

Interactive comment on “Retrieval of height-temporal distributions of particle parameters from multiwavelength lidar measurements using linear estimation technique and comparison results with AERONET” by I. Veselovskii et al.

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Received and published: 5 September 2013

We would like to thank the reviewer for an extended and detailed comments which, we hope, helped us to improve the manuscript.

1) Regarding the results shown in Fig 1, it is unclear what simulated measurements were used (3+2) (3+1?). Since 3+1 measurements are mainly used later in the paper

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3+1 (at least) simulations should be shown. I would further suggest that 3+2 measurements be also shown.

Simulation is shown for 3+2 retrieval. The idea of this figure is just to illustrate the approach. In the revised manuscript new figures are added showing retrieval of particle parameters from synthetic and experimental data using both regularization and LE approaches from 3+2 and 3+1 sets.

2) The reference to (cor) de Graaf et al (2010) on page 3065 should likely be replaced with the more recent and extensive de Graaf et al. (2013) Applied Optics paper.

Done

3) How many principle components were used to generate the coefficients ultimately applied to the real data? What was the associated magnitude of the expected error magnification factors?

We used all 4 components. Our attempts to decrease the number of components didn't lead to improvement. We didn't calculate error magnification factor and uncertainties were estimated from simulations.

4) I understand that the extinction was not derived directly from the uv Raman channel and that employing a Klett inversion using a S value estimated using the Raman channel will yield a higher resolution and more precise (but less accurate) extinction estimate. However, you should estimate the error in S and propagate this uncertainty into your extinction estimates and ultimate results. As far as I can determine, this has not been done and a fixed value for S of 70 ± 0.5 has been used.

Klett method was used just to illustrate the structure of aerosol layer with high height resolution. In inversion we used only Raman derived extinction. In the revised manuscript we added corresponding comment to make it clear

5) Line 16 “..laser wavelengths”

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Done

6) Change all instances of “validation” to “evaluation”. The favourable comparison of the lidar results with AeroNET results is important but given that they are both optical remote sensing methods employing not too dissimilar wavelengths I feel that “validation” is too strong a term.

Accepted and changed

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 3059, 2013.