

Interactive comment on “Technical Note: The impact of spatial scale in bias correction of climate model output for hydrologic impact studies” by E. P. Maurer et al.

Anonymous Referee #2

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General comments: This technical note illustrates the effect of the spatial scales at which quantile mapping bias correction is performed on coarse climate model data and subsequent hydrologic simulation. Quantile mapping method is most commonly used in the course of downscaling method in US hydrologic projection study, and the authors pointed out the fine spatial scale is tempting to use for the bias correction. However, the greater degree of non-stationarity of bias in higher resolution data (for certain location) have negatively impact on bias correction during validation period (therefore when applying to future climate scenario).

I think the manuscript is already publishable quality in terms of the paper presentation,

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science question they are asking and the results. However, I would like the authors to consider a few comments below.

Specific comments:

1. Page 10897, L8. The sentence “Sources of fine scale and coarse-scale variability. . .” sounds strange. Also, if you provide some examples of sources of variability at fine and coarse scale data, that helps readers to easily understand this whole paragraph (this part was the most difficult part to understand for me in the paper).

2. It looks like non-stationarity of bias is magnified in higher elevation to me (Fig3). If you agree, I think it would be great to add reason (or speculation that can be explored in the future). And do you think the illustrated impacts of the quantile mapping scale on precipitation bias are greater in complex terrain regions than flat region? The authors show CDF for bias corrected precipitation (and temperature) at one pixel which I believe is pixel where DeltaBias is large in Figure 3 (0.125 degree). If you select one pixel where DeltaBias is small, I would expect the CDF would be closer together even during validation period. I would consider showing “good pixel” and discussing the impact of quantile mapping scale differ from grid box to grid box.

3. Uncertainty of hydrologic simulations is always difficult to discuss due to hydrologic model uncertainty, and their parameters. I would include in the limitation (P 10904, L13-19) a sentence to state the result of the impact on runoff is also from one model.

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