Anonymous Referee #2 Received and published: 30 December 2020

GENERAL COMMENTS: The Captive Aerosol Growth and Evolution (CAGE) chamber system is a novel idea in order to investigate particle growth related to secondary aerosol formation. The use of a gas-permeable ePTFE membrane ensures that the gas composition of the chambers matches the ambient one. The manuscript is well written and provides a detailed analysis of the design and the evaluation of their performance.

SPECIFIC COMMENTS: One key aspect not shown is related to temperature measurements of the air inside the chambers. It is clearly very difficult to maintain the same temperature between the two chambers when one covered to prevent sunlight and the other uncovered during the field deployments. The blower used to circulate air through the exterior of the chambers minimizes such effects to some extent. Where there any temperature measurements conducted either from the external of the chambers or from inside of the chambers or from the sampled air (event the readings from the instrumentation) and if yes how different were the two chambers (the covered vs the uncovered). The temperature difference might affect the wall loss profiles for the two chambers and the reaction rates.

During the experiments described in the manuscript, we did not record temperature inside the chamber enclosures. (Since then we have added multiple sensors and have installed small, variable speed air conditioners to control the temperature). We did, however, install simple digital-display temperature sensors inside the chamber enclosures and on the outside, just below the chamber enclosures (where it was always shaded). We did our best to put ventilated light covers around the sensors inside the enclosures and wrapped the probes with Teflon tape to minimize bias from solar heating. We found that the temperature inside the uncovered enclosure was about 3 °C higher than that outside in the middle of the day. Of course, at night there was little difference. The temperature difference was much lower with the covered chamber. However, the only measurements from the "covered" chamber that were used in the manuscript were those from the period when the chamber-ambient characterization experiment was conducted, during which the "covered" chamber was not covered (lines 148 and 208).

Line 148: "With the exception of the results from the chamber-ambient characterization experiment described below, only measurements from Chamber A will be described here."

Line 208: "Unlike the rest of the 2-month study, Chamber B was uncovered for these experiments in order to assess the chamber-to-chamber consistency."

We added a brief mention of the steps taken to minimize heating in Section 2.4:

"The ventilation air flow created by the blower, together with the use of light reflective materials and coatings, helps minimize heating of the chamber above the surrounding temperature during daytime."

Page 4, line 127: radial O-rings. What material are they made from.

We at first used FEP-encapsulated viton o-rings. Unfortunately, those did not last long. We then switched to PTFE o-rings, which probably didn't seal as well, but were much more resilient.

Page 5 line 145: Can you provide the related data in the SI from the spectroradiometer for the reduction.

The spectroradiometer was not used for this comparison. Instead, a digital-display, total UV sensor was positioned inside and then outside of the enclosure of the covered chamber. It was noted that the covers reduced the intensity by 99%, but the values were not recorded. It is likely that the relative reduction varied over the course of the campaign as the reflective covers got dirty (possibly increasing the efficiency) and less rigid (likely decreasing the efficiency). Regardless, as noted above, no data from the covered chamber was used in this manuscript.