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Atmospheric Measurement Techniques Discussions

Interactive comment on "A new laser–based and ultra–portable gas sensor for indoor and outdoor formaldehyde (HCHO) monitoring" *by* Joshua D. Shutter et al.

Anonymous Referee #1

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General comments

This paper report the characterization of a new commercial laser-based HCHO sensor from Aeris Tech Inc. The 3σ detection limit of the sensor was 690 pptv with 15 min integration time. A comparison with LIF instruments was performed. The Aeris sensor provides a small and easier-to-operate HCHO sensor, which can be potentially adopted in networks. This work is interesting and meets the scope of AMT.

The new sensor takes advances in the design and data processing method, which should be included in the manuscript. Without these key informations, I do not see the compelling advances to publish in AMT in its present form.

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Discussion paper

Specific comments

1, A schematic diagram is useful to make the principle of the sensor clearer.

2, Details about the multi-pass cell (the type of the cell, diameter, coating of the mirrors, and some related references) are not clear.

3, Details about the fast-fitting routine (ART) and some related references are not clear.

4, Table 1, for absorption spectroscopy, what were the path lengths previously used? Then the readers can clearly see the sensitivity of the Aeris sensor with 13 m absorption pathlength and that with hundreds meters.

5, Fig. 3, for the Allan-Werle deviation, time series measurement results need to be shown. I found some disagreement between the Allan deviation and Fig. 4 and 5. The peak-to-peak variations were obviously larger than the value getting from Allan's plot.

6, Please explain the abbreviations in the manuscript, "CAFE", "ISAF", "FILIF",. . .

7, Some explanations of the 2% disagreement of Aeris sensor and NASA CAFE and ISAF are necessary. How were these two LIF instruments calibrated? Positive offset (180 to 210 pptv) was within the detection limit of Aeris sensor.

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