This study explores the influence of the spatial and natural climatological variability of rainfall on rainfall and associated flow return period estimation in urban areas. For this purpose, a stochastic rainfall generator was employed to generate rainfall time series with and without spatial variability. The resulting rainfall time series (corresponding to 4 different scenarios including combinations of spatial and climatological rainfall variability) were applied as input to the urban drainage model of a test catchment in Lucerne, Switzerland. Based on the results, both rainfall and flow return periods were computed and the individual influence of spatial and climatological rainfall variability on extremes was quantified. The study is very interesting and the results constitute a valuable contribution towards improved design of urban drainage systems. The paper is well written and we certainly enjoyed reading it.

[reply] We thank the reviewers for their kind words and for the time and effort reviewing our manuscript.

I suggest that the authors clarify/address the following points prior to publication:

1. Please specify the drainage area of the points at which urban flows were analysed. As highlighted in previous studies, the drainage area of interest has a significant impact on the impact of spatial rainfall variability on simulated urban flows. In fact, in the figures provided in the supplement of the manuscript under consideration, it can be seen that the impact of spatial variability is somewhat different at the different locations at which flows are analysed. This is likely partly due to differences in the drainage areas associated to each point under consideration (this is, the areas upstream of the point of interest). Please provide information about the drainage areas under consideration and briefly analyse the impact of this factor on your results (a detailed analysis of this could also be suggested as 'future work').

[reply] The drainage area is: 11.5 ha total area (5.3 ha impervious area) are connected to location A and 30.2 ha (13.6 ha) are connected to locations B and C, whereas both locations are constrained through the overflow weir structure. A detailed analysis as suggested by the reviewers will require a larger catchment than the one studied here (might be suggested as a 'future work'). We will add this information in manuscript.

2. While 2 km radar data were employed to calibrate the rainfall generator, 100 m spatial data were then generated. Please discuss the implications of this and whether the downscaling model that was employed accounts for scaling, thus making it appropriate to downscale down to 100 m (although the model was only calibrated based on 2km data).

[reply] The rainfall model was scaled to 100 m resolution as mentioned in Section 3.2.1. We will add a figure in the supplementary material with an example of the model scaling (e.g. for the rainfall coefficient of variation) and will add a short explanation in the text for the choice of rainfall spatial correlation structure used.

3. The temporal resolution adopted in the study (10 min) may be too coarse for urban applications and may result in smoothing of urban flows, which may in turn result in underestimation of flow extremes (as indicated in Ochoa-Rodriguez et al. (2015), temporal resolutions <= 5 min are required for urban hydrological applications, with resolutions of 10 min leading to large

underestimation of peak flows. Likewise, Wang et al. (2015) showed results of flow simulations resulting from rainfall inputs at temporal resolutions from 1 to 10 minutes and compared them against flow observations; the results associated to 10 min rainfall inputs largely underestimated observed flow peaks and resulted in 'distorted' hydrographs). I understand that the temporal resolution of choice was likely constrained by the resolution at which rain gauge rainfall records were available. Please discuss the implications and limitations of the temporal resolution of choice and clearly mention in the future work section that tests should be conducted at finer temporal resolutions.

[reply] The rainfall temporal resolution was indeed set to 10 min following the temporal resolution of the records. We do agree that temporal resolution of rainfall data used as model input significantly influences flow dynamics including peak flows. We will add a short discussion of the implications and limitations of the 10 min temporal resolution used in this study.

4. The current title of the paper is rather misleading and I would suggest changing it to better reflect the purpose and focus of the study. For example, the focus on extreme values / return period should somehow be mentioned. Furthermore, I would suggest changing 'temporal variability' to 'natural climatological variability'. The term temporal variability conveys the idea of temporal resolution, which, as described above, is not the purpose of this study and is in fact one of its shortcomings.

[reply] We agree with the reviewer comment. A more suitable title for the manuscript will be consider and the term "temporal variability" will be replaced with "climatic variability" (or similar term).