Atmos. Meas. Tech. Discuss., 6, C2758–C2759, 2013
www.atmos-meas-tech-discuss.net/6/C2758/2013/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Open-path, quantum cascade laser-based sensor for high resolution atmospheric ammonia measurements" *by* D. J. Miller et al.

Anonymous Referee #2

Received and published: 1 October 2013

This paper is interesting, nicely written, and should be published. I believe comments on the following would add to the paper.

1) Details of the following

âĂć Laser tuning range used for ammonia measurements. âĂć Maximum tuning range possible with this laser. âĂć What modulation index was used for open path studies?

2) Figure (1), page 7029, shows a transmission version of the Herriot cell. This configuration is more sensitive to thermal and other mirror movement than the conventional Herriott cell. Why did the authors chose the transmission configuration?

3) The ramp frequency of 50Hz is unusually low. A higher current ramp frequency would probably improve S/N. Page 7010 (lines 15-16).

4) Low power consumption is one of the stated benefits of their experiment. Page 7008 (Lines18-20) A sensitive pulsed QCL based WMS technique has been demonstrated [Manne J. et.al, Applied Optics, Vol. 50 Page E112 (2011)] and of course pulsed laser operation may consume less power than a CW laser operation.

5) Comments on why the authors used an over-modulated signal to calculate the background noise would be helpful. Page 7017 (Lines: 10-29): Did the commonly used method of tuning the laser slightly to a non absorbing region or to a region with minimal or no ammonia absorption for background measurements pose limitations?

6) The 1σ detection is called the noise equivalent limit and not the minimum detection limit. Detection limit is typically defined either as 2σ or 3σ. Page 7017, last line:

7) The 2f signals plotted in Fig 7 and 8 are superimposed on a non-linear background. Is this due to other nearby absorbing gases?

8) The 2f of ammonia in Fig. 3 and Fig. 7 appear to have different tuning ranges. What are they?

9) Fig 7: Are both peaks shown in the figure for ammonia?

10) Figure 10: A zero –ammonia background scan for this plot would give a better representation of system noise with time.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7005, 2013.