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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the observed response of ozone to NO_X and VOC reactivity reductions in San Joaquin Valley California 1995–present" *by* S. E. Pusede and R. C. Cohen

Anonymous Referee #1

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This paper describes a unique statistical approach that appears to provide explanations for ozone sensitivity to NOx and VOC precursors. Aside from some minor clarifications I have only two major comments.

The authors make definitive statements on the causes for the responses in ozone probability responses to NOx and VOCs. Given the non-linearity of the chemistry and the many coupled processes in the atmosphere could there be another unknown and permissible explanation that could also explain the model results? It is unclear as written whether the authors considered or pursued other permissible explanations and had data that excluded these thus leading to the conclusion presented in the manuscript.

The authors state that they would like to see this approach applied to other locations. Are the unique conditions found in the SJV making this approach possible? In other location must there be the sustained one way valley flow that sets up the highly statistical likelihood of having an upwind and downwind region? This possible limitation is not discussed in the manuscript.

Minor Comments Page 9774 line 1: The authors note that "For example, we know of no case where a quantitative prediction of the reduction in the number of annual violations of a health-based standard was made in advance of a policy and then explicitly verified with observations after the fact."

The authors may want to consider the following citation. A.B. Gilliland et al. "Dynamic evaluation of regional air quality models: Assessing changes in O3 stemming from changes in emissions and meteorology" Atmospheric Environment 42 (2008) 5110–5123

Page 9775 line 15 Missing the Farmer et al 2011 from reference list

Page 9776 line 23 It would help the reader to have a condensed version of these bullets as a table with a column that includes the paths linked with figure 2.

Page 9777 line 8 Could the author provide more text making it clearer the relationship between probability and ozone production P(O3) and why its treated as equivalent such as in figure 6.

Page 9780 line 6 What determined these ranges, is it based on any meteorological record?

Page 9781 line 3 Was there any additional analysis (i.e. Sillman Ratio) done by authors that can help confirm the inferences made here concerning the NOx sensitivity.

Page 9782 line 1 text refers to P(O3) but figure shows exceedance probability.

Figure 1 Difference between gray and white circles?

Figure 5 It is difficult to discern what four-year window each dot represents.

Figure 6 P(O3) in caption but exceedance probability shown on graph.

Appendix A Rationale for 10am – 2 pm averaging time for NO2?

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 9771, 2012.