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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Laboratory measurements of the optical properties of sea salt aerosol" *by* R. Irshad et al.

R. Irshad et al.

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In response to referee comments made by A. Lambert on 23 April 2008:

-1- The temperature of the aerosol cell was approximately 298K (+/- 2K) throughout the experiment. This was measured by a Honeywell temperature sensor and these details have been included in the revised paper.

-2- The paper by Czico and Abbatt (2000) is indeed interesting and gives data on the infrared extinction spectra of some of the major components of sea salt. The measurements are particularly interesting as they are undertaken on the actual aerosols of the component compounds, rather than solutions. This does offer a source of comparison data for the band parameters of the a priori model, and the information given has been cross-checked with the current band parameters in use. The specific band mentioned

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at approximately 1350cm-1 for NH4HSO4 and NH4NO3 does indeed appear in the extinction spectrum of dry SSA. However, this band disappears as the aerosol is made more dilute by the addition of water. The data from Czico and Abbatt (2000) is helpful in providing further confirmation of the bands used in the retrieval model.

-3- The additional references given in the suggested link have been considered previously. These include Shettle and Fenn (1979) and Segelstein (1981), both of which are cited in the original paper. Winter and Chylek (1997) have been discussed previously - while the results they obtain for the effects of SSA on planetary albedo are interesting they nevertheless use volume mixing rules to obtain data for their calculations with no verification of those rules. Comparisons of calculated optical depth to measurements suggest their results are slightly outside the range of measured values. Erroneous refractive indices may be a factor in this discrepancy. For water, Pope and Fry (1997) have made detailed measurements of the absorption spectra but have not determined complex refractive index. While it is relatively simple to obtain an estimated imaginary part of the refractive index, also obtaining the real part of the complex refractive index is less straight forward. Indeed, this is the main purpose of the current work - to obtain complex refractive indices from extinction spectra. When considering all the references suggested for water, the most complete data for the refractive indices of water over the wavenumber range analysed in this work (approx. 400 - 20,000 cm-1) is from Segelstein (1981), so this is the data used for comparison and calculations in the paper.

Thanks are due to A. Lambert for helpful comments made and advice given.

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