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Interactive comment on "Explorative Analysis of Long Time Series of Very High Resolution Spatial Rainfall" *by* E. Dybro Thomassen et al.

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We are somewhat surprised and disappointed with the rather harsh review provided by this anonymous reviewer. Let us try to provide an answer to why we think this study is both novel and useful, as well as providing a suitable link to design of weather generators. We understand the reviewer in the way that if these points are justified then the remaining major criticism, lack of conclusions, is also addressed.

We have clearly stated that our key interest lies in identifying properties relevant for a spatial weather generator. The point rainfall generator was originally described by Rodriguez-Iturbe et al (1987) and made operational by Cowpertwait (1994). The main novelty and development between these two key papers is the work on identifying a

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Discussion paper

suitable number of parameters and how to estimate these, i.e. to obtain a parsimonious description of the variability observed in a historical record. Still, estimation of parameters in the model now known as the Neyman-Scott Rectangular Pulses model is cumbersome and partly subjective due to some over-parametrization of the model, as anyone who has worked with the model knows. We see therefore an identification of dimensions in observed spatial data as a highly needed prerequisite for starting the work on a spatial weather generator. You simply need to know how many variables you should employ in an ideal situation to avoid correlation between variables. This is exactly what is studied in the paper we have submitted and we use as input the longest, most complete, and most accurate precipitation series we know of globally with a resolution needed for urban hydrology applications. As pointed out by both Einfalt et al (2004) and Thorndahl et al (2017) development and deployment of spatial rainfall generators will be of very high value to the urban hydrology community as soon as suitable observational data is available.

However, the reason for publishing such analyses is also, that they can be used outside of the application field that the authors intend to use it for. We can immediately find three other fields of application as discussed briefly below: 1. To validate climate change models of future precipitation in very high resolutions. We point towards the groundbreaking paper by Kendon et al (2014) and their use of high-resolution radar data for verification of precipitation fields at resolutions where no re-analysis data exists for proper validation of model outcomes. 2. To be used for making a typology of extreme rainfall for use in now-casting that better than random projections of the rainfall fields captures realistic temporal evolutions and characteristics as shown in e.g. Olsson et al (2015). 3. To search for good co-variates in e.g. regional modelling of precipitation. The work published in Arnbjerg-Nielsen et al (1996) is a very simple application of some of the tools employed in the present study. This work was the inspiration to identifying the co-variates of the regional model of precipitation extremes developed and published 20 years later by Madsen et al (2017).

We hope that this is sufficient to convince the editor, and perhaps also the reviewer, that our paper is suitable for publication, especially since the reviewer states that the structure of the paper is clear and the methods are applied in a satisfactory way.

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