

Interactive comment on “Stochastic rainfall analysis for storm tank performance evaluation” by I. Andrés-Doménech et al.

Anonymous Referee #1

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This manuscript provides a new approach for storm tank designing, by using the analytically derived probability distribution function of stormwater detention tanks performance variables, based on a local stochastic rainfall analysis. Although the results are of great interest, it has some implicit hypothesis which authors must discuss along the paper: 1. Authors analyze rainfall duration, cumulated depth, and interevent duration, and propose a stochastic model for the characterization of rainfall occurrence in Valencia, and Santander, in Spain. Authors discuss that 2 parameters gamma or pareto distribution functions provide better fit than exponential curves, widely used in previous studies. However, there is an important issue in this analysis: they never consider rainfall seasonality in their analyses. Precipitation regime in Valencia and, Santander follow fully seasonal behavior. Ignoring this in a stochastic model may be considered a practical approach, but the resulting model is not realistic. Provably, analyzing rainfall

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properties seasonality, the exponential distribution function may provide a better fit. 2. The lack of seasonality in the approach does not invalidate general manuscript results. Because selected stormwater performance variables are related to runoff production, after rainfall events, characterized by its long term mean efficiencies, seasonality has no effect in the results. However, this is an important issue that must be discussed in the paper, because not considering seasonality may be considered only as a practical approach, but this may produce unrealistic results. 3. Authors must discuss the consequences of this simplification in a general stormwater tank performance analysis. For example, seasonality has effect over the runoff pollutant dynamic. Long interevent periods, followed by high intensity precipitation events, as in the case of Valencia region during the summer session, reduce stormwater tank pollutant retention efficiency, with respect to considering shorter interevent periods, or smaller precipitation depths, like it is the case during the spring or fall season. If simulation analysis were applied to some pollutant retention efficiency variable, analytical and simulation results were not matched, without considering seasonality. This must be pointed out in the manuscript, and considered for further research. Other minor comments are also: " The significant correlation between v and d may be addressed by considering a more independent couple of variables, like may be the case of rainfall duration d and mean intensity v/d . " Authors mention that Valencia Municipality nowadays recommend using $36 \text{ m}^3/\text{ha}$ for detection tanks specific volume design criteria. Authors should discuss this criteria based on their own results.

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