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Interactive comment on “The impacts of precursor reduction and meteorology on ground-level ozone in the Greater Toronto Area” by S. C. Pugliese et al.

Anonymous Referee #3

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The impacts of precursor reduction and meteorology on ground-level ozone in the Greater Toronto Area

By Pugliese et al.

In their paper, Pugliese et al. present an analysis of 13 years worth of observational data to investigate the response of ground-level ozone to emissions changes that have occurred in the Greater Toronto Area during the same amount of time. Even though no new analysis techniques are presented, the process followed by the authors to arrive

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to some conclusions is interesting. The paper is, in general, well written though some issues need to be addressed.

General (major) comments: For the analysis of meteorological data and the corresponding influences on Ox, two different sites were chosen: Toronto North to investigate wind influence and Downtown2 for solar radiation. It is not clear why these two sites were selected; in fact, it is not clear if the same conclusions hold if the analysis is conducted for other sites. This should be clarified.

I found confusing the analysis conducted on the influence of wind patterns on Ox. First of all, the analysis is carried out only for 2008-2012, why not use more years to have more data and do a more robust statistical analysis? Authors indicate that "...the summer of 2012 was affected by a large number of days with air transport from the W-SE, the fewest days with air transport from the W-NE and the highest number of stagnant periods..." Comparatively, the summer of 2012 had less W-SE than 2010 and about the same as 2008. Similarly, all years have about the same days of stagnant conditions (2010 being the lowest). Using "fewest", "highest", "large" can be confusing: better use a more quantitative analysis. Lastly, in the conclusions, the authors indicate that "...air transport from upwind regions may have [played a role in the Ox increase]...". However, in the discussion of the results, authors indicate that "...Ox concentrations cannot be explained by wind transport...". There is an apparent contradiction here. (Minor comment: error bars in Fig 5 might help to give an idea of the variability of the data.)

OVOC data at a very limited extent are presented (Fig. 2) and not discussed at all. If no additional insight can be derived from it, I suggest removing it from the paper.

Specific (minor) comments: Page 10210, line 6. Define GTA in the abstract.

Page 10211, line 3. For the international readership, define if \$ are US Dlls or else.

Page 10211, line 19. "...fuel combustion and transportation..." Clarify because there

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is an overlap here (part of the transportation emissions come from fuel combustion).

Page 10211, lines 26-27. References are quite old (particularly Wolff and Lioy, 1978). I suggest updating these.

Page 10214, line 20. Use GTA instead of Greater Toronto Area.

Page 10215, line 2. "... emissions made directly in the city,..." I found confusing this statement; please clarify.

Page 10215, line 6. "...frequent smog episodes..." I found ambiguous this statement. I suggest giving quantitative data (e.g., % of days above a given limit for given species [O₃, PM_x, etc.]).

Page 10215, lines 24-26. Provide a reference where additional details on how the carbonyls sampling and analysis was conducted, or else provide the details here.

Page 10216, line 13. Is Seinfeld & Pandis (2006) the best reference for this?

Page 10217, lines 17-18. For completeness, provide coordinates or incorporate a marker in Figure 1 on the location where the solar radiation device was deployed.

Page 10218, line 7. I guess it should be "continues".

Page 10218, line 14. For completeness, provide coordinates or incorporate a marker in Figure 1 on the location where the Lakeview Generating Station was located.

Figure 4. Right vertical axis should read "30 Deg C", not "30 Dec C".

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 10209, 2014.

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