

***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.

Received and published: 30 March 2009

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 N_2O_5 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

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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 $I(\text{H}_2\text{O})_2^-$ instead of $I(\text{H}_2\text{O})^-$?

The signal is normalized to $I(\text{H}_2\text{O})^-$, not $I(\text{H}_2\text{O})_2^-$. 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 N_2O_5 and ClNO_2 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.

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