

Interactive comment on “Long-term measurements of ground-level ozone in Windsor, Canada – Part I. temporal variations and trends” by Xiaohong Xu et al.

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Received and published: 6 March 2019

Referee comments: The authors investigate temporal variations and long-term (1996-2015) trend of ground-level O₃ and its precursors (NO_x and VOCs) at two urban sites in Windsor, Ontario, Canada. They looked into trend of ozone and total ozone (O₃+NO₂) in different months of year and different time of day. The analysis showed decreased O₃ titration, reduced local photochemical production of O₃, and increased background O₃ level during the study period. The authors suggest that these factors are the reasons for the increased annual O₃ concentration in the study area.

This study provides useful results for assessing and further developing O₃ control mea-

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asures in city of Windsor and adds to the data base on surface ozone changes in North American cities. However, there is limited novelty on data analysis method and little new insight into the ozone processes. IGAC's Tropospheric Ozone Assessment Report project (<http://www.igacproject.org/activities/TOAR>) has analyzed the trends of surface ozone in the world and offered general discussions on its relationship with its precursors in different parts of the globe. Other previous papers have examined the trends and discussed the factors influencing the trend in individual city/location. It is unclear how the present study advances our understanding of the ozone trend and driving factors. I suggest the authors add more in-depth analysis and discussion of the data, perhaps by reducing some general descriptions of the data and incorporating findings they intend to put in part II of analysis of this dataset.

Response: Thank you for valuing our work and for your insightful suggestions. This study particularly focused on Windsor, Ontario, an urban location where high ozone levels were often observed. Relative to the IGAC's Tropospheric Ozone Assessment Report project, long-term measurements of both ozone and its precursors were evaluated to advance the understanding of different ozone trends (i.e., peak ozone levels vs. annual averages). The study findings showed the effectiveness of emissions control policies implemented in Canada and the U.S. We have amended the manuscript as follows to highlight the original contribution of this study (Line 84-91). Track changes were used in the marked-up manuscript uploaded online. The line numbers refer to the marked-up manuscript.

“Built on our understanding of spatial variations (Mills et al., 2018; Fleming et al., 2018), this study evaluated temporal variations and trends of ground-level O₃ and its precursors (NO_x and VOC) in Windsor, an urban location in Southern Ontario, Canada, during the 20-year study period of 1996-2015. The main objective was to identify the driving force of long-term trends of O₃ concentrations in Windsor during the past 20 years, as well as seasonal and diurnal variations. Findings of this study will shed light on the effectiveness of emission control policies and help develop feasible approaches to

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reducing O₃ concentrations in this region.”

The Part II of this study focuses on the influence of meteorological conditions and regional transport on smog season O₃ in Windsor. We feel that the findings may not align well with the current manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-851>, 2018.