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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Bias correction of Simulated Historical Daily Streamflow at Ungauged Locations by Using Independently Estimated Flow-Duration Curves" *by* William H. Farmer et al.

William H. Farmer et al.

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Reviewer Comment 1: *This is an interesting paper, which in my opinion could be made easier to follow with some adjustments. I make a few suggestions that I honestly believe could improve its readability and subsequent impact.*

Author Response 1: Thank you for taking the time to review our manuscript. There is certainly a lot of material presented, so we appreciate your recommendations for improving readability. If you continue to have concerns, do not hesitate to comment

again.

Reviewer Comment 2: *Even a specialist of statistical hydrology could use one or two hydrographs (you only show us box plots!). An introductory graph with an example hydrograph and FDC could help the reader understand your methodology.*

Author Response 2: For the revision, based on this and other reviews, we will include a two-panel graphic showing the overlay of an observed and simulated hydrograph (for a representative site) with a second panel showing the overlay of observed and simulated flow duration curves. We will also consider a figure that shows the steps of the methodology.

Reviewer Comment 3: *I do not like the way you deal with all the aspects of the methodology in parallel, it makes things very difficult to understand what you are doing. I would have preferred a paper structure where (a) you show us what a "perfect" simulation of the FDC used for bias correction could give for results, then (b) you would show that due to the inherent uncertainty of FDC prediction at ungauged points you loose a lot of the theoretical advantage, while managing to improve overall bias*

Author Response 3: This is a great suggestion for the flow of the paper. Other reviewers also made suggestions about the flow of the paper. We definitely plan to make revisions for clarity but need to determine which ideas are most appropriate.

Reviewer Comment 4: *Last, I believe that in addition to box-plots, you should also show the reader some QQ plots to show that even if on average there is a reduction of bias, there will always be catchments where the bias correction method will increase the bias : e.g. a plot showing the original low flow bias vs the bias corrected low-flow bias (with one point per catchment), and then the same for high flow.*

Author Response 4: This will be a useful figure, so we will consider weaving it into our manuscript.

Reviewer Comment 5: *P2 L15. “the nature of this approach. . .” : I have difficulties to understand this sentence. . .*

Author Response 5: This sentence is meant to point out that the timing of the raw simulation is not altered, only the magnitude. That is, the methodology assumes that the timing (sequence of relative rankings) is "good". We will find a better way to say this. One possible revision might be, "This approach assumes that, while the streamflow magnitudes of a historical simulation are biased, the timing or rank-order of the streamflows are relatively accurate."