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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of the poke-flow technique combined with simulations of fluid flow for determining viscosities in samples with small volumes and high viscosities" *by* J. W. Grayson et al.

Anonymous Referee #1

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The experimental method developed is elegant and well backed up by simulation, albeit not entirely unique due to their previous demonstration of the method in their Renbaum-Wolff, 2013 paper(1). The explanation of the technique is clear, hence it is an appropriate technical paper and I believe should be published. The errors on the measurements are large, but future work has been suggested that hopes to constrain the upper and lower viscosity limits.

The methods and results sections are concise. It seems that the required detail needed

for reproducing the experiments is stated. I do not think any more figures are needed to make the technique clearer. However could a couple more measurements be made of the polybutene standards at different temperatures to see if the trend continues to match the company's measurements as shown in figure 6? The errors in the measurements at ∼295 átŠC plotted in figure 6 mean that the viscosity limits overlaps with the values stated by the company at the higher temperature of ∼335 átŠC. It would be good to see the changing viscosity with temperature measured with this technique as figure 6 looks a bit incomplete.

There is quite a hefty introduction resulting in a lot of references and could possibly be shorter, but this is somewhat necessary as it outlines the current state of the techniques that exist to tackle the viscosity problem.

The limitations of the technique are clearly outlined, such as the problems with lower and higher RH measurements for sucrose. I believe these limitations prevent this technique being widely applicable to atmospheric applications. For example due to the limited viscosity range that can be measured discussed on page 888. Can you expand on how you 'expect this approach to also be valid at higher viscosities'? How convinced are you that the viscosity range that can be measured is atmospherically relevant?

(1) Renbaum-Wolff, L., Grayson, J. W., Bateman, A. P., Kuwata, M., Sellier, M., Murray, B. J., ... Bertram, A. K. (2013). Viscosity of α-pinene secondary organic material and implications for particle

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