

Interactive comment on “Quantifying water diffusion in high-viscosity and glassy aqueous solutions using a Raman isotope tracer method”

by H. C. Price et al.

Anonymous Referee #2

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The manuscript describes a method for determining the diffusion constant of water in amorphous matrices and applies the approach to a range of benchmark problems with compositions relevant for understanding water transport in atmospheric aerosol. The manuscript is well written, setting the context for the work, and clearly demonstrates the validity and value of the new approach. The paper should be accepted for publication in ACP once the authors have had an opportunity to consider revising the manuscript according to the following comments.

(1) The authors should provide some further details of the grid of experimental measurements made (both in radial coordinate and in time) and consider how they might

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better represent the fitting of the data, currently presented in the form of Figures 5(b) and 10. In these figures, it is not possible for the reader to clearly discern what is experimental data and what is a fit. If all of the data recorded is of the form shown in Figure 5(a), I would prefer to see fits to a simple 2-d plot of this form rather than the full surface shown in Figure 5(b). This would allow the reader to make a more informed judgement on the quality of the fit. Can the authors state:

- how many points the retrieval is fit to;
- what the time resolution is and how many radial coordinates were measured;
- how the radial values were aggregated from what must be a x-y Cartesian coordinate set of measurements (for example, it is not exactly clear how figure 2(b) is arrived at from measurements on the particle of cylindrical symmetry and simply presenting a clear explanation of this would suffice);
- a metric for the quality of the fit determined.

The authors should also provide more detail on how they arrived at the estimate of the spatial resolution of the technique of 1.3 microns.

(2) The authors should present the coefficients for the VFT fits shown in Figure 6 in a tabulated form.

(3) When considering the diffusion timescales shown in Figure 8(b), given the inherent problems of assuming a Stokes Einstein treatment, the authors should also include the parameterization of the diffusion constant provide by Zobrist et al. (2011) for direct comparison with the values reported from the new measurements.

(4) All of the Figures have text labels that are far too small for publication in a two column journal format - they are quite hard to read even in the format of the ACPD article.