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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Solid state and sub-cooled liquid vapour pressures of substituted dicarboxylic acids using Knudsen Effusion Mass Spectrometry (KEMS) and Differential Scanning Calorimetry" *by* A. M. Booth et al.

Anonymous Referee #2

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This paper describes determination of solid phase vapour pressures of substituted dicarboxylic acids using the KEMS technique. The vapour pressures are compared to existing literature values as well as predictions obtained with existing predictive techniques. From the measured values, estimates for subcooled liquid vapour pressures are calculated and compared to existing literature values. The data presented in this manuscript is very valuable for the atmospheric science community. It is particularly promising that the KEMS method seems like a relatively fast method to determine vapour pressures of low-volatility organics. However, I have a few (relatively minor)

comments that the authors should address before the manuscript can be accepted for publication in ACP.

General comments:

1. I would encourage the authors to concentrate a bit on the readability and clarity of their presentation. This includes dividing long sections to subsections: particularly, I think that the "Introduction" would benefit from being divided into paragraphs, and the Sect. on "Vapour pressure estimation techniques" could be divided to subsections according to the 3 studied techniques. Also, the authors should check the size of the fonts and symbols in their figures (now the figures are tedious to read), as well as the distinguishability of the different symbols. I would also encourage the authors to move some of the information that is currently presented in Tables 2, 3 5 and 7 to figures. This would help the reader to get a general idea of the comparability of the different methods (and, for instance, the systematic differences) with a quick glance of a figure rather than having to read through the table. I think the visibility of the authors work would improve by making the manuscript a little bit more reader-friendly.

2. It would be good if the authors would give uncertainties to their vapour pressure and sublimation enthalpy values in Table 1. The conversion from solid to liquid state is probably quite sensitive to the values used - the authors should demonstrate the related uncertainty. Also, the enthalpies have a temperature-dependence. This should be discussed too (particularly in connection with the change in the heat capacity that has been assumed for the solid-liquid conversion, since the temperature-dependence on dHvap is realated to the heat capacities).

3. Regarding the experimental technique: Have the authors checked wether it is possible that the molecular beam is diluted because of diffusion before it's detection? I.e. is ti possible that it gets wider before it reaches the MS?

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 5717, 2010.