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Atmospheric Measurement Techniques Discussions

Interactive comment on "Chlorine activation by N_2O_5: simultaneous, in situ detection of $ClNO_2$ and N_2O_5 by chemical ionization mass spectrometry" *by* J. P. Kercher et al.

J. P. Kercher et al.

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We thank Reviewer 2 for the helpful and insightful comments. We believe our responses to these comments have improved the manuscript considerably.

Reviewer #2:

1. Were calibrations conducted at varying times of the day?

Calibrations were conducted under varying conditions, such as ambient RH and temperature, however, they were usually conducted between 1pm and 4 pm local time. This is because N2O5 from the cold trap had to be added to the sample flow manually. We have updated the text to reflect this issue, and we note that this issue is

a motivation for the continued development of our online synthesis approach to calibration which can be more easily automated for routine standard additions on hourly timescales.

2. The details of future N2O5 calibration methods should be left to a future manuscript.

The details have been removed from the text, and the manuscript in which it is described has been cited [Bertram, et al AMTD, 2009].

3. Comments on Section 4.1 pg 129 and Figure 3: The section describing the ClNO2 calibration is confusing.

The section has been clarified as suggested to denote more correctly the .

4. Comments on Section 4.1 pg 129 and Figure 3: It is misleading to plot ClNO2 counts vs N2O5 concentration. Should ClNO2 be plotted against the change in N2O5 concentration?

This is correct. The ClNO2 counts are plotted against the amount of N2O5 lost, though it was not explicitly stated in the text or figure caption. The text and figure caption have been updated.

5. Comments on Section 4.1 pg 129 and Figure 3: The scale for the ClNO2 counts is incorrect in figure 3.

The confusing inset has been omitted from the figure, as it is somewhat redundant to the behavior shown in an earlier figure.

6. What concentrations of N2O5 and ClNO2 were used to generate figure 4.

N2O5 and ClNO2 concentrations were on the order of 1-3 ppb for the generation of the original Figure 4 (now Figure 5). Mixing ratios in excess of 1 ppb have been observed for both species, so the data was taken under relevant conditions. A statement to this effect has been added to the text.

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7. Why is the signal normalized to I(H2O)2- instead of I(H2O)-?

The signal is normalized to I(H2O)-, not I(H2O)2-. This typo has been corrected in the text.

8. Give more detailed information on complete ship track, such as wind direction and time.

A forthcoming paper will present a scientific analysis of the data from the measurements in the Long Island Sound. We are showing a small portion of the data here to illustrate that the CIMS can be used to detect N2O5 and ClNO2 simultaneously in the field. We think presenting more detailed information is outside the scope of this paper. However, we have improved the discussion of the ambient conditions along the ship track for the segment of data shown.

9. Ratio is misspelled in Fig. 6.

This has been corrected in the manuscript.

10. Please report the temperatures in Kelvin.

All temperatures are now in Kelvin.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 119, 2009.