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# ***Interactive comment on “Volatile organic compound emissions from the oil and natural gas industry in the Uinta Basin, Utah: point sources compared to ambient air composition” by C. Warneke et al.***

## **Anonymous Referee #2**

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C. Warneke et al., present concentrations of selected volatile organic compounds and NO<sub>2</sub> measured in ambient air at a ground site in Uinta Basin, Utah as well as concentrations measured in the immediate vicinity of various sources related to the oil and gas industry. Interesting observations include variations of the VOC composition between different types of gas wells: with and without Dehydrators, oil wells, condensation and water tanks and other sources. Comparing the measured individual source profiles with the ambient air measurements the authors have concluded that the main emission sources in the Uinta Basin are individual wells, such that the observed VOC composi-

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tion is a mixture of raw natural gas with oil and condensate tank flushing. These data are important for regional air quality.

P11899 L20: only NO<sub>2</sub> data were discussed in the text; do we need details of the O<sub>x</sub> and NO<sub>x</sub> measurements?

P11902 L3 “the mixing ratios observed at the site are characterized. . . by very high mixing ratios during short-term spikes caused by local point sources.” What are these local sources? Do they have any relation to the oil and gas industry? It would be useful to add to Fig. 2 a more detailed map of the sampling site with a scale showing closest wells and other possible sources.

In Fig. 3 it looks like the methane concentration is sometimes lower than 2 ppm. Was the background level of methane subtracted? It would also be useful to include not just max and average concentrations, but minimum detected values too.

In Fig. 5 and 6 for some of the compounds there are elevated concentrations when the truck goes in one direction, but no spikes when it goes in the opposite direction at the pad entrance. Is there any explanation for this?

P11906 L17 “Methanol was also one of the very few compounds that was not well correlated with the other hydrocarbons at Horse Pool (e.g.  $R^2 = 0.18$  with benzene)”. Does this indicate that gas wells are not significant sources of methanol in the area?

P11907 L8 “The Horse Pool data show good correlations for all compounds with benzene” It would be more informative to show a table with  $R^2$  values for the correlation with benzene. The table can be added to supplement materials.

P11907 L11 “The slopes of the larger aromatics and the cycloalkanes with benzene in the oil well sector are clearly different from the gas well sector and the difference increases with the molecular weight of the compound.” It would be much easier to analyze Fig. 10 if the author would draw linear fit lines similar to what is presented in the top right panel in all other panels.

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Fig. 13 Can relative contributions of raw gas and tank flashing to the total emissions be estimated from the available data?

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 11895, 2014.

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C3859