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

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In the paper, the photolysis rates and NOx 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 NOx 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 NOx emission adjustments, the authors limit the

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 NOx 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 NOx 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.