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Atmospheric Measurement Techniques Discussions

Interactive comment on "Microphysical particle properties derived from inversion algorithms developed in the framework of EARLINET" *by* D. Müller et al.

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Page 12825, line 8: "comparably high quality" Provide numbers in the abstract

We removed that part of the sentence.

(the same for real and imaginary parts at line 10)

We inserted numbers.

Page 12826, lines 20-21: "Both methods. . . algorithms" What is a "non-true" inversion algorithm? Rephrase, or omit this phrase.

The explanation is given in the sentences on lines 21 – 27 (page 12826) and lines 1-2 (page 12827).

Page 12826, lines 24-25: “That means. . . computations” I think you mean “That means that we carry out forward computations”?

Yes

Page 12827, lines 5-8: “The disadvantage is. . . results” Is this because you do not use other constrains too (not only the shape of the size distribution constrain)? Please clarify.

We rephrased and now mention that one disadvantage is the way how measurement errors influence the performance of the inversion algorithm.

Page 12828, lines 12-24: “The retrieved. . . SSA” What are the accuracy requirements for the imaginary part of the RI and the SSA for climate change studies? See for example Mischenko et al. (2004) and provide the numbers here, so your retrieval accuracy is put into context: Mishchenko, M.I., B. Cairns, J.E. Hansen, L.D. Travis, R. Burg, Y.J Kaufman, J.V. Martins and E.P. Shettle (2004), Monitoring of aerosol forcing of climate from space: Analysis of measurement requirements, J. Quant. Spectrosc. Radiat. Transfer, 88, 149-161.

That paper presents numbers on SSA (Table 5 in Mishchenko et al). We mention these numbers in our paper.

Page 12829, lines 6-7: “We carried out. . . mode” The light scattering mode used in the AERONET inversion algorithm is not “the AERONET scattering model”, it is the Tmatrix code for the non-spherical (spheroid) particles and the Mie code for the spherical particles. Please rephrase.

We rephrased this paragraph.

Page 12829, lines 21-25: “The inversion. . . parameters” Provide relevant references

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We added three appropriate references and cited them: 1) Doicu, A., Trautmann, T., and Schreier, F.: Numerical {Regularization} for {Atmospheric} {Inverse} {Problems}, Springer Berlin Heidelberg, 2010. 2) Rodgers, C.∼D.: Inverse {Methods} for {Atmospheric} {Sounding}: {Theory} and {Practice}, World Scientific, 2000. 3) Vogel, C.∼R.: Computational {Methods} for {Inverse} {Problems}, {SIAM} Philadelphia, 2002.

Page 12831, lines 8-11: "Moreover... (Bockman et al., 2012)" Provide more info about the performance accuracy, especially for the coarse mode of the dust particles.

The coarse mode of the dust particles was not investigated. Therefore, we completed the sentence as follows:

Moreover, the two-dimensional spheroidal model was applied to a measurement scenario of Saharan dust observed over Barbados (13.16 N, 59.44 W) to retrieve the two-dimensional fine-mode PSD.

Page 12842, lines 26-28: "Those. . . Samaras et al. (2015)" Include this in the abstract.

We did as follows in the abstract:

We considered particle radii as large as 7–10∼μm in our simulations where the Potsdam algorithm is limited to the lower value.

And in the text we added:

Those investigations show that the Potsdam algorithm should not be used for radii larger than 5 – 7 μm depending on the refractive index (rule of thumb), see \citet{osterloh_2013}, \cite{samaras_2015}.

Page 12849, lines 7-9: "In this study. . . refractive index." Include this in the abstract.

We inserted this sentence into the abstract.

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