ESSDD

Interactive
comment

Interactive comment on "A homogenized daily *in situ* PM$_{2.5}$ concentration dataset from national air quality monitoring network in China" *by* Kaixu Bai et al.

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This paper developed a homogenized daily in situ PM2.5 concentration dataset from national air quality monitoring network in China. The topic has important climate implications in evaluating air quality variations at an interannual scale. The paper is well organized and written. The findings of this study are worth of publication in the journal after minor revision as following:

Reply: Thank you for your insightful and constructive comments on our manuscript, which has been well incorporated into this revision. For clarity, our point-to-point responses are provided below while detailed revisions can be found in the revised

manuscript.

1. The reference station is very import for the adjustment. So the regional representativeness for the selected stations should be clarified.

Reply: Thanks for your insightful comment. Yes, the reference series is vital to the detection and adjustment of possible inhomogeneities in each data series. In this study, we have developed a complex data integration scheme to derive reference series rather than using one data series sampled at an adjacent station. The representativeness of each selected data series was also taken into account which was even used as the first screening criteria (R>0.8 and CV<0.2). More details related to the construction of reference series can be found in section 3.3.1 in the revised manuscript.

2. The scales of most maps are missing.

Reply: Thanks for pointing it out. We have added the scale bar in each map in the revised manuscript.

3. Why you only chose these three stations for analysis in figure 5?

Reply: Figure 5 illustrated three typical inhomogeneities that frequently emerged in PM2.5 time series, including abrupt changes during a short time period, a long-term chronic drift, and site relocation related drifts. So, the reason to choose these three stations is mainly due to the variation pattern of inhomogeneities detected in these PM2.5 time series is informative and thus can be used as a good illustration. We have clarified this in the revised manuscript to ease the readership.

4. Suggest that regional trend in the Northwest and Northeast China should be added in table 1.

Reply: Per your suggestion, we have added the regional trend of PM2.5 concentration in these two regions in Table 1 in the revised manuscript.

5. What is your standard on the daily average from hourly data? Similar with China

National Environmental Monitoring Center?

Reply: Actually, there is no data gap in our derived PM2.5 dataset since we had filled the missing values in raw PM2.5 time series using the gap filling method that we developed recently. In other words, PM2.5 daily averages were calculated based on 24-h observations rather than only using available observations within each 24-h. Such a treatment significantly reduced the bias level in PM2.5 daily averages given no missing values. More details related to the gap filling method can be found in section 3.2. Missing value only presented for days with less than four observations during each 24-h of the day.

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