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Hydrology and Earth System Sciences Discussions

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

Anonymous Referee #6

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The authors present an interesting and practical approach to storm tank performance evaluation. The critical evaluation of different distribution functions is shown to be important which makes this a substantial contribution to hydrological sciences. The analytical approach seems to me to be highly efficient in computation once fitted. The authors have provided adequate proof of concept both by rigorous statistical hypothesis testing and by comparison with continuous simulations. Finally the paper is concise and to the point.

Besides the points mentioned by other reviewers, I can mention only one point of concern: an assumption is made that during an event, the amount of discharge from the storm tank to the WWTP is zero. I guess that if this is not assumed, the analytical approach becomes more complicated. I wonder whether this assumption may result

in the analytical model unjustly producing a storm tank overflow situation, especially when the rainfall depth is close to the critical value (i.e. a long duration event with not very high intensity). The fact that the comparison between the analytical and continuous simulation experiment are very much the same could perhaps be due to the 'event-based' way of simulating storm runoff response with the SCS-CN approach. Any information on intensity within the event is removed by doing so. I hope the authors can comment on this to support this assumption.

I liked this paper and recommend minor revisions before publication. Some detailed comments are given below.

p. 1853. l. 5. "a very unequal distribution through the year". Is this accounted for in the experiment by assuming separate distributions in different seasons? If so, please indicate how. If not, then using one distribution is perhaps a very strong assumption that should at the least be mentioned. (see also comments of other reviewers)

p. 1854. l. 17. The units of P_{0i} are not fully clear to me. Does mm mean mm over the total event (this is what I guess, given the values in Table 1) or is it mm per unit of time?

p. 1858 l. 1. It is not clear what the units of v, $r(v)$ and $f(v)$ are. Is this a fully event-based model, which computes runoff over the total storm duration, or is it subdivided into time steps?

p. 1858. Eq. 6. $F_R(0) = F_V(P_0)$, should this not better be written as $F_R(0) = F_V(v < P_0)$?

p. 1858. l. 13 and 16. "with an implicit expression for $v(r)$", I guess this should be $r(v)$ as runoff is dependent on rainfall, not vice versa. Are you referring to eq. 5 here? If so, please make reference to eq. 5.

p. 1860. l. 8. "we set $Q_V = 0$ during the event". I refer to my comment here. Why would you do this? For a very short high intensity event this may be realistic, but for a longer event, where the time scale of discharge from the tank is in the order of the duration

the event, this may not be realistic. Please give a reasoning for this decision and reflect whether the SCS-CN model is sensitive to high intensity-short duration events compared to low intensity-long duration events, having the same total storm depth.

p. 1860. eq. 14, same as my comment on eq. 6.

p. 1864. l. 4 “half the amount of time at Santander”

p. 1864. l. 8. “a flexible approach to identify”

Table 1. The amount of significant numbers is too high in my opinion.

Table 4. Same as Table 1.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1849, 2010.