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Atmospheric Measurement Techniques Discussions

Interactive comment on "Intercomparison Study of the CAPS PM_{ex} (Cavity Attenuated Phase Shift Particle Light Extinction Monitor) with the combination of an Integrating Nephelometer and a Particle Soot Absorption Photometer" *by* A. Petzold et al.

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This manuscript extends the work that has already been published describing the new extinction measurement using a new approach of attenuation in a cavity. The paper is well-written, concise and a useful addition for those who wish to know how the instrument measures up against the older, conventional instruments. The approach of using

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well-controlled laboratory experiments as a starting point is the best way to proceed with the follow-on of some ambient measurements.

There are no major obstacles for proceeding to AMT except, of course, the one that John Ogren has already raised, i.e. including in the tables and figures an indication of the expected uncertainties in both the Neph+PSAP results and those from the new instrument. The correlation plots are difficult to evaluate without knowing a priori how much scatter would be expected.

Likewise, although the PSAP has a much slower response than the new instrument or the Neph, it would be useful to know what the variation is in the new instrument calculated from the higher sample rate data, since it is a much faster response instrument than the PSAP, i.e. in figures like Fig. 7a, put the sigma bars on the averages from the new instrument.

One of the advantages of the new instrument is its fast response. Has that already been reported?

Other suggestions and questions:

1) It would be useful to add a curve on Fig. 6 that is the ratio reported in Table 3, i.e. the ratio of the new instrument to Neph+PSAP measurements.

2) Why was the precision of the new instrument estimated only from ambient measurements? How did the two new instruments perform under the laboratory conditions.

3) The comparison of average results from the new instrument is quite interesting and show, on average, very good comparison with the neph+psap. That said, in Table 3, the ratio is 1.13 and 1.14, respectively for AS4 and AS5. I believe that not only is it important to point out the good agreements but to explain those cases where the agreement is less satisfactory. Is the overestimation by the new instrument a bias in this instrument or a failure in the other instruments due to uncorrected biases?

In Fig. 7b, where are those outlier points coming from?

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4) When comparing Figs. 11 and 12, there seems to be a lot more variation in the ratio seen in Fig. 12 than in Fig. 11, i.e. the line is almost 1:1 in Fig. 11, i.e. a ratio of new instrument to Neph+PSAP of 1 but clearly this ratio varies between 0.8 and 1.2 in Fig. 12. How can these two figures be reconciled? These figures also need on them some indication of the expected uncertainties.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 7587, 2012.