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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Importance of Ammonia Gas-Particle Conversion Ratio in Haze Formation in the Rural Agricultural Environment" *by* Jian Xu et al.

Anonymous Referee #3

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Secondary inorganic aerosol are major fractions of PM2.5 in China, especially during the hazy episode. Xu et al. investigate the role of ammonia gas-particle conversion ratio on secondary inorganic aerosol formation mechanisms in a rural site in China. They propose a self-amplifying feedback loop that link ammonia gas-particle conversion ratio with secondary inorganic aerosol. Overall, this paper makes a meaningful contribution to the haze formation mechanism in the rural agricultural areas in China. I favor its publication after the following issues are addressed.

1) Section 2.1 the authors have found the PM2.5 mass concentrations on Chongming site is higher than the urban (Pudong) site. Which fraction (sulfate, nitrate, ammonium

or organics) of PM2.5 mass is higher?

2) Section 3.1 the authors straightly go to NH3 levels in Chongming and its link to secondary inorganic aerosol. Since this article is about haze pollution, I would suggest them adding an overview section of the major PM2.5 species (NH4+, Na+, K+, Ca2+, Mg2+, Cl−, NO3−, and SO42−) to help the readers get a fully understanding about the typical air pollutants on the monitoring site.

3) Section 3.2 ISORROPIA II has been used to predict the pH and aerosol water, however, the activity coefficient extracted from E-AIM IV was adopted. The authors should provide comparison of activity coefficients predicted from the two models (Peng et al., 2019, EST).

4) Section 3.2 Lines 162-165, I suggest rephrasing the texts here.

5) Section 3.2 I suggest the authors compare their ε(NH4+) S curve results with previous reports in other sites using the same methodology (e.g., Figure4 in Nah et al., 2018, ACP).

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