

## ***Interactive comment on “Considering rating curve uncertainty in water level predictions” by A. E. Sikorska et al.***

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Sikorska et al. explored the uncertainty of the rating curve in modelling water levels in a urban catchment.

The topic of the study is significant and relevant to HESS, the paper is concise and generally well structured while appropriate references to literature are included. Lastly, the research work is overall scientifically sounded, but I have two major comments that should be addressed.

My first concern is about the fact that (as stated in the paper) "eight recorded rainfall-water level events" were used to calibrate and validate the model. Here, I think that a

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critical discussion about the assumption of stationary of model parameters is missing. This is rather questionable because this catchment has experienced (as stated by the authors) a "rapid urbanization in the last three decades and today urban areas cover 58.7% of the catchment".

My second concern is the arbitrary use of ranges and distributions for the model parameters (Table 3). I think these assumptions are unavoidable, but they do require justification, and possibly some more numerical experiments. The area of the catchment, for instance, was set as a free parameter (RR1). However, I presume that the area of the catchment can be measured with a proper accuracy. So, why not to fix the catchment area to the measured value, and use only 3 free parameters? This can be a numerical experiment worth trying to also explore the changes in the posterior distributions of the other parameters in view of e.g. possible compensation of errors.

Indeed, I understand that the catchment area cannot be perfectly measured, but modelers typically allow parameters between ranges of observation uncertainty. In the current study, if I understand well Fig. 3, the posterior distribution of RR1 has a peak around 7 km<sup>2</sup>, which is almost a quarter of the actual catchment area (28.7 km<sup>2</sup>). I wonder whether this requires some more justification. Also, what are the consequences in terms of water balance?

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