

## ***Interactive comment on “Inter-comparison of statistical downscaling methods for projection of extreme precipitation in Europe” by M. A. Sunyer et al.***

### **Anonymous Referee #2**

Received and published: 19 September 2014

The paper evaluates and compares 8 different statistical downscaling methods applied to 11 catchments in Europe using the ENSEMBLE projections. The study focused on extreme precipitation with return period of 1 and 5 years. The work is particularly useful for estimating hydrological impacts using climate model projections. I recommend moderate revision before it can be published.

General comments:

- The discussion or results lacks critical thinking and interpretation. It largely discusses the figures in text but does not always provide reasons. Sometimes, the authors are

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speculating, e.g. “This is likely due to the fact that in Europe, extreme precipitation from convective storms occurs more frequently during summer, and this has a larger influence on the outputs from the RCMs and SDMs due to their higher spatial resolution. “ Do they know for sure extreme precipitation from convective storms occurs more frequently during summer in Europe and on what scales, daily, hourly? This needs to be supported by scientific evidence or citations.

- The conclusion is not very useful after lots of work put in the comparison of 8 different statistical downscaling methods. The authors state in the conclusion: “we recommend the use of a set of statistical downscaling methods as well as an ensemble of climate model projections.”. But the authors also state: “There is not a tendency in the performance of the bias correction methods depending on the mean and extreme precipitation regime. It also shows that the differences between the methods and the performance of the bias correction methods depends on the catchment studied.” It does not provide any insight to people who want to conduct impact studies and need to choose downscaling methods for a river catchment. If the methods do not show much difference, why should we use a set of downscaling methods? And if we do have the research capacity to use several of them, what should we do with the set of different methods? E.g. Do we use the mean value? Are certain types of downscaling methods more suitable for certain catchments? It seems the authors have rushed to the conclusion without critical thinking and interpretation of the results.

- The paper is full of acronyms (names of catchments and methods) which make it very hard to follow.

Specific comments:

6169-23: 'up to half' is not strictly correct according to Figure 3. In the conclusion, authors use 'at least 30%' instead of 'up to half'. The former is better.

6170-18: 'approximately 25km' but EURO-CORDEX is at a finer resolution.

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6171-15: 'Wetterhall et al. (2012) Conditioning model output statistics of regional climate model precipitation on circulation patterns' provides another interesting comparison, worth adding to the literature review.

6172-8: Hundecha et al., 2014. Is this already accepted or published?

6172-24: 'where most extremes occur'. Throughout the paper, authors have not defined the extreme precipitation. Is it based on return period or percentile?

6173-5: 'while the other catchments use', change to 'while the remaining use'

6176-11: 'closed from' change to 'closed form'

6181-16/24: (i) and (iii) should be (1) and (3)

6184-3: 'three source' should be 'three sources'

6193-9: 'for higher return levels'. There are only 1 and 5 years return levels presented in this study, so this should be 'for the higher return level, 5 years'.

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