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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Identifying biomass burning impacts on air quality in Southeast Texas 26–29 August 2011 using satellites, models and surface data" *by* David A. Westenbarger and Gary A. Morris

Anonymous Referee #2

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This paper attempts to show the impacts from biomass burning on SE Texas (Houston area) from multiple biomass burning events in August 2011. The stated goals are to demonstrate an impact on surface O3 from the bb emissions. The analysis is a hodge-podge of surface observations, models and satellite data that tries to show the link with surface O3. Unfortunately none of these really convincingly link the bb emissions to O3. One can find many bb events, satellite data and even trajectories that purport to show a link, but often the actual concentrations are very low. How can we say that high O3 in Houston (a very high O3 city) was due to bb emissions? What are the con-

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Discussion paper

crete pieces of evidence that support transport of smoke into the city and how much was O3 enhanced by this process? So this analysis (and manuscript) needs a major redo before it can demonstrate something useful. To guide this, I suggest the authors consider, at minimum, these questions: 1. What is the proof that PM, O3 or its precursors (CO, VOCs and/or NOx) were transported into Houston at that time? 2. Are there specific tracers that could be used to identify smoke influence at the surface (e.g. enhancement ratios, pattern of VOCs, potassium or other bb tracers, etc). 3. Does high PM prove that smoke was transported? 4. Were PM and O3 correlated on these days or does this matter? 5. Why do the observations show a wide range in highest days (eg highest O3 on 8/26 and 8/29, highest PM on 8/30 and 31, highest AOD on 8/26, highest NAAPS on 9/2). 6. If O3 was enhanced by the bb emissions, by how much and why isn't O3 enhanced on days with highest PM? Are there other factors (e.g. temp, meteorology, etc) that are needed to explain this? A few other comments: Abstract: The abstract states "...we examine the influence of transported emissions ....on O3 and precurrsors..." But most of the analysis is focused on the satellite data and models. If the goal is to demonstrate surface impacts, the authors need to spend more time analyzing and presenting the surface data. Most of the surface data presentation uses daily means, which is insufficient to understand what is going on. While the introduction and background section include a lot of citations, most are 2010 or earlier. The authors need to update these citations to include more recent findings on O3 and biomass burning influence.

Figure 2: These demonstrate that peaks occur on random days throughout the period. It is not clear what is the connection between any of these. And none of this "proves" the presence of smoke. Figure 3: Very hard to decipher. Caption says histograms, but this figure does not show a usual histograms and the legends are hard to read (fonts too small). What are you trying to show here? Does this figure show something that is not in figure 2?

Figure 4: I think a key missing point is that fires are very often present in the Mississippi

Valley. The fact that trajectories go by fires in no way proves that these fires had a significant impact. You need a stronger case to make that claim. Is PM much higher than usual for this trajectory direction on 8/26 and 8/29? Figure 7: All models seem to have a hard time getting bb transport right and NAAPS is no exception. It's a challenging problem for many reasons. I note from Figure 2, that NAAPS predicts highest PM on 9/2, whereas in reality it occurred on 8/30. So what do we take away from this?

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