

Interactive comment on “Influence of satellite-derived photolysis rates and NO_x emissions on Texas ozone modeling” by W. Tang et al.

Anonymous Referee #1

Received and published: 7 November 2014

In the paper, the photolysis rates and NO_x emissions are adjusted based on GOES observations and OMI NO₂ products, respectively. The authors applied both region-based and sector-based approaches when adjusting the NO_x emissions using Kalman filter method. The CAMx results after such adjustments show marginal improvements on NO₂ and ozone simulations, but not as promising as most would have expected. The authors stated that the the satellite retrieval errors and the model uncertainties might play important roles here. While it certainly can be the case, the authors might need to investigate further into the main causes here.

In both region-based and sector-based NO_x emission adjustments, the authors limit the

C8862

number of scaling factors to 7. The authors acknowledge that such arrangements might cause deterioration of the model performance as the a prior patterns are assumed. Since Kalman filter certainly allows the number of scaling factors to be much larger, it is recommended that the authors try to release such unnecessary constraints in their inversion setup.

General comments:

1. Both region-based and sector-based NO_x emission adjustments were made in the paper, but only "sector-based" approach is mentioned in the abstract.
2. In the Introduction section, more references should be added when discussing "studies using satellite NO₂ measurements to create top-down NO_x emissions for atmospheric modeling".

Specific comments:

1. Please check equation 5 (last term).
2. Page 24491, line 23, "while it adds 50% ...": Should it be 49% ?
3. Page 24493, line 16, "0.09 reduction in both modeled NMB ...": Is it 0.09 reduction in NMB? Table 5 shows that it is from 0.09 to -0.02.
4. Table 3: Are the "overall" evaluation statistics based on the data from all regions listed above them? Then, the "overall" numbers do not seem to be right. The values should fall between the minimums and the maximums of the separate regions. For instance, in the last column, the NMEs are all above or equal to 0.30, but the overall NME is shown as 0.16.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 24475, 2014.

C8863