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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Precipitation variability within an urban monitoring network in terms of microcanonical cascade generators" *by* P. Licznar et al.

Anonymous Referee #3

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This is an interesting paper. Although I am not very much impressed about the methodology and the results, they appear sound to me. The paper therefore deserves publication in HESS, at least if the level of new innovation is strong enough in comparison with the previous publications by the authors (Licznar et al., 2011a, b; Rupp et al., 2012), and if the authors can respond well to the major comments.

My two major comments are:

* It appears that the methodology is not new in comparison with the previous publications by the authors (Licznar et al., 2011a, b; Rupp et al., 2012). In Licznar et al.

(2011a, b), similar methodology was applied but to other rain gauges in Poland and Germany; and Rupp et al. (2012) made use of the same rain gauge data of Warsaw?? Can the authors clarify the scientific innovations of the current paper more clearly? These should better demonstrate that this paper is more than a new case study (applying existing methodology), hence deserves publication in a journal as HESS.

* The authors propose to use of overlapping moving windows for the calculation of the empirical histograms and calibration of the small-scale rainfall generators (micro-canonical cascade generators in this study) for use in urban hydrological applications. This indeed leads to more smooth histograms and parameter calibration results, as shown in the paper. But, it does not meet the shortcoming of local precipitation data shortage (see motivation of the authors on page 5253 line 13) !! The histograms and calibrations are still based on the same short rainfall record. Given that rainfall statistics may strongly be influenced by climate oscillations (e.g. at decadal time scales; see Willems, 2013), precipitation statistics derived from short records may be biased. They may systematically differ from the long-term statistics, which is the main problem of the local precipitation data shortage. This is not solved by the proposed use of overlapping moving windows. I suggest that the authors make this clear in the paper.

Additional minor comments (mainly textual suggestions), follow below. The English language needs strong polishing. Some sentences that need to be rephrased are mentioned below, but there are many more.

Page 5255 Line 4: Motivation is given here for studying the spatial variability in the MCM generators. The authors claim “a number of MCM generators varying in space” need to be built, but what about the spatial correlations? These need to be addressed as well.

Page 5260 Lines 13-16: It is unclear why this sampling in 100 points was done? Why not simply considering the full empirical distribution?

Page 5264 Lines 14-15: “this overproduction does not disqualify the use . . . for practical

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engineering tasks . . .": why not? Did you quantify the impact of the overestimation in rainfall on, for instance, sewer or stormwater reservoir design?? If not, I suggest to weaken that statement. What could be done here is to quantify the bias in return period of the design value, if the biased MCM-based rainfall data would be applied.

Figures 7 and 8: I suggest adding the confidence interval limits to the points in the figure. This would allow to check whether the parameter estimation uncertainty can explain the higher value for the parameter a for timescale 8 in comparison with timescale 4 . . .

Figure 10: highest rainfall intensities show strange behavior (constant exceedance probability above a given precipitation threshold; + discontinuous behavior). Please discuss.

Page 5252 Line 4: "resolution": please clarify time and/or space ??

Page 5252 Line 4: "probabilistic assessment": What kind of probabilistic assessment? Of the network itself? Or. . .? Clarify to the reader.

Page 5255 Line 3: "answer to the question": remove "to"

Page 5255 Line 3: "is it sufficient a single . . .": check language

Page 5256 Line 5: "step response error": I don't think it is clear to the reader what this means. Explain more.

Page 5257 Line 22: "we do not however limit": check language

Page 5258 Line 23: "gauges are however": "are" is missing

Page 5258 Line 26: "making difficult the identification": check language

Page 5267 Line 15: "cluster analysis technique": remove "technique"

Page 5267 Line 27: "it is enough one single": check language

Page 5268 Lines 3-4: "the quite common practice": sure ??

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Page 5268 Line 4: remove “gauges data adoption”

Page 5268 Line 5: remove “fully”

Page 5268 Line 5: “to find more clear”: add “more”

Page 5268 Line 6: remove “our observations”

Page 5258 Line 17: “to be equal to 0”: add “to”

Page 5258 Line 23: “gauges are however”: add “are”

Page 5264 Line 14: change “disqualifies” to “disqualify”

References:

Licznar, P., Łomotowski, J., and Rupp, D. E., 2011a. Random cascade driven rainfall disaggregation for urban hydrology: An evaluation of six models and a new generator, Atmos. Res. 99, 563–578.

Licznar, P., Schmitt, T. G., and Rupp, D. E., 2011b. Distributions of microcanonical cascade weights of rainfall at small timescales, Acta Geophys., 59, 1013–1043.

Rupp, D. E., Licznar, P., Adamowski, W., and Leśniewski, M., 2012. Multiplicative cascade models for fine spatial downscaling of rainfall: parameterization with rain gauge data, Hydrol. Earth Syst. Sci., 16, 671-684

Willems, P., 2013. Multidecadal oscillatory behaviour of rainfall extremes in Europe, Climatic Change, 120(4), 931–944

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 5251, 2014.