

***Interactive comment on* “The role of climate and emission changes in future air quality over southern Canada and northern Mexico” by E. Tagaris et al.**

Anonymous Referee #1

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This manuscript presents model simulations over a large North American domain similar to those discussed in Tagaris et al., JGR, 2007, and focuses in on Mexico and Canada. While a cataloguing of model differences is presented, no evaluation of the modeling results over Canada and Mexico is presented. In order to have any confidence in the model results, evaluation of the air quality and meteorology predictions is warranted. These areas have higher uncertainty due to the close proximity to the domain boundaries and emission estimates.

This study uses updated emission scenarios for Canada and Northern Mexico. However, no direct comparison is provided to show how much the updates changed the

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future emission scenario, whether they resulted in model improvements, and whether they lead to different results or conclusions.

The general conclusions for the Canadian and Mexican areas are generally similar to those shown from the U.S. in Tagaris et al., 2007. The authors have some nice illustrations of these results, but what conclusions from here progress beyond what has already been suggestions for regional air quality changes under future climate? Are there any differences in these results from other results reported in the literature over Canada and Mexico?

No direct comparisons are made to other literature where air quality under future climate has been studied. Are these findings consistent with the global scale modeling results published (e.g., Stevenson et al., JGR 2006; Huang et al., JAMC 2007; Wu et al., JGR 2007, 2008; Zeng et al., ACP 2008; Racherla and Adams, ACP 2008)? What about other regional simulations referred to in the introduction?

The authors mention that the boundary conditions do not change. When only climate changes in the 2050 simulations, very little difference is noted in the Canadian and Mexican areas. Since they are so close to the model boundaries, the constant boundary changes have to play some role in this. Going in 5 grids is not sufficient to remove this influence for PM_{2.5} or O₃.

The manuscript should have a substantial amount of revision before being deemed acceptable for publication.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 3405, 2008.

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