

***Interactive comment on* “Contribution of HONO to the atmospheric oxidation capacity in an industrial zone in the Yangtze River Delta region of China” by Jun Zheng et al.**

Anonymous Referee #3

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General Comments:

This manuscript reports the results of a field campaign in Nanjing, a megacity within the Yangtze River Delta (YRD) region, during December, 2015. HONO and related species were simultaneously measured. High levels of (especially daytime) HONO were reported and were most likely due to heterogeneous reactions involving NO₂. YRD is one of the most developed and also polluted regions of China. Atmospheric oxidation capacity (mostly determined by the OH radical) is the fundamental driving force that is responsible for the fast formation of secondary air pollutants such as O₃ and PM. Although observations of high levels of HONO are not surprising in China,

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such a comprehensive field campaign like this study is still of practical importance to fully understand the role of HONO chemistry in this region. Especially, the budget of OH radical in the YRD region shall be extensively assessed. The subject of this study is within the scope of ACP. Overall, the experimental methodology is generally sound and the measurements were properly conducted. The manuscript is fairly well written and the logic is clear to follow.

One of my major concerns is that the authors claim that primary emission did not contribute significantly to the observed HONO. But I would suggest the authors to further evaluate the significance of primary emission using the box model, which should be able to give a more reliable and quantitative assessment of primary emitted HONO. Also, I would suggest the authors to weaken the role of correlation analysis (Section 3.5.5) and rely more on the model simulation results. The good correlation between aerosol surface density and HONO does not necessarily mean that HONO is produced on aerosol surfaces. A model sensitivity study would be a better way to verify if high loading of PM was playing an important role in HONO formation by promoting heterogeneous reactions.

In summary, I will recommend this manuscript to be published in ACP after the above issues have been addressed adequately.

Technical comments:

- 1) L103: “because”
- 2) L273: “heterogeneous”
- 3) L329: “the origins of these...”
- 4) L368: “appears”

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-944>, 2019.

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