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Atmospheric Measurement Techniques Discussions

Interactive comment on "Technical Note: Can ozone be used to calibrate aerosol photoacoustic spectrometers?" *by* Donald A. Fischer and Geoffrey D. Smith

Anonymous Referee #2

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Review of "Technical Note: Can ozone be used to calibrate aerosol photoacoustic spectrometers?" by Fischer and Smith

Overall this paper is an important contribution to the literature on the use of ozone for calibration of photoacoustic instruments. A revision may include discussion of the following points.

1. Around line 25 on page 2, the important paragraph on previous work is presented. It would be good to go into the difference in the bath gas discussion between the Davies and the Bluvshtein work here, since this plays such a strong role in the results of the current paper.

2. The authors present amplitude measurements for photoacoustic signals from gases and aerosol, but no phase measurements. The phase information may help determine if time lags for physical/chemical processes are important.

3. Some of the historical literature on the subject may be useful, e.g., Harshbarger, W. R., and Robin, M. B. 1973. The opto-acoustic effect: Revival of an old technique for molecular spectroscopy. Acc. Chem. Res. 6:329–334. doi:10.1021/ar50070a001 for example.

4. Between lines 15 and 20 on page 4, use of copper tubing is mentioned for delivering NO2. We find that copper tubing can remove NO2 until passivated, though that's probably not important for the short length of tubing and the experiment here.

5. Around line 5 on page 5, " . . . particles were size selected at 500, 550, 600, and 650 nm using an electrostatic classifier .. " . Just to be sure, it would be good to specify if this is diameter or radius. Particle loss issues and thermal relaxation rate of aerosol might be important to study, and that distinction would be important.

6. In Fig. 4b an 'error bar' would be useful for the NO2 measurement.

7. Any speculations or discussion about why the NO2 calibration is higher than the nigrosine calibration?

8. The need to check calibration with various combinations of gases highlights the need for accurately measuring the resonance frequency and quality factor for quantitative measurements.

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