Atmos. Chem. Phys. Discuss., 11, C13582–C13583, 2011
www.atmos-chem-phys-discuss.net/11/C13582/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Optical-microphysical properties of Saharan dust aerosols and composition relationship using a multi-wavelength Raman lidar, in situ sensors and modelling: a case study analysis" *by* A. Papayannis et al.

M. Mishchenko

mmishchenko@giss.nasa.gov

Received and published: 22 December 2011

Referee Report #2

I largely agree with the 1st Reviewer and believe that this nice paper deserves publication in ACP. I have only two minor comments to add.

1. While the operational MODIS algorithm appears to include nonspherical particle models, there is no way to unequivocally identify dust aerosols from a single-view radiance observation. On the other hand, the effect of nonsphericity on the retrieved AOT

can be quite large and is strongly scattering-angle dependent, see, e.g.,

Mishchenko, M. I., I. V. Geogdzhayev, L. Liu, J. A. Ogren, A. A. Lacis, W. B. Rossow, J. W. Hovenier, H. Volten, and O. Munoz, 2003: Aerosol retrievals from AVHRR radiances: effects of particle nonsphericity and absorption and an updated long-term global climatology of aerosol properties, J. Quant. Spectrosc. Radiat. Transfer 79-80, 953-972.

Therefore, it would be interesting to know what the scattering angles were for the relevant MODIS observations and whether the aerosol models identified by the MODIS retrieval algorithm were consistent with the other types of retrieval.

2. Page 25491, line 13. The depolarization ratio (either linear or circular) is a definitive indicator of particle non-sphericity, but not necessarily a measure of non-sphericity:

Mishchenko, M. I., and J. W. Hovenier, 1995: Depolarization of light backscattered by randomly oriented nonspherical particles, Opt. Lett. 20, 1356-1358.

This means that weakly aspherical particles can have depolarization ratios exceeding those of strongly aspherical particles.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 25473, 2011.