Atmos. Chem. Phys. Discuss., 14, C3016–C3017, 2014
www.atmos-chem-phys-discuss.net/14/C3016/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "A meta-analysis of particle water uptake reconciliation studies" *by* J. D. Whitehead et al.

Anonymous Referee #1

Received and published: 1 June 2014

J.D. Whitehead et al. present an interesting reconciliation study for particle water uptake issue based on a large number of datasets from different locations. Such work helps us to better understand measurements of sub-saturated and supersaturated aerosol water uptake and their discrepancies. This manuscript represents a substantial contribution to scientific questions and is within the scope of ACP. I recommend this paper for publication in ACP, but not in this version. The following comments and suggestions should be addressed. (1) It is good that the paper is written concisely. But as a full-research paper, more information should be added in the text. I would like to see more and better documentation of data and results before jumping into the conclusions, especially, the aerosol size distributions, chemical compositions and mixing state. In this paper, Nccn is derived from aerosol size distribution and D50. D50 is determined

mainly by aerosol mixing state and chemical compositions. Nccn highly depends on the shape of aerosol size distribution. We can see in the supplementary material that there is very large variation for Nccn among different datasets. I do suggest the authors should present a comparative compilation of the properties of aerosol size distributions from all the locations in this revised manuscript. Also, it would be very interesting to consider the dataset from such heavily polluted region for these reconciliation studies of particle water uptake. (2) Regarding the kappa calculation, differences in hygroscopicity with HTDMA and CCNc can arise through solution non-idealities, the presence of slightly soluble or surface active compounds, or non-spherical particle shape. The magnitude of this difference and its dependence on particle size is consistent with the presence of surface active organic compounds. In other words, the role of some organic compunds in particle water uptake processes is different for the conditions of sub-saturation and supersaturation. I suggest the authors add more discussions on this in the revised manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9783, 2014.