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Interactive comment on “A novel instrument for measurements of BrO with LED based Cavity-Enhanced Differential Optical Absorption Spectroscopy” by D. J. Hoch et al.

Anonymous Referee #2

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This paper presents an in situ instrument to measure BrO, HONO, HCHO, and O₃ in the 325 – 365 nm spectral range. It is an improved version of a previously-submitted AMT paper (<http://www.atmos-meas-tech-discuss.net/5/3079/2012/amtd-5-3079-2012.html>).

The direct comparison to DOAS and multipass absorption instruments is a definite improvement to the paper.

Comments:

- The abstract should indicate that the detection limits refer to single concentrations

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and not mixtures of the four analytes:

“In laboratory studies, BrO as well as HONO, HCHO, O₃, and O₄, could be reliably determined at detection limits of 20 ppt for BrO, 9.1 ppb for HCHO, 970 ppt for HONO, and 91 ppb for O₃, for five minutes integration time [with single absorbers], respectively.”

- NO₂ is the strongest absorber in this spectral region for most of the atmosphere, but it is not mentioned in the manuscript. Its potential detection limit and interference with retrievals of BrO should be discussed.

- Section 4.2 lines 4 – 16 describes the method for calculating the detection limit and corrections to this detection limit. Several corrections to the detection limit are discussed. It would strengthen the paper to report the 1-sigma precision for the retrieved concentration timeseries of a constant concentration of BrO (and other species), since the authors likely already have this data.

- Pg 6070 lines 19 – 25: “Due to its compact size and low power consumption it is possible to apply the BrO CE-DOAS-instrument – besides in reaction chamber investigations – also in field studies with batteries even if other electrical power is not available. To our knowledge this instrument is the first mobile cavity based BrO instrument in the UV wavelength range, which is applicable to field measurements. As mentioned above two other CE instruments exist for the detection of BrO (Chen and Venables, 2011; Grilli et al., 2012), but their field application seems to be limited due to size and power consumption.”

This paragraph states that this instrument can be used for field measurements, but the ability to simultaneously measure multiple absorbers at atmospherically-relevant concentrations isn't demonstrated in the paper. It should be edited to indicate that field measurements with UV LEDs may be possible in the future.

- The prior reviews were concerned with the novelty of these results. In this revised version, the authors have added “novel” to the title. It is not needed.

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