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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Process analysis and sensitivity study of regional ozone formation over the Pearl River Delta, China, during the PRIDE-PRD2004 campaign using the CMAQ model" *by* X. Wang et al.

Anonymous Referee #2

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General Comments

The manuscript describes an air quality model study with a nested model system over the Pearl River Delta in China, a region with poor air quality. The manuscript is well structured and provides a comprehensive analysis of a selected period in October 2004 where a field experiment took place in this region. Some aspects in the manuscript could be clarified as outlined below. After taken these clarifications into account, I recommend publishing this manuscript as ACP paper.

Specific Comments

- The authors use many abbreviations throughout the manuscript. Even though they are explained, it is sometimes difficult for the reader to have all these abbreviations in mind. Therefore I recommend to write the full names for those which are only seldom used, e.g. OPE, IPR. Not every expression needs an abbreviation.

- introduction: CTM studies over Hong Kong are cited, but references to modelling studies over the Pearl River Delta are not cited. As it is mentioned that limited studies are reported and 3-D studies have rarely been performed, references to such studies should be provided.

- section 2.1: It should be clarified how the MM5 model is set-up over the largest domain. With NCEP data only or additionally, with data from the field experiment? In addition, it is not clear if the smaller domains receive the meteorological initial and boundary condition from the respective domain around it or always from the largest domain. If so, it remains unclear why the 12 km resolution model simulation is carried out as all the presented model results seem to be from the 4 km resolution simulation.

- section 2.1: The emission inventory of Streets et al. (2003) has been set-up for the year 2000. What changes happened in the Pearl River Delta region from 2000 to 2004? As economy and traffic volume and associated emissions are changing rapidly in China, it would be helpful to discuss briefly such potential influences. In addition, does biomass burning, which is not included in the inventory has any effect in this region during the autumn season?

- section 2.2: what is the performance of the MM5 simulations in the other resolutions, which influence the simulation in 4 km resolution?

- section 3: even though model results of ozone, NO2 and VOC compare reasonably well with observations at the measurement sites, a more thorough discussion of the deviations between model results and measurements would raise the value of the

manuscript

- section 3.1: table 3: it is unnecessary as it consists only of one row and expect one number, the others are already mentioned in the text

- summary: the manuscript would benefit from some remarks about the new insights that came out in comparison to what was already known before (maybe in relation to the limited studies and 3-D studies that have rarely been performed, as mentioned in the introduction)

- Fig. 8a: TRAN is obviously not the sum of VTRA and HTRA. Also in Fig. 8c TRAN seems to be incorrect.

Technical issues

- title: in my opinion, abbreviations should be avoided in the title (PRIDE-PRD2004, CMAQ), it would read better as follows: . . . during a field campaign using an air quality model system

- abstract: PRD should be introduced when used first

- introduction: page 26836, line 15: raised instead of drawn; page 26837, line 10: 'CTM's are fundamental tools' instead of 'A CTM is a fundamental tool'

- section 3.1, line 15: insert at 'the' monitoring and line 16: delete across

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 26833, 2009.