Interactive comment on "Event-based stochastic point rainfall resampling for statistical replication and climate projection of historical rainfall series" *by* Søren Thorndahl et al.

Søren Thorndahl et al.

st@civil.aau.dk

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The authors would like to pay our gratitude to reviewer L. Bengtsson for some useful comments and suggestions.

LB1: The paper aims at determining rainfall for urban design. It is excellently written up to the result section, well describing previous research and the methodology used. However, the result section can be improved. When comparing observations and modeling it is not sufficient to conclude good or satisfactory agreemnet or letting the reader interpret figures by himself.

Reply: We recognize that some figures needs to be clearer in order to support the conclusions and that the text should be elaborated in certain sections to underline the results more. We will revise the results section in order to make sure that readers of the paper will not have to interpret results themselves.

LB2: Since the main objective, besides deriving a new method for simulating rain series in a new climate, is to derive rain series that can be used for urban design, idf-curves should be shown in the conventional way as intensity vs duration for different return periods. Although this is done in Fig. 5, the scale is not relevant. It would be better to use linear scale and not extent the duration further than 3 hours. I would like to see such curves directly after and based Fig. 1 and after Fig. 6. The two new figs should be compared and discussed more explicitly in the text.

Reply: We agree that the IDF-curves are difficult to read. We will have a look at them again. Splitting them up in historical and climate projected as proposed might improve clarity, and we will have a look into if they can be well presented by a linear scale with max. 3h duration.

LB3: Concerning climate change projections, I Think it should be told how large bias was used when improving the direct projections. As far as I know after simulating the present climate, correction factors are used to fit to observations and this bias is kept when modelling rain in future climate.

Reply: This is s a good point. Currently this information is beyond our knowledge since climate model ensamples are executed and processed by DMI. But we will have a look at it.

LB4: I agree with the authors that the expected increase of the number of 20 mm rain in a year seems unrealistic. I have done studies of several daily rains series extending more than 150 years and found significant increase of the number of 10 mm events, significant but minor increase of 20 mm daily events but none of 30 mm events. Perhaps the authors could look into long series of daily rainfall to investigate

changes that have occurred.

Reply: We have not been able to investigate the orgin of this value from the data that was provided to us by DMI. Following reviewer Patrick Willems suggestion to apply new RCM ensamples based on RCP scenarios which has recently been available to us, we will have a closer look at the target parameter.

LB5: A morec technical aspect is that the intensity in Fig 1 and 6 ought to be mm/min OR it should be clear from the legend that the graph shows rains over minutes. Also I Think the scale in Fig 3 should be changed. Usually log-scale is used or linear scale extending maybe up to 15 Days. On page 5 line 26 there is one value too much.

Reply: All good points we will revise accordingly

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