Stochastic rainfall analysis for storm tank performance evaluation

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Response to Referee Comment RC-C745 – Paola Allamano (Referee)

On behalf of co-authors, I thank gratefully Paola Allamano for his constructive and useful comments. Then, here are the responses for specific referred issues.

1. About event duration *d*

Event duration is characterised as a main descriptor of the rectangular pulse model built for the rainfall process.

Then, it is also used to formulate the general tank overflow model (equation 13) where the total volume detained equals the tank volume, V_D, plus the volume derived to the waste water treatment plant, $Q_V(d+t_C-t_R)$. Results developed in the paper correspond to the case $Q_V=0$, i.e., no flow is derived to the plant during the event. This is 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.

2. About goodness-of-fit tests

a) The KS test was used because of its reliability for the exponential pdf. Moreover, it has been considered as an additional selection criterion for the critical interevent time. Nevertheless, in the revised version of the manuscript the CVM test could also be added to check the goodness-of-fit of the exponential pdf for event duration in the Valencia case.

b) Results shown in Table 3 are used to highlight that, for selected pdfs, fits improve significantly if censored series are used. This is why for event volume only the Pareto model is taken into account and for event duration both exponential and Gamma-2 are considered.

c) We thank the referee for pointing out an imprecision in the manuscript which will be amended in the final version. In fact, the evaluation of the KS statistic summarized in Figure 4 was done correctly by computing the empirical distribution function as i/n. The Hazen plotting position was used, as recommended for highly skewed populations, for the probability plots shown in figures 6 and 7.

3. About censored variables

a) Expected values of the runoff volume r (equation 12) and the spilled volume w (equation 19) are both evaluated considering the impulse probabilities at r=0 and w=0. This fact will be highlighted in the revised version of the manuscript.

b) The interevent time characterisation is performed by considering the lower bounded variable S and so a bounded exponential distribution, without any simplification.

4. Minor points

All referred minor points will be considered to be added and/or solved in the revised version of the paper.