**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Comparisons of
WRF/Chem simulations in Mexico City with
ground-based RAMA measurements during the
MILAGRO-2006 period" *by* Y. Zhang et al.

Anonymous Referee #3

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General observations:

The manuscript by Y. Zhang et al. presents an extensive performance evaluation of
WRF/Chem model with surface measurements taken at RAMA sites in the Mexico City.
One interesting thing of the manuscript is that it considers both meteorological variables
and criteria pollutants at the same time in the analyses, under different meteorological
scenarios and different PBL and LSM schemes. Although previous published papers
had addressed this issue before, the validation of WRF/Chem for the Mexico City is
worthwhile, particularly for the peculiar tropical dynamics in this region. However, I
have some questions and suggestions for the authors.

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Interactive Discussion

Discussion Paper

Pg. 1339 lines 8-9

... Time series of surface wind speed at monitoring stations (not shown) indicate that the model captures well the diurnal cycle of the observations ...

This statement is quite important, and it needs to be elaborated in more detail. Previous papers on Mexico City and elsewhere had reported troubles getting the right time of shifting of the MET variables on the diurnal cycle.

Pg. 1340 lines 22-24

... Uncertainties in emissions rates of NO and NO2 and deficiencies in model chemistry parameterization (e.g., conversion between NO and NO2) may be responsible for these model biases...

There are many reasons for that behavior. One could be to a lesser reactive simulated atmosphere than the real one. After photochemistry is switched off, N-containing compound may form faster than the model does (i.e. to produce PANs, Organic nitrates, etc.). I consider convenient for the paper to include a discussion on how other key reactive species behaves against measurements, such as formaldehyde, Ox, etc. Those are available at different sites during MIALGRO field study.

Pg. 1342 lines 11-12

... Table 1 also shows that the mean values of major pollutants (CO, NO, NO2 and NOx) decrease from weekday to weekend both in observations and in simulations as expected ...

A dispute on this issue rises recently in the Mexico City Metropolitan Area (MCMA). The environmental authority claims that O3 levels increase at weekends, particularly on Saturday. Under this assumption, the No Circula Program was extended to include Saturdays also. According to your table 1, not big differences in observed O3 levels were found on weekends. I think expanding a little more this discussion will increase the papers results.

Pg 1331 lines 12-14.

... from approximately 4 million vehicles (burning over 40 million liters of fuel per day) and the emissions from ...

This statement is not correct. According to the latest Emission Inventory (2006) for the MCMA, the fuel consumption in this region is 47 million liters/day. This amount considers all fuels: gasoline, diesel for industrial and transport sectors, natural and LPG gas. The energetic content for all fuels is then converted into litters/day.

The Emissions Inventory 2006 for the MCMA has been improved substantially. Now it includes hourly emissions per pollutant, per day of the week, per season of the year, and it is spatially disaggregated. You can download it from the next link:

http://www.sma.df.gob.mx/sma/index.php?opcion=26&id=501

It could be good for the authors include this information as a reference and to re-write the emissions inventory section accordingly.

Specific suggestions and changes.

Pg 1333, lines 13-14.

... The dynamic cores in WRF include a fully mass and scalar-conserving flux form mass coordinate version that is widely used in air quality ...

The sentence is not clear.

Pg 1335 Lines 2-3.

... The emissions inventory used in this study was gridded based on the official, bottomup emissions inventory for the MCMA for the year 2004 ...

Now is available the 2006 emissions inventory for the MCMA. See above.

Pg. 1336 lines 6-7

... Four meteorological variables, temperature, relative humidity, wind direction, and wind speed were measured at 10 stations ...

The RAMA network has available 15 met stations, why to use only ten?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 1329, 2009.