

Interactive comment on “Air-quality in the mid-21st century for the city of Paris under two climate scenarios; from regional to local scale” by K. Markakis et al.

Anonymous Referee #2

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This paper addresses future air quality for the city of Paris and surrounding areas using a high resolution (4 km x 4 km grid cells) chemical transport modeling system for selected future projections for the 2050s time frame. The focus in this work is on the effects of using the high resolution model to assess ozone and PM levels for this area. The paper is well written and the methods and results are clearly documented. As such, the paper represents another step forward in understanding the range of potential air quality conditions due to ongoing reduction of anthropogenic emissions in the context of climate change. On this basis, the paper should be published. There are only minor revisions suggested as outlined in the following.

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The typical nesting used for WRF (and for CTM modeling) is a factor of 3 with consistent grid scales for both the meteorology and chemical modeling, but in this study, the meteorology is nested from 50 km to 10 km, while the CTM results are nested from 50 km to 4 km. The authors should address first how and why the meteorology is nested to 10 km while the chemistry is nested to 4 km and what are the effects of these differences. Second, are there any specific issues associated with larger than normal nesting steps?

An important aspect of climate impacts on air quality is the role of biogenic emissions sensitive to temperature and other meteorological factors. There is no description of how biogenic emissions were treated and whether the biogenic emissions played any significant role in the modeled changes.

Because a major focus in this paper is on how emissions changes affect ozone chemistry, there should be a better documentation of the changes in emission among the control and two future projection cases. A table or graphic summarizing regional and/or urban emissions (NO_x, VOCs, etc) for each case would be helpful.

The authors note that peak ozone episodes are not fully captured by the modeling system as evident from the current decade evaluation results. How does this aspect of model performance affect their overall conclusions related to future ozone behavior? In this case, do the results represent a lower bound on future ozone levels?

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