

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

Received and published: 13 April 2012

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
C1511

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.