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Comment

Interactive comment on “Are there urban signatures in the tropospheric ozone column products derived from satellite measurements?” by J. Kar et al.

Anonymous Referee #1

Received and published: 17 February 2010

The paper titled “Are There Urban Signatures in the Tropospheric Ozone Column Products Derived from Satellite Measurements” submitted for publication to the journal of Atmospheric Chemistry and Physics detected ozone plumes coming from metropolitan areas using satellite tropospheric ozone column measurements, specifically the total ozone residual (TOR) and tropospheric column ozone (TCO) retrievals. The conclusions of the paper rely on the assumption that the observed plumes originated from the precursors emitted within these urban centers. Although similarities of ozone and NO₂ plumes are observed, these qualitative observations should not be enough to convince the reader that the plumes are indeed from these urban centers or that the plumes contain significantly higher column amounts. A more quantitative assessment,

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such as a statistical comparison between upstream and downstream TOR and/or TCO and a correlation between NO₂ and TOR/TCO should be conducted. The efficiency and overall quality of the writing can be improved with minor edits. Below is a more detailed outline of the reviewer's comments and suggestions.

Page 3809

Line 5: Should read as "...several factors, such as the..." Line 6: Should read as "...lower troposphere and..." Line 6: Should read as "In general, the..." Line 9: The term "well placed" is awkward. Perhaps "ideal". Line 23: "Therefore" is not needed. Should read as "In this paper, we..." Line 25: Acronyms such as TOMS, SBUV, OMI, MLS are never defined.

Page 3811

Line 3: The term "As mentioned above" should rarely (if ever) be used. There is rarely any need to repeat statements within a document. If this statement is essential in reminding the readers of an important fact, then simply state the fact without the "As mentioned above". Line 5: Should read as "Eastern China and Eastern USA..." Line 5: Words like "this", "that" and "these" without specifying what the authors are talking about are vague. Perhaps edit to read as "This delineation was possible..." Line 15: Consider replacing "depiction" and "one" with "data" Line 23: Should read as "general, the plumes..." Line 23: Prior to discussing how far ozone plumes can be advected (Lines 23-26), it would be useful if the authors cited a typical lifetime of ozone in the troposphere Line 27: Should read as "...lower directly over Mexico City and a strong outflow..." Comment: The authors qualitatively reason that the ozone plumes are signatures of urban centers based on NO₂ plumes. Although NO₂ and O₃ have different tropospheric lifetimes, the concentrations downwind of the urban centers should correlate to some degree if in fact the statement presented on Page 3812 (Line 20) is true. To quantitatively address this issue, an NO₂/O₃ correlation map should be presented. Additional analyses could include a quantitative comparison of the ozone values up-

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stream versus downstream of these urban centers. The conclusions of the paper are very hard to believe if the results of these quantitative analyses are not shown.

Page 3812

Line 1: Should read as "...low column ozone directly over the city is likely..." Line 18: It would be useful if the authors cited a typical lifetime of NO₂ in the troposphere

Page 3814

Line 15-16: The sentence "However a caveat should be pointed out in this context." should be removed. Line 22: "etc" should be removed

Page 3815

Line 12: Combine the sentences starting with "Figure 5" and "These" to remove the use of the vague term of "These" Line 23: Should read as "In fact, Fresno and Visalia are just below..."

Page 3816

Line 9: What does the term "away from the city" mean? This statement needs more clarification. For instance, how far from the city? Why was this distance chosen? What would result if the authors choose another distance for the analysis? In which direction is "away from the city" either in geographic coordinates or in relation to the mean wind direction? What would result if the direction "away from the city" changes? This analysis seems to be arbitrary without proper discussion and the results may be considerably biased based on the chosen parameters. Line 19: The term "footprint" must be defined if it is used. The authors have been using the term "signatures" and it is suggested that they remain consistent.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 3807, 2010.

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