Atmospheric
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Discussions

EGU

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.

Anonymous Referee #1

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This paper describes an LIF-based instrument for airborne observations of NO in the troposphere and stratosphere. Details are provided on measurement theory and performance characteristics. It is shown that this instrument performs as well, or better than, a state-of-the-art Cl-based instrument. The paper is well-written and the number and style of figures is appropriate. My comments are relatively minor, and publication is recommended.

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 GOAMAZON)?

L64: "repetition"

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

L206: -90K is very cold indeed!

L215: "dependence"

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

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.

L373 – 378: These statements would fit better in 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).

Figure 9: Caption incorrect.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-24, 2020.