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Interactive comment on "Ozone Production and Its Sensitivity to NO_X and VOCs: Results from the DISCOVER-AQ Field Experiment, Houston 2013" *by* Gina M. Mazzuca et al.

Anonymous Referee #2

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This paper by Mazzuca et al. presents modeling and data analysis results aimed at characterizing ozone production rates and ozone production efficiency in various locations around Houston, TX, during the DISCOVER-AQ campaign of September 2013. In general, the paper is well written, uses mostly adequate citations, and has an appropriate abstract. However, I believe that some of the figures are not necessary and that some of them provide very little new insight. The analyses performed and the approach used are tried and true so technically, there are no major faults with the work (though I question the use of a box model in Houston when the meteorology is so complex - why not just use the 3D model as it can provide answers to some of the questions asked and the ambient data can be used for model evaluation). However, due to a lack of

novelty and a lack of truly new findings that warrant an entire manuscript, I am unable to recommend this manuscript for publication in ACP.

With regard to figures, Figure 1 is not necessary (the ozone isopleth is "classic"), Figure 2 would be better as a map with points/labels as the extraneous stuff is distracting, and Figures 3 and 4 can be combined. In addition, some of the figures are intuitive based on previous work in Houston and other locations (5, 6, 8, and 9).

My largest criticism of this work is that it is known from three previous field campaigns that ozone production rates and sensitivities in Houston are temporally and spatially dependent. It seems to be that the most new information appears on lines 203-205 (line 206 is intuitive) regarding O3 loss and the split between RO2 and HO2 reactions with NO (unless this information is published elsewhere and I am unaware) and on line 255+ where it is noted that OPE has decreased in Houston compared to previous campaigns (due to the decrease in NOx emissions). I do not believe that these warrant a manuscript by themselves.

The authors do not put Houston in the context of other locations. For example, they state on line 68 that "there are a limited number of observation-based studies on ozone production and its sensitivity to NOx and VOCs." There have been such studies made in Houston (SHARP, TEXAQS I and II) as well as in other locations across the US (Nashville, New England) and Europe. It would be appropriate to make such comparisons.

A minor comment on the box model. What is the basis for assuming a two-day lifetime for all calculated species to avoid build up? Could a citation be provided? Or could other meteorological models be used to provide a more accurate estimate (this gets back to use of a 3D versus box model)?

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