Review for Development and Application of a United States wide correction for PM2.5 data collected with the PurpleAir sensor

The paper Development and Application of a United States wide correction for PM2.5 data collected with the PurpleAir sensor by Barkjohn et al. is an evaluation of the PA units using reference sensors for PM2.5 values. Overall, the paper is well written and clear, I have some concerns and comments for things that hopefully you will be able to address and clarify

General comments

My biggest concern is about the fact you used the T and RH from the PA itself to perform your analysis. Even the company itself does not recommend using these values for ambient conditions for the same reason you mention in your paper. Also, you cite Holder et al. 2020 but even they state that "the PA temperature and RH measurement are interpreted as an internal rather than ambient measurement". You also enhance this comment in line 375.

Information on the location of co-located units (lat/long) will help the community to understand which purple air sensor you used (pubic), also if you could provide their name that will be important, at least for the public one.

Why 50 meters for distance for collocated units, 1 km is not good for that, other works used a distance larger than 50 m for collocated units. I am wondering how many more collocated units you could have gotten if you had a larger distance between units.

In table 1 you used 50 PA units but in Fig 1 you show more than 50, it is confusing. Maybe have in table 1 the full number of units

Why did you remove data from a station like Iowa, why not using as much data as you have as you could have a full range of T ad RH conditions?

PA company record on using the cf_atm so why also testing the other type?

In Section 3.5 you mention that the use of T for correction should be used on a local basis, but don't you think this is an important factor. In your work, you covered locations with wide T

conditions from cold Alaska to warm Florida is it possible that only changes in RH can represent the way to correct the PA data across the US? Also, from Table S2, it seems most of your RH were <100, only 3 PA units reach RH of 100 is it possible the lack of high RH harm your analysis.

Would be nice to see the distribution of RH and T from all dataset (not just for Iowa)

Comments of figures and tables

Many of your figures are pixelated

Table 1 - I assume PA data on table 1 is uncorrected. What do you mean by the wide PurpleAir correction equation?

Fig 1 - The quality of the fig itself is not great it is very pixelated, also R2 values on each plot would have helped to see the comparison between A and B. you should more h=than 50

Fig 7 - Does the data represent the entire data set or one location?

Specific comments

Line 56-60: it seems you have too many references can you reduce the amount or at least separate them into multiple sentences

Line 85: you state that the data was until 2018 but some of your data was for 2019

Lines 110-114: the entire section is unclear, I do not understand what you mean, can you rewrite this part to make it clearer

 Line 235: what do you mean - *one ran multiple sensors in series*