

# Controlled release testing of commercially available methane emission measurement technologies at the TADI facility

## Response to Reviewer Comments

Corresponding author: Audrey McManemin ([anm49@stanford.edu](mailto:anm49@stanford.edu))

We thank the reviewers for their thoughtful and constructive review of our manuscript. We appreciate their recognition of the experimental design, thoughtful discussion, and the importance of our findings regarding the current state of methane quantification technologies. Below we address each specific comment.

We believe these revisions will strengthen the manuscript and improve its clarity. We look forward to submitting the revised version.

### Reviewer 1 Comments received October 3, 2025

Reviewer Comment	Author Response	Edit
<i>Lns 11 &amp; 63 &amp; 340: Remove all reference to academic in this paper. The study tested commercial techniques and the quantification codes are not provided in the manuscript or supplementary information. I understand the results from academic teams will be presented in an accompanying paper. I'm not sure "public" adds much – it what way?</i>	Accepted	Removed all references to "academic" and "public" from the paper
<i>Ln 12, This not the first blind methane detection and quantification study in Europe. Please refer to Liu et al (2024) AMT 17, 1633–1649, 2024.</i>	Accepted	Added reference on P3 L54
<i>Ln 27, ...have contributed</i>	Accepted	Updated L27
<i>Ln 28, ...pre-industrial time, and given ...</i>	Accepted	Updated L28
<i>Ln 34, U.S. Inflation Reduction Act – I'm not sure this is a relevant example anymore given recent developments.</i>	Accepted	Removed reference
<i>Ln 140, Table 2 can be moved to the supplementary information. Not contributing much for the reader here.</i>	Accepted	Data contained in SI Table 23-24.
<i>Ln 158, Table 3 delete columns 2-5 and replace with a single column with the number of estimate submissions. Data is repeated in a different form in columns 6-9.</i>	Accepted	Updated Table 3 (Table 2 in revised document)
<i>Ln 180, This figure and its caption are confusing – please remove. Table 3 is a more useful summary of false positives etc.</i>	Accepted	Moved to SI Section 5 with updated legend and revised caption (SI Figure S17)

<i>Ln 219-223 and Table 4. It would be interesting to include a column that shows the “Participant estimates within +/- 10% of the true value” and provide a short discussion. This is the kind of number that regulators have in mind and it would be good to show just how problematic this is. If not 10%, check relevant policy documents to see what recent expectations are.</i>	Accepted	Updated Table 4 (Table 3 in revised document) and added in discussion (lines 353-359).
<i>SI P35, “Names of individual personnel not required” &amp; P36-43, Remove references.</i>	Accepted	Updated on P35 and P36-43

### **Reviewer 2 Comments received November 3, 2025**

<b>Reviewer Comment</b>	<b>Author Response</b>	<b>Edit</b>
<i>P5, L95: It might be worthwhile listing the academic teams and their technologies as well, to get a better overview – potentially in the supplement.</i>	Accepted	Added to SI Table S9
<i>Fig. 2: What does the dark blue bar represent in the diagrams? Why is there a split at 50 kg/h? Although, as the other reviewer mentioned, this figure is not easy to grasp at first, it nicely shows the different types of detection (TP, FP, FN) in terms of release rates.</i>	Accepted	Moved to SI Section 5 with updated legend and revised caption (SI Figure S17)
<i>P12, L247: Please define CoV.</i>	Accepted	Defined in L292
<i>P13, L251: What do the authors mean by 'aggregate'? Are they referring to binned winds?</i>	Accepted	Added definition after “aggregate (i.e. analysis performed on the combined quantification estimates of all the teams)” L293
<i>P16, L340f: I could not find any analysis of observations among the eight commercial systems that classify as 'aircraft' or 'vehicle' in this work. Please remove them from the list throughout the text.</i>		Removed from L61 and L395 and
<i>P17, L370f: I do not understand why “the study design focused on mobile ground-based solution” although the analyzed technologies were either airborne (or even space-born) or continuous monitoring, at least, in this work. Did the academic teams (not evaluated here) primarily deployed mobile ground-based solutions?</i>	Accepted	Added clarification (i.e. drones) and removed aircraft and satellite on L427
<i>P5, L94: I could not find SI Section 1.2.2 in the Supplement.</i>	Accepted	Updated to point to appropriate section (1.3-4)
<i>h vs. hr: Please use common units for hour.</i>		Updated on L292, L293, L217, Figure 3, and SI

