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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Emission and chemistry of organic carbon in the gas and aerosol phase at a sub-urban site near Mexico City in March 2006 during the MILAGRO study" *by* J. A. de Gouw et al.

J. A. de Gouw et al.

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We thank the reviewer for careful reading of the manuscript and constructive comments. Below we repeat the reviewer's comments followed by our responses.

1. No meteorological information during the observation period at the T1 site was provided in the manuscript. This reviewer believes that it is important and necessary to provide such discussions. Fast et al. (2007) characterized the overall meteorological conditions during the MILAGRO 2006 campaign into three regimes. Did the local chemistry at the T1 site show any influence from weather conditions within each period?

We added a new Fig. 5 that shows what wind directions were sampled at T1, and how

the measured levels of CO depended on wind direction. A more thorough discussion of the effect of meteorology on the observations would go well beyond the current manuscript, which is already quite long. We did add a reference to Fast (2007).

2. The authors focused on the emissions and chemistry of organic carbon in both gas and aerosol phases at a local scale (T1 site). However, one of the objectives of the MILAGRO campaign was to investigate the local and global impact of plumes originated from Mexico City. Thus, a series of ground sites were set up along the proposed transport route including T1, a downwind site from urban Mexico City. Had the authors considered the possibility that the afternoon observations at T1 were mainly aged city plumes instead of the locally processed emissions?

Our new Fig. 5 and the additional paragraph in section 3.1 describe in more detail where the pollutants observed at T1 may have been emitted.

3. According to the calculation based on Equation 3, the authors concluded that in the mid afternoon 25% of the sampled air consisted of local non-processed emissions and 75% consisted of processed emissions that were released early in the day. Because this work was not based on quasi-Lagrange sampling of the air parcel, a more proper interpretation of this calculation should be that the air sample emitted in the early morning would be processed by OH oxidation to the extent of 75% after traveling downwind from the T1 site for 8 hr.

We disagree. If the reviewer were correct, one would expect to see more removal the more reactive a compound is. Instead, the removal seems to reach a maximum of about 75% above a reactivity of 2x10^{-11} cm^3 molecule^{-1} s^{-1} (Fig. 10). We maintain that the better explanation is that the sampled air masses contain 25% of relatively unprocessed and thus local emissions. It should be noted that local emissions were not negligible in the vicinity of T1; this has been explained better in the Introduction, also in response to comment #2 of reviewer 1.

4. Biomass burning events could be identified visually during the MILAGRO 2006

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campaign. However, the authors found no significant influence from these sources at a suburban site. Could that be explained, at least partially, by the local meteorological conditions?

The discussion in section 3.3 has been improved. The highest concentrations of trace gases were observed in the early morning, when the surface was isolated from the atmosphere aloft and the surface measurements were not very sensitive to emissions from fires surrounding the city. Also, we redid the analysis for the period after March 23, when regional fire activity was at a minimum. See our response to comment #7 of reviewer 1.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 21265, 2008.