

Interactive comment on “Data-based discharge extrapolation: estimating annual discharge for a partially gauged large river basin from its small sub-basins” by L. Gong

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Referee #1:

Thanks for your comments. I have read through your comments and I think answers to most of your questions or criticism are already in the manuscript. In my reply below, I try to cover several main points you have raised from your comments:

1) Your comments: “...The problem posed is an upscaling problem, using information from several (100, I believe) small gauged basins...”

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My reply: you sounded as if no clear information has been given for the number of basins used. In the manuscript, I have dedicated the whole section 4.1 (page 6837) - "Definition of gauged basin area and active basin area" to explain how 51 small basins were selected for the extrapolation.

2) Your comments: "...You can use proximity, you can use similarity, you can use some other regression approach. You have to somehow go through this step, and it is obviously so, and yet I could not find out what the author has done, as it is hidden behind a lot of words (even if, as I think, he is doing it). It is just not presented well."

My reply: If I have understood you correctly, you expect to see a conventional regionalisation approach in my manuscript but you can not find it. Therefore you think the manuscript is not presented well. If this is the case, I think you have more or less ignored the entire content of the manuscript. This manuscript is NOT about conventional regionalisation, and non of the conventional method (including proximity, regression, or similarity among basins of similar spatial scales) is actually used. As stated in the title and abstract, this manuscript is to present a new method named "Data-based discharge extrapolation"; starting from Abstract and Introduction I explained what is conventional regionalisation and what is the new method; and throughout the manuscript I presented the theory of the new method, construction of experiments and corresponding results systematically.

3) your comments: "...once you get distributed information on the individual sub-catchments or rectangular grid, one can then upscale to the regional scale you are interested in. . .however, I would have liked to see some mapping of either the annual water balance, or its predictors over the large region, so one can visualize the heterogeneity we are dealing with etc."

My reply: from the title of the paper it is clear that the paper is dealing with annual discharge of a large river basin, but not the spatial distribution of runoff or any variables; and this has been made clear many times both in the text and in the figures.

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4) your comments: "I could not understand (i) the theory or the rationale behind it, (ii) what was done, and (iii) what the outcome was. "

My reply: The theory was presented in a whole section - section 3; In the method section I have used two experiments to prove the feasibility of the proposed scale-extrapolation method, before describing the exact procedure of scale-extrapolation. Corresponding results of the two experiments and the extrapolation were presented in the result section systematically.

This manuscript is the first one in a series dealing with "scale-extrpolation", a new and exciting method for water resources estimation on large scale. In this first manuscript I wanted to convey the messages that it is possible to make estimation 1) without any modelling and 2) use only a small part of the dataset; more theory and experiments will come in the follow up papers. I welcome more insightful comments Referee #1 for the revised manuscript in the near future.

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