

***Interactive comment on* “Toward closure between predicted and observed particle viscosity over a wide range temperature and relative humidity” by Sabin Kasparoglu et al.**

Anonymous Referee #1

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The experimental work is great but the analysis is hard to follow and more detail is needed.

Questions:

1. Figs. 2 and 3: What is the dimensionless number D that appears in the plots? It's not defined anywhere. Is it D_A that's defined on line 155 or is it related to the diffusivity?
2. My main issue is that it's unclear to me what's going on in Fig. 5 (and Fig. 6 which is related). In Fig. 5, the contour lines are said to represent equilibration timescales. Obviously you are not just taking the inverse diffusivity at a given RH and T and multiplying that by the particle radius squared to get tau because you state that you did

KM-GAP simulations to get these values. So my questions are:

2.1. What is the initial and final state (RH and T)?

2.2. What is the radius of the particle?

2.3. Why is tau defined in such an unconventional manner on line 173? Why is not just the e-folding time?

3. The third paragraph in the discussion that begins "The central tenet ...". Have you proven this hypothesis? You state it then quickly say that it's supported by the phase diagram model. But it's a very complicated hypothesis and you don't explain how your results prove it. Conceptually, what would it even look like if the hypothesis was not true?

Typos:

Line 267: "attempted by unsuccessful"

Line 280: "timescale evaluate along"

Figure 5 caption: "timscale"

Figure 6 caption: no units on the numbers that are listed in the caption.

Figure 6 y-axis: "1k" and "100m"

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Discussion paper

