Review of the manuscript “Optimization of process models for determining volatility distribution and viscosity of organic aerosols from isothermal particle evaporation data”

This is generally a very well written manuscript, which describes how process models together with input optimization algorithms can be used to constrain the parameters that influence OA particle evaporation. I recommend that the manuscript should be published in ACP after minor revision.

General comment:

The manuscript is relatively technical and method oriented. For non-experts within the field it can be hard to understand the possibilities and limitations with the described methods. I suggest that you add more discussion about the possibilities and limitations with the described methods in the summary and conclusion section. One limitation which I think should be discussed a bit more is the uncertainties in the observations. On line 265-266 you write that you assume a 1 % uncertainty in the measured evaporation factor (EF), I think this uncertainty can be substantially bigger. How sensitive is the optimization of all parameter values to the uncertainties in the observations? I.e. what happen if the uncertainty of the measured EF is 5 %?

Now you use the term “correct” values when you talk about measured and/or literature data on particle phase density, individual compound saturation concentrations and viscosity. But can we really state that we know the correct values of all these parameters? I would avoid using the term “correct” or at least clearly define what you mean with “correct” parameter values. It would also be good to add a short discussion about how the described methods can be used in order to suggest/design new experiments which can give better constrains on the volatility and viscosity properties of SOA particles. Recommendation of new experiments is always welcomed by experimental aerosol scientists.

Minor comments:

When I read section 3, L250-285 I start to wonder what artificial parameter values of C* and the mole fractions did you actually use in dataset 1-4? Then later when you start to describe the results it become clear to me that these values can be found in figure 2-5. Still, I think it would be good to have a table which provide these values already in Sect. 3. In this table you can also include the best optimization values for these parameters and the 10th and 90th percentiles. With this table include you do actually not need all the figures.

In Table 1 and Table 4 some field are empty, but I guess it should be saying e.g. Xmole,dry(t=0 s) “Fitted(min: 0.01 max:1)” and T(K) 293 in all fields. I suggest that you write out explicitly in each column these values, even if they are the same in all experiments/simulations.

L424-425: You use the term “non-viscous” and “viscous” when talking about mixtures with low-viscosity and high-viscosity. I would recommend that you use the late terms instead and possible specify that the particle-phase mass transfer limitation was negligible in the low-viscosity mixture and hence neglected.