Authors' response for Anonymous Referee #1

1. First of all, I would like to commend the authors for the hard work and – as a result – great improvements they could achieve on the manuscript. When reading the provided answers to my first review I was not sure if the authors did understand my critique. However, their revisions prove me wrong. What I am still missing is a discussion about why a "forecasting" setting was chosen over a "simulation" setting for the examination — albeit the former somehow undermines the importance of the rainfall. I believe this would be a perfect addition to the final discussion provided in the conclusions, where the authors (already) examine some of the limits of their work.

Response: *In all three experiments, we used only "simulation" setting, no "forecasting" setting.*

2. The other thing, which is probably clear in general, and most likely just a result of my oversight or bad memory is the following question: Why are the reported results in this version so much worse than in the first manuscript version?

Response: *As the reviewer's comment on the first revision, if we put the discharge in the input, the relationship between it and the output would affect the analysis of the effect of different types of rainfall on the results. In the new version, we removed the discharge from the input which is the reason for the discrepancies between the two results.*

3-4: ***Response:*** *Thanks to your suggestion, I have rewritten the LSTM description and added references.*

5-8: ***Response:*** *Thanks to your suggestion, I have rewritten the sentences based on your comments. I think the sentence ("The regional setting is of particular interest because it allows the model to encapsulate different hydrological processes by learning from more data and situations.") you suggested is very helpful and I have added it to the essay as well.*

9: ***Response:*** *Thanks to your suggestion. Considering that rainfall is the most direct and influential factor on rainfall-runoff simulation, the main objective of this study is to compare the difference between the results obtained using the LSTM model driven by rainfall data with spatial distribution information and the LSTM model driven by basin mean rainfall data. I added the description in the introduction. In addition, I also mentioned at the end of the paper that subsequent studies will consider combining more factors with spatial distribution information on this basis. There are some issues that need to be addressed if considering combining more factors, such as differences in resolution. This is also part of the follow-up study.*

10: ***Response:*** *I have rewritten the RNN description and added references.*

11-12: ***Response:*** *I put the explanation of all variables in front of the formulas.*

13: ***Response:*** *There are two main reasons for using two regional models. The first reason is that this allows comparing the results of different regional models. The second reason is that catchments located in the same area have similar regional characteristics and rainfall runoff relationships. A regional model that performs reasonably well across all catchments within a region could potentially be a step towards the simulation of runoff for such catchments.*

14. ***Response:*** *Thanks to your suggestion. We did not do a formal hyper-parameter search. I have added the relevant description in Experimental Setup.*

15. ***Response:*** *I modified the relevant descriptions and moved them to Experimental Setup. I think the point you raise is very relevant. In that study, we counted the average length of vectors characterizing spatial distribution information for 10 watersheds (excluding catchment 6), and then we tried three lengths of 20, 30 and 40, and the results showed that 20 gave the best results. In fact the research we are doing now is related to the length of the vector, that is, how long the vector is(how much information it may imply), and the relationship between the simulation results. The size of the catchment, the heterogeneity of the rainfall distribution, etc. all have a potential impact on this relationship. We did not add the average rainfall as a supplement because the average rainfall value would potentially provide additional information compared to zero. This information may affect the relationship between spatial distribution information and the results.*

16. Minor comments

Response: *Thank you for these comments, we have modified the sentences and tables accordingly.*

Authors' response for Anonymous Referee #2

1. Please zoom in one (or two) pick flow and present the variation of simulated and observed flows along with the rainfall used in the simulation. Please choose a long look back window. It will be useful to see if there are any lags or not (which cannot be seen clearly in Fig 7). It is important to show that the model(s) built is sensitive to rainfall and does not suffer from the influence of long look back window(s).

Response: *Thank you for your suggestion. In the latest version of the manuscript, I have updated Figure 4, Figure 5, and Figure 7. In each figure, I show the corresponding runoff process, while I zoom in to show two of the time periods with rainfall information.*

2. Other comments

a-d
Response: *Thank you for your comment. I have modified the sentences and tables accordingly.*

e
Response: *Thank you for your comment. The ID of each watershed is shown in Table 1.*

f-g
Response: *Thank you for your comment. I have modified the sentences and tables accordingly.*

h
Response: *Thank you for your comment. D is defined in the text at the top of the table.*