

## ***Interactive comment on “A compact QCL spectrometer for mobile, high-precision methane sensing aboard drones” by Béla Tuzson et al.***

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This is an excellent paper and a real joy to read. The authors did a great job in both discussing their new instrument and in validating the performance in a variety of test environments. Such attention to detail is commendable and is not typically found in such new developments.

This paper is acceptable for publication with only 4 very minor points that this reviewer would like to see addressed.

1. It would be very informative to the reader if the authors could indicate how reproducible the Allan-Werle results of Fig. 4a were obtained. Does this figure represent typical performance or does this represent the best series of measurements? For that

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purpose it would be very interesting to plot a histogram of the 1second Allen-Werle deviations if the authors indeed recorded multiple plots.

2. Regarding the temperature sensitivity of their instrument, is there any possibility to further stabilize the temperature of the electronics and/or the entire optical system either actively or passively employing better insulation? Although the 4 ppb/K sensitivity (not 4 ppb/K-1) is quite good, 10 degree C temperature changes, as would be experienced by changing altitudes, seem to affect performance for time periods  $\sim 20 - 30$  minutes (Fig. 5). It would be nice to mitigate this long equilibration time period.

3. It would be useful to indicate the H<sub>2</sub>O sensitivity of their retrieved CH<sub>4</sub> results since situations where the H<sub>2</sub>O mixing ratios can approach up to 3-4 times the 1% levels simulated.

4. The authors may wish to explain the slight UAV overestimate of CH<sub>4</sub> relative to the CRDS in Fig. 8 at just after 08:00 at 12 m sampling height.

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