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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of CALIPSO aerosol optical depth retrievals to AERONET measurements, and a climatology for the lidar ratio of dust" *by* G. L. Schuster et al.

Anonymous Referee #1

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This paper is a well written, in-depth investigation of $\sim$ 500 nm aerosol optical depth (AOD) nearly coincident retrievals by the AERONET network and the CALIPSO satellite lidar. While the authors find fairly good agreement between the two types of retrievals, they do find statistically significant differences for two types of aerosols, dust and marine. They provide compelling reasons for these differences (i.e., AERONET marine measurement locations on land near water and can include non-pure marine aerosols, varying dust source regions and consequent differences in lidar ratios, and the fact that the CALIPSO retrieval only has a limited choice of lidar ratios while the AERONET retrieval is a complete inversion. Besides reporting significant findings, this paper provides motivation for implementing more advanced CALIPSO retrieval approaches

that could possibly more finely discriminate sub-type differences in dust and marine aerosols. Retrieval techniques that made more complete use of dual-wavelength lidar data have, for certain cases, yielded goodd agreement between AERONET and lidar retrievals (e.g., McPherson et al., 2010 JGR; Repasky et al., 2011 JTECH).

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 11641, 2012.