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Atmospheric Measurement Techniques Discussions

Interactive comment on "On the parametrization of optical particle counter response including instrument-induced broadening of size spectra and a self-consistent evaluation of calibration measurements" *by* Adrian Walser et al.

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From the perspective of an engineer and instrument developer, the authors have developed a very convincing processing methodology that seems to be able to account for the broadening of ambient size distributions as a result of uncertainties intrinsic to the basic operating principles of single particle light scattering instruments. The methodology that is presented offers an improvement over other methodologies that have also recognized the limitations of these type of instruments but stopped short of introducing a more complete list as in done in the current study. I am a firm believer that if we

know how to improve the accuracy and reliability of a measurement, then we should do it, regardless of how small of an incremental improvement it might be. That is the engineering purist in me that supports that view.

From the perspective of a scientist, I ask these questions of the authors,

1) The proposed methodology would seem to require quite a bit of effort and I have a very large set of measurements of atmospheric aerosols with a very wide variety of composition, shapes and sizes. How much computational time will it take for me to analyze 20,000 spectra of BC, BrC, OC, dust, bioaerosols, sea salt and inorganic compounds?

2) The focus of my research is to model the impact of these different aerosol populations on climate. After I have corrected my 20,000 spectra, I wish to put them into my climate model. To do this I need to compute extinction coefficients, single scattering albedos and asymmetry factors, all size, composition and shape dependent. Does your methodology tell me what indices of refraction and shapes were used to come up with the inverted size distribution? If not, will the uncertainty in my derived optical properties be any smaller using the corrected size distributions than if I had just used the measurements as they are and made estimates of the particle optical properties? If the answer is yes, then provide me with a quantitative measure of how much improvement.

In the introduction, the authors state: "The size distribution of aerosol particles is a key property to understanding the impact of aerosols on human health and Earth's climate.". This is the first and last time the environmental importance of aerosols is mentioned. In order to bring closure to this study and have scientific relevance, this study needs to convince the reader and potential user of the technique that there is a real need to apply this technique before using the measurements in scientific research. I understand that AMT is specifically focused on measurement techniques; however, in the journal section on Aims and Scope, this sentence makes clear that "Papers submitted to AMT must contain atmospheric measurements, laboratory measurements

relevant for atmospheric science. . ..". It is the joint responsibility of the authors, the editor and the reviewers to make sure that published papers meet these aims and scope. Without the additional answers to the questions I have posed, I am not yet convinced of this study's scientific relevance.

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