

Interactive comment on “Quantification of nitrous acid (HONO) and nitrogen dioxide (NO₂) in ambient air by broadband cavity-enhanced absorption spectroscopy (IBBCEAS) between 361–388 nm” by Nick Jordan and Hans D. Osthoff

Anonymous Referee #4

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This paper shows the new instrument for the simultaneous measurements of ambient HONO and NO₂ by BBCEAS, and its assessment. This paper is well written and the authors pay attention to the analysis. Unfortunately, it is not "novel" technique for the ambient measurements of HONO and NO₂ by BBCEAS because there are many similar reports, as authors show. However, there is a little example for the application of the BBCEAS to the ambient measurements for the trace species. In addition, the comparison of the simultaneous measurements of HONO and NO₂ between IBBCEAS and the other technique is important. Therefore I recommend that this paper is published

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after the clarification some questions shown below.

1. For this instrument, there is no some experimental conditions. What company do you use for the spectrometer and CCD camera? How much is the flow rate of the sample/ambient air (important information due to the next concern)?

2. For the intercomparison of the simultaneous measurements of HONO and NO₂ by BBCEAS and TD-CRD, the authors tried to the estimation of the effects of the NO titration and NO₂ oxidation by box model. In this experiments, the concentration of HONO is 23.9 ppbv. Therefore, the OH radicals must be produced the same concentration in the TD cell. I think the concentration of OH radical can not ignore compared with that of NO₂ (109 ppbv). In the TD cell, the reaction of OH with NO₂ must be caused and nitric acid must be produced. Womack et al. (Atmos. Meas. Tech., 10, 1911–1926, 2017) shows the temperature and flow rate dependences of the thermal dissociation of nitric acid. According to the Womack's paper, nitric acid may not be dissociate due to the lower temperature under the author's experimental condition. I think that the retrieval of NO₂ may be underestimate due to the formation of nitric acid. How do the author estimate the effect of the reaction of OH? And do the author consider the effect of the retrieval of HONO on the underestimation of NO₂?

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