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Atmospheric Measurement Techniques Discussions

Interactive comment on "Selective measurements of NO, NO_2 and NO_y in the free troposphere using quantum cascade laser spectroscopy" *by* B. Tuzson et al.

Anonymous Referee #1

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The paper by Tuzson et al. describes the application of a quantum cascade laser spectrometer to measure NO, NO2 and NOy at the Jungfraujoch in 2012. Beside an evaluation of the spectrometer performance, the paper describes an intercomparison with CLD measurements for those species. The paper is well written and the topic itself is appropriate for AMT. Thus, I recommend publication of the manuscript after some minor revisions:

In the experimental description of the NOx QCLAS great detail is given about the precision of the instrument and potential uncertainties due to background structures. To

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summarize this, it would be nice if the authors would give a quantitative estimate of the total uncertainty for NO and NO2 measurements, respectively.

From the Allen variance plot it seems that the stability of the instrument with respect to background drifts is of the order of 2 min. In the results and discussion section the authors state that background measurements are performed every 10 min? Is this sufficient to account for background drifts?

The comparison between the QCLAS and the CLD in-situ measurements presented in Figures 5 and 6 is quite impressive, but rather qualitatively. I would appreciate a more quantitative analysis, including a regression analysis.

Finally, the authors discuss the differences in the NOy measurements, and claim that an (unlikely) 14 % difference in the conversion efficiency for PAN would be necessary to explain the difference. The conversion of PAN in a gold converter is quite straight forward (thermal decomposition followed by reduction of NO2). Therefore the conversion efficiency for PAN should be very similar to the conversion efficiency for NO2, which I guess has been measured for the two converters. The conversion of HNO3 (which might represent a large fraction of NOy at this altitude) is more complex, and thus prone to errors in the conversion. Has the conversion efficiency forHNO3 been determined for the two converters?

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 8969, 2012.