

Review of “Transferring model uncertainty estimates from gauged to ungauged catchments”

This paper deals with the highly challenging and important problem of quantifying uncertainty in streamflow estimates at ungauged locations. I think this paper moves forward the discussion on this topic by providing a novel and practical approach and is, therefore, suitable for publication in Hydrology and Earth Systems Science. The manuscript is well-written and I have only minor editorial comments. I do also have some major comments/questions that could improve the clarity of the manuscript.

Major comments/questions:

1. Could the authors make some clarifying comments about the difference between confidence intervals/estimated and prediction intervals/estimates? It seems to me that that the early part of the experiment presented here focuses on the confidence intervals/estimates around estimated streamflows and the latter portion of the work (Section 5.2) as an attempt to define the prediction intervals of the estimated streamflows. Is this what the authors intended?
2. If the authors were intending to obtain prediction intervals for the estimated streamflows, then only the experiment design for Section 5.2 seems valid to analyze here. More clarifying statements are needed to understand why the experiments were done both ways (treat donors as gauged or ungauged).
3. I think there needs to be some additional strategies for validation of the uncertainty estimates. I would also ask the authors to consider other behaviors typical of confidence or prediction estimates and test whether their approach follows what would be expected behavior, such as the effect of sample size or changes in the estimates related to different flow categories. Is there null hypothesis for the method that could be tested?
4. Please provide more details in the text for Section 5.3. The use of groups seems to be somewhat arbitrary and the authors should expand more on their findings here. What would the authors recommend for a practitioner trying to use this approach?

Minor comments:

p. 8045, line 22: Change to read “Here we consider a target ungauged catchments (TUC)...”

p. 8045, lines 23-26: The subscripts and superscripts seem inconsistent to me. For any one ungauged catchment, the authors define its neighbors as NGC_1 , NGC_2 , etc. I think that would mean that in the next sentence, the subscripts should stay the same and the superscript should be i 's. Maybe it would be better to say something like, “For the i th ungauged catchments, there are n neighbouring catchments with the notation: NGC_1^i , NGC_2^i , NGC_3^i , etc.”

p. 8046, line 13: Think it should be “error” and not “errors”