

“Seasonal effects in the application of the MOMA remote calibration tool to outdoor PM_{2.5} air sensors”

General Comments

The manuscript presents research work using a remote calibration method (Moment Matching, MOMA) for a network of PurpleAir PM_{2.5} measurements made in Phoenix, Arizona USA between July 2019 and April 2021. While the authors showed that the MOMA approach compares well with compared the performance of the MOMA approach with US EPA correction methodology in improving the accuracy of the PM_{2.5} data across the PurpleAir network, the presented evidence that MOMA performed better in estimating daily exceedance of smoke levels compared to the EPA correction when both methodologies were compared to exceedances derived from reference data.

Finally, the authors further showed that they could identify different PM_{2.5} categories corresponding to dust, smoke and urban aerosol by using information from the MOMA gains estimated from 3-day rolling average, the PM categories were assessed using reference PM speciated measurements.

Specific comments

The authors have used specific MOMA gain threshold for the PM source category identification (MOMA gain < 0.6 \equiv smoke, MOMA gain > 2.5 \equiv dust and 0.6 < MOMA gain < 2.5 \equiv urban) based on the network averaged MOMA gains derived for the PurpleAir. It would be good to add some uncertainty to criteria. I would suggest the authors not only show the average daily MOMA gains across the network (Figure 3) but also include the standard deviation of the daily MOMA gains across the network as a measure of confidence in the derived daily MOMA gains. This is particularly important as the authors have indicated in Figure 2 that there might be sites that trigger frequent MOMA calibrations like Dysart and how does this affect the statistics (mean MOMA gain) presented in Figure 3.

Technical corrections

P.2, line 41: PM_{2.5} size range is not defined as was done for PM₁ and PM₁₀.

P. 4, line 96: add that 70% is actually ‘70% hourly percentage difference’.

P. 4, line 11: authors need to specify that the number of JLG Supersites is two.

P. 7, line 178: Author needs to include the period over which the “Mean uncorrected PM_{2.5} concentration...” was estimated over. Was it for the entire duration of the deployment?

P.9 line 201, Looking at the interpretation of Figure 3 and the MOMA gain thresholds, I would say the short periods with MOMA gains > 2.5 are mainly June and August.

P.9 line 215, “change the PM_{2.5}/PM₁₀ for each PM_{2.5} source category” to “the reference PM_{2.5}/PM₁₀ for each PM_{2.5} source category identified by MOMA”

P.10 line 224, change “source categories, and b)...” to “MOMA source categories, and b)...”

P.10 line 224, change "... b) normalized species concentrations measured for....." to "... b) normalized species concentrations measured at two Supersites for ..."

P.12 line 260, change "Nr. " to "Number"

P.14 line 303-305, A.D. is not listed in the author list, remove? Also, C.C is missing from this list.

P.14 line 312-314, Keep the abbreviation consistent, G.S.H should read G.H. (see lines 303-305). D.E.W. is not an author in this manuscript, delete or include if missing.