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Interactive comment on “Evaluating model performance of an ensemble-based chemical data assimilation system during INTEX-B field mission” by A. F. Arellano Jr. et al.

Anonymous Referee #2

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This is a very well written and informative paper dealing with an ensemble approach to data assimilation for CO using the NCAR DART system. Ensemble approaches to data assimilation are one of the powerful and important techniques to integrate model with observations to improve predictive skill. This paper presents clearly an important application using assimilated meteorology and MOPITT CO, and presents tests of the assimilation system, as well as demonstrates its impact on model performance, as well as demonstrates other important outputs from the ensemble assimilation.

The tests selected are appropriate. They explore in the ensemble meteorology, CO initial state and emissions. This paper presents valuable insights and results into

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important issues of chemical data assimilation. For example, they demonstrate an improvement in model prediction when MOPITT CO is assimilated as determined by comparison with INTEX B observations. They show that the assimilation system converges on a time scale ~ 5 days, thus supporting the information content of the MOPITT observations. They show the usefulness not only for reanalysis but also for short term forecasting.

They also show that the ensemble assimilation approach provides valuable information on model uncertainty and error. Both very important benefits of this approach. For example, the analysis for the INTEX B period found a spatial error structure with over prediction in the source region and under prediction in far downwind regions. This implies model errors, whose origins require further study.

I would like to see in Figure 13 the field itself along with the difference fields to get a better understanding of changes.

All in all a fine paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9717, 2007.

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