

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

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The paper considers uncertainty in hydrological signatures due to errors/uncertainties in rainfall and discharge time series: 1) point measurement, spatial interpolation and equipment malfunctioning errors for rainfall (no systematic errors), and 2) uncertainty in stage-discharge relation (no stage time series uncertainty). MCMC sampling is employed to estimate signature uncertainties based on the time series uncertainty. The findings illustrate individual and combined contributions of the above rainfall and discharge uncertainties to the extent of signature uncertainty; and show that each uncertainty source, except for the rainfall point measurement uncertainty, contributes to a sizable signature uncertainty (for the selected signatures).

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The paper is well thought-through and addresses an existing gap in uncertainty assessment for hydrological time series and its propagation into hydrological signatures. One important aspect that, in my opinion, the authors need to acknowledge and discuss is that the ‘posterior’ distribution of the rating curves is not strictly a statistical distribution, since the Voting Point likelihood it is based on is not a formal statistical likelihood. This has implications on the use of the MCMC sampling method as well as on the interpretation of the corresponding signature values as draws from probabilistic distributions. Further, I would suggest specifying in the title which hydrological signature uncertainty is considered in the manuscript, as there are other uncertainty sources, e.g. due to the time period selection, due to regionalization in ungauged basins.

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