Uruci et al. extended an algorithm by combining SOA yield measurements, thermodenuders (TD), and isothermal dilution (TD) to constrain the volatility product distribution (α_i), effective vaporization enthalpy (ΔH_{vap}), and effective accommodation coefficient (α_m) and finally reduce the uncertainty of parameterization of SOA formation.

The topic is worthy of investigation as the parameterization of SOA is a significant source of uncertainty in air quality modeling and is also suitable for publication in AMT. The overall writing is clear. However, there are some weaknesses in the result and discussion part that needed to be concerned prior to publication.

Major comments:

1. The main purpose of the study is to combine SOA yield measurements with TD and ID to reduce the uncertainties of estimation of α_i, ΔH_{vap}, and α_m. However, there is no comparison of estimated parameters between derived from combining approach tests and derived from single-set tests to indicate the improvement.

2. The estimates of SOA yields, TD, and ID in all cases were good with MNE_M of ~25% or less (Table 2), but the estimated α_m dramatically deviated from the truth value for almost all tests (Table 1). It indicates 'the difficulty of constraining α_m.' Does this mean that the extended approach fails to improve the estimation of parameters, or at least for accommodation coefficients? In other words, why should we focus on the accommodation coefficients to decrease the uncertainty of parameterization of SOA yields?

3. For the description of Experiment B1 in section 4.2.2, the saturation concentrations of LVOCs, SVOCs, and IVOCs range from 10^{-2} to 10^{4} μg m^{-3}, but the SOA yields of α-pinene (precursor for Experimental B) are quite different from them. I wonder whether it is applicable to use a larger volatility bin for this oxidation system, as Pathak et al. (2007b) reported that 'the performance of the both 4- and 7-product basis set parameterizations is similar for practically all data points.'

4. Table 2 lists mean normalized errors of measurement data vs 'True' values (MNE_T) and vs estimated values (MNE_M). I wonder if the authors try to use similar values of MNE_T and MNE_M to support the good performance of the extended approach. And what is the reason for causing the small difference between them?

5. What do ‘close to unity’ and ‘resistances to mass transfer are small’ mean in Line 370? The authors may want to include a description of the accommodation coefficient in the introduction section.

Language suggestion:

1) Line 20: add a comma between ‘approach’ and ‘we’;

2) Line 29: ‘less’ should be changed to ‘smaller’;

3) Line 74: give the whole word when first using the abbreviation for ‘TD’, and also for ‘LVOCs’ in Line 112;

4) Line 77: delete ‘more’;

5) Line 85-88: The sentence ‘In TD applications in the …’ is hard to understand, please rewrite it;

6) Line 100: delete ‘two’;

7) Line 101: ‘type’ should be changed to ‘types’;

8) Line 106: delete ‘of’;

9) Line 107: ‘obtained’ should be changed to ‘conducted’;

10) Line 114: add a comma between ‘enthalpy’ and ‘we’;

11) Line 119: replace ‘so’ with ‘thus’ or ‘therefore’, and change throughout the text;

12) Line 148: change the sentence ‘The time-dependent evaporation of SOA in the TD is described in this work…’ to ‘The time-dependent evaporation of SOA in the TD used in this work is described…’

13) Line 288: delete ‘also against’;

14) Line 403: add a comma between ‘problems’ and ‘the’;

15) Line 457: Please simplify the sentence ‘…covering in that way…’ to make it easy to understand.