

## Comment on acp-2021-723

Anonymous Referee #2

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Referee comment on "Exploration of the atmospheric chemistry of nitrous acid in a coastal city of southeastern China: results from measurements across four seasons" by Baoye Hu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-723-RC1>, 2021

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Hu et al. performed seasonal field observations of HONO in Xiamen, China in August, October, and December 2018, and March 2019, along with measurements of trace gases, aerosol compositions, photolysis rate constants ( $J$ ), and meteorological parameters. The result shows that the average observed concentration of HONO is  $0.54 \pm 0.47$  ppb. Vehicle exhaust emissions is an important source of HONO. By considering the influence factors on HONO formation, further explains nighttime heterogeneous conversion of  $\text{NO}_2$  to HONO. The daytime unknown sources are likely to be related to light, it is find that there is a logarithmic relationship between  $P_{\text{unknown}}$  and particulate nitrate photolysis in four seasons. Then, the different parameters of nitric acid during photolysis are discussed, and using the resulting parameters for simulation. The simulated results are compared with the observed values. Finally, daytime HONO photolysis forms significantly more OH than daytime photolysis of  $\text{O}_3$  in four seasons except for summer afternoon, further explains the importance of HONO in atmospheric chemistry. The manuscript can be considered to be accepted after addressing the following comments. The language can be further improved to make it easier for readers to follow up.

- Manuscript should be proofread before resubmission to avoid minor errors, such as Line 32, add " $\text{ppbh}^{-1}$ " after 2.05; Line 100, "gas" should be "gases"; Line 173, "Figure 2" should be "Fig. 2", I think it should be uniform throughout the text.
- Lines 107-108. the English usage in the statement of " The surrounding soil is used for green not for agriculture " is not understandable and the sentence should be rephrased.
- Lines 118, There should be more detailed information in the parentheses, such as model number, manufacturer, and region.
- Lines 158-159, the sentence is grammatically incorrect. And correct other similar mistakes in this manuscript.
- Lines 254, delete a "in".
- Lines 268-272, The concurrence of both "(2) short duration air masses ( $<2$  h)" and "(5)  $\text{NO}/\text{NO}_x > 0.50$ " may result in inaccuracies, the emission factors need to be calculate in fresh plumes, wider constraints do not guarantee that most of the calculated NO comes from vehicle emissions.
- Lines 382-384, dose "H" is the mixing layer height? If we use the mixing layer heights (1074.4 m) in spring and  $=0.2 \text{ cm s}^{-1}$  to calculate the dry deposition time, the dry

deposition time is 14.9h, that's longer than HONO's life span. So I think the author should reconsider the meaning of "H".