**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "Measurement of relative humidity dependent light scattering of aerosols" *by* R. Fierz-Schmidhauser et al.

Anonymous Referee #2

Received and published: 10 November 2009

General comments

The manuscript presents measurements of the light scattering coefficient at controlled relative humidity measured with nephelometer. Data from a laboratory study show a good agreement between measured and modelled f(RH). It was shown, that differences between two systems, running in parallel during a filed study, can be explained by two different branches of the hysteresis curve, since the RH history in the two systems was not the same.

Since nephelometers are key instruments for this study a discussion of measurement uncertainties should be given. In Figures A3 and A4 measured and modeled normalized scattering coefficients are shown. It is not clear if measured scattering coefficients were corrected for truncation. Differences between measured and modeled scattering

C739

coefficients can be up to 50% for 300 nm ammonium sulfate particles as shown in Fig. A2. Even if systematic error cancel out when calculating f(RH) uncertainties and systematic errors should be discussed.

The temperature difference between nephelometer inlet and sensing volume is about 4.5° C for the unmodified nephelometer (Page 2166, line 10). Are there temperature and RH gradients inside the sensing volume of the non modified DOE/ARM nephelometers? Does a RH gradient lead to an additional uncertainty in the measured scattering coefficient at high RH?

Specific comments

Page 2162, line 14: Measured and modeled scattering coefficients are not within the range of uncertainties, as shown in Figure A2.

The measurement points RH3 and RH2 are named "exit of humidifier" (page 2167 line 4) and "after humidifier" (Figure A1), respectively. This naming could cause confusion.

Page 2167, line 3: "...and the RH within the instrument is monotonously rising to the entrance of the nephelometer..." In Figure A1a the RH is slightly decreasing between measurement points "before dryer" and "in nephelometer".

Page 2171, line 8: Which uncertainties are included in the 10% uncertainty? Calculation of f(RH) can compensate for some systematic uncertainties, e.g. the uncertainty in nephelometer calibration.

Page 2171, line 18: Does that mean "... are in agreement with the model ..."

Page 2172, line 15: Why are differences attributed to sampling losses? The differences are smaller than the measurement uncertainties of 10% (page 2171, line 9).

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2161, 2009.