

## RESPONSE TO REVIEW 1 of Yamanouchi et al. (2023)

We thank the reviewer for their comments on the manuscript, which we have addressed below. The comments are in blue font and the responses are in black font.

This paper is by a well respected group, with high technical capability in ground based remote sensing. The manuscript is well written, clearly states the methodology, measurement outcomes, and in general a high standard of presentation. This is an important dataset for Canada, and while the dataset itself could be reproduced in principle, it covers a long timeline, and the level of technical expertise means that it is very unlikely to be repeated in the Canadian region.

The data has already been used in a number of studies, satellite validation, and will continue to be an important part of future model and other measurement comparisons.

While the FTS instrumentation is a Canadian domestic system (Bomem), and is not used widely in other equivalent NDACC sites on a global basis, the Toronto group is very experienced in maintaining and operating this FTS at an acceptable level within the network. In particular, the use of HBr internal cells to monitor the instrument lineshape is an important determination of the stability of the instrument. This has been done since the beginning of the measurement record. It is clear from this record that the FTS has been upgraded at least once, 2014 for example, so this may have had an impact on the data record. The authors note that there was no impact on the retrieved columns; is this a qualitative or quantitative statement?

The analysis method is state of the art, in terms of the software package SFIT4, and each species that is retrieved follows the agreed protocol that has been painstakingly developed by members of the NDACC community. The Toronto group regularly reports on all standard NDACC (via archiving) as well as a number of other interesting research gases.

The presentation quality and written components are in general very good. Below is a short list of minor corrections for consideration.

line 105: is the data for the low modulation periods included in the data record? Are they flagged in any way?

Data with low modulation efficiency are included in the data record and are not flagged in the NDACC archive. After the 2014 upgrade to the FTIR, we saw no qualitative impact on retrieved columns.

line 146: missing bracket

Fixed.

line 158: "...2016. These..."

Fixed.

line 165: O2?

Fixed.

line 308: wayward full stop

Fixed.

line 358: there is also natural background HCl from the ocean release of CH<sub>3</sub>Cl

This information has been added.

table 2: have the authors considered using the second HNO<sub>3</sub> window simultaneously (872-874 cm<sup>-1</sup>) with the 868cm<sup>-1</sup> region?

No, the HNO<sub>3</sub> retrievals have only been performed using the microwindow at 867.50-870.00 cm<sup>-1</sup> as recommended by the NDACC IRWG. The 872-874cm<sup>-1</sup> could however be tested in the future.

figure 1: odd mixture of metric and imperial units?

This is due to the figure being adapted from the manufacturer's schematics.

figure 18: wavenumber scale missing

Fixed.

Figure 28: the key colour for 2020 (both CH<sub>4</sub> and CH<sub>3</sub>OH) is grey but for all other graphs it is red?

This is because we do not have data for those species in 2008.