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Interactive comment on "Joint effect of organic acids and inorganic salts on cloud droplet activation" *by* M. Frosch et al.

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We thank A. M. Booth for the constructive comments on our manuscript. We have addressed all comments in a point by point fashion below. During revisions we realized that there was a mistake in our parameterizations of water activity and surface tension as functions of growth factor for pure oxalic acid and its mixtures, partly due to crystal water of oxalic acid. This has been corrected in the text and figures of the revised manuscript. In addition to the comments given by the referees we have improved/corrected the text in a few other places, reduced the number of significant figures given in Table 6 and changed Fig. 7 so that we now show Köhler curves for dry particle diameter of 35 and 100 nm and also include experimental values for comparison.

"We have measured mixed dicarboxylic acid and ammonium solution surface tensions with a view to following the impact of predictive surface tension models on cloud activation predictions (Booth et al., 2009). We found that varying the surface tension predictions used had a bigger impact (on the predicted ambient saturation ratios at which mixed particles activate into cloud droplets) than changing the organic to inorganic mass ratios. We belive that studies such as Frosch et al., are critical in providing data necessary for constraining our models of surface tension effects. Especially compounds such as pinonic acid. The authors note that NRFA and cis-pinonic acid are important due to a significant surface tension reduction in the concentration ranges relevant for activation. They see a smaller surface tension reduction in these compounds when mixed with an inorganic fraction, as one would intuitively expect. This result is at odds with those of Kiss et al., (2005) and Shulman et al., (1996), and our own measurements. The authors suggest this is dues to the difference concentrations of inorganics between the measurements. I would agree with this and also refer the authors to the work of Tuckermann (2007) who see the behaviour between inorganics enhancing and suppressing surface tension reduction switch once the concentration of organic is at a certain concentration."

We thank A. M. Booth for his comment. The surface tension reduction by NRFA is slightly stronger than that caused by the humic acid sodium salt studied by for example Tuckermann (2007). We have included the works of Tuckerman and Cammenga to the discussion on page 17990.

We have also added the following text to page 17984, line 12: "Booth et al. (2009) have addressed the surface tension of mixtures of dicarboxylic acids and salt and the implications for cloud droplet formation."

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 17981, 2010.