Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
https://doi.org/10.5194/amt-2022-58-RC2, 2022

Comment on amt-2022-58

Anonymous Referee #2

Referee comment on "Air pollution measurement errors: is your data fit for purpose?" by Sebastian Diez et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-58-RC2, 2022

This is a well written paper on air sensor uncertainty. Uncertainty in air sensors is a very important topic in the field. While the authors lay out a number of issues with current uncertainty methods their method seems to make only minor improvements on current methods. This paper is still helpful as it provides another way to visualize similar information in different ways which may speak more clearly to some people. I have a number of specific comments below that I hope the authors will address to improve the strength of the paper.

Comments:

Yes, these plots you are proposing may be more helpful than just R2, MAE, and RMSE but typically I'm seeing those metrics reported along with slope and intercept (and often a scatter plot). This seems like a false comparison you talk about repeatedly in the paper. Slope, intercept, and R2 seem to provide much of the same info as BA or REU plots just in a different form. The BA plot seems to be just a less intuitive form of a scatterplot but maybe I'm missing how to interpret it in a helpful way? I see that there is value though in visualizing things in different ways since people see things differently.

In the end the plots you've made reveal very little about temperature, RH, and other pollutant interferent biases. Is there any way to modify the plots you are proposing to make them more helpful in addressing the issues you've brought up about interferents and error?

Are all the DQOs for REU just percentages? There is no absolute target? (e.g. 25% or 5 ppb)

Did you consider how your estimation of uncertainty compares to the method in this recent paper? https://amt.copernicus.org/articles/14/7369/2021/

You may want to add a reference to the EPA performance targets. They recommend slope, intercept, R2, RMSE, along with precision metrics, and making plots looking at error vs. T/RH/Dewpoint. Base testing is colocations with enhanced lab testing. (https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/7348604, https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/7348603)

Can you include equations for RMSE, MAE, and REU.

Figures 1 and 2: These are really nice illustrations!

Figure 1. can you define the acronyms (e.g. REU) that you haven't defined in the text yet.

Line 353 do you need "roadside side" or just "roadside"

Line 367: "at during" only need "during"