

Interactive comment on “A Hybrid Stochastic Rainfall Model That Reproduces Rainfall Characteristics at Hourly through Yearly Time Scale” by Jeongha Park et al.

N Peleg

nadav.peleg@sccer-soe.ethz.ch

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Dear Park, Onof and Kim,

I read your paper entitled “A Hybrid Stochastic Rainfall Model That Reproduces Rainfall Characteristics at Hourly through Yearly Time Scale” and found it very interesting. I have some questions and a comment following my reading, which I am listing below.

Kind regards,

Nadav

1. Is the rainfall generator capable of simulating the diurnal cycle of precipitation? I
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didn't find a mention to it in the text.

2. You mentioned that “. . . Poisson cluster rainfall models are designed to reflect the original spatial structure of rain storms containing multiple rain cells” [page 3 line 5], which implies that the rainfall generator can be used in a multisite context. Yet, the examples and discussion are given for single sites. Can the model be used to simulate hourly rainfall at multi-sites? And if so, can you please provide some examples to the ability of the model to preserve the spatial structure of the rainfall?

3. In page 4, line 4, it is mentioned that “. . .Poisson cluster rainfall models have also been used to generate future rainfall scenario under climate change”. How can the model be re-set to simulate rainfall for a future period following the methodology you are suggesting here?

4. You state that “Our hybrid model is not easy to implement because it requires extensive analysis of the correlation structure of the fine-scale rainfall statistics to fine-tune the MBLRP model to downscale the generated monthly rainfall” [page 26 line 20]. Can you give some further information in this direction? e.g. what is the minimum number of years that are required for a proper analysis of the statistics? How many gauges are required to cover a given area?

5. A short comment from my side – you mention in the introduction the importance of rainfall at small scales. The paper here focused on the hourly scale, and you mention in the conclusion that the model can be (with implementing some methods, as random cascades) also used to simulate rainfall at sub-hourly scales. It is maybe worth mentioning in this context that there are already several gridded sub-hourly rainfall generator models that are presented in the literature (e.g. Paschalis et al. 2013 – WRR; Peleg and Morin 2014 – WRR; Peleg et al. 2017 – JAMES; Benoit et al. 2018 - WRR) and to briefly discuss the advantages/limitations of using the tool you are suggesting for simulating rainfall at fine scales in comparison to the others.

