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Comment on acp-2021-723

Anonymous Referee #1

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-RC2>, 2021

The manuscript "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. reports year-long observations of HONO together with gaseous, particulate, and meteorological parameters which are relevant for investigating HONO sources. The manuscript adds valuable information on HONO concentration level and its temporal variation under coastal condition. I have reviewed the old version which submitted to ACP in 2020. The quality of the new manuscript is significantly improved. I only have the following minor suggestions before it is accepted for publication.

Line 31-32: an unit is missing here, should be "2.05 ppb h⁻¹ in winter".

Line 209-212: It's farfetched to say the concentration of sea salt during the daytime (2.91 $\mu\text{g}\cdot\text{m}^{-3}$) is higher than that during the night (2.73 $\mu\text{g}\cdot\text{m}^{-3}$). From my side, these levels are similar. I doubt if this small difference in sea salt could have large effect on the contrasting HONO levels between daytime and nighttime. Figure 4 shows that NO_x concentration in the daytime is higher than in the nighttime. The higher HONO in the daytime is more likely due to the higher NO_x ornitrate photolysis as you discussed in following section.

Line 214: SLB should be defined here.

Line 216-224 and line 247-256: The two paragraphs are overlapping. I suggest to integrate the two paragraphs. Figure 5 shows the correlation between NO₂ and HONO, it is better to also display the correlation between NO_x and HONO here.

Line 251: "the photolysis of NO₂" should be changed into "the photolysis rate constant of NO₂".

Line 255-256: "which indicates that HONO formation during the daytime is controlled by light rather than Reaction (R5)." It is hasty to draw this conclusion here. It's better to say "HONO formation during the daytime is more possible to relate to light than Reaction (R5)."

Line 254: "correspondence" should be changed into "correlation".

Line 269-270: How is the duration of air masses been determined? How do you acquire it?

Line 273-277: $\Delta\text{NO}/\Delta\text{NO}_x$ and $\Delta\text{HONO}/\Delta\text{NO}_x$ should be clearly defined.

Section 3.5: first of all, there are various assumptions on HONO production pathways been made in the previous sections. It would be better to provide a full picture on how large of each contribution to the HONO formation.

Line 412-413: "We will discuss... in the next section". Do you mean "in this section"?

Line 448-449: "As shown in Fig. 11, the HONO/NO_x ratios in the four seasons were close to the calculated value (0.02)". What is the calculated value? Do you mean "the calculated value by Elshorbany et al., 2012?"

Fig. 5 and Fig. 11: The correlation between HONO and NO₂ in spring is better than that between HONO and NO_x. Why?