We thank the reviewer for her/his positive assessment. We have modified the text to clarify the mentioned points.

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Line 190: I do not understand the meaning of "these four data points". It is not explained anywhere in this section.

This analysis resulted in four data points, ΔX vs. ΔCO, for characterizing source emission profiles. A linear least-square regression analysis was then applied to these four data points, with the slope of the regression line describing the molar emission ratio (ER) of the species X relative to CO, $ER_{X/CO}$, in ppbV $ppmV^{-1}$.

was modified to read:

This analysis was performed for each of the fire overflights resulting in four data points, ΔX vs. ΔCO, for source emission characterization. A linear least-square regression analysis was then applied to these four data points, with the slope of the regression line describing the molar emission ratio (ER) of the species X relative to CO, $ER_{X/CO}$, in ppbV $ppmV^{-1}$.

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Line 199: The term delta CO-source is not defined. It is central to the eqn and must be defined.

The dilution-corrected molar excess mixing ratio of a species X, $\Delta_{dil}X$ (in ppbV), at a downwind location was calculated from the locally observed ΔX and ΔCO using the following equation:

was modified to read:

The dilution-corrected molar excess mixing ratio of a species X, $\Delta_{dil}X$ (in ppbV), at a downwind location was calculated from the excess mixing ratio of CO observed at the fire source, ΔCO_{source}, and the locally observed ΔX and ΔCO using the following equation:

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Line 223: The box model is not fully explained. The authors need to include more information on how dilution is incorporated.

The following text was added:

The model calculates dilution from the simple equation

$$\frac{dX}{dt} = -k_{dil}\left(X(t) - \bar{X}_{background}\right)$$

where k_{dil} represents the dilution rate coefficient obtained from the decrease of ΔCO versus plume travel time. k_{dil} was calculated in 285 s time bins (equivalent to 1 km distance bins). More information on the UWCM and the underlying theory can be found in Dillon et al. (2002), Wolfe and Thornton (2011) and Wolfe et al. (2012).

Dillon, M. B., Lamanna, M. S., Schade, G. W., Goldstein, A., and Cohen, R. C.: Chemical evolution of the Sacramento urban plume: Transport and oxidation, J. Geophys. Res., 107, 4045, 10.1029/2001JD000969, 2002.

Wolfe, G. M. and Thornton, J. A.: The Chemistry of Atmosphere-Forest Exchange (CAFE) Model – Part 1: Model description and characterization, Atmos. Chem. Phys, 11(1), 77–101, doi:10.5194/acp-11-77-2011, 2011

Wolfe, G., Thornton, J., Merrill, W., Overview of the UW Chemical Model, User Guide - Version 2.1, last updated 10/12/2012