Atmos. Meas. Tech. Discuss., 7, C1661–C1662, 2014
www.atmos-meas-tech-discuss.net/7/C1661/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Simultaneous retrieval of effective refractive index and density from size distribution and light scattering data: weakly absorbing aerosol" *by* E. Kassianov et al.

Anonymous Referee #2

Received and published: 11 July 2014

General

The article describes a method for retrieving effective density and refractive index from simultaneous size distribution and scattering methods. The method is interesting and I certainly want to apply it to my own data as well if I understand it properly. I have some probems in understanding the details so I will ask for some more explanations.

I agree with everything reviewer 1 wrote and add some more points to be discussed.

Detailed comments

P4953, L5-6. AOD and g are definitely important but I would not forget SSA when you

evaluate the importance of aerosol optical parameters.

P4954, L20 why not talk about submicron and supermicron particles?

P4955, L5- Give a more detailed description of how the modeled scattering and backscatter fractions were calculated. Which code was used? What was the resolution of the angular integration, etc?

P4955 L12 it is written "the near orthogonal isolines". I don't understand this. Orthogonality is the relation of two lines at right angles (90°) to one another. Both in fig 1b &1c I see nearly parallel isolines.

P4954 - 4955 In the whole method description, give formulas where the relationship between scattering and density and backscatter fraction and density are explicitly given. It would make it easier to understand the method.

P4956, L12-13 In this sensitivity study, is the size distribution time series a real measured one from some selected day? Or all simulated, both SMPS and APS?

P4957, L2. Here you just say that there are diurnal cycles. What has been observed? Explain observations and the reasoning for using the sinusoidal variation of both n and density in the simulation.

P4961, L17. "For these events, the relative contribution of large (1 μm<Dp <10 μm) particles to the light scattering can be substantial." The word "can" is strange here – the contribution of large particles IS substantial if f < 0.5.

Fig 2 e&f. I don't understand. If the "observation" is purely modeled from the size distribution, what is the difference between the "original" and "retrieved" characteristics? Shouldn't that be zero?

Fig 3. Why were scattering coefficients and backscatter fractions not calculated at the same density?

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4949, 2014.