

Interactive comment on “CCN predictions using simplified assumptions of organic aerosol composition and mixing state: a synthesis from six different locations” by B. Ervens et al.

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This paper has sufficiently been commented and does not require a second review for making a decision. There is just one more issue I feel the authors should address before publication:

In the abstract and the end of the manuscript, previous work is cited that places the importance of CCN error in aerosol-cloud studies. This is a very important point, which I feel needs further elaboration and discussion (certainly if it is to be cited in the abstract). To state whether CCN prediction error is “important”, it must be placed within the context of the problem in question. If the goal is to obtain average droplet num-

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ber predictions, a 10-30% difference is not important. It can be important for indirect forcing though; for example, Sotiropoulou et al. (2006) and Sotiropoulou et al. (2007) looked into this (there are probably more studies like this but these are the most relevant I am familiar with) and found that the relative uncertainty of droplet number to CCN changes can range from 0.1 (the levels stated in this paper) to ~ 0.5 . By propagating this sensitivity relationship through a GCM simulation of the indirect effect, it was found that the CCN closure uncertainty typical of studies during the past few years gives an acceptable (yet sizeable) relative uncertainty in indirect forcing estimates. Simplified treatments however of composition may introduce larger CCN prediction uncertainty, which could be important for indirect forcing assessments. One can argue of course that GCM studies overestimate indirect forcing because of the incomplete representation of feedbacks across scales (e.g., Stevens and Feingold, 2009), but that affects the absolute magnitude of indirect forcing (which is still unknown) much more than the relative uncertainty from CCN prediction uncertainty.

I would like to make clear that an extensive discussion is not asked for, but some discussion along the above lines is important.

References

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- Stevens, B. and Feingold, G. (2009) Untangling aerosol effects on clouds and precipitation in a buffered system, *Nature*, **461**, 607-613, doi:10.1038/nature08281