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Atmospheric Measurement Techniques Discussions

Interactive comment on "Assessing a low-cost methane sensor quantification system for use in complex rural and urban environments" *by* Ashley Collier-Oxandale et al.

Anonymous Referee #2

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Overall this paper provides an in depth analysis of the use of metal oxide sensors for sensing of Methane in this case as part of the FRAPPE/DISCOVER-AQ and California community project. Investigating the use of this particular type of "small sensor" in a relatively complex and changeable environment is a timely investigation. The deployment environments are atypical in their proximity to petrochemical extraction, transport or storage activities/facilities however this adds to rather than detracts from the utility of this manuscript.

The particular focus on calibration is well received. The in depth discussion on calibration models adds to the literature around these and other low cost technologies. This

reviewer feels that additional information regarding the field normalisation and other colocation activities would be useful. Particularly the practical setup used (shared inlets, enclosed chambers, flow cells or simply proximity etc. . .) and how it was replicated reliably. Additionally, information on inter-sensor differences in baseline, noise and response would be useful as well as a very short discussion of sensor selection (if undertaken). Further it could be informative to consider any hysteresis in these sensors from transient high concentration episodes (either of the detected species or of confounding species/parameters) which may or may not be seen in the data (irrespective or response time relative to the reference instruments). A short discussion on the response time of the sensor and of the instrument set up in its case (and any calibration issues that may result from this) would be welcomed.

Sensor drift over time is addressed and discussed however this reviewer feel it might be useful to show the variation in instrument drift pod to pod (possibly as a supplemental figure) and campaign to campaign to help investigation of sensor ageing relative to reference grade instruments and potentially effective lifetimes for the use of these sensors.

This reviewer thinks that a short discussion of cross sensitivities would be useful. Including with environmental parameters. Similarly, a discussion on potential differential response to other hydrocarbons would be useful. Potentially an associated point; This reviewer feels that the removal of reported values below the local background is not fully justified or explored currently as it could point to additional interferents or modes of behavior of the sensors. A further comment on the rational for removal of data spikes could also feed into this.

The nature of the deployments within wider deployment domains, particular within FRAPPE/DISCOVER-AQ, provided opportunities for cross comparison between techniques was well used by the research team and provide pointers to effective deployment methodologies.

Minor typographic errors: “In that vein, it is important explore the operational differences”: Missing “to” between “important” and “explore”.

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