<b>Table 4:</b> Shift text below Table to caption or use footnotes.	Accepted	Added in footnotes
---	----------	--------------------

**Editor Comments received January 19, 2026**

<b>Reviewer Comment</b>	<b>Author Response</b>	<b>Edit</b>
<i>L17 – superscript R2</i>	Accepted	Updated L17
<i>L43 – passive imaging can also rely on direct sunlight (see for example ground-based EM27/SUN measurements as used by Luther et al 2021 and other studies). Please reword this sentence.</i>	Accepted	Removed the word “backscattered” so sentence now reads “Passive imaging relies on sunlight...”
<i>L59 - presumably a total of 4 weeks spread over the two months? Perhaps clarify. (I note this is clear at L75, but perhaps "Over a total of four weeks" here.)</i>	Accepted	Changed to “Over a total of four weeks...”
<i>L62 - remove the pair of commas</i>	Accepted	Removed the commas
<i>L64-65 - what does "academic teams" mean? Operation and quantification methods? Perhaps clarify as well.</i>	Accepted	Changed to “The technologies belonging to academic institutions and research laboratories”
<i>L68-69 - this sentence sounds a bit awkward now. I suggests replacing "marks" with "constitutes" or similar.</i>	Accepted	Combined with previous sentence, changing to “, constituting a large-scale, ...”
<i>L96 - does this mean that at some points between start and stop time the release rate might have been 0? This seems to be the case based on later info. I suggest you could remove "nor whether the emission rate was non-zero in each time slot" as this is better explained in the next paragraph anyway.</i>	Accepted	Removed “nor whether the emission rate was non-zero in each time slot”
<i>L108 - "in that week" --&gt; "during that week"</i>	Accepted	Changed “in” to “during”
<i>L129 - the Stanford team? This hasn't been introduced as the coordinating group? I suggest "defining" this somewhere before here.</i>	Accepted	Added a sentence on L79 “A team from Stanford University was onsite during the experiment to help coordinate along with TotalEnergies scientists and engineers.”
<i>L133-134 - I'm guessing they didn't actually measure the methane releases exactly, but rather made measurements of methane concentration (or similar). Tighten up wording.</i>	Accepted	Changed to “the participants measured methane concentrations with their instruments to provide an estimate of the release flowrate”
<i>L181 - could --&gt; might</i>	Accepted	Changed to “might”

<i>L191 - exactly half?</i>	Accepted	Changed “more than half” to “half”
<i>L234 - it's --&gt; that it is</i>	Accepted	Changed to “that it is”
<i>L273 vs L276 - white paper vs whitepaper</i>	Accepted	Changed all instances of “whitepaper” to “white paper”
<i>L291-312 - there appears to be a bunch of text missing here and strange line numbering, so it would be worth checking this. Either that or the tail end of the table footer and start of the following paragraph are both (accidently?) deleted and the line numbering is just messed up.</i>	Accepted	Confirmed line numbering is accurate
<i>L334 - Add "The" at the start of this sentence</i>	Accepted	Added “The”
<i>L341-342 - change to "technologies; however, more"</i>	Accepted	Changed to “technologies; however, more...”
<i>L389 - "the detection limit"</i>	Accepted	Added “the”
<i>L401 - given you've been focused on the instruments, perhaps replace "teams" with "instruments" or similar throughout this paragraph (your call though!)</i>	Accepted in part	Changed some references of “teams” to “technologies”
<i>L414 - missing a space between sentences</i>	Accepted	Added a space
<i>Overall, I think the fact that the experiment was conducted under realistic (non-ideal) conditions could be more strongly emphasised meaning that performance is more likely to reflect applications. Additionally, the fact that the experiment helped identify issues with some solutions could also be perhaps more strongly highlighted.</i>	Added	Added two sentences to L:  However, the fact that the experiment was conducted under realistic (non-ideal) conditions means that the performance demonstrated here is more likely to reflect real-world applications of these technologies. Additionally, the realistic conditions of the experiment helped to identify issues with some technologies that may have gone unnoticed in more ideal scenarios.