

## ***Interactive comment on “Photochemical Production of Ozone and Emissions of NO<sub>x</sub> and CH<sub>4</sub> in the San Joaquin Valley” by Justin F. Trousdell et al.***

### **Anonymous Referee #2**

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review of Trousdell et al.

Trousdell et al. present data from flights over the San Joaquin Valley in California. They calculate NO<sub>x</sub> and CH<sub>4</sub> emission rates for this region, as well as photochemical ozone production rates. This could be a good paper, however it is currently lacking in several ways. First, the authors should describe the steps taken to determine the different terms in equation 1. Show a vertical profile of NO<sub>x</sub>, show how you determine z<sub>i</sub>, etc. This will make it easier for the reader to follow the authors' conclusions.

The writing style should be improved as well. This paper would be better if the authors introduced each section with some background information about what they are doing

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and why. There are numerous grammatical mistakes throughout the paper. I have tried to correct some, listed below. Commas should separate introductory clauses in sentences. Often there are missing spaces between words and parentheses. Subscripts are sometimes missing.

Until these changes are made, I find it difficult to properly review it. Therefore, I recommend that major revisions are necessary.

Some other questions I had are as follows:

More explanation is needed for the boundary layer height (ABL). For these flights, what were the ABL heights determined from aircraft and from the model. What were they used in Equation 1?

p. 5, line 5, and Figure 2, define in what time period is this probability calculated?

p. 5, line 21, before using WRF for vertical mixing, how does the model compare with ABL heights?

p. 9, line 7, add units to  $6 \times 10^6$

Table 1 needs more information/description. Are the authors solving for F<sub>0</sub>? What are the estimates of z<sub>i</sub> on these days? Also, you should use the same notation for average scalar as in Equation (1).

p. 13, line 24, Please explain where this 59% number comes from

Section 4.1.1.5., explain what the Leighton ratio is before discussing the deviation of it and presenting a modified ratio

Supplemental Information, Figure 1: It appears the conversion had some formatting errors

Grammar

p. 2, line 2, add comma after “scalars” p. 3, line 9, change to “data tend to be” p. 9,

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line 1, add comma after “budgets” p. 9, line 22, change “%50” to “50%” p. 10, line 2, change to “data were” p. 11, line 22, add a comma after “In their model for soil NO<sub>x</sub>” p. 12, line 13, start sentence with “It is . . .” p. 12, line 14, add comma after “satellite” p. 12, line 21, add comma after “urban air” p. 13, line 6, subscript the 2 in “NO<sub>2</sub>” p. 14, line 20, change “try and” to “try to”, and subscript “NO<sub>2</sub>” p. 14, line 25, change “lose” to “loss”, and subscript “NO<sub>2</sub>” p. 15, line 12, I’m confused by “14-6” p. 16, line 3, end sentence after “temperature” p. 16, line 16, the sentence beginning with “Marr” needs to be re-written p. 16, line 23, change “where” to “were” p. 18, lines 11 and 12, subscript the 3 in “O<sub>3</sub>” p. 20, line 16, change comma between “CH<sub>4</sub>” and “NO<sub>x</sub>” to “and” p. 21, line 9, subscripts for NO<sub>x</sub> and CH<sub>4</sub> Figure 6 caption, there is something missing between “2.” and “10.7”

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