Responses to Reviewers:

Reviewer 1:

We have revised the manuscript following his/her suggestions as is described below.

General comments

The authors describe the issues related to the change of the grid dimension. Their finding, as they point out, may be is suitable only for Mexico. Therefore the results have only local application. As technical information it is interesting and can be publish as technical note in order to be considered by other researchers in the field. This work is shorter than other similar (i.e. Misenis et al 2010)

In this study, the model is applied in Mexico City. There are several reasons for selecting this city; (1) there are intensive surface measurements of O3, CO, NOx and the measurement range extents over the entire city (see Figure 1). Intensive measurements are necessary to evaluate the model result and to derive at which horizontal resolution the model performance is reasonable for simulating chemical oxidants in large cities. (2) Mexico City is an urban area with a large horizontal size, and the model horizontal grids can therefore be changed over a large range (e.g., 3, 6, 12, and 24 km). We do understand that every city is different in terms of photochemistry, meteorological conditions. However, the result of the study provides some useful information about the sensitivity of model horizontal resolution to the simulation of chemical pollutants. For example, the study shows that the simulated result is more sensitive to the resolution of meteorological fields than the resolution of emissions. Furthermore, as the Reviewer 3 points out **"The paper also suggests that the ratio of urban dimension to grid size might be used as an indicator for the required grid resolution. This is a valuable result (although it isn't included in the abstract) since it provides a concept that generalizes the results of the paper and that could be tested in other urban settings."** In the revised manuscript, we add some of the above text in the revised paper.

We are confused by the statement that **this paper is shorter than Misenis et al. (2010).** Publication of a paper should be based on scientific merits and not on the length of the paper.

The authors explain tree different issues related to the change of the grid scale (meteorology, emissions and photochemistry). However there is another dimension to be considered the vertical structure in the model that also has to be changed if the horizontal scale varies.

The reviewer is correct when he(she) says that the vertical resolution is another factor that affects the accuracy of the model results. This issue, however, is not straightforward to address since it involves related issues, such as the formulation of vertical mixing in the planetary boundary layer, the formulation of convection, etc… These issues are considered

as outside the scope of the present study. We add, however, a paragraph in the text to highlight the importance of vertical resolution.

Specific comments

There is no explanation about the way that the authors extract the concentrations values from the model, it is possible to obtain the station values by bilinear interpolation but also is possible to do an average of the stations and compare with model results. It is possible that the authors are comparing volume average (model) against point values, and it can lead differences between measurements and model.

In the revised paper, we clarify the method which is used to extract model values according to the location of the measurement sites.

Reference:
Misenis, C., Zhang, Y. An examination of sensitivity of WRF/Chem predictions to physical parameterizations, horizontal grid spacing, and nesting options Atmospheric Research, . Article in Press.

We reference this paper in the revised paper.