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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol optical properties at Lampedusa (Central Mediterranean) – 2.of single scattering albedo at two wavelengths for different aerosol types" *by* D. Meloni et al.

Anonymous Referee #2

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This is a very nice paper, with good references to the literature and appropriate sensitivity studies. I have only a few comments.

1) 4974.(8-13) These two sentences are incorrect and should be eliminated. For decades, aerosol absorption and scattering have been measured independently of any size or composition measurements by using aetholometry and nephelometry. Currently, alternative methods (i.e. cavity ringdown, photoacoustic) are also being developed to more accurately determine aerosol absorption in the atmosphere. The main deficiency of these measurements is that they are in situ, thus being expensive to op-

erate anywhere except at land surfaces, where the aerosol may not be representative of the full depth of the troposphere. An advantage of the method used in this paper is that it is a column measurement.

2) 4974.8: Somewhere before the literature review, the paper should make a reference to Herman (1975) as the seminal paper on inferring aerosol absorptive properties from diffuse and direct irradiance measurements.

3) It would be nice to see in the sensitivity study what the importance of the solar aureole is to the measurement of DDR. Much of the forward-scattered radiation by dust will be blocked by the MFRSR band. Even though some of this radiation is estimated from the nearby diffuse field, the estimate will necessarily be low, since the peak of the aureole will be missed. Since desert dust has such a high and spectrally varying asymmetry parameter, it would be useful to estimate the impact on DDR using a simple single-scattering technique. Note that the Henyey-Greenstein phase function is not adequate for this task – explicit Mie calcualtions are needed. For low water clouds (which are much larger than dust particles) about 45% of the single-scattering occurs within 5 degrees of the solar disc. What is the angular width of the MFRSR band? What is the fraction of dust scattering which is blocked?

Technical comments:

4978.26: replace dependency with dependence

4986.9: replace "averages SSAs" with "average SSAs"

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4971, 2005.

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Interactive Comment