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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol single-scattering albedo and asymmetry parameter from MFRSR observations during the ARM Aerosol IOP 2003" *by* E. I. Kassianov et al.

E. I. Kassianov et al.

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The authors would like to thank the referees for the constructive criticism. Their comments and suggestions are well taken. Below we provide our replies.

"The paper does not provide all the information to understand the methodology. . . the paper requires a deep review"
- Such information is added (please see below). Paper is deeply revised. In particular, Figure 1 is extended; four new tables, two new figures and related text are added, two new Appendixes are included.

"List of all the available instruments. . . may be helpful"
- We added Table 1.

"The aircraft collected data only for 15 days: specify the time interval"
- Done (page 10, line 8 from the top).

"Maybe a more complete description of the 8 cases, with time behaviour of aerosol optical depth and Angstrom exponent may be helpful"
- Agree. Figure 1 is extended and Figure 2 is added.

"Are the two nephelometers and the two PSAPs the same model"
- Yes. Please see Table 1.

"Where the two couples of instruments inter-calibrated prior and after the campaign?"
- We do not have such information.

"What are the uncertainties on w0 and g derived from these measurements?"
- Added. Page 11 (lines 1-5 from the bottom) and page 12 (line 1 from the top).

"The manuscript is completely missing statements on data retrieval methods and uncertainties in the derived tau"
". . . The comparison of coincident MFRSR, CIMEL and NIMFR derived tau at the ARM site would be essential. What are the biases among the three datasets?"
- Table 3 and Appendix A are added.

". . . The authors say that tau values obtained from the NIMFR are used. This is a key question. . . Why didn't they use the MFRSR optical depth?"
- Previously (when the first version of the paper was prepared), the MFRSR retrievals of tau had some calibration issues. Recently, these issues were resolved successfully (please see Table 3). In the revised version we use the MFRSR-derived values of tau. Appropriate changes are made in Figures 4-7.

"Figure 2. . . to maintain the consistency of the method they should present tau values from NIMFR"
- Done. Please see Appendix A and Table 4.

"Which complex refractive index is assumed? What are the lower and upper limits of

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the five parameters?"
- The requested information is added. Page 6 (lines 6-9 from the top).

"Please specify which wavelengths are used for the retrieval of the refractive index"
- Done. Page 7 (line 2 from the bottom).

"Please add some more information about the correction applied to the forward scattered radiation"
- Done. Page 8 (lines 1-7 from the top).

"I suggest to cite this reference in the introduction"
- Done. Page 3 (lines 3-4 from the bottom).

"I would change the title of section 2 from 'Approach' to 'Methodology'"
"I would like add in this section the first part of section 3 (optical properties)"
- New extended sections "Improved version of the MFRSR retrieval" and "Aerosol IOP and selected cases" replace previous section "Approach."

"I would like to have an idea of the uncertainties on w0 and g both from surface and aircraft measurements and from AERONET and MFRSR retrievals"
- Added. Page 9 (lines 1-7 from the bottom) and Page 10 (lines 1-3 from the top).

"Specify that the direct and diffuse irradiance are broadband"
- Done. Page 16 line 3 from the bottom.

"Add error bar on both measured and modeled irradiances"
- We specify uncertainties of these irradiances in the text. Page 17 (lines 2-3 from the top) and Appendix A.

"Change 'values' with 'quantities'"
- Done.

"I would say 'Since g is highly variable in space and time'"
- Changed.

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EGU

"Change ’describing’ with ’described.’"
- Changed.

"add ’is’ after ’that’"
- Added.

"a space is missing"
- Space is added.

"reference"
- Updated.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 13367, 2006.