



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

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Review of Tang et al. EMDNA: Ensemble meteorological dataset for North America.

One of the factors limiting the performance of land surface models (LSMs) and hydrological models (HMs) is the uncertainty in meteorological forcing data. There are a variety of ways this uncertainty can be assessed, but use of ensemble datasets that represent the plausible range of forcings is especially efficient/convenient. This paper provides both the methodology to produce ensemble meteorological datasets suitable for forcing LSMs and HMs and assesses a dataset already generated for North America, EMDNA, spanning 1979-2018 with a daily time step.

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Overall, it has been a real pleasure to read such a well-written, clear and careful study. I strongly recommend acceptance with minor corrections. I list below a note about data accessibility, a few minor points and some small text corrections.

Data access:

Using <http://doi.org/10.20383/101.0275> to access the EMDNA files via a Chrome browser the authors need to be aware that under each year a warning appears: “File list too long truncated.” This means that the last file that can be seen is: EMDNA\_YYYY.049.nc4. This may just be a browser-specific issue, but I suggest the authors recommend downloading via ftp and, if necessary, provide a protocol for this. Alternatively, it may be that there is a recommended browser that does not have this problem. Less important: Line 589 says: “The total data size is 3.35 TB.”, but the site indicates 3.39 TB.

Minor points:

Line 107 “The possible dependence between reanalysis estimates and station data is not considered when merging them in this study.” This is an important issue that has been under-played here. You should clarify for the reader whether surface observations (e.g. from SYNOPS) are actually incorporated into/constrain the various reanalyses. If so, you should spell out the effect this could have had on the results (i.e. the direction of bias).

Line 190 “leave-one-out cross-validation procedure” – perhaps mention that this is also known as the jackknife procedure.

Line 247 “orographic uplift”: As I was originally trained as a geologist this sounds awfully like orogenesis or mountain building (which is not relevant at the time scale of this study). I suggest changing to e.g. “orographic uplift of air parcels/clouds”.

Line 331 “in northern Canada and Alaska. . .where under-catch of precipitation is often large.” Firstly, precipitation gauges can over-catch rain as well as under-catch so

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that: “catch correction” or “gauge-catch correction” are more generic than “under-catch correction” (would need changing in several places). Secondly, I recommend that you explain that in Canada and Alaska the issue is the dominance of snowfall as a proportion of total precipitation (since snow catch errors are proportionately much larger than for rain). Thirdly you might want to add, to your notes that variances/errors are often higher in areas which are data sparse and topographically elevated, that the increased proportion of snowfall (and hence uncertainty due to catch-corrections) could be a correlated factor.

Lines 604-608 “four main steps” I suggest you include mention for catch-correction of precipitation via Beck et al’s (2020) data.

Text corrections: Line 152: Reverse order of text: “gridded precipitation and temperature” > “temperature and gridded precipitation” [to agree with earlier mention of linear regression and logistic regression].

Equation 14: Should:  $R_{t,PR} = \rho_{CRRt-1,TR} + \dots$  be changed to  $R_{t,PR} = \rho_{CRRt-1,PR} + \dots$  [i.e TR > PR]?

Line 395: “The grid resolution is” > “For the improvement estimates the grid resolution is”

Line 427: “higher accuracy reanalysis estimates” > “higher accuracy than reanalysis estimates”

Line 523: “observation filed” > “observation field”

Line 527-528: “necessary considering OI” > “necessary considering that OI”

References: Check formatting because Karger et al., 2017, Mendoza et al., 2017 and Weedon et al., 2014 need full stops in the abbreviations of the journal names.

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-303>,  
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2020.