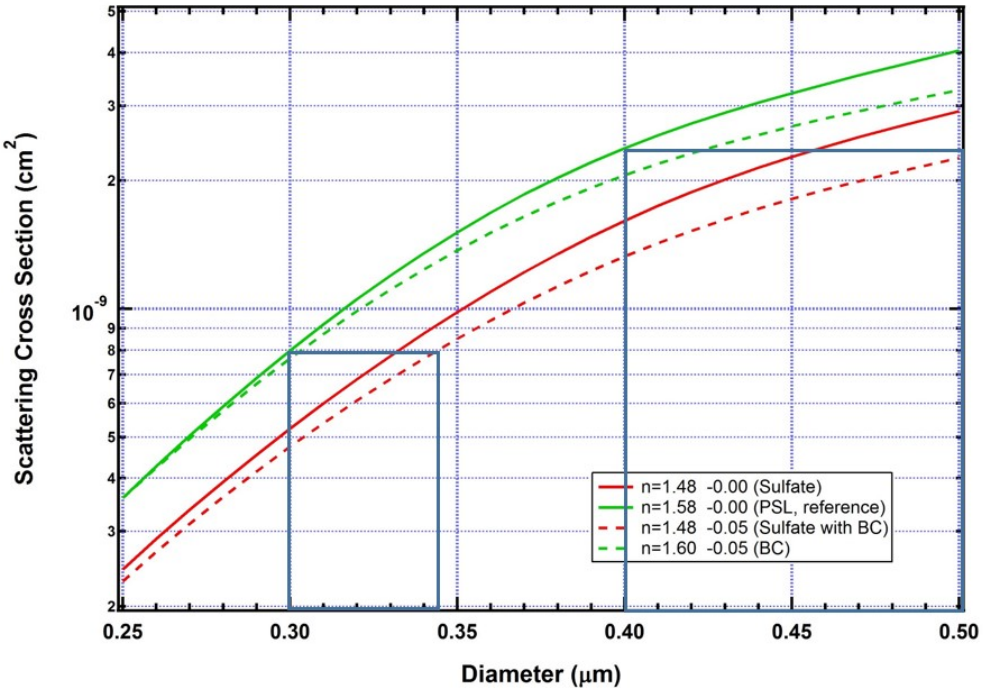
This short note describes the calibration of the PCASP sizing and flow rate. Whereas I am always supportive of ways to improve the measurement with particle probes, and I find nothing that is technically incorrect with the approach taken in this paper, I think that the adjustments in the size calibration curve are, unfortunately, irrelevant. The evaluation avoids the more relevant issue and that is that we don't measure PSLs in the atmosphere so that the very small shifts in the sizing calibration curve have not made any real improvement in the accuracy of the sizing.

The reason that trying to make minute adjustments (0.01 µm as reported in the paper) to fit the PSL data does little to improve the accuracy is shown in the figure below that shows the scattering cross sections over a small range of the PCASP size range for PSLs and three types of frequently found particles in the atmosphere: sulfate, sulfate mixed with a little light absorbing carbon (LAC), and organic carbon mixed with light absorbing carbon (BC). Drawn on this figure are two boxes that illustrate the problem.

From Table two in the manuscript,, we see that the maximum PSL size of the mid gain range is 0.3 µm and the upper size of the first channel of the low gain is 0.4. Looking at the figure we see that for a sulfate particle with a little LAC, the size of the top channel of the mid gain is actually 0.34 µm and for the 1$^{st}$ channel of the low gain it will be 0.5 µm. These are uncertainties far larger than the shifts being made to the calibration curve. In addition, given that we try to match gains in the PCASP based on the PSLs, that relationship will no longer hold for particles with other refractive indices. For example, in the case of sulfate with LAC, there will be particles larger than 0.35 µm but less than 0.5 µm that will likely get lost if they fail to exceed the minimum ADC threshold of the low gain. This will also create the gap between stages that in the paper is only attributed to baseline offset.



Other small points are that the proper reference should be used for Mie scattering theory (Mie, 1908) and a reference to an important early paper on the PCASP that is missing is to Pinnick et al. (2000) who did a very careful analysis of the calibration curves of the ASASP that has the same collection angles as the PCASP. Had the authors been aware of this paper, they probably would have arrived at the same conclusion that I point out in this review.

Mie, G.: Beiträge zur Optik trüber Medien, speziell kolloidaler Metallösungen. Annalen der Physik, Vierte Folge, Band 25, No. 3, pp. 377–445, 1908.

Pinnick, Ronald G. , Pendleton, J. D. and Videen, Gorden (2000) 'Response Characteristics of the Particle Measuring Systems Active Scattering Aerosol Spectrometer Probes', Aerosol Science and Technology, 33: 4, 334 — 352. The collection optics are identical.