

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2022-426-RC2>, 2022
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Comment on acp-2022-426

Anonymous Referee #2

Referee comment on "Seasonal modeling analysis of nitrate formation pathways in Yangtze River Delta region, China" by Jinjin Sun et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-426-RC2>, 2022

The study provides a comprehensive overview of the pathways of nitrate formation in the Yangtze River Delta region. The study is of great interest and adds to the knowledge of the chemistry involved in the NO_3^- formation and factors affecting these pathways for an urbanized and heavily populated region. The study is of importance as it provides a seasonal analysis of the NO_3^- formation process which can be highly useful for regulators for planning and mitigation strategies. The paper is well written easy to follow. However, following are a few comments and suggestions which I think will help in improving the overall clarity of the paper.

Major comments:

- The authors should highlight the reason for using SAES emission inventory over the YRF region instead of the MEIC or REAS emission inventory. The authors should also mention the resolution at which the SAES inventory provides emissions.
- Line 271-273: The authors may provide a reason for the better performance of the model in predicting the concentrations of $\text{PM}_{2.5}$, O_3 and NO_2 when compared to past studies.
- The authors may highlight key mitigation strategies for NO_3^- , based on the pathways identified as major contributors to NO_3^- in the YRD region.
- The authors should add a section highlighting the limitations of the current study.

Minor Comments:

- Line 90 and 132-133: Check grammar.
- Line 102-104 and 133-134: Rephrase the sentence to improve clarity.
- Fig S4, S8, S10 and Table S7 have not been referred to in the main manuscript.