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Discussions

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Interactive comment on "Evaluation of uncertainties in mean and extreme precipitation under climate changes for northwestern Mediterranean watersheds from high-resolution Med and Euro-CORDEX ensembles" *by* Antoine Colmet-Daage et al.

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Dear Editor,

We are responding to the comments from Reviewer 2 who has provided interesting comments.

The major comments have been answered with additional elements.

Thereafter, the comments from Reviewer 2 start with "RC2:" and our responses start with "ACD:"

RC2: Major comments

RC2: 1. It is well written manuscript with throughly analysis.

RC2: 2. On the other hand, I'd like to question the validity of the simulated changes given the fact the all RCMs underestimate extreme precipitation even in EVAL. Further, this underestimation seems worse in HIST. Can the authors provide quantitative assessment how different in EVAL and HIST?

ACD: We understand perfectly the reviewer doubts about the validity of the simulated changes given the RCM underestimation of extreme precipitation. However, we would like to specify that the future changes presented are relative, indeed it represents a ratio between past and future precipitation. Thus, the past underestimation must be effective in future simulations too, but the relative change between both won't be affected. Moreover, the papers from Monerie et al. (2016), Reifen and Toumi (2009) and Knutti et al. (2010) cited in section 6 shows that past performance does not guaranty future accuracy, and are not related to the relative changes. Then, a quantitative assessment between the extreme precipitation underestimation of EVAL and HIST simulation isn't realistic. Despite we could make the hypothesis of cumulative errors between the GCMs and the RCMs for the mean annual cycle of precipitation, we cannot make the same hypothesis for extreme precipitation because the physical processes of those phenomena are very different and not linear.

RC2: 3. Continued... Can the authors separate one with better/worse performance in terms of extreme precipitation?

ACD: Despite some systematic performances seems to appear through the metrics describing models performances to simulate mean and extreme precipitation, the aim of this paper isn't to classify models among themselves but rather assess their uncer-

tainties. Moreover, it would not be robust to discriminate models according to their performances in such specific regions with these specific metrics chosen according to the particular goal of this study.

RC2: 4. Uncertainty in observation - SAFRAN: In discussion section, the authors provide a bit of confusing message about how good observation dataset is. If there are different high-quality observation datasets, it'd be nice to provide them.

ACD: The message in the discussion section attempts to alert on the SAFRAN underestimation of extreme precipitation compared to the pluviometers data from the studied catchments and according to Quintana-Seguí et al. (2008). The attached figure shows this SAFRAN seasonal underestimation for the Lez catchment comparing the data from the 3 grid cells covering the catchment (black line) and the pluviometers available in the catchment (colored lines). However, as explained in the section 2.3, SAFRAN is the better gridded observation dataset covering the studied regions. Moreover, it is a reanalysis that have been done precisely to force the hydrological and soil models later.

RC2: Overall, it is well written and organized paper. However, I hope the questions/comments will be taken care of before its publication.

Yours sincerely,

Antoine Colmet-Daage

On behalf of all the co-authors.

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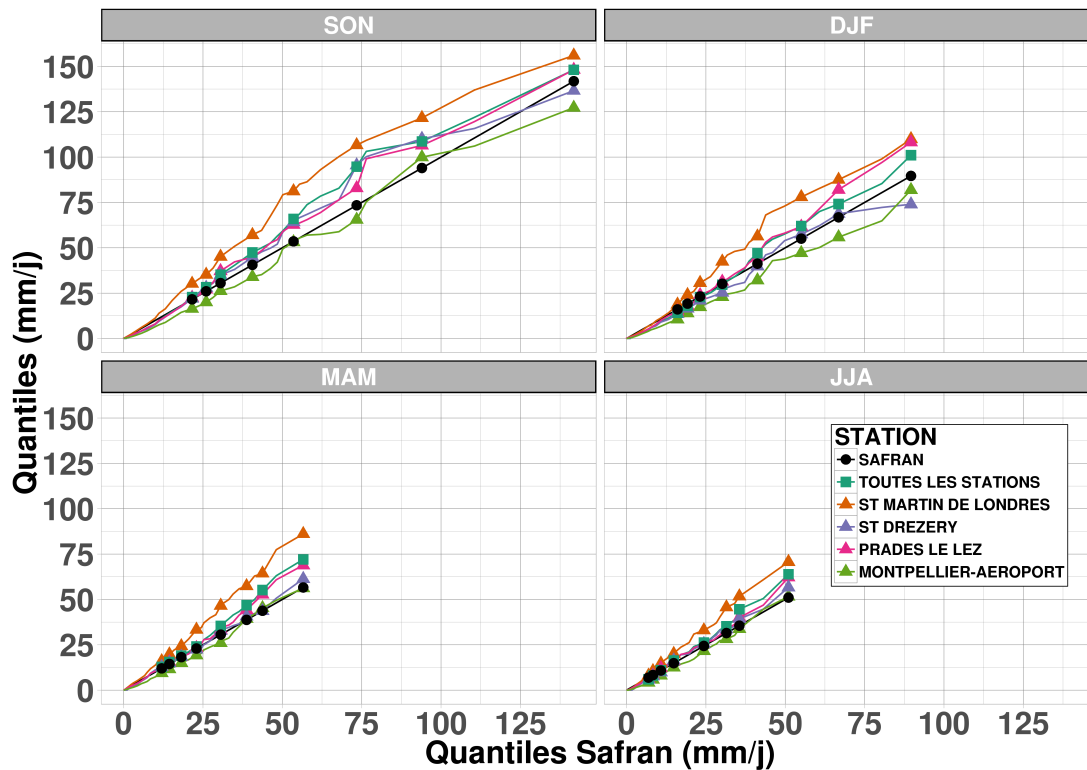
Fig. 1. Seasonal extreme precipitation quantiles underestimation of SAFRAN dataset compared to local pluviometers.