Atmos. Chem. Phys. Discuss., 5, S2284–S2286, 2005
www.atmos-chem-phys.org/acpd/5/S2284/
European Geosciences Union

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.

p. kiedron (Referee)

kiedron@asrc.cestm.albany.edu

Received and published: 30 August 2005

Meloni et al. used MFRSR data to obtain single scattering albedos (SSA). The paper basically deals with two issues: (1) how good is the technique used, (2) how the obtained results can be incorporated into our knowledge of aerosols in specific location and under specific conditions. My comments are concerned with first part.

The method to retrieve SSA from direct-to-diffuse ratios (DDR) was first outlined by Herman et al. (1975). It seems that MFRSR with its ability to deliver instantaneous direct and diffuse irradiances is an excellent instrument for this approach. Further-

Full Screen / Esc
Print Version
Interactive Discussion
Discussion Paper

EGU

more, because MFRSR measures direct and diffuse through the same opto-electronic channel the absolute radiometric calibration is not necessary to obtain the exact DDR.

There are however questions about MFRSR that chiefly are related to the ability to correct signals for angular response (1) that is different for each channel (wavelength), (2) it is not perfectly characterized and (3) that potentially may change in time. Simply MFRSR is not an ideal Lambertian spectroradiometer

Both direct and diffuse components need to be corrected. The diffuse component correction is not done by the standard MFRSR software according to this reviewer knowledge. This correction is usually SZA independent but some assumption on the nature of radiance distribution (of clear sky) must be made. If this correction was not implemented in the data used for the subsequent retrievals then one could expect that DDR's were used in the retrievals were larger by up to 5% then the actual values. Was this issue addressed by the authors?

Because of how MFRSR is constructed the cosine responses (angular responsivities) usually are not symmetric. Thus the consistent differences in DDR between morning and afternoon periods should be looked upon as a possible cosine correction errors. But obviously morning and afternoon atmosphere differences exists in some locations. The question is whether the authors looked at results keeping this in mind. Were there systematic morning-afternoon differences?

In reality the claim that DDR is independent of calibration is rather meaningless because to proceed with complete retrievals aerosol optical depths (AOD) are also needed. And they can only be obtained from a well calibrated MFRSR.

What I would like to see in the future of usage of MFRSR data and similar instruments is a more thorough analysis of propagation errors due to calibration uncertainty and cosine response uncertainty. I am aware that the error and stability analysis is much more complicated and time consuming that the retrieval process itself, however you cannot trust the latter without the former.

ACPD

5, S2284–S2286, 2005

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