Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2018-362-AC1, 2019

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Precipitation extremes in a EURO-CORDEX 0.11° ensemble at hourly resolution" *by* Peter Berg et al.

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Received and published: 13 March 2019

We appreciate very much the comments and suggestions, as well as the time and energy spent in reviewing our manuscript. Below are answers to all items raised.

The paper "Precipitation extremes in a EURO-CORDEX 0.11âŰę ensemble at hourly resolution" by Berg et al. presents the difficulties and uncertainties regarding the evaluation an future projections of sub-daily precipitation extremes and how far they can be tackled at the mement. The topic is relevant and suitable for this journal. The manuscript is well written and the overall quality of the presentation is good. It offers new insights into the topic. They demonstrate how unsatisfactory the data availability

for sub-daily precipitation observations as well as high-resolution simulation data is at the moment. The make the effort to compile the observational base at least for several European regions and compare the respective methods to derive the extreme precipitation depth-duration-frequency functions (DDF). The results of the evaluation and the large ensemble variability prove the necessity to examine this topic further including more simulations. At this stage neither the quality of the RCMs to reproduce short term precipitation extremes or the questions regarding the CC-scaling in the future can be fully determined, as the manuscript shows in a convincing way. I fully agree with the authors, that sub-daily data should be added to the ESGF, if possible for the existing CORDEX simulations but certainly for future efforts. This is not only necessary for precipitation but also for other variables like e.g. wind. I recommend this paper for publication. Additionally, efforts to provide suitable comparable Pan-European observation data for the analysis of extremes and model-evaluation are highly appreciated. There is just a minor questions/suggestions: - The authors derive the DDF for five regions. The spatial distributions are shown just for Germany and France. Is the representation of the spatial pattern comparable in the other regions?

We show only the spatial distributions for Germany and France, as we only have gridded data for those two observational data sets. However, we also show the RCM spatial patterns for the full model domains, which shows at least the differences between the models in different regions. E.g., REMO shows similar low correlations with orography in Sweden (compare the very southern parts and the Scandic mountains bordering Norway in Fig. 6). This is stated on Page 8 line 24, but we will stress this point for each data set in Section 2.2 in the revised manuscript.

Due to the different methodologies used to derive the DDF it is difficult to distinguish which of effects presented stem from the differences of the methodologies and which from the problems of the models to represent short term extremes.

Indeed, this is an issue. This is why we focus on the 10-year return period that is

within the data range of the different data sets. In our experience, this reduces the impact of the methodological choices for the extreme value analysis, as we argue for on Page 8 lines 6–8. Further, we have made an effort to "homogenize" the different data sets by applying area reduction factors in a transparent way, see Section 3.3. For these reasons, the evaluation is qualitative and we focus on the main characteristics and not minor deviations, which we will include a statement about in Section 4.1 Evaluation in the revised manuscript.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2018-362, 2018.