Stochastic rainfall analysis for storm tank performance evaluation

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Response to Referee Comment RC-C804 – Remko Uijlenhoet (Referee)

On behalf of co-authors, I thank gratefully Remko Uijlenhoet for his constructive and useful comments. Then, here are the responses for specific referred issues. This response completes the one given by co-author A. Montanari to the general remark of the interactive comment.

SPECIFIC REMARKS

P.1855, l.21-22 / P.1855, l.22-23. This sentence will be reformulated in the revised version of the paper taken into account these remarks.

P.1859, Eq(9). It is true that an assumption incorporated in this expression is that rainfall is spatially uniform over the considered urban catchment.

Historical record series at Valencia show some spatial variability, especially along the orthogonal direction to the seafront. But with respect to the application of the model to storm tank sizing, it should be noticed that catchments managed by them should not be very large to achieve an optimal management. The case study presented in the paper corresponds to a 500 m x 1400 m area, approximately rectangular shaped (68.8 ha), where the assumption of no spatial variability is very reasonable.

P.1862, l.7-14. As different selection criteria are used, they do not fit the optimal value simultaneously. A plausible range for s_{crit} is thus identified and finally, a value in its lower bound selected in order to increase the sample size of rainfall events.

The critical interevent time s_{crit} allows identifying and defining statistically independent rainfall events; indeed, s_{crit} has not in fact a physical interpretation, it is only a statistical criterion.

One of the main purposes of the paper is to show that with a relatively simple model, good accuracy is achieved while results from the analytical model are compared against continuous simulation ones.

P.1862, l.22. As indicated in the paper, some authors (see, for instance, Adams and Papa, 2000 – referred in the original manuscript) dealt with this issue, concluding that values similar to those obtained by the authors are not "appreciable" enough to consider a bivaried model.

Moreover, the dependence between *v* and *d* is not really significant for the results achieved in the paper since only a volumetric analysis based on *V* is performed. Results correspond to the case Q_V=0, i.e., no flow is derived to the plant during the event, which corresponds to the most precautionary situation in order to obtain the tank efficiencies. In this case, the event duration *d* do not play any role in the derivation of the tank efficiencies.

P.1863, l.3. The analytical development presented is based on the choice of the Pareto model for rainfall depth description. As a consequence, if another pdf fits better this variable, the resulting analytical expressions would be different.

P.1864, l.11-17. The variability of expected values of runoff and overflow volumes is not presented in the paper, as the purpose is to evaluate long term efficiencies based on the average response of the storm tank through the year. Nevertheless, the obtained analytical expressions could also allow exploring this possibility.

P.1864, l.18. The data set used to perform the continuous simulation is the same as the one used to estimate the analytical model parameters because the aim of the procedure is to validate the accuracy of this latter towards the system response. As indicated in the paper and in previous interactive comments, the hydraulic and hydrological parameters of the model were previously calibrated at Valencia.

EDITORIAL REMARKS

All the editorial remarks will be considered for the revised manuscript version.