

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-21

Anonymous Referee #1

Referee comment on "Sizing response of the Ultra-High Sensitivity Aerosol Spectrometer (UHSAS) and Laser Aerosol Spectrometer (LAS) to changes in submicron aerosol composition and refractive index" by Richard H. Moore et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-21-RC1>, 2021

Review of "Sizing response of the Ultra-High Sensitivity Aerosol Size Spectrometer (UHSAS) and Laser Aerosol Spectrometer (LAS) to changes in submicron aerosol composition and refractive index" by R.H. Moore, et al.

This manuscript provides experimental results and discussion regarding the sensitivity of size calibrations of two optical particle instruments to aerosol composition and refractive index. Calibration of optical particle counters to particle refractive index is extremely important and can result in significant uncertainties in sizing information if aerosol composition is not accounted for in the instrument calibration and response. This paper is very well organized, presented, and well written. The authors did a careful and detailed job of presenting laboratory experiments as well as examples from field experiments. Their results are important and provide useful context for uncertainties in aerosol size distributions for atmospherically relevant refractive indices. I have very few comments and most of them are minor. I recommend publication after addressing the comments below. Nice job!

Line 145: First figure mentioned should be in order (figure 1).

Line 169: Include what Figure 1a and 1b are (Figure 1a (LAS) and Figure 1b (UHSAS)).

Line 174: Same comment as above.

Line 6: What is considered "dry" for these experiments? Was RH measured?

Line 330: How well is RH known, and is it possible that particle bound water is affecting the results?

Line 377: Include location of the fire (state).

Tables:

For tables 2-4, include/define RI "refractive index (RI)" in the caption.

Figures:

Figures 1 and 2: Please include wavelengths for the LAS and UHSAS in the captions.

Figure 5: In the caption, please include the RH of the measurements (RH<?).

Figure 8: Please include location of fire (state, US).

Figure 9: Please include location of fire (state, US). Were these data obtained under dry (RH<?) or ambient conditions (please state in caption).

Figures 10-12: Include location of fires and whether the measurements are dry (RH<?) or ambient.

References:

Check formatting, some journals are spelled out in some instances and not in others (e.g., Atmos. Phys. Chem., or Atmospheric Chemistry and Physics).