Review of "Temporal characteristics of atmospheric ammonia and nitrogen dioxide over China based on emission data, satellite observations and atmospheric transport modeling since 1980" by Lei Liu et al.

This manuscript showed interesting results on the temporal evolution of NO_x and NH_3 over China. By comparing the data resulting from inventories of REAS and EDGAR, the authors found that NH_3 and NO_x continually increased over China during 1980-2010. Furthermore, based on previous satellite observations and an atmospheric chemistry transport model (MOZART-4), they also found that NO_2 over China increased from 2005 to 2011 and then decreased significantly from 2011 to 2015. Finally the authors discussed the plausible reasons including control policies of Chinese government to the emission trends of reactive nitrogen. Overall the topic of the study is sound and the manuscript was written well. However, I have the following concerns to be addressed before recommending it for publication in *Atmos. Chem. Phys.*

Major comments:

1. In line 168 of page 8, the authors filtered the DOMINO product with an absolute error below 10^{15} molecules cm^{-2}. However the NO_2 vertical column densities (VCDs) error depend on the net values of NO_2 VCDs. Therefore the filter may arbitrarily exclude the high NO_2 VCD values. The authors should evaluate the influence of absolute errors on the final emission results and show it in current study.

2. The authors compared the emission data of NO_2 and NH_3 from satellite observations to that from Mozart-4 model simulations. But the authors did not explain whether the satellite overpass time has been considered during the comparison or not. The OMI satellite only gives the NO_2 data at about 1:30 pm of local time. The same time could also be used for the extraction of NO_2 data from Mozart-4 model. Whether this will influence the output results and conclusions of current study? This point should be clarified more.

3. The MOZART-4 model contained 12 bulk aerosol compounds, 39 photolysis, 85 gas species as well as 157 gas-phase reactions. However, the authors did not discuss the influence of NO_x and NH_3 sink on their emission values at all while elucidating the data from MOZART-4. Although the authors have discussed the potential impacts of emission regulation or

energy efficiency enhancement relevant government control policies on the NO_x and NH_3 emissions, they are encouraged to show their insight on the correlations of atmospheric process of NO_x and NH_3 with their final emission values.

4. In section 3.1, the authors showed the emission data result from REAS and EDGAR, but they did not give convincing reasons for the different results of 0.24 kg N ha^{-1} y^{-2} from EDGAR and 0.17 kg N ha^{-1} y^{-2} from REAS. The authors should supply plausible explanations (e.g. induced by methodological difference of data compiling or meteorological factors etc.) to this. In addition, the authors thought 0.24 kg N ha^{-1} y^{-2} from EDGAR was much higher than 0.17 kg N ha^{-1} y^{-2} from REAS in lines 221-222 of page 11. However, they thought 0.33 kg N ha^{-1} y^{-2} was close to 0.24 kg N ha^{-1} y^{-2} in lines 231-232 of the same page. This is logically wrong. They need to correct it and also the relevant discussions.

5. In lines 311-315 of page 15, the whole daily coverage over China cannot be achieved also due to the row anomaly effect. This effect may cause half of the satellite pixels to be unusable. The discussions here should be rearranged.

6. Lines 99-101: the authors are encouraged to expand introduction on the method for converting satellite data to NH_3 column. Only a reference citation is not convenient for readers to follow up the work in a straight way.

Minor comments:

7. Line 102: the words of ‘provides’ and ‘potential’ should be changed to ‘provide’ and ‘possibility’.

8. Line 104: the description of ‘emission data are also very important tools’ is confusing, and there is no logic comparability with ‘satellite observations’ in the front dialogue, so I suggest to remove the ‘tools’ or modify the front dialogue properly.

9. Line 110: change ‘resolutions’ to ‘resolution’.

10. Line 170: change ‘the manuscript’ to ‘previous work’.

11. Line 130: change ‘denotes’ to ‘denote’.

12. Line 228-29: Similar information of the first dialogue here has been shown in lines 221-222, so there is no necessary to show it twice.

13. Line 229-230: the description of ‘Liu et al. (2013) conducted that emissions of national anthropogenic NH_3 and NO_x summarized from published data during 1980-2010’ is confusing and should be rearranged.

14. Figure 1: add error bars to panel b please.