Atmos. Chem. Phys. Discuss., 11, C8726–C8727, 2011
www.atmos-chem-phys-discuss.net/11/C8726/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric ammonia measurements in Houston, TX using an external-cavity quantum cascade laser-based sensor" *by* L. Gong et al.

L. Gong et al.

lg15@rice.edu

Received and published: 9 September 2011

The authors would like to thank the anonymous referee for his or her valuable comments. Our point-by-point responses to the reviews and all relevant changes made in the manuscript are presented below.

1. What was the background level measured in pure nitrogen. To which extend desorption of ammonia from previous measurements was a problem.

Answer: The background level measured in pure nitrogen was $\sim$0.5 ppb with a standard deviation of 0.72 ppb after averaging the data over 300 seconds. Desorption of ammonia from previous measurements was insignificant in this study. As we described

in the Section 2.1, big events of elevated NH3 levels were far less than one hour. The quick decay processes after spikes are also shown in Figure 2. In order to minimize NH3 adsorption onto surfaces and to prevent water vapor condensation in the sensor, the sensor enclosure was heated to 38 degrees celsius. All tubing was made of Teflon®. In addition, the majority of the sampling inlet was heated using autotransformators and was made as short as possible to minimize the sites for NH3 to stick.

2. How the lowest concentrations of 0.2 ppb in summer and 0.1 ppb in winter have been obtained?

Answer: In order to determine atmospheric concentration levels of NH3, each acquired sample scan was compared with the 5 ppm NH3 reference scan by implementing a LabView-based general least-square (LS) linear fitting algorithm. This procedure yields a fit coefficient value, which generally indicates to what extent each sample scan represents a reference scan; namely NH3 concentrations are estimated purely based on fit coefficient values. However the LabView-based general LS linear fitting algorithm does not take into account the minimum detection limit of the sensor, leading to observed values below the detection limit. Readers need to be aware that there is an error/uncertainty of 0.72 ppb (300 s averaging time) for NH3 measurements in this study. Relevant changes have been made in the Section 2.1 (Page 16340, Line 12).

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/11/C8726/2011/acpd-11-C8726-2011-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16335, 2011.