

Interactive comment on “Desert dust satellite retrieval intercomparison” by E. Carboni et al.

Anonymous Referee #2

Received and published: 10 February 2012

This is a good, valuable, and important manuscript describing a massive comparison of satellite aerosol retrievals in the case of a major dust event. Given the importance of the aerosol forcing problem, it is essential to quantify the actual uncertainties in our knowledge of aerosols derived from satellite observations. This manuscript contributes substantially towards achieving this goal. It should be published after a relatively minor revision.

Specific comments

1. The title is a bit misleading since the authors compare spatially and temporally averaged retrieval results rather than pixel-level retrievals.
2. Abstract, line 4. Since pixel-level retrievals are not analyzed, it is problematic to “identify and understand the differences between current algorithms”.

C40

3. Abstract, line 6. “. . .hence HELP improve. . .”

4. Abstract, final sentence. This statement is not substantiated by the main text since the authors have not analyzed separately the effects of sampling and the effects of retrieval-algorithm differences.

5. Page 718, line 5. Mishchenko et al. (2007) is missing in the reference list.

6. Page 721, lines 20-22. The statement after the comma is not generally true. In the case of MODIS and MISR, fully collocated pixel-level comparisons are possible, in which case sampling, cloud-screening, and quality control data cut issues are completely avoided. This allowed the introduction of the concept of fully compatible MODIS and MISR pixels in

Liu, L., and M. I. Mishchenko, 2008: Toward unified satellite climatology of aerosol properties: direct comparisons of advanced level 2 aerosol products, *J. Quant. Spectrosc. Radiat. Transfer* 109, 2376-2385.

Direct comparisons of level-2 MODIS and MISR aerosol products have revealed differences comparable to those reported in this manuscript, with quality flags playing a minor role; see Mishchenko et al. (2010) (cited in the manuscript).

Furthermore, the left-hand upper panel in Fig. 3 in

Mishchenko, M. I., I. V. Geogdzhayev, L. Liu, A. A. Lacis, B. Cairns, and L. D. Travis, 2009: Toward unified satellite climatology of aerosol properties: What do fully compatible MODIS and MISR aerosol pixels tell us? *J. Quant. Spectrosc. Radiat. Transfer* 110, 402-408. Correction: *J. Quant. Spectrosc. Radiat. Transfer* 110, 1962 (2009)

reveals large differences between long-term spatial averages of AOT for fully compatible MODIS and MISR pixels, including those over areas affected by dust. These averages are large despite the fact that the corresponding Level-2 MODIS and MISR pixels were fully collocated in time and space.

C41

Therefore, it is incorrect to attribute the observed differences in the spatial and temporal averages to sampling issues or quality flags only.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 691, 2012.