**Atmospheric
Measurement
Techniques
Discussions**

Interactive
Comment

Interactive comment on "Linear estimation of particle bulk parameters from multi-wavelength lidar measurements" *by* I. Veselovskii et al.

Anonymous Referee #2

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The paper provides a modified algorithm for the linear estimation of aerosol bulk properties (particle volume, effective radius, and complex refractive index) from multi-wavelength lidar data. A disadvantage of the method is its application only in spherical scatterers (Mie theory).

General comments: The authors should elaborate much more clearly, in which part their algorithm approach differs from the work cited and if really this work is a "new" one. If it is not the case, they could probably use the term "modified approach" or "optimized approach".

Major comments: Page 7509: lines 20-22. The authors assume that the errors are the same for all channels and refractive index is spectrally independent inside the spectral

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range considered (355-1064 nm). It is well know that this condition does not apply in real particles, which do present a spectral dependence. Therefore the authors should elaborate more this section, or rephrase it, by saying that "our technique is limited to spectrally independent refractive index values".

Page 7515: line 21. How the particle depolarization ratio is calibrated in the Turkish system? The authors should be more precise in this issue, since many erroneous values often occur.

Page 7516: What is the uncertainty in the retrieved values of aerosol extinction and backscatter? Error bars should be added. In addition, what is the Signal to Noise Ratio for the lidar signal at these heights? The authors should comment on that.

Technical comments: Page 7500: line 15, add "respectively" before "the uncertainties". Page 7504: line 15, replace "can't" by "cannot". Page 7509: line 19, replace "I" (bold), by "I" (not bold). Page 7510: line 1, replace "0.075 um, 10 um", by "0.075 um - 10 um" Page 7510: line 2, replace "1.35 um, 1.65 um", by "1.35 um - 1.65 um" and "0.00 um, 0.03 um", by "0.00 um - 0.03 um". Also omit "previously". Page 7511: line 30, replace "didn't" by "did not". Page 7512: line 09, replace "r0=0.2", by "r0=0.2 um". Page 7513: line 20, add "%" after "25". Page 7514: line 11, omit "The top of the boundary layer...2250 m". It does not give any valuable information here. in lines 21-22, please rephrase "The real part...is less than" to a more clear phrase. Page 7515: line 24, replace "below altitudes" by "for altitudes below". Page 7515: line 25, replace "didn't" by "did not". Page 7516: line 1, add "and the optical properties of ash particles" after "for this day". Page 7516: line 7, add umlaut in "o" (of Angstrom", and A with o at the top o A). Page 7516: line 9, replace "are" with "were". Page 7516: line 21 and page 7517 line 25, replace "doesn't" by "does not". Page 7526: Fig. 5, please add error bars in profiles. Page 7527 and 7528, please add at the end of figure caption: "Contours show areas of enhanced aerosols volume density".

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 7499, 2011.