We thank Dr Nadav Peleg (the Editor) for his comments and for his coordination of the entire review process.

(1) The Editor suggests to move Appendices to the Supplement.

Appendices. Please consider moving the appendices to Supplementary Material to reduce the length of the paper.

Ans: Thank you for this suggestion. We would prefer to keep the Appendix A because it is highly relevant to the property derivation in the main context, but we agree to move Appendices B and C to the Supplement.

(2) The Editor suggests to improve Figure 1.

Figure 1. Consider adding an arrow to indicate the timeline.

Ans: Thank you for the suggestion. An arrow has been added to indicate the timeline.

(3) The Editor suggests to reduce the number of digits after the decimal point in Tables 1-4 and other parts in the manuscript.

Tables 1-4 (and elsewhere in the text). Do you really need to present the figures with 4 digits after the decimal point? Consider reducing the digits after the decimal point to 2 or 3 (if needed).

Ans: Thank you for the suggestion. We have reduced the number of digits after the decimal point to 3.

We thank Reviewer#1 for his careful reading of the paper and his perceptive comments.

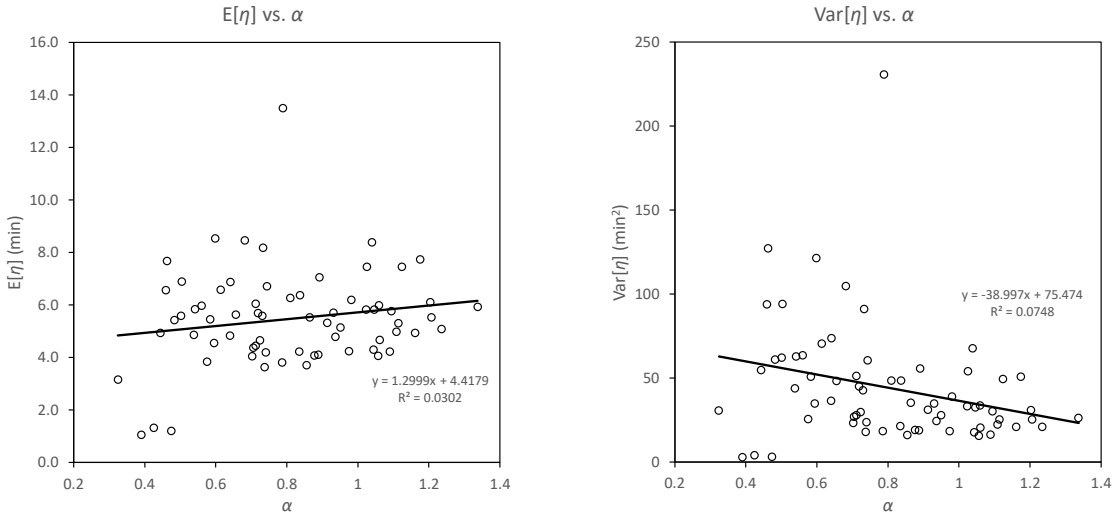
Here are some responses to the points made by Reviewer#1.

(1) Reviewer#1 suggests to further investigate the impact of parameter α to the statistical property of parameter η.

I agree that VAR(eta) = alpha/nu^2. I was mistaken. It might worth investigating how the mean and variance of the parameter eta behave for the case in which the parameter alpha is lower than 1 and for the case it is greater than 1 based on the 12 parameter sets that were already estimated for Bochum data. I believe this investigation will enlighten the strength of this model.

Ans: I think there is a misunderstanding here. In the randomised models, η is no longer a parameter (as it was in the non-randomised model). Rather, it is a random variable whose mean and variance depend upon parameter α: there are analytical relations between the mean and variance and α (as in the equation referred to in the reviewer's comment; the other is $\mathrm{E}[\eta] = \frac{\alpha}{\nu}$). So, presumably, what the reviewer is referring to as the variance of η, is something like the variability between the different parameter sets of the mean value of η, i.e. $\mathrm{E}[\eta] = \frac{\alpha}{\nu}$, for each parameter set.

From that equation, it is clear that, assuming ν does not change, the values of $\mathrm{E}[\eta] = \frac{\alpha}{\nu}$ would get larger when α increases so that the variability of $\mathrm{E}[\eta]$ would also increase when α increases. But in fact, parameter ν also changes, so there is nothing than can be concluded a priori. The sample of 12 parameter sets is very small, so we fitted the model to a few more data sets and obtained the figure on the left below. For completeness sake, we include a similar evaluation of the variability of $\mathrm{Var}[\eta]$ with α.



This shows that, aside from three parameter sets for small values of α, there is no visible trend in the variability of either $\mathrm{E}[\eta]$ or $\mathrm{Var}[\eta]$ with α. This is confirmed by fitting a regression line to these points and observing that the gradient is not significantly different from 0 with 95% confidence (see also the small values of the coefficient of determination). We do not think that including either of these figures would add much to the paper; and since they make use of data that were not utilised in the paper, their inclusion would require first presenting these other data sets, which would significantly lengthen the paper. We therefore propose to leave out this analysis.

(2) Reviewer#1 points out the limitation of fixed-window annual maximum.

While I agree with your point (thus no additional works requested on this matter), but I am not too sure whether the fixed window approach is a standard (at least it is not standard in the US). If it is standard, I think the standard needs to be improved because the fixed-window annual maximum rainfall is not true annual maximum rainfall.

Ans: Thank you for the explanation. As mentioned previously, we chose to use the fixed window approach, so our results could be easily compared with those from the previous relevant works (such as Kaczmarska, et al., 2014). We would consider using a moving window approach in our future work.

(3) Reviewer#1 confirms that the overestimation of proportion dry can be resolved by filtering out trivial rainfall or by narrowing down search space of phi and kappa.

I also confirmed that the overestimation of PD is caused by very trivial rainfall (e.g. 0.001mm) from my simulation. I also found that this problem can be fixed when you narrow down the search space of the parameter phi and kappa. You may also want to either briefly mention it or investigate it.

Ans: Thank you for confirming that the overestimation issue can be resolved by filtering out trivial rainfall and for the suggestion on restricting the search space of phi and kappa. Since we have not carried out any investigation on restricting the search space of kappa and phi, we cannot make any claims in the paper about the usefulness of doing this. This is something that will have to be examined in a separate publication.

References

Kaczmarska, J., Isham, V., and Onof, C.: Point process models for fine-resolution rainfall, Hydrological Sciences Journal, 59, 1972–1991, https://doi.org/10.1080/02626667.2014.925558, 2014.