

Interactive comment on “An IBBCEAS system for atmospheric measurements of glyoxal and methylglyoxal in the presence of high NO₂ concentrations” by Jingwei Liu et al.

Anonymous Referee #3

Received and published: 2 April 2019

General comments

This paper reported the development of an incoherent broadband cavity enhanced absorption spectrometer for simultaneous measurement of NO₂, glyoxal (GLY) and methylglyoxal (MGLY). A NO₂ photolytic convertor (NPC) was used to minimize the interference of high concentration NO₂ to GLY. The photolysis of NO₂ can lead to the formation of O₃. My major comment is that if the photolysis of ambient air can potentially generate artificial GLY or MGLY, especially in VOCs rich environments.

Specific comments

1, page 2, line 17. A careful survey of GLY instruments is encouraged. A short discus-

sion about recent IBBCEAS systems used for GLY measurements and their detection limits is better than only a sentence of other gas's applications.

2, page 2, line 28. I note a paper recently accepted for publication in AMT that also tried to fix the problem of NO₂ interference to GLY, which should be included in the introduction.

Liang, S., Qin, M., Xie, P., Duan, J., Fang, W., He, Y., Xu, J., Tang, K., Meng, F., Ye, K., Liu, J., and Liu, W.: Development of an incoherent broadband cavity-enhanced absorption spectrometer for measurements of ambient glyoxal and NO₂ in a polluted urban environment, *Atmos. Meas. Tech. Discuss.*, <https://doi.org/10.5194/amt-2018-430>, in review, 2018.

3, page 5. How to determine the absolute GLY concentration in this work is still not clear, by measuring the pressure or flow rate?

4, page 7, line 19. The relative change of 1-R is more meaningful than R.

5, page 11, sec. 4.2. Please include the fitting residual information and give some discussion about the "unknown reasons". Did the authors shift or stretch the reference spectrum?

6, page 12, sec. 4.4. Please include the comparisons with other IBBCEAS systems. The sensitivity of Min et al.'s was $1.5 \times 10^{-10} \text{ cm}^{-1}$, and the authors' was $8.4 \times 10^{-11} \text{ cm}^{-1}$ (with 100 s integration time, line 18 in the text). Table 2 is not clear (5s, 100s). The corresponding time for each detection limit needs to be clearly stated. Furthermore, please carefully check if the data used in Table 2 are correct.

7, page 23, Fig. 4, please check the convolution of MGL reference is correct. There is an obvious shift, and the peaks are vanished.

8, page 27, Fig. 8(a). The symbols are not clearly indicated.

Interactive comment on *Atmos. Meas. Tech. Discuss.*, doi:10.5194/amt-2019-40, 2019.