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Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of a bias correction method applied to downscaled precipitation and temperature reanalysis data for the Rhine basin" *by* W. Terink et al.

Anonymous Referee #5

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SUMMARY

The manuscript by Terink et al. addresses the problem of reducing the systematic errors in the reanalyzed/simulated climatic data. The authors adopted a pre-existing methodology based on application of simple two-parametric conversion functions and used it to correct the ERA15 precipitation and temperature data, downscaled with a regional climate model. Substantial attention is paid especially to validation of the results, both for the calibration period and for independent samples. I recommend the paper for publication after a minor revision; below, some comments are given which the authors may take into account when finalizing the paper.

COMMENTS ON METHODOLOGY AND RESULTS

Since the de-bias techniques are the main focus of the paper, the authors may consider mentioning other existing methods of correction. Specifically, since attention is also paid to the problem of misrepresentation of the dry/wet day ratio, existence of techniques using adjustments constructed for individual percentiles of the respective statistical distributions may be of interest to the reader (such as the method described by Deque, 2007, or the approach used by Piani et al., 2010).

It seems to me that the exponential form of correction (Eq. 1) may be prone to instability for high daily precipitation sums. I do not know what maximum values of daily precipitation were typical for the analyzed dataset of observations, but at many European weather stations, daily sums well in excess of 100 mm are not an exception. If such a large P happens to be corrected with a higher value of the power coefficient b (which, judging from Fig. 18, exceeds 1.5 on some occasions), the resulting value may surpass physically feasible precipitation limits (as the multiplicative factor a will not be able to compensate for the high P**b term). To assess whether such instability takes place, the authors may try to analyze the maximum precipitation values (or its highest quantiles) over the validation period (this would be especially desirable for the results in Sections 4.5 and 4.6, where the performance of the de-bias methods is investigated for independent samples).

The potential loss of stability may also be the reason for higher spread of precipitation biases in the corrected series, demonstrated in the Sect. 4.6: 10 randomly selected years may not provide large-enough sample to sufficiently suppress the effect of high temporal variability of daily precipitation. Since the total size of the analyzed series cannot be increased, the authors may try to widen the 65-day selection window for the random sampling in Sect. 4.6, and see whether the spread of precipitation biases is decreased.

TECHNICAL COMMENTS

p. 224, l. 16: Could it be that “river basis” was supposed to be “river basin”?

p. 235, l. 18: “already” seems misspelled

p. 235, l. 21: “parameter” seems misspelled

p. 239, l. 2: “. . .suggesting an almost similar standard deviation“ – I suggest using "similar“ instead of "almost similar“; same at line 22

The authors may consider re-arranging numbers of the figures to better suit the order in which they are referenced in the text. For example, the very first figure to be referenced in the text (at page 225) is Fig. 17; figure 18 is first mentioned between figures 3 and 4.

REFERENCES

Deque M. (2007): Frequency of precipitation and temperature extremes over France in an anthropogenic scenario: Model results and statistical correction according to observed values. Global and Planetary Change 57, 16–26

Piani, C., Haerter, J.O., Coppola, E. (2010): Statistical bias correction for daily precipitation in regional climate models over Europe. Theoretical and Applied Climatology 99, 187–192

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 221, 2010.