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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A simple representation of surface active organic aerosol in cloud droplet formation" *by* N. L. Prisle et al.

Anonymous Referee #2

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The paper presents and reviews a simplified parameterisation aimed at assessing the wider impacts of bulk/surface partitioning. The manuscript is well written and presents some interesting food for throught with regards to the complex effect of organic compounds on CCN activation potential. The paper certainly fits within the scope of ACP and can be published as is. Before this, i have some minor points to make.

Minor general points.

Page 23603. The authors state that the combined effect of surface partitioning and surface tension effects is not readily anticipated in each case. This is quite an important point with regards to 1) the often unfortunate drive to neglect even 'low' levels of cpmplexity and 2) the need for schemes such as the one presented here. I do wonder however whether this demands that one has to have domain based parameterisations.

How would one, for example, provide a scheme for different environments and would the level of simplification proivided be able to capture the dynamic evolution of the aerosol properties(i.e. surfactant 'nature')? Along these lines of discussion, is it not pertinent to assume the organic fraction to be described by at least a low order collection of different typres of surfactant? Or do the auhthors believe can we assume the organic fraction to be accurately modelled essentially using one isotherm to represent the complex mixture?

Page 23614. The authors breifly discuss the applicability of parameterisations based on the expected composition and inorganic:organic ratios found in the atmosphere and comparisons with laboratory data. It would appear the labratory comparisons all include inorganic/organic systems with a common ion (Na). It has been shown that these system can exhibit complex non-linear behaviour, but just how atmospherically representative are these? For example, do they present an 'extreme' reference point with regards to bulk/surface partitioning? The simple parameterisation appears to work for 'strong' surfactants in systems with these common ions but less so for 'weak' surfactants.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 23601, 2010.