

Interactive comment on “Analysis of cloud condensation nuclei composition and growth kinetics using a pumped counterflow virtual impactor and aerosol mass spectrometer” by J. G. Slowik et al.

Anonymous Referee #1

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Analyses of cloud condensation nuclei (CCN) properties are usually made either by measuring aerosol particle composition and size and activating the CCN under controlled conditions; or by directly measuring the composition of ambient cloud particles. In this manuscript by Slowik et al., an efficient method is described to analyze CCN composition with the possibility to both control the CCN activation conditions and to directly measure the chemical and physical properties of the active CCN particles. The advantage with this method is that it provides information of both the conditions and CCN properties at the moment when the particles are being activated. Results from

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an application of the method, including measurements in downtown Toronto and in Egbert, are also presented and analyzed, with some interesting observations and conclusions on differences in CCN activity for particles in an urban outflow and during a biogenic event. The manuscript is well written and structured. I only have some minor comments seen below:

Page 287, line 11: The Köhler reference must be included in the reference list.

Page 289, line 13: Could you motivate why you have chosen a supersaturation of 0.33 %?

Page 293, line 9: The Slowik et al. (2010) reference should be included in the reference list.

Page 293, lines 22-23: Should it be “Figure 2 through 4”?

Page 294, line 21: The polydisperse distribution is broader than the CCN-active distribution also on the “large diameter” side in Fig. 2b. Whereas the CCN-active distribution starts below 1 μm diameter, the polydisperse distribution starts at $\sim 4 \mu\text{m}$ diameter. Do the authors have any idea of the reason for this?

Page 294, line 23: “size cut off of the PCVI ($\sim 1 \mu\text{m}$)”. In page 292 on line 21, it says that the size cut was 2-3 μm ?

Page 303, line 28: The year of the Liou and Ou reference should be 1989.

Page 304, line 8: Throughout the text the reference Kumar et al. (2003) is used, for instance on page 290, lines 2 and 23. It is better if the references used in the text are consistent with the references in the reference list. Why is not “Kumar, P. P.” used in the reference list?

Page 310: I would prefer if it was mentioned in the figure caption of Fig. 2c that it represents polydisperse distributions of organics (despite that it is mentioned in section 3.1 that the CCN-active organic mass distribution is not shown). The same goes for

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the figure caption of Fig. 6.

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4, C46–C48, 2011

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