

Interactive comment on “Mass transfer effects in hygroscopic measurements of aerosol particles” by M. N. Chan and C. K. Chan

Anonymous Referee #1

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General comments:

The manuscript provides a literature survey of aerosol hygroscopic measurements with focus on TDMA measurements and associated mass transfer effects. I have not seen any survey or review on this topic before, so I consider it original enough to be published in Atmospheric Chemistry and Physics. There are certain shortcomings, however, that should be addressed before the paper is ready for publication.

Specific comments:

In its current form, the analysis is based almost entirely on results from lab and field measurements, with practically no theoretical background or discussion (or it is scat-

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tered around the text). At the very least, the manuscript should include one or two paragraphs where the authors would explicitly summarise the most plausible factors influencing (or hindering) the establishment of hygroscopic equilibrium (coverage of particle surface by surfactants, particle size, phase changes inside the particles etc.). How accommodation coefficient is related to these issues and how small it should be to have influence on mass transfer?

The influence of particle size (diameter= D) on water mass transfer effects should be discussed more explicitly in the text. First, since the particle volume is proportional to D to the power 3 and condensation flux to D to the power 1-2, the time scale for achieving an equilibrium size goes as D to the power 1-2, unless there other are factors that are dependent on size. For example, different-size and type particles have a different probability to have surfactant layer of a certain thickness.

Minor/technical comments:

On page 4060 (line 17), it is stated that the manuscript focuses on TDMA and EDB measurements. In reality, the focus is on TDMA measurements, as EDS measurements are discussed only briefly.

On page 4061 (line 2) the acronyms “AC” and “DC” should be defined.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4057, 2005.

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