Hydrology and Earth System Sciences Discussions

Interactive comment on "Technical Note: Downscaling RCM precipitation to the station scale using quantile mapping – a comparison of methods" *by* L. Gudmundsson et al.

Anonymous Referee #2

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This paper, in general, is well written and covers one actual scientific issues in regional or local climate modeling – bias correction. The article is well structured and nicely intercompares several commonly used bias correction methods. It concludes that correction approaches strongly vary in their performance depending on the application purpose and the application area. This information is very important and should be kept in mind for any impact assessment. Furthermore, the applied ranking method is very useful and should be considered in more inter-comparison studies. Thus, I would recommend this article for publication after some minor remarks:

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1) What are the authors' suggestions for the application of bias correction for future periods; to be more precise, can the authors quantify the additional uncertainty imposed by bias correction methods?

2) Could the authors explain in more detail the here applied cross validation. Is the 10 fold cross validation based on a bootstrap method?

3) Did the authors also investigate different wet day thresholds than >0 mm/d as e.g. given on page 6189 line 13.

4) Are the shown results valid for the entire year? If so please mention this in the Figure caption. Are there seasonal differences in the performance?

5) page 6191, last paragraph and ff: Can the here shown remaining dimension of the biases at the different stations and the errors at different probability levels be interpreted as some kind of expectation values after bias correction? Shouldn't quantile mapping approaches (including the here shown best method QUANT) reduce the RCM errors more efficiently?

6) Base on remark 5: Is there any expected values of bias after bias correction?

7) Can the authors explain why none of the fitted quantile mapping approaches, e.g. the Bernoulli Weibull, is able to capture the extremes, although the Weibull distribution designed for the estimations of extremes?

8) Themeßl et al (2012) showed quantile mappings potential for the estimation of new extremes (outside the calibration range), but only based on the nonparametric quantile mapping here. Do the authors have any idea how the here shown methods would perform in this context?

9) The authors should somewhere mention the restriction of any mentioned quantile mapping for improving temporal persistence parameters such as correlation of consecutive days!

10) Did the authors also analyze the spatial coherence on daily basis after correction, especially at the extremes?

11) page 6188, line 88: remove "for"

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 6185, 2012.

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