

## ***Interactive comment on “Downscaling a global climate model to simulate climate change impacts on US regional and urban air quality” by M. Trail et al.***

### **Anonymous Referee #2**

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Comments on “Downscaling a Global Climate Model to Simulate Climate Change Impacts on U.S. Regional and Urban Air Quality” By Trail et al.

General evaluation

In this manuscript, WRF3.1 was nested within GISS ModelE2 to downscale the climate change information over the U.S. under RCP4.5 scenario. Two periods (2006 to 2010 and 2048 to 2052) were chosen. Several variables were analyzed, including temperature, precipitation, insolation, stagnation events, and ventilation. Based on the downscaled higher resolution data, the impacts of climate changes on regional and urban air quality were discussed.

C817

Overall, dynamical downscaling is a useful tool to obtain high resolution climate change information. The discussion about the impacts of climate change on the air quality is also interesting. However, I find that the authors overstated the importance of their study on the air quality aspect, because in the current manuscript all the impacts of climate change on the air quality are implied, since no direct or quantified links between the climate change and the air quality are established, and no air quality model is used. As the authors reviewed, studies on the impacts of climate change on air quality rely on the coupling of regional climate model such as WRF to Multi-scale Air Quality model. Therefore, I believe that the whole paper should be reorganized, and focus of the study should be back to the climate change issue.

1. Please state clearly what “consistent changes in regional climate would enhance ozone level” in abstract (line 28).
2. Please consider the following title: “Downscaling a global climate model to simulate climate change over U.S. and the implication on regional and urban air quality”. (See the general evaluation)
3. L143-L144: I wonder the temporal resolution of SST and sea-ice. Are they monthly data?
4. L149-150: Please state clearly what “chemical parameters” were produced? Does the GISS model include the atmosphere chemistry model?
5. L233-234: “These biases . . . correspond to . . .” is a very strong statement. Please list the corresponding biases from GISS model here.
6. L220-L235: I also wonder how well the stagnation event and ventilation are simulated during the period of 2006-2010. A comparison to the observation is needed.
7. L260: “greather” should be “greater”
8. L308: please give the clear definition of the stagnation event (The threshold of the wind speed and the precipitation).

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9. L319 – L322: The differences of the changes in stagnation events between 36km simulation and 12km simulation are evident. Please explain the differences.

10. L340-L342: Some discussions are needed for the difference.

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Interactive comment on Geosci. Model Dev. Discuss., 6, 2517, 2013.