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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.

Anonymous Referee #3

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Review of "A method to resolve the phase state of aerosol particles" by Saukko et al.

Overall

This manuscript presents a new method to determine the phase state of airborne submicron particles using a one step impactor and a condensation particle counter. The idea is to make use of the fact that the bouncing behavior of particles depends on their phase. I enjoyed reading this manuscript: the experiments are well designed and the text is well written. I have a few comments outlined below.

Specific comments

Abstract: line 6: "related to deliquescence and efflorescence" could be deleted, has

been said in the text just above.

Introduction:

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

"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 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.

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.

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

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.

References

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