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Interactive comment on "EMDNA: Ensemble Meteorological Dataset for North America" *by* Guoqiang Tang et al.

Jonathan Gourley (Referee)

jj.gourley@noaa.gov

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Reviewer Summary:

This article presents the methodology of the development of an historical meteorological dataset to be used for hydrologic modeling studies and beyond. The primary variables considered are daily precipitation, mean temperature, and diurnal temperature range. The uniqueness of the methodology is the development of 100 daily ensemble members as well as the optimal interpolation method based on 3 model reanalysis products used as background fields and station data used as observations. Overall, the presentation of the methodology is clear and understandable. I have a few comments that can be considered to improve the clarify of the presentation, but overall consider

this a novel and useful contribution to the field of hydrometeorology.

Major comments:

1. Considered variables - The meteorological dataset is comprised of 3 variables: mean daily temperature, mean daily temperature range, and daily precipitation amount. While these are common variables used in hydrologic modeling, it would be useful to the reader if the authors could provide some more justification on the use of these variables alone. The model reanalyses and station observations consider many more variables. If one were using a more complex Earth system model, for example, there could be a need for additional variables related to moisture, pressure, wind, and solar radiation. Consideration of the other standard variables would broaden the outreach of such a dataset.

2. Snow - The authors touch on the issue of gauge undercatch related to precipitation especially in mountainous regions and high latitudes. It's well known that the gauge efficiency with snow is much different than with rain. Were these treated the same or differently? Second, is it up to the user to determine if the "precipitation" is either in solid or liquid form? It would be useful to provide some more clear guidance on how to make this important hydrologic discrimination.

Minor comments:

1. Line 45: Change "reflectivity-rainfall relationships" to "representativeness of radar variables to surface rainfall." This more general as it considers dual-polarization variables (now used for rainfall estimation).

2. Line 48: Satellite data also have issues with data latency, which can limit their use in real-time applications.

3. Line 93-94: Change "northern to" to "north of" and "southern to" to "south of".

4. Line 110 (figure caption): Remove "radial".

5. Line 119-120: I am confusing Trange - as it can represent a grid cell with a large diurnal temperature range with little uncertainty or a grid cell with small diurnal temperature range but with large uncertainty bounds. These are quite different. Please clarify how this framework can be applied to a diurnal temperature range (comprised of two variables).

6. Line 316-319: But does this method apply separate corrections to rain and snow? Please specify.

7. Line 382-383: Why not use a normalized RMSE to remove the patterns caused by climatology? Also, was it not necessary to show the normalized bias because it was successfully removed?

8. Line 414-416: OK, now we're normalizing the variables by the mean as per my comment #7. But why just do it here and not before?

9. Line 435: I'd be OK if Fig. 8 were moved to an appendix or removed. It's pretty busy and didn't provide many insights.

10. Figure 9: Are ensemble members 1 and 100 randomly chosen or ranked? In either case, my eyes can distinguish no/little differences in the plots using the same color bar. Please explain and consider using a different color bar if you're trying to highlight differences.

11. Line 503-504: Regarding the lower CRPSS with Trange, is this because it's composed of both the daily max and min?

Jonathan J. Gourley

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