

Geosci. Model Dev. Discuss., referee comment RC4
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Comment on gmd-2022-213

Anonymous Referee #4

Referee comment on "Customized deep learning for precipitation bias correction and downscaling" by Fang Wang et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2022-213-RC4>, 2022

Review comments on Wang et al.

The article is well written and easy to understand. I have the following comments for the authors to consider.

P2. L55. Single image super-resolution approaches have attracted much attention for precipitation downscaling. In Vandal et al. 2019 cited here, the authors first coarsened a precip dataset and then tried to recover the original fine scale precip data. While that exercise had pedagogical meanings, it is not exactly very practical. Sun and Tang (2020) focused on a 3-deg study area in Texas and demonstrated downscaling and bias correction using multiple coarse-resolution satellite data and Attention GAN superresolution. That work is especially relevant to this study, as it focused local and fine features for an area near Gulf of Mexico. It can be added to the list of references here.

MERRA2 is reanalysis data. I wonder if near real time data from, e.g., GPM, should be used to demonstrate operational aspect of this algorithm.

Most deep learning studies adopt some baseline. The authors may want to show a comparison to baseline. A meaningful baseline here can be bilinear interpolation.

P32. Figure 3. The downscaled maps seem to be smooth and lacking many details shown in Stage IV. Here the authors mainly considered climate covariates from MERRA2. I think adding static covariates such as DEM may help to resolve some local details.

References

Sun, A. Y., & Tang, G. (2020). Downscaling satellite and reanalysis precipitation products using attention-based deep convolutional neural nets. *Frontiers in Water*, 2, 536743.