

Interactive comment on “Uncertainty in hydrological signatures” by I. K. Westerberg and H. K. McMillan

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The paper shows how uncertainties in catchment rainfall and runoff measurement, interpolation and extrapolation propagate into uncertainties in hydrologic signatures, which are widely used in hydrology. The Authors use a methodology for uncertainty propagation based on Monte Carlo simulations. They consider sources of uncertainty and uncertainty models proposed in the literature. The methodology is applied to two small catchments in England and New Zealand.

I really liked reading this paper, which is well written and inspiring. I definitely see the need for more publications of this kind in order to build up a more generalised understanding of the uncertainties in the data (and in how the data are used) which

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are at the basis of hydrologic studies. I am therefore supportive for the publication of the paper in HESS.

I just have a couple of suggestions which may help to improve the paper and which require little additional work for the Authors:

- The amount of information provided in the paper is a lot and it would be nice to summarise it in tables. As in Table 1 the signatures are explained, it would be nice to have a table that lists all sources of uncertainty considered and the references in the literature where they have been discussed. More importantly, it would be nice to have a final table that summarises the major (dominant) sources of uncertainty for each signature as well as the relative uncertainty ranges found for the two catchments under study.

- Reading the title of the paper I would have expected more discussion on generalisation of results. I was involved in editing a book on runoff prediction in ungauged basins (Blöschl et al., 2013, already cited in the paper), where an assessment of uncertainty of regionalisation methods was attempted based on a literature review of many studies around the world. Let's assume that in the next years many researches will perform similar studies on uncertainty in hydrologic signatures and that the Authors will be asked to synthesise these works (and try to understand the effect of climate, catchment scale, dominant hydrologic processes, antropogenic influence, etc...). What information would the Authors like to find in these papers? How this information should be organised and presented? This may be discussed in the conclusion and the final table referred to in the previous point could be an example of what the Authors would like to find in other papers on the subject. In other words, I believe that this paper could aim at setting a standard for studies on uncertainty in hydrologic signatures.

Minor comments:

Page 4237, lines 21 and 24: I get confused here. “The main aim of this paper was...” refers to Juston et al. (2014) while “The objectives of this paper were:” refers to the

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present paper. Am I right? Maybe a rewording could help the reader here.

Page 4238 line 15 and page 4239 line 6: why missing precipitation values have been infilled with two different procedures in the two catchments? I guess the reason is because that was done in previous works but the text doesn't state it. Moreover, methods of infilling rainfall data are not considered in the uncertainty analysis, why?

Page 4251, lines 9-12: I do not understand why events defined using a threshold related to the mean or median flow are more sensitive to rating curve uncertainty than events defined using a flow percentile threshold. What percentile is preferable? In the end the median is also a percentile, why isn't it good?

Figs. 1 and 2: I think that the reader would get more understanding on the two study areas if the Authors would add a sample of the hydrograph in the figures (or in an additional one). This would show how the runoff responses differ in the two catchments (e.g., difference in flashiness). I am thinking to something like Figure 1 in <http://www.hydrol-earth-syst-sci.net/17/2263/2013/hess-17-2263-2013.pdf>

Best regards,

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