

Interactive comment on “Diverse Chemical Mixing States of Aerosol Particles in the Southeastern United States” by A. L. Bondy et al.

Anonymous Referee #1

Received and published: 12 April 2018

The authors present a rich and very valuable dataset describing the mixing state of aerosols observed during SOAS 2013. The article is well-written and the work is technically sound. The work provides important insights which are likely to have an impact on the fields of aerosol and atmospheric chemistry. I recommend it for publication in ACP after some minor revisions.

- Page 1, line 18 change 'condensation' to 'condensation or reactive uptake'
- Page 3 lines 1-2 In addition to the many reasons the authors list for why the mixing state of aerosols is important, it is also very important for aerosol chemistry. E.g. transition metal ions cannot be important for the chemistry of SOA or biomass burning aerosols if they are not internally mixed with those aerosol types.

C1

- Page 4, section 2.1 Can the authors comment on how the potential loss of semivolatile organic species in the MOUDI and under vacuum may have biased the results?
- Page 6, section 2.2.1, as the authors state, a number of assumptions are required regarding particle shape and density in order to derive mass information. Please add some discussion of the uncertainties inherent in these calculations and how this is propagated to the final results.
- page 9, line 10-13 the meaning of this sentence is clear but the way that it is written is confusing, please rephrase
- Page 10, line 8 'predominantly'
- page 16 line 13 'containing'?
- I may have missed the explanation - but why is there SSA in Centerville? This seems surprising.
- Page 20, line 21 - this statement about soot inclusions making SOA light-absorbing is a bit overreaching. In a model wouldn't that particle be considered an aged soot particle rather than SOA, and therefore already be represented as absorbing? Also, the community has considered SOA to be potentially light-absorbing (brown carbon) for some time.
- page 30, Figure 1 - this figure is very hard to understand. It is problematic that some of the same colors are used to indicate MOUDI stages vs. aerosol components. Maybe this needs to be broken up into several panels or separate figures.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1222>, 2018.

C2