

Interactive comment on “The impact of aerosols on polarized sky radiance: model development, validation, and applications” by C. Emde et al.

C. Emde et al.

claudia.emde@dlr.de

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We would like to thank the anonymous reviewer for the helpful comments and suggestions. We followed each of them in our revised version of the manuscript.

In the following we answer point-by-point to the specific comments.

1) The paper is about using polarization measurements to get information on aerosols properties. References about works done for aerosol retrieval from polarized radiances measurement should be added and in particular them from ground-based measurement such as sun photometer. For example, Li et al., 2006, 2009 and some references therein should be included.

These references were indeed very helpful and they have now been included in the introduction.

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2) As suggested by the other referee, it would useful to have more information about the aerosol size distribution used. Indeed, some people may not know OPAC database and, in addition, multi-angular radiances at different wavelength can be used to retrieve aerosol size distribution (Dubovik et al., 2002). It can thus be informative to have the shape and the characteristics of the aerosol size distributions used in the paper.

We have included all necessary information about the aerosol size distributions (Table 1).

3) More detailed explanation and/or references about the computation of the new direction after a scattering event and about the method called the importance sampling would be interesting to people who want to develop such code. Indeed, why dividing by P_{11} (eq 13) solves the problem concerning the dependence of Z on incoming and scattered angles. Moreover, it is certainly just a notation problem but in eq. 9 and eq. 13, I_{sca} is equal to two different things.

In Eq.9 I_{sca} is the "Stokes vector" and in Eq.13 I_{sca} is the "Stokes weight vector". We have now clarified this by an index w . The importance sampling method in general is described in the book by Marshuk (1980). Collins et al. (1972) have applied it to sample the scattering direction in polarized radiative transfer. The two references have been included.

The technical corrections have been incorporated.

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