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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Primary and secondary sources of formaldehyde in urban atmospheres: Houston Texas region" *by* D. D. Parrish et al.

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We thank Dr. Olaguer for his comment. The main conclusion of our paper is that secondary formation of formaldehyde (CH_2O) from primary emissions of alkenes is by far the dominant CH_2O source (95±4% of total) in the Houston urban area. We are gratified to note that Dr. Olaguer apparently agrees with this conclusion as he states "... well downwind of a large industrial flare, primary formaldehyde fades to a small percentage of total formaldehyde, ..."

Our paper does not address local microenvironments in the Houston area; hence we saw no reason to discuss the 2010 TCEQ Flare Study. That study investigated emissions from a 36-inch diameter industrial flare under controlled conditions at an outdoor flare test facility. It, as well as several preceding studies, indicate that CH_2O is emitted

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from such flares; such flare emissions presumably contribute to primary CH_2O emissions from industrial facilities, which account for a small fraction (4±2% in our analysis) of CH_2O sources in Houston.

Our paper does not address modeling of ozone formation in the Houston area, other than to note that CH_2O is an important precursor for photochemical formation of ozone. We do not doubt that Dr. Olaguer's high resolution modeling can indicate very rapid ozone formation immediately downwind of a flare, although the exact details must be very sensitive to assumed initial NOx concentrations and plume dispersion rates. However, Dr. Olaguer claims that his modeling invalidates our conclusions. Since our conclusions are primarily directly derived from ambient measurements in the Houston area, and address the entire budget of CH_2O sources in the Houston area, we do not believe high resolution modeling of plumes from flares can assess our conclusions.

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