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Earth System Science Data Discussions

Interactive comment on "High-spatial-resolution monthly temperature and precipitation dataset for China for 1901–2017" *by* Shouzhang Peng et al.

Anonymous Referee #3

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The authors proposed a high-spatial-resolution monthly temperature and precipitation dataset for China by Delta downscaling of CRU dataset. The original CRU at 30' resolution is downscaled to 1km grid. The new downscaled data set include four common climate elements that are always the driven data for various models. This topic is quite interesting and would be useful for the climate change community. However, there are some obvious flaws in the downscaling procedure and the evaluation part. More interpretation and discussion should be improved. Therefore, I do not support this publication in ESSD at current version.

General comments:

1. Downscaling is a complicated procedure, especially for precipitation from 30' to 1km grid. I do not agree that the downscaled data set represents the local physical

process. Actually, Delta downscaling is an interpolation method. CRU data set is also actually produced by interpolation method. The final downscaling result is the sum of "raw" CRU and interpolated anomaly. For my understanding, there is not any physical process involved. Conventionally, for a better local representation, local topography features should be considered such as aspect, slope and elevation.

2. WorldClim data set is used as the reference data in downscaling. However, how well does WorldClim represent the climatology over China? I did not find this information in the current version. The bias of WorldClim could be transferred into the final results. Therefore, it is not easy to understand why the downscaled data has a better performance. If the authors use other reference data, how will the downscaling result be?

3. In addition, the "Direct evaluation" is not adequate. The time series are different for CRU, WorldClim, and observation. How do the authors guarantee the consistency of time series, in particular the period 1901-1950? Meanwhile, the mean climatology is calculated from 1970-2000. Is this time period appropriate for representation? For precipitation, the observation has shown significant nonstationary features after 1980s in China under the global warming. Unfortunately, Delta downscaling method does not consider the nonstationary.

4. The authors evaluated the new data set using 745 observations over China. I think it is not enough, especially for the west of China, such as the high mountains areas and Tibet Plateau. Meanwhile, most observations begin after 1950, how about the pre-1950? Therefore, it is hard to conclude the data set is "sufficiently reliable".

5. How many observations have been used in CRU and WorldClim? These sites should be excluded since they destroy the independence of evaluation.

Specific comments:

1. Figure 1, the range of DEM from 0 to 8848 is wrong. The Turpan Basin is for sure

below the mean sea level. What is the spatial resolution of DEM in this figure?

2. Figure2, it is hard to follow this downscaling framework. There is no legend for all figures, which is the mandatory element. The color scales should be the same for a better comparison.

3. More interpretation should be given for the Delta downscaling method. For example, how to calculate the “ratio” for PRE anomaly? Is there a simple mathematical formula?

4. Once again, “Direct evaluation” is not sufficient. More details about the bias or errors should be supplemented.

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