

## ***Interactive comment on “Inverse modelling of Köhler theory – Part 1: A response surface analysis of CCN spectra with respect to surface-active organic species” by S. Lowe et al.***

**Anonymous Referee #2**

Received and published: 22 March 2016

This study presents a methodology to investigate the sensitivity of CCN spectra to different parameters using different approaches. The results shown are not entirely new and future work is necessary in order to relate them to “real world” characterized by simultaneous measurements of aerosol chemical composition and size distribution, supersaturation, CCN spectra, etc.

The theoretical investigations shown here were performed at a fixed temperature, using literature data for three aerosol types: marine, polluted continental and rural. The organic aerosol and surface tension were assumed to be the same for all aerosol types. The possible effects of this data are not discussed in the manuscript.

The manuscript looks like a report, most of the section Section 4.2 may be moved in

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a Supplementary Material. The results shown in it have to be presented in a more synthetic and comparative manner. It is not evident how much the sensitivity to parameters depends on the approach used in a quantitative manner. This is also not clear in Table 3 which is not actually discussed. Also, it has to be moved from Conclusions to Results.

Such a study may be very interesting if it succeeds in showing the limits/differences due to the different approaches used in modelling aerosol activation and quantify the acceptable/relevant uncertainties of measured parameters of fundamental importance in these approaches. The latter information may be important for planning future field campaigns and for development of instruments.

Minor comments:

The term “posedness” is not commonly used, replace or explain it better.

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2015-1027, 2016.

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