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Atmospheric Chemistry and Physics Discussions

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 #1

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1. The presented data adds to an emerging body of data that considers the variation of VOC emission from oil and gas emission sources. The paper provides a useful contrast between different source types and product types. The difference between VOC emission compositions from dry gas, wet gas and oil well is of critical importance for a variety of air quality issues.

2. The paper would benefit from additional grammatical review. A case in point is the first sentence of the abstract; "Emissions of" rather than "The emissions of". However

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Discussion Paper

this is not critical as the paper clearly explains the presented data. Also some loose statements are made, e.g. p11897 line 20: “was very small” needs clarification.

3. The use of the terms “dry-gas collection” and “wet-gas collection” are confusing given the importance of the produced hydrocarbon composition. The definitions given in the paper conflict with the industry standard definitions of “wet gas” and “dry gas”. Also perhaps “consolidated from multiple wells” versus “single well.” Then perhaps the best-associated term is “collection and dehydration.”

4. The use of the terms “gas wells” and “oil wells” is also confusing. Given that the paper is measuring not just wells but also additional emission sources then “wells” should be replaced with “well pads.”

5. The paper relies upon comparison of ambient mixing ratios with some measurements in close proximity to emission sources. However there is no quantification of identified emission sources. This limitation is acknowledged in a couple of locations including the conclusions. However the paper should refer to existing and emerging techniques that can provide quantification; namely tracer release methods and remote geospatial Gaussian methods.

6. Given that there are likely to be considerable truck traffic emissions associated with well pads is there any influence noted in the VOC measurements?

7. While the lack of correlation with methane is noted p11907 line 10 this is an important finding that merits more discussion. It points to fugitives being dominated by processing (dehydration) as opposed to handling (pneumatic valves/well heads).

8. While the authors note that sample sizes are limited the paper compares data to inventory information. I cannot find an exact indication of the number of pad measurements performed that are shown in figures 2, 7, 8 and 9. This is important as were 9 out of 1000 gas wells sampled?

9. Section 3.4 is a little confusing and hard to follow. On p11909 sentence starting on

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line 23 is that what the data shows? I would place a period after dehydrators and a separate sentence that notes the most important inventory categories for VOC. Given that sources were not quantified what is the metric to state “broadly consistent” p11909 line 29.

10. Given the title of the paper I do not understand why sources (5) and (6) are noted but then excluded from analysis. Also while other sources are noted (7) these are not really discussed.

11. How can the flow back pond source be included in the conclusions when detailed discussion of this source (5) is noted as being published elsewhere? Indeed should these sources be included in the figures (and paper) and/or be given full discussion.

12. Where did the ethane (and other light NMHC) data come from that is used in Figure 13.

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