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

H Müller

mueller@hydro.tuwien.ac.at

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Dear Park, Onof and Kim,

I enjoyed reading your paper "A Hybrid Stochastic Rainfall Model That Reproduces Rainfall Characteristics at Hourly through Yearly Time Scale". There are a few questions and comments from my side, you may want to answer or include in your manuscript.

1. The rainfall model generates hourly rainfall time series. Are there any investigations/plans to extend it to e.g. 5 min resolution (instead of applying cascade models

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as suggested in the outlook)? Do you see any restrictions or arising problems, if the method would be extended to a finer temporal scale?

2. To enable comparisons with other rainfall generators, maybe the authors want to spend a few words on the total number of parameters required to generate the hourly rainfall time series? E.g. for the MBLRP-module you use 6 parameters per set and one set per month, resulting in 72 parameters for module 3. What is the total number of parameters?

3. P15l18-20 "...the MLRP model that reflects the original spatial structure of rainfall in reality, ..." What is the connection between the point statistics mentioned before and the spatial structure? Is it planned to extend the introduced model to be able to generate spatial rainfall? Even if not, maybe the authors want to include in their outlook, how this can be achieved, for example i) during the rainfall generation by e.g. the circle approach with the radius of single pulses or their velocities as additional parameters (Cox and Isham, 1988, Bordoy and Burlando, 2014) or ii) subsequently be a resampling approach (Müller and Haberlandt, 2015)? Where do the authors see opportunities/limitations?

Technical notes:

Fig. 13: For the observations extreme values with return periods of 200 yrs are shown for all stations, taken from a fitted GEV distribution. The observation length is only 30 yrs (1981-2010) and it can be questioned if the comparison of extrapolated values for 200 yrs return periods is reliable from a statistical point of view. I would rather limit the comparison to 50 yrs or 100 yrs.

Fig. 14 (caption): I think the model colors have been swapped by mistake: 'our model' should be red, 'MBLRP' should be blue.

References:

Bordoy, R., Burlando, P. (2014). "Stochastic downscaling of climate model precipitation

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Cox, D. R. F. R. S., Isham, V. (1988). "A simple spatial-temporal model of rainfall“. Proceedings of the Royal Society A415, 317–328.

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