

***Interactive comment on “Comparative evaluation of the impact of WRF/NMM and WRF/ARW meteorology on CMAQ simulations for PM<sub>2.5</sub> and its related precursors during the 2006 TexAQS/GoMACCS study” by S. Yu et al.***

**Anonymous Referee #1**

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General comments In view of the large spread between air-quality model predictions the influence of meteorology is of scientific as well as practical interest. This may also be understood in terms of online coupled meteorology and air-quality models or in terms of ensemble predictions of air-quality. Although the subject is of general importance the article still needs some revision before publication (see specific comments below). The main issue regarding the discussion paper is that the title suggests that the impact of two meteorological drivers (with different dynamical cores) on the predictions of the modelling systems will be considered, but in practice the authors focus

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more on the similarities between the model systems. In particular there is only little explicit interpretation of the results in terms of differences in meteorological drivers.

**Specific comments** The title of the article suggests that the differences between model system (WRF/NMM-VMAQ and WRF/ARW-CMAQ) predictions will be explicitly interpreted in terms of differences in the dynamical cores of the model systems. This is however, not the case and it may be suggested to either include more discussion of the results or change the title.

The description of the model systems provided in the article is not sufficient to facilitate interpretation of the results in terms of differences of the model systems. In particular the main differences between the NMM and ARW dynamical cores is not explained and the model configurations (domain, resolution etc.) are also not properly explained. It should not be necessary to consult a reference for basic features which are of importance in the interpretation (comparison of model system predictions) of the results.

Referring back to the title the conclusion should contain at least one valid bullet regarding the differences (or no differences) between the model systems, i.e the impact of WRF/NMM and WRF/ARW meteorology on the CMAQ pm2.5 simulations.

The comparison with measurement data is vital in this article and a discussion of the the quality of the measurements should be included.

Some discussion of the meteorological performance of the NMM and ARW dynamical cores would be helpful in interpreting the model system predictions.

**Technical comments** The preparation of model data to be comparable with measured profiles is not explained in enough detail (section ).

Too many abbreviations which are either not used or not defined (e.g HGB, DFW,CEM,NEI,VMT,P3)

The term "reasonably well" is used throughout the article to indicate some basic level of performance. It is, however,often unclear what is meant when the term is used, e.g.

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section 2.1, 3.3.1, 3.3.2; conclusion.

Include more details regarding the model system and configurations used (section 2.1)

Missing reference on p. 32035, second paragraph, line 4: ...CEM estimates of ...

CEM not defined

Unclear what is meant by running the model continuously: no restarts or no "holes" in the simulation period or something else ? (section 2.1)

Several references to "part 1" of this study; the title, however, there is no part 2 in the title of the current study . Include specific reference instead.

Unclear what is meant by "slightly consistent" (section 3.1)

The term "OTHER" should have been defined when first used (section 3.2)

The terms "underestimated/overestimated vertically" is not clear (section 3.3.1)

No need to include an "extra" summary in the last paragraph of the conclusion

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 32031, 2011.

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