

Interactive comment on “Numerical analysis of the impact of agricultural emissions on PM_{2.5} in China using a high-resolution ammonia emissions inventory” by Xiao Han et al.

Anonymous Referee #1

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The NH₃ emissions from agricultural activities in China, which is one of the largest agricultural countries in the world, significantly affect regional air quality and horizontal visibility. In this study, the contributions of NH₃ from multiple agricultural emissions to aerosols were calculated using the RAMS-CMAQ-ISAM system; it allowed to trace the transport and chemical reactions of NH₃ from fertilizer and husbandry emissions sectors to quantitatively estimate the contribution of agricultural NH₃ emissions to the PM_{2.5} mass concentration in China. As input was used the high-resolution PKU-NH₃ emissions inventory, which was complemented with MIX Asian, REAS and GFED data; different meteorological factors were used to capture the formation processes and transport of secondary aerosols. For model evaluation, several observation data

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were compared with the simulation results for both meteorological parameters and SO₂, NO₂, and PM_{2.5}.

Major points. Suggestion: the “Results and discussions” section should be extended by providing explanations on different aspects. 1) How the emissions input influences the changes in concentrations patterns? Please discuss the seasonal variation in emissions for the months of January, April, July and October. 2) Identify, which of the agricultural sub-sectors, i.e., fertiliser, husbandry, farmland ecosystems, livestock waste, crop residue burning, and excrement waste from rural populations, are contributing most to the seasonal changes. 3) Emphasis the influence of meteorological conditions. 4) How this tool could support policy makers in designing the PM_{2.5} emissions mitigation strategy in China. 5) Explain why “the influence of NH₃ would enhance with the decreasing of ambient NH₃ mass concentration”; provide directions for further research on this topic.

Minor points. For the regions in China for which the findings are discussed – spell them out (e.g. “NEC”). Figure 6 – add to the caption “April and October”. What is T in Table 2 - “of T contribution”. What is TA, Page 9, line 269 - “10% TA NH₃ emission”.

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