

***Interactive comment on* “Projections of mid-century summer air-quality for North America: effects of changes in climate and precursor emissions” by J. Kelly et al.**

Anonymous Referee #2

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This study examines the impacts of future climate change and emission change on air quality for North America. Extensive analysis and simulation have been carried out in this study. I think this manuscript could contribute to our understanding on the evolution of atmospheric composition but it could be further improved with some revisions.

- (1). Some sections, especially the introduction is unnecessarily long; some background information is not closely related to this study.
- (2). p3879, L12 - Is it true that the global model provides not only boundary condition but also initial conditions to the regional climate model?
- (3). p3887-3890 - How the chemical boundary conditions for the regional air quality

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model is obtained/handled?

(4). p3900, L21-23: the model results show decreased OH with higher biogenic HC emissions; however, some studies (e.g. Lelieveld et al. 2008) have shown that biogenic HC emissions don't actually decrease OH levels - please provide some explanation here, such as the chemical scheme used in the model.

Lelieveld, et al., Atmospheric oxidation capacity sustained by a tropical forest, Nature, 452, 737–740, 2008.

(5). p3901, L1-3: it looks the increases in O₃ and PM is not the case for everywhere; some regions actually show decreases in O₃ or PM with climate change (at least based on figures 7 & 8) - please clarify on this.

(6). P3901, L5: how the "overall reactivity" is defined? Does that simply refer to the average atmospheric OH concentration?

(7). p3902, L26-27: "health benefits associated with the associated reduction in smog precursors would be immediate" Does not read well; please considering rewriting this part.

(8). p3877, L27 "(5) decreased cloudiness" - is this a general/robust feature of climate change?

(9). I'm not sure why the authors would choose different/inconsistent scenarios for future climate (A2) and emissions (RCP) - I would suggest using consistent scenarios if possible.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 3875, 2012.

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