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Atmospheric Measurement Techniques Discussions

Interactive comment on "A method to resolve the phase state of aerosol particles" *by* E. Saukko et al.

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The authors thank Referee #3 for positive comments and suggested improvements to the manuscript. The points raised are discussed below:

Abstract: line 6: "related to deliquescence and efflorescence" could be deleted, has been said in the text just above.

Removed.

Other/earlier references could also be given in addition to Roberts and Nenes 2005, e.g. Hudson 1993.

Reference added.

"these methods rely on detecting the size change of particles as they are activated according to Kohler theory": in an HTDMA (subsaturation of water vapour) the particles do not usually "activate" this normally requires supersaturated conditions and happens in CCN counters.

The corresponding paragraph has been rephrased to distinguish between deliquescence and activation.

"the water activation of particles can also be strongly affected by its phase" – some references could be given here, e.g. Hori et al 2003, Bilde and Svenningsson 2004.

Reference added.

The Electrodynamic balance technique should also be mentioned as a mean to study aerosol-water interactions and phase change and some references given, e.g. Marcolli et al. 2006, Pope et al. 2010.

Reference added.

Page 6233: the collection effciency curve, figure 2 is measured for DOS (liquid particles, what RH?) – could it be different for crystalline particles or for a different relative humidity?

The DOS was generated with quite dry ($\sim$5% RH) pressurized air with a bubbler. The DOS is quite hydrophobic, so water uptake is likely to be low upon higher RH. If calibration particles are other than spherical, then the shape factor (and the particle density) must be taken into account when calculating the aerodynamic diameter. Also, the use of crystalline particles would make calibration difficult, since the bounced

particles are indistinguishable from non-impacted particles. The bouncing can be suppressed by a different choice of substrate, or by coating the substrate with eg. suitable vacuum grease, but these changes may also have an effect to the collection efficiency curve.

Figures 4 and 5: I suggest the x-axis crosses the y-axis at y=0, that would make it easier to see that the points at high RH are at or below zero before correction.

Figures changed accordingly.

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