We thank for the valuable commenting of Referee #2 and the opportunity to revise our manuscript. We fully addressed the reviewer's comments as described below. The column 'Line' is referring to the line number in the revised manuscript.

Comments Referee #2	Authors response	Line
1. Abstract, line 18: precision at 1 sigma?	We clarified the sentence to: "...and a precision for half-hourly data between 2.1 and 10.6 ppm-m (half width of the 95 % confidence interval) was estimated."	19 to 20
2. Section 2.1, Line 69: even though details are described in reference, there should be a brief further description as to how concentrations are calculated and how the calibration waveform is measured. Otherwise, it is more difficult to understand the metrics discussed in this paragraph.	The manufacturer does not provide detailed information on the derivation of the concentration. The manufacturer states that the calibration waveform is fitted to the measured waveform with the use of the linear least-squares regression analysis (Appendix F, Boreal Laser Inc., 2018b). However, we don't have more details on the employed fitting procedure and the measurement of the calibration waveform. We changed the sentence to: "Together with the concentration measurement, the supporting parameters 'received power' (of the reflected incoming beam) and 'R2' (the goodness of fit between the sample and the calibration waveform) are provided as standard outputs of the GF3 instruments. According to the manufacturer, a valid concentration measurement can be expected if the following constraints are met: 'received power' is in the range of 50 to 3000 µW and 'R2' is above 0.85 (Boreal Laser Inc., 2018b)."	69 to 72
3. Section 2.2, Line 80: how was the QCL instrument calibrated? How often? What scale was the calibrant traceable to (e.g. WMO)?	The used QCL instrument provides absolute concentration measurements (based on absorption spectra from the HITRAN database) without the need for empirical calibration (Nelson et al., 2004). Nevertheless, the instrument was tested occasionally using cylinder standards of 1.50 ppm and 2.00 ppm CH_4 (with a factory certified accuracy of 2%). It generally agreed with the standards within their uncertainty range.	
4. Section 2.3, paragraph 2: I do not feel there was sufficient justification for the use of median based statistics over Gaussian, especially when the result was to use Gaussian assumptions to convert the median statistics to Gaussian ones. There should at least be a discussion as to why the outliers are expected to be as prevalent in a non-Gaussian manner as to justify this approach.	As mentioned in the text, we have chosen the median based statistics, because it is less sensitive to outliers and to deviations from an ideal Gaussian error distribution. In fact, there's only a marginal difference in precision estimation between GF3 and QCL, when using Gaussian statistics. However, it has a substantial impact on estimates (mainly) from	115 to 116

	two campaigns comparing GF3 side-by-side measurements, where the distribution of ΔC clearly differed from an ideal Gaussian distribution (see Fig. 3) and thus the precision estimate based on Gaussian statistic would be clearly influenced by a few large values. For clarification, we enhanced the text as follows: "The ΔC data partly showed significant deviations (asymmetry, outliers) from an ideal Gaussian distribution. Thus, for analyzing the difference between devices, the median ..."	
5. Section 2.3, line 120: I don't understand the propagation justification to add the sqrt(2) factor. It seems to me that there are some math steps or justification missing to explain how the error is being propagated.	As mentioned in the second sentence preceding Eqs. 1 and 2, the sqrt(2) factor was introduced to partition the uncertainty (precision) of the concentration difference ΔC to the two individual concentration measurements that are assumed to be of equal magnitude. For clarification we slightly modified the text as follows: "The estimates of bias and precision for ΔC can be partitioned equally to the concentrations of both intercompared devices by dividing by the square root of 2 (according to Gaussian error propagation)."	121 to 123

References:

Boreal Laser Inc.: GasFinder3-OP Operation Manual, Part No. NDC-200036, 2018b.

Nelson, D. D., McManus, B., Urbanski, S., Herndon, S., and Zahniser, M. S.: High precision measurements of atmospheric nitrous oxide and methane using thermoelectrically cooled mid-infrared quantum cascade lasers and detectors, Spectrochimica acta. Part A, Molecular and biomolecular spectroscopy, 60, 3325–3335, doi:10.1016/j.saa.2004.01.033, 2004.