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Interactive comment on "Measurements of N_2O_5, NO_2, and O_3 east of the San Francisco Bay" *by* E. C. Wood et al.

E. C. Wood et al.

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We thank Referee #1 for the comments.

1. The authors should note that one reason for the dominance of the nighttime pathway is the small calculated OH concentration. In fact, the rate of both day and night loss processes for NOx are considerably smaller under these conditions than in summer. A quick estimate and contrast of the NOx lifetime in summer and winter would be an interesting addition to this discussion.

We have added text in the discussion of our revision contrasting the NOx losses in summer and winter, noting both that OH changes and that the chemistry

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of the nocturnal and residual layer is therefore quite different in the two seasons.

2. The interpretation of the signal, which is the sum of NO3 and N2O5, exclusively as N2O5 is reasonable under the conditions described. The authors should perhaps note more explicitly that the correction for the NO3 contribution would range from roughly 1 - 10% for the stated range of conditions.

We have added a statement to this effect in the text of the revision.

3. The height of the inlet above the ground surface was 1.2 m. Is it possible that deposition to the ground plays a role in the N2O5 loss? If so, the lifetime of N2O5 with respect to hydrolysis on aerosol may not be as short as inferred. Previous modeling studies of Geyer, Stutz and coworkers have showed that there may be significant vertical gradients in NO3 and N2O5, especially within the last few meters above the ground surface.

We have added text in the revision discussing vertical gradients describing possible effects of deposition and emissions of NO. Geyer and Stutz, who highlight the effects of NO, were making observations directly in a source region. Their model is one-dimensional and assumes uniform NO emissions at the bottom. Our situation is slightly different in that we expect zero NO emissions in the near field because we are several km from the source region.

4. Figure 3: Why is the NO2 concentration only displayed when there is N2O5 present? Is there a more complete time series in NO2, or was the NO2 instrument only running simultaneously with the N2O5 measurement?

There are NO2 measurements shown when N2O5 was not present. Although power to the instruments failed on January 5th, the NO2 instrument was running continuously on January 6th. We added text in the revision to highlight those measurements.

Technical comments: 1. Page 8: At low NO and NO3 concentrations, the quantity F(NOSUM) = 2[N2O5]/(2[N2O5] + [NO2]) rather than 2[N2O5]/[NO2].

This has been changed in the revision as suggested.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6645, 2004.