Ye et al. present a chamber study of secondary organic aerosol (SOA) formation from pinanediol (PD), a proxy of a first-generation product of monoterpenes. The authors give careful attention to the wall loss of both particles and vapors, and, with this accounting, the SOA yields are found to be 2-3 times larger than those of typical monoterpenes. Analysis of dynamical 2D-VBS modeling suggests the formation of a significant fraction of ELVOC from PD oxidation. The paper requires a number of clarifications before it can be published.

General comments:

1. What 8 m^3 chamber has a surface area of 12 m^2 (line 105)? This is off by a factor of probably about 2. The smallest surface area to volume ratio is that of a sphere, and a sphere with a volume of 8 m^3 would have a surface area of 19.3 m^2. Likely, any chamber with this volume would have an even larger surface area (and certainly much larger than 12 m^2). Related to this, what is the source of the estimate of 10 g in line 107?

2. How are the data points in Fig. 1 obtained, since in Fig. 2 there is a slightly decreasing trend when the concentrations reach “quasi-steady-state”?

3. How do you perform the stepwise injection of the compounds in Fig. 2, i.e. at each injection step does the volume of the chamber change because of constant sampling? Also, you mention the longer evaporation time of the less volatile compound: can you give an estimated timescale?

4. In the heating experiment (Fig. 3), how much PD do you inject into the chamber at 13^oC in order to get 866 µg m^{-3}? Have you tried to increase temperature to just 22^oC to see if you can get a similar portion of bulk concentration of PD with the ones in Fig. 2? In other words, how can you verify the possibility of pure condensation of PD on the wall or other lines at such a lower temperature? Otherwise, one would think the vapor-wall interaction mechanism is different in heating and dilution experiments.

5. In the dilution experiment, you show that PD-wall partition is irreversible above 22% of the initial value, which may be true if the oxidation rate of PD is similar to the dilution rate. So how do you simulate the photo-oxidation of PD? What are the actual values of j_{HONO} and OH level in the chamber? What is the oxidation mechanism used in the simulation: parallel or in series?

6. If the conclusion in lines 318-320 is correct, why does Fig. 1 not have a y-intercept of 0? Also, how are you accounting for the additional loss you saw in the experiment for Fig. 4?

7. Around line 372, you are assuming that the condensation sink does not change as more vapor deposits throughout the experiment. How do you justify this assumption, particularly for the boundary layer? The mass transport through the boundary later is changing throughout the experiment, so the condensation sink of deposited particles also changes.

8. Can you clarify the necessity of the correction for delayed condensation? In the caption of Fig. 8, you attribute the delayed condensation to the diffusion time of vapor molecules to the surface of the particles or the wall. Do you mean the gas-phase production rate is too fast compared with the timescale to reach gas-particle-wall equilibrium, so that the instantaneous equilibrium assumption cannot be used at the initial stage?

9. Since you are comparing your experiment to a nucleation experiment in CLOUD (lines 513-520), you should justify your assumption that you used enough seed to suppress nucleation when discussing particle number concentration (line 351).

10. How do you distinguish “overall SOA yield” and “instantaneous SOA yield”? It looks like Fig. 9 and Fig. 10 are plots of temporal profile of overall SOA yield.

Specific comments:

Line 93: Remove the symbol “‡” in the citation.

Lines 91-94 repeat what is more succinctly said in line 89.

Line 163: I believe the unit is m^3 not m^{-3}.

Line 178: What type of neutralizer did you use?

Lines 199, 265, 269, 271, 306: There should not be a space before °C.

Lines 213 and 220: The period should go after “Fig” not after the number, as is done in the rest of the paper.

Line 218: Why does it look like the y-intercepts for oxy pinocamphone and PD are not

0?

Line 228/Fig. 2: The overshoot time for 2-Nonanone appears to be a lot closer to 10 minutes than to 1 min, especially for the data a little after 2 hours.

Lines 265 and 278-280: These sentences repeat each other but, in line 265, you say “factor of 10 to 30” and in lines 279-280 you just say “30-fold increase.” What happened to the range in the second sentence?

Line 283: The PD should be “absorbed into” or “absorbed by” the Teflon walls, not “absorbed in” them.

Line 307: Does the ratio decrease before dilution when the concentration is held constant? Otherwise, diffusion into the bulk Teflon does not make sense.

Line 308: This is the wrong Zhang 2015 reference.

Line 310: There should be a space after “5.5” before “h,” as is done in the rest of the paper.

Line 317: Did you try slowing the rate of dilution even more to see if there was an effect?

Line 339: “as same as” should be “the same as” or something of that sort.

Line 352: The font is bold.

Line 352: How do you verify ignoring other dependencies? E.g. the dependence of the wall loss rate on the diameter of the particle.

Lines 384 and 386: These lines have odd spaces/indentations.

Line 437: Inconsistent spacing after the equals sign.

Line 474: Be consistent between “oxy-pinocamphone” and “oxy pinocamphone.”

Line 466-476: It is better to represent the chemical mechanism in a scheme.

Line 517: OS_C needs a line above it instead of an accent mark.

Line 535: Where in the supplemental material is this provided?

Line 536: You should probably mention this is for α=1 and give the justification for choosing this value of α that you give in the figure captions.

Lines 561, 880, and 904: “Teflon,” “summary,” and “simulation” are misspelled.

Lines S26-S28: It is unclear when you switch to an explanation of method 3.

Figure 3: Why is there a bump/overshoot in the Pinanediol concentration around 0.1 hours?

Figures 4 and S1: Why not make these A and B parts of a figure, so that they can be more directly compared?

Figure 5: The SMPS used in this experiment cannot detect nano-particles, so the last sentence about nucleation may not stand.

Figure 7: Use another color or background for the case α = 0.1.

Figure 7: The solid red versus thickly shaded red are very difficult to distinguish, even when viewed in color.

Figure 8: Since you already use red in the figure, it may make more sense to replace the red dashed line with another color.

Figure 11: This figure is missing a legend.

Figure 12: Missing colorbar for contour lines.

Figure 13: I suggest you change “Bulk suspended” to “Particle suspended” in the legend.

Figures S2 and S3: Cn is never defined. Also, in S2, the labels on the blue arrows are sufficiently far away from these arrows to be somewhat confusing.