

## ***Interactive comment on “Measurement of ozone production sensor” by M. Cazorla and W. H. Brune***

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The authors would like to thank anonymous reviewer #2 for his comments and feedback.

The specific comments are addressed below:

Specific comments:

1. Page 3345, line 18: "therefore, to is to" → "therefore, is to".
2. Page 3346, line 9: "polyethermide" → "polyetherimide".

These misspellings have been corrected.

3. Section 2.3.5: The authors evaluate artifact due to high relative humidity in terms

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of NO<sub>2</sub> loss. However, I think only NO<sub>2</sub> does not cause the artifact. Uptake of HO<sub>2</sub> radicals on the surface of the Teflon inner wall could accelerate under high relative humidity. This might be cause the underestimation of the ozone production rate. In addition, although the authors recognize HONO formation by NO<sub>2</sub> loss on the Teflon surface, they do not discuss the photochemistry after HONO off-gassing, which could cause "artifact" formation of OH radicals.

It is important to remark that the relative humidity condition of 50% is for the inside of the chambers and not for the ambient air. Because the daytime temperatures inside the chambers can be 5-10 deg C greater than ambient, the relative humidity inside the chambers can be as much as 25% lower than in the ambient air.

We have found no evidence that HONO off-gassing or HO<sub>2</sub> uptake is affecting the ozone production rate when the relative humidity inside the chambers is less than 50%. This is the constrain that we have placed on making ozone production measurements with this version of the MOPS. It may be possible for HONO off gassing to be important for conditions in which the relative humidity inside the chamber was greater than 50%, but, since we are not using the data under this condition and are modifying the MOPS so that wall effects will be minimized in the next version, we did not investigate this possibility thoroughly. We have the following evidence that HONO off gassing and loss of HO<sub>2</sub> are not important for the ozone production results that we present in this paper:

First, the laboratory tests of HO<sub>2</sub> and OH loss inside the MOPS chambers with humidified air to 40% relative humidity indicate that the abundance of HO<sub>2</sub> inside the MOPS chamber agreed within 5% with the abundance of HO<sub>2</sub> in the artificial atmosphere. Second, laboratory results show that at 40% relative humidity inside the MOPS chambers, the loss of NO<sub>2</sub> is less than 3% and at 50% relative humidity, the loss is less than 8%. Finally, if the same amount of HONO off gasses from both chamber walls, as we would expect, any ozone production from HONO off gassing will cancel out, since the ozone production measurement is a differential measurement between the sample and reference chambers. During atmospheric measurements, the MOPS ozone production

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baseline was often checked early in the morning This check is done by removing the Ultem film from the reference chamber. With two clear chambers being radiated by the sun, the MOPS should read zero ozone production. Although anomalous signals were seen when the relative humidity was above 50%, when the relative humidity was below 50%, the baseline signal indicated zero ozone production.

4. Page 3355, line 11: The authors describe the detection limit of the instrument. I think the authors should also state S/N ratio to determine the detection limit.

The signal-to-noise ratio during the ozone production maximum was typically 20-30. We expect that this S/N will be greatly improved in the next version. We have added a sentence stating the typical signal-to-noise ratio in the text.

5. Page 3356, line 5: The authors discuss the uncertainty using the slope obtained by Fig. 3. It appears that the intercept for the regression line in Fig. 3 is significant. What does the intercept mean?

Figure 3 only to demonstrate a good correlation between ozone differences seen by the MOPS and a commercial ozone monitor and is the result of only one test with seven different ozone values. The data presented in Figure 3 show a good correlation, but they are insufficient to determine with any significance if the intercept is different from zero. In order to determine if the intercept on Figure 3 has some statistical significance several more tests with many more ozone points are needed.

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Interactive comment on Atmos. Meas. Tech. Discuss., 2, 3339, 2009.