

Interactive comment on “Emissions of volatile organic compounds (VOCs) from concentrated animal feeding operations (CAFOs): chemical compositions and separation of sources” by Bin Yuan et al.

Anonymous Referee #2

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In this study, Yuan and his colleagues measured the emissions of different VOCs, along with methane and ammonia, from CAFOs of northeastern Colorado through two methods: mobile laboratory and aircraft measurement. The high time-resolution measurements allowed the authors to identify different sources of VOCs within the CAFOs. They found ethanol was mainly from feed storage and handling while NH₃ predominately came from animals and their waste. A multivariate regression analysis was conducted to determine the relative importance of these two sources for different VOC species. The contributions of different VOCs to odor activity, NO₃ reactivity, and OH reactivity were also investigated. The study was interesting and the result was well

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presented. However, the reviewer would recommend the authors make the following edits before the manuscript can be reconsidered for publication:

Line 33-34 “emissions of ethanol concentrations”. Concentrations can’t be emitted. I would recommend changing it to “concentration of emitted ethanol” or “concentrations of ethanol emissions”.

Line 85-86 Should be “within the facilities that contribute to VOC emissions”.

Figure 2 For the upper left figure, the number labeling of the time of measurement (1,2,3,4) should be on the same side of the road for easy reading. On the current figure, 1 was put on one side of the road, while 2 and 3 were put on the other. I had a hard time finding the location of time point 1 while first reading the manuscript.

Line 226-228 The authors stated that “We note that OAV, OH and NO₃ reactivity are measured along the fence line and they decrease rapidly with downwind distance and dilution.” If the authors have data to support such a statement, please put them in the manuscript. Otherwise, please indicate “(data not shown)” at the end of the sentence.

Line 234 Is it possible to separate the VOCs from animal exhalation and animal waste?

Figure 4 On the top graph, there seem to be pretty high discrepancies on the sources of VOCs for the two dairy farms, especially for carboxylic acids, alcohols, and carbonyls. Are there any explanations for that?

Line 265-268 The authors claimed that the reason for feed+handling played a major role in VOC emission of VOCs in Chicken farms was because “Chickens were raised in production houses and emissions of NH₃ and VOCs may be treated when in-house air was ventilated out”. Are there any supporting evidences for such a claim, like a detailed layout of the chicken farm to prove that such treatment does exist?

Line 324-325 The authors stated that “the enhancement ratios of acetic acid to NH₃ may be used as an indicator for emissions from different animal types” based on the observation on known beef feed yards and dairy farms. Have the authors tested this hy-

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pothesis on other CAFOs in the region that were covered by the aircraft measurement to support this claim, if the locations of other CAFOs in the region were known?

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