

Interactive comment on “Estimating NH₃ emissions from agricultural fertilizer application in China using the bi-directional CMAQ model coupled to an agro-ecosystem model” by X. Fu et al.

Anonymous Referee #3

Received and published: 10 February 2015

The paper estimated the NH₃ emission from the agricultural fertilizer application in China using an agricultural fertilizer modeling system coupling with a regional air quality model and an agro-ecosystem model, rather than the traditional emission-factor method. It improved the spatial and temporal resolution of NH₃ emission from fertilizer use. The manuscript was well written and easy to understand and is suitable for the special issue "East Asia emissions assessment (EA2)" in ACP. I recommend it for publication in ACP after the following minor revisions are addressed.

C163

General comments: 1. Compared with the US case in the research of Cooter et al., 2012 and Bash et al., 2013, what are the differences and difficulties when this method is used in China?

2. It is nice to see the authors compared the results of this study with others in 3.2.2. In addition to the current comparison, I wonder if the authors can also compare the seasonal variations of different NH₃ emission inventories.

3. The discussions on the uncertainties of NH₃ emissions are simple and not very clear, is it possible to have more details in conducting or estimating the uncertainties of emission inventories in this study?

4. As mentioned in section 3.4, some uncertainties still exist for this approach. I would like to suggest that in the conclusion part, authors may need to add some discussions about the possible improvements for this model when it is applied in China in the future.

Special comments: 1. P751, Line 11: In the year of 2010, there are 2856 official counties in China, not 2710. Please check. 2. Page 753, Line 1-2: It would be nice to have some sort of citation for the "unpublished materials".

3. P756, Line 7-8, kg grid⁻¹ seems not a good unit. It might be better to use kg ha⁻¹.

4. Page 772: Please clarify what the thin black line represents in Figure 3.

5. Page 778: The green colors in Fig. 8 are not easy to distinguish. Please make the figure more readable.

6. The language shall be improved. For example, the tenses in some sentences are confusing in Line 1-3, Page 751 & Line 4-7, Page 756. Please double check the languages of the whole paper carefully.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 745, 2015.

C164