

***Interactive comment on* “Tropospheric HONO Distribution and Chemistry in the Southeast U.S.” by Chunxiang Ye et al.**

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Received and published: 13 March 2018

"Extraordinary claims require extraordinary evidence" is a phrase made popular by Carl Sagan [Rational Wiki]. This is particularly relevant to the Ye et al. [2018] paper. The authors make the extraordinary claim that "...the sum of all known NO_x-related HONO formation mechanisms was found to account for less 20% of the daytime HONO source in the background terrestrial air masses, ...". If this claim were true, it would possibly force a reassessment of our understanding of HO_x and NO_x budgets of the troposphere, depending on the details of the other 80% of the (unknown) sources. However, the evidence presented Ye et al., [2018] does not justify that claim. In fact, Neuman et al. [2016] conclude: "Outside of recently emitted plumes from known combustion sources, HONO mixing ratios measured several hundred meters above ground

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level were indistinguishable from zero within the 15 parts per trillion by volume measurement uncertainty. The results reported here do not support the existence of a ubiquitous unknown HONO source that produces significant HONO concentrations in the lower troposphere.” The conclusion of these two studies disagree strongly, yet the reported measurements were made from different aircraft with different instrumentation, but in the same region of the country over the same time period, summer 2013. Unfortunately, Ye et al., [2018] do not discuss or even cite Neuman et al. [2016]. The differences in the results reported in these two papers point to clear experimental problems in the measurements. Until these problems are resolved, the extraordinary claim of Ye et al. [2018] should not be published.

References

Neuman, J. A., et al. (2016), HONO emission and production determined from airborne measurements over the Southeast U.S., *J. Geophys. Res. Atmos.*, 121, 9237–9250, doi:10.1002/2016JD025197.

Rational Wiki, https://rationalwiki.org/wiki/Extraordinary_claims_require_extraordinary_evidence

Ye, C., et al. (2018), Tropospheric HONO distribution and chemistry in the Southeast U.S., *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-105>.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-105>, 2018.

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