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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.

Anonymous Referee #3

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The manuscript of Berg et al. provides a comparison between regional climate model outputs of precipitation and high-resolution observational datasets in Sweden, Germany, Austria, Netherland and France. Overall, the manuscript is well written, the objectives are clear and the results support the goals of the study. Yet, I am puzzled with this submission since to my opinion it does not bring new results. Indeed, the conclusion can be found in the introduction, page 2, line 13-19:

"However, RCMs and GCMs have shown severe problems with their sub-grid scale parametrisations of convective processes, which affect their ability to reproduce, e.g., the diurnal cycle of rainfall intensity (Trenberth et al., 2003; Fosser et al., 2015; Prein et al., 2015), the peak storm intensities (Kendon et al., 2014), and extreme hourly intensities (Hanel and Buishand, 2010). It is therefore questionable to which extent such

RCMs are capable of describing cloudbursts in present as well as in future climate"

Indeed, it is well known that the current generation of CORDEX RCMs includes a convective scheme that is not able to reproduce adequately the small-scale high-intensity rainfall events. Beranová et al. (2018) evaluated the hourly outputs of RCMs and projections for short duration's rainfall have been provided by KyselÃ¡ et al. (2012), among others. This is the reason why regional climate models that explicitly reproduce convection are being developed, there is a huge amount of literature presenting this new generation of climate models, see for instance Coppola et al. 2018 or Berthoux et al. 2018 (I believe both should be cited in the text). However, I agree as stated by the authors page 3, line 1 that the convection-permitting simulations are still not widely available, unlike EuroCordex runs. Yet, when reading the manuscript it seems that these convection-permitting simulations are still not available for research purpose, when several studies have already been produced with these types of model (see Berthoux et al. 2018, Reszler et al. 2018). It can be somewhat misleading to the reader not familiar with climate models.

Specific comments:

Since the study focuses on the summer season, the title should say it. In various regions such as south France, the maximum intensity events are occurring in the autumn, not during summer.

Page 4, line 6: Rajczak and Shär 2017 analyzed daily model outputs

Page 3 section 2.1: it should be clearly stated here that the 9 simulations all include a parametrized convection scheme.

Page 13, lines 9: it is not clear which threshold is used in the GP model for future time periods. As explained page 7, lines 7-14, a precipitation threshold is defined for each grid point to have 3 events on average per year. Which value is used for the future time period? the threshold value yielding 3 events per year in present climate ? The

authors should provide, at least in the text, the ranges of threshold values obtained for the different grid points/regions.

Page 15, line 13-15: it is very good that the authors talk about data availability in the discussion. It should be stressed also that the different data sets they used are probably not homogeneous at all: some rely on observed precipitation, some rely on a mixture of observed precipitation and simulations from a climate model (Germany) and some rely on a weather generator (France). Further work should try to homogenize these data sets prior to the evaluation of climate models, or the discrepancies between data set could induce an artificial bias in the evaluations. Due to different sources of data, is it very likely that the spatial patterns of the different datasets cannot be compared in a robust way.

References:

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