasting and evaluating.

Response: We agree that more attention should be paid to clarify the advantages and disadvantages for total runoff and component flow by using multiple parameter sets. In the original manuscript, we seem to give excessive description for entire streamflow assessment. Actually, the evaluation of multiple parameter sets on entire streamflow is to verify the feasibility and applicability of N-simulations for streamflow components. As the observed component flows are unavailable, the ability in simulating entire flow to some degree indicates the ability for component flows. According to the suggestion from the referee, we will focus more on Figures 10-12 to illustrate the merits of N-simulations for component flow forecasts.

2. The main part in current manuscript is the evaluation of N-simulations for entire streamflow. In my

opinion, the evaluation of entire streamflow is the foundation of evaluation of streamflow components. For there is no direct reference data for evaluation of streamflow components. The accuracy in entire streamflow is to some degree the evidence of model ability. This is the reason for usage of simulated streamflow components driven by observation as reference in components evaluation. I suggest the authors clarify this in the manuscript.

Response: Thanks for this very useful suggestion. The evaluation of N-simulations for entire streamflow is exactly the base of evaluation for component flows, which is not mentioned in the original manuscript. To make the paper more logical, we will add this interpretation in the subsection 4.1, the first beginning for results. We believe that this will make the paper easier to understand.

3. A brief data description used for hydrological modelling should be supplemented though it is similar for the previous publication.

Response: As mentioned in response to Referee #1, snow model and frozen algorithm are used in current study, which is different to previous study. In this way, the description of related snow depth data and additional calibration parameters will be added in Subsection 2.2 and 3.1 respectively.

4. I would suggest the authors to simplify the contents about hydrograph separation. Detailed description can be found in Li et al. (2017), and it is better for the authors to just list the differences for the method used in this manuscript with the original one.

Response: We will simplify the introduction of hydrological separation, but the subsection will be retained for this is a key component for our study. In the research of Li et al. (2017), only the snow induced components in total runoff is calculated, while in this study the streamflow is separated into four different parts. This difference will be depicted in detail in the revised manuscript.

5. There is no need to verify the forecasts with two reference data. Evaluation based on simulations is irrelevant to the objectives mentioned in introduction. I suggest omitting the related parts. If it remains, I would like to see it more strongly justified

Response: We agree that the verification based on two reference data is to some degree irrelevant to the two aims mentioned in introduction. We will revise the manuscript by using only the observed streamflow as verification data which is supposed to make the paper clearer.

6. I could understand most of the manuscript without difficulty, and the methods are well documented. However, there are many minor errors in spelling, grammar and English style that I have not corrected.

I recommend that the authors have the manuscript proof-read by a native English speaker before publication.

Response: The manuscript will be carefully checked and polished by a native English speaker.

Response to specific comments:

7. Page 6, Line 4: as snow and glacier melt water is considered together, term “meltwater” is better representative than “snowmelt”.

Response: Thanks for your suggestion. The term “snowmelt” will be replaced by “meltwater” in the revised manuscript.

8. Page 9, Line 31: “Lead times of 3, 5, 7, 10, 12 and 14 days” make it “Lead times of day 3, 5, 7, 10, 12 and 14”

Response: “Lead times of 3,5,7,10,14 days” will be changed into “Lead times of day 3, 5,7,10,12,14”.

9. Page 9, Line 32-33: “Generally, flood volumes tend to be better captured with the increase of “duration”, especially for lead times from 7 day to 12 day” should be explained.

Response: The detailed explanation will be added. There are two reasons for why flood volumes tend to be better captured with the increase of “duration”. One is that there are errors in peak time which makes the single day flood volume prone to bias. Another reason is that when the “duration” increases, the bias from streamflow for this relatively long period can offset with each other.

10. Page 10, Line 32: “It seems that N-simulations scheme works in poorly-calibrated regions.” from what results the authors draw this conclusion.

Response: When we compared Figures 7-9, we found that NX is the only case that N-simulations consistently provide comparable or even better results than S-simulation when verified on simulated streamflow. Since the contents related to evaluation on simulated streamflow will be left out due to the irrelevance to study topic as suggested by referee, this sentence will be deleted in the revised manuscript.

11. Page 13, Lines 2: “but” make it “while”

Response: We will change “but” into “while”.

12. Page 13, Lines 27: “We believe that the phenomenon captured by most of the parameter sets would

be the most possible truth.” Change it to “From the view of ensemble, the phenomenon captured by more parameter sets is regarded as the most possible occurrence.”

Response: Thanks for your suggestion. The sentence will be revised into “From the view of ensemble, the phenomenon captured by more parameter sets is regarded as the most possible occurrence.”