Interactive comment on "Aerosol microphysical retrievals from Precision Filter Radiometer direct solar radiation measurements and comparison with AERONET" *by* S. Kazadzis et al.

Anonymous Referee #2

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The paper contains original material and is worthwhile to be published in AMT.

Minor changes are required.

The so-called linear estimation (LE) procedure is applied to pure spectral particle extinction data, no sky radiance information (phase function) is available in contrast to the AERONET inversion method. So, AERONET inversion retrieval products clearly represent the quality standard. That should be mentioned in the paper.

Page 14, line 7: Why does AERONET inversion overestimates the volume concentration V-c? I believe the other methods underestimate V-c, and AERONET is correct. But

what is true? At least the classical AERONET approach is more reliable.

Line 13: aerosol load is greater than 0.4? What does that mean. . . . you mean AOT?

I was expecting a discussion on the reasons of the discrepancies (in this section 3.2.3), but that is not given!

Section 3.3. uncertainties in the retrievals:

I expected an explanation why the uncertainties in the LE retrieval products are so systematic (a clear pronounced bias is visble). But an explanation is missing. Please provide! Clarify why there is this bias, what causes this.

A table with all the instrument parameters, wavelengths, capabilities. . . would be nice as an introductory table. . ..

Fig.4, please explain in more detail what does air mass of 1.5, 3, or 5 mean, many readers may not know what a sun photometer exactly measures.

Fig 6.: AERONET inversion is the reference, and the LE solution partly considerably deviate from the AERONET inversion results (30% or so..). Please provide the reasons for the visible systematic deviations of the blue and open circles from the red ones (the best solutions).

Fig 7: good figure, may be draw (horizontal) zero lines. . .

Fig 8: AERONET inversion results (the quality standard) are a factor of 2 higher than the LE products. Why are the LE results so poor? This systematic bias needs to be explained! The explanations for the uncertainties and biases must be one of the goals of such a paper.

Figure 9: again good figure, may be draw a zero line in the right plot.

Fig 11, a picture of instrumentation and Athens in the background is attractive, but a Table with instrumental information is also useful. . .

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