**Hydrology and
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Discussions

Interactive comment on "Transferring model uncertainty estimates from gauged to ungauged catchments" *by* F. Bourgin et al.

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While this paper presents an interesting and novel approach to quantifying uncertainty in hydrological modelling, I think that more should be said about the limitations of the approach. It has been applied in France, but I suspect that it would be difficult to apply in data scarce regions. The are many areas where there are simply not enough gauged catchments to represent the variability in the hydrological response across many ungauged catchments. A further problem is that many gauged catchments are also affected by poorly quantified anthropogenic impacts that will impact on the ability of the data to adequately represent the natural hydrological response that the model is trying to simulate. There are aslo poyential problems with the lack of representa-

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tiveness of the climate inputs in the gauged catchments that could lead to bias in the quantified parameter values of the donor catchments. These additional uncertainty issues do not seem to be addressed in the paper and I think that they should at least be mentioned and there impacts on the overall likely success of the method should be noted.

Spatial proximity is mentioned on page 8045, but what about the effects of highly variable topography (or other factors) between closely adjacent catchments? Would this not invalidate an approach based solely on distance?

I did manage eventually to understand all of the steps in the method and the performance measures. However, I had to read them several times and I really think that they could be better explained. The paper is quite concise (generally a good thing), but in terms of the explanations I think it is too concise and would benefit from further and clearer explanations of some of the points within section 3 and 4. I refer to some examples below.

Page 8047 explains the sharpness index that used the Q5/Q95 ratio for the historical FDC. I think that the authors did not use the 'width', which would be Q5-Q95, and therefore should not refer to width. I also fail to see how 1-Q5/Q95 can provide a measure of uncertainty when it is soley based on historical flows according to the explanation provided in the text.

Page 8048 refers to the skill or interval skill score. I think that the use of the 1{X,Y} notation is confusing in equation 1. Why not give this a variable name (e.g. INDF) and then use separate equations to define how INDF is calculated. I tried to understand wht the skill score is doing and it seems as if high values of S relates to poor skill - is that correct, or did I get it wrong? I assume that l and u represent the lower and upper bounds of the uncertainty at any point in the time series? What is 'unconditional climatology'?

Page 8050 refers to using donor catchmenst as gauged (the difference between this

and treating them as ungauged also needs further explanation I think). Why should the results be less reliable in this case and why is there a benefit when treating donor catchments as ungauged - this seems to be somewhat counter intuitive?

Page 8051: It was not immediately clear to me what data are used to calculate the NSE criterion? Is it the upper and lower prediction bounds or what? Please provide a clearer explanation.

I would therefore like to suggest to te authors that they seriously consider making the explanations for most of the methods a lot more clear so that readers can understand the approach and methods much easier.

Minor points and corrections: P8042, L16: Surely this should be residual errors at gauged locations. P8043, L5: '.. of the work by Oudin...' P8044, L16: ' ... discharge data ARE available..' P8044, L17: '.. ungauged LOCATIONS ...' P8044, L25: Please indicate what the performance criterion is (NSE presumably)? P8048, L24: Please use percentages (70%) instead of a fraction (0.7) to be consistent with the rest of the text. P8049, L11: What is the basis for 30 and 80%? P8049, L13: 'yield' shoudl be plural. P8049, L18: I do not understand what 92% represents nor where it comes from. P8050, L2: 'rainfall-runoff MODEL' P8050, L26: 'increase' should be plural. P8050, L26 & P8051, L3: should be 'compensate FOR..'

The lines used for the boxplots in figures 6 to 8 could be thicker to make them clearer in a printed version of the paper.

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