

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

Anonymous Referee #1

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I agreed to review this paper as I thought it sounded interesting, and related to work I am doing. However, in hindsight, I was partially wrong.

I still think there could be something interesting here, but it does not come across well at all. In fact I could not understand (i) the theory or the rationale behind it, (ii) what was done, and (iii) what the outcome was. I can spend a lot of time trying to wade through the details, but I figured that the paper needed to be substantially reworked to make it readable, and so I will review it again in detail at a later stage.

The problem posed is an upscaling problem, using information from several (100, I

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believe) small gauged basins, to come up with estimate of annual runoff over a larger region. In simple terms, the first step is find a way to interpolate within these gauged basins. 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.

Of course, once you get distributed information on the individual subcatchments or rectangular grid, one can then upscale to the regional scale you are interested in. Then work out what are the factors that stand out in this upscaling etc. Along the way, 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. None of this is presented: if it has been presented it would have made the paper interesting.

BTW, what are the predictors being used: I noticed annual precipitation, annual potential evaporation, anything else? How about soils, geology, topography etc. Is within-year variability a factor? the role of snow, and associated seasonality?

Overall, the presentation was rather weak and too wordy: the author should try to present in more compact form the disaggregation/interpolation he is doing (and the form and the factors that come into it), and then the upscaling that follows. A more compact (even mathematical) presentation will make for easier (and more positive) reading. Likewise, more insightful figures should make it easier to convey the excitement of what is being attempted.

Therefore in conclusion, I recommend major revision of the manuscript before its publication. The paper is not in a form that is publishable, in spite of its potential.