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Hydrology and Earth System Sciences Discussions

Interactive comment on "The within-day behaviour of 6 minute rainfall intensity in Australia" *by* A. W. Western et al.

Anonymous Referee #2

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This paper focusses on the fitting of probability distribution functions to 6 minute data observed during one day. Therefore, different theoretical distribution functions are tested. I believe this paper is of interest to the HESS community and is already of high quality. I only have some minor comments or suggestions.

1. It is not clear to me why you cut-off the lower intensities before fitting the pdf. Couldn't you as well take all non-zero precip-data? I understand you focus on the higher precipitation events, but still (even after the cut-off that you applied) you focus on the right tail. To make the analyses more general, I suggest to include all data, or to better discuss why you didn't include it, and demonstrate the effect of putting a threshold on lower precip data on the fit (and the parameters of) the TDFs.

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2. page 3194, line 28: you mention 2 mm h^{-1}: shouldn't this be 0.2 mm h^{-1}?

3. page 3196, line 3: "at least using traditional ways of thinking about rainfall": what do you mean with this? What would the alternative way(s) be?

4. page 3197, equation 1: why use the RMSE? In statistics the "Wasserstein distance" (also called "Earth mover's distance") is used more often! This measure has the advantage that it not only looks at the vertical differences between both functions (as the RMSE does) but also accounts for the horizontal differences. (this measure was lately used in HESS papers of Ehret and Zehe (HESS, 15, 877–896, 2011) and van den Berg et al. (HESS, 15, 1445–1457, 2011))

5. page 3198 lines 10 to 14: give more explanation on why the bins were set in this way. Is there any specific reason for using this formula?

6. page 3198 lines 21-23: a lot of emphasis is given to the upper tail, while the objectives of the paper are focussing on the complete pdf. Some focus can be on the upper tail (but then this has to be specified in the objectives), but, given the current definition of the objectives, the whole pdf should be examined.

7. page 3199, lines 9-11: it is not clear why the RMSE90 is used.

8. page 3208, line 20 to page 3200, line 5: basically, you end up with two groups: 1 and 2 (where 1 is better then 2, but 2 can be preferred above 1) and group 3 and 4 (where you state that the order between 3 and 4 is not important): I suggest that the authors do not rank them as they did, but rather that 2 groups are defined.

9. page 3211, line 6 to 10: as this study is a precursor study, it would have been interesting to have had some insight in how the pdfs change with changing daily rainfall. The study conducted could have binned the daily totals and have looked at the statistics of the parameters of the distributions within each bin and see whether they change or not.

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Interactive Comment

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