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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measured particle water uptake enhanced by co-condensing vapours" *by* Dawei Hu et al.

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This paper presents an experimental study of the effect of three different organic vapors on ammonium sulfate particles' equilibrium growth at varying relative humidities. As such, it relates to the co-condensation effect in cloud drop formation, whereby semivolatile organic or inorganic vapors add soluble mass to an aerosol population undergoing cloud drop activation, which can result in enhanced cloud drop number concentrations. I find this study a welcome addition to the literature, and have only a few comments, mostly relating to past work.

In the abstract, it is stated that the "... enhancement of particle water uptake through co-condensation constitutes the first direct measurement of this process..." Similarly,

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in the end of Section 4 it is claimed that the authors have “observed for the first time that co-condensation of organic vapours can significantly promote water uptake of aerosol particles. . .” I don’t think these statements are quite correct. Wagner and coworkers have published results of binary vapor condensation rates (both water-nitric acid and water-propanol) from which the co-condensation enhancement can be directly seen. See Rudolf et al., J. Aerosol Sci. 22, S51, 1991; Rudolf et al., J. Aerosol Sci. 32, 913, 2001.

CCN counter experiments and their explanation. I think the authors should refer to Romakkaniemi et al. (AMT 7, 1377, 2014) who studied the evaporation of ammonium nitrate and condensation of nitric acid inside the DMT CCN counter.

It is said on lines 345-346 that the absolute magnitude of co-condensation depends on the organic saturation ratio and not the absolute concentration. I think it should be clarified here that this refers to equilibrium growth. At cloud drop activation, the absolute concentration of the co-condensing species matters a lot.

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