

## ***Interactive comment on “Closure between measured and modeled cloud condensation nuclei (CCN) using size-resolved aerosol compositions in downtown Toronto” by K. Broekhuizen et al.***

**K. Broekhuizen et al.**

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Dr. Pöschl brings up a good point that these papers address issues relevant to the activation of mixed inorganic/organic particles, and we will make reference to the most relevant in the final version of the manuscript. There are, however, several caveats to point out. The first is that a number of the relevant references are studies of very well defined laboratory generated aerosol particles, for which the composition and surface tension are reasonably well known. In particular, the study by Henning et al. and Svenningsson et al. advance the understanding of hygroscopic growth and CCN activation of well defined systems. Furthermore, the studies of Rissler et al. and Mircea et al. investigate aerosol properties in the Amazon basin at sites with relatively low anthro-

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pogenic influence. As such, the sites are characterized by significant water soluble organic carbon (WSOC). Our downtown Toronto site was influenced almost entirely by fresh anthropogenic emissions of a very hydrocarbon-like nature (from the AMS measurements). This limits the applicability of the above references to our work, especially without detailed information about the WSOC content and surface tension of the particles. Given that our analysis assumed the organic component was fully insoluble and that the growing droplets had the surface tension of water, it should be noted that any inclusion of WSOC or surface active species in our Köhler calculation would lead to an overprediction of CCN concentrations. This fact, coupled with the high degree of closure achieved, gives us confidence in our assumptions and limits the usefulness of a more complex treatment of the organic fraction. However, motivated by Dr. Poschl's comment, in the final version of the manuscript we will include calculations of the degree to which closure would not be achieved if some WSOC or surface active species were present in our aerosols. This will illustrate the robustness of our conclusion and, to some degree, give us additional information on the nature of the particles studied.

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