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Atmospheric Measurement Techniques Discussions

Interactive comment on "Single-photon laser-induced fluorescence detection of nitric oxide at sub-parts per trillion mixing ratios" *by* Andrew W. Rollins et al.

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We thank the referee for their useful comments on our manuscript. Below, we address the individual comments. Our responses to the referee's comments are shown in **bold**.

L23: while it may be true that very low NO chemistry remains poorly understood, it is known that many of the OH observations used in the Rohrer 2014 study suffered from positive artifacts. So, not sure if this is the best reference. Perhaps there are more recent observations that are artifact-free and illustrate this point (e.g. from SOAS or

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GOAMAZON)?

We have removed the Rohrer citation. We revised this sentence and instead cite the Fittschen (2019) study which provides a comprehensive discussion of this issue.

L64: “repetition”

Fixed.

L178: What is the actual width of the fluorescence collection gate (in ns) used in data acquisition? Does it exclude the laser pulse?

We have added some text at the end of this paragraph to describe the gate choice (lines 195-199).

L206: -90K is very cold indeed!

Fixed, thanks!

L215: “dependence”

Fixed.

L268: what is the width of the running average? And is it just a boxcar window?

This information was added here (now line 285).

Sect. 7: Is there any significant background variability in the FIREX data beyond what is seen in the lab? If so, it seems like this would affect the chosen background smoothing window.

A line addressing this point was added to section 6.1 (lines 359-361). A paragraph in Section 7 is also added to discuss this issue (now lines 374 – 381).

L373 – 378: These statements would fit better in Section 7.

These sentences have been moved to the end of Section 7.

L404: Bringing up the isotopologue detection here seems out-of-place. While this is exciting, it might be better to state that this is possible rather than to state that you have done it (unless you want to show some data to support it).

Agreed. We have modified this sentence state that it will be the focus of future work.

Figure 9: Caption incorrect.

This caption has been corrected.

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