

## ***Interactive comment on “Development of an incoherent broadband cavity enhanced absorption spectrometer for in situ measurements of HONO and NO<sub>2</sub> in China” by Jun Duan et al.***

### **Anonymous Referee #1**

Received and published: 27 March 2018

General comments: This paper describes details of a newly developed HONO and NO<sub>2</sub> simultaneous measurement system based on an incoherent broadband cavity enhanced absorption spectrometer (IBBCEAS). There have been recent several reports of a HONO and NO<sub>2</sub> simultaneous measurement system so that measurement principle reported in this article is not novel. But I think IBBCEAS is revolutionary measurement system of HONO and evolution of the HONO measurement system is important in order to clarify behaviors (i.e. source, sink, reactions in the atmosphere, and so on) of HONO. In this paper, some performances are improved (e.g. stability, detection limit, and so on) and the authors developed the mobile measurement system of HONO and NO<sub>2</sub>. I recommend this paper to be published in Atmospheric Measurement Tech-

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niques. However, I found several dubious points in this paper. The authors should revise appropriately.

Specific comments:

Title: I think “in China” can be deleted. I think this system can measure HONO and NO<sub>2</sub> simultaneously in other country as well as China.

Page 2, lines 3-4 “such as O<sub>3</sub>”: O<sub>3</sub> is one of photochemical smog, so that other secondary pollutants are recommended (e.g. HNO<sub>3</sub>).

Page 8, lines 4-5 “a slope of 0.988 and an intercept of 0.50 ppb,”: The authors should add errors of a slope and an intercept.

Section 3.3.1: For HONO generation, do the authors confirm simultaneous generation of NO<sub>2</sub>?

Section 3.3.1: The authors should state relative humidity (RH) as an experimental condition, and should discuss an RH dependence of the HONO loss.

Section 3.3.1: NO<sub>2</sub> loss is negligible? The authors should comment the NO<sub>2</sub> loss as well as the HONO loss.

Section 3.3.2: The authors should discuss an RH dependence of the secondary HONO formation.

Page 11, line 4 “a slope of 0.94 and an intercept of 0.10 ppb,”: The authors should add errors of a slope and an intercept.

Page 11, lines 10-11 “a slope of 0.96 and an intercept of -0.12 ppb,”: The authors should add errors of a slope and an intercept.

Technical corrections:

Page 1, line 29: NO<sub>x</sub> → NO<sub>x</sub>

Page 1, line 30: R<sup>2</sup> → R<sup>2</sup>

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Page 2, line 11: (Jr et al., 1984; → (Pitts et al., 1984;

Page 2, line 29: (J et al., 2001) → (Heland et al., 2001)

Page 4, line 11:  $f = 60 \text{ mm}$  →  $f = 60 \text{ mm}$

Page 13, line 10: J, H., J, K., R. K., and P, W.: → Heland, J., Kleffmann, J., Kurtenbach, R., and Wiesen, P.:

Page 13, line 15: Jr, J. N. P., → Pitts, J. N., Jr.,

Page 15, line 30: NO<sub>2</sub> → NO<sub>2</sub>

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