

Referee #2

Specific comments:

Update Laurent, 2016 to the most recent (2020) version, add doi/url, https://meta.icos-cp.eu/objects/JUOeklwSb3fh8hdK9eL3_V9V (see also correct citation there)

Updated

Referee #3

General comments

The authors present a comprehensive analysis of CO₂ observations from a monitoring station in India, making a valuable contribution to this special issue on greenhouse gases in the Asia-Pacific region. The manuscript fits well within the scope of Measurement Report. I recommend acceptance after the authors have addressed the following comments.

We sincerely thank the reviewer for the positive and encouraging assessment of our manuscript. We are pleased that the reviewer finds the study to be a valuable contribution to this special issue and appropriate for the scope of a Measurement Report. We appreciate the recommendation for acceptance and have carefully addressed all the comments provided below.

Specific comments

Line 149: The authors mention the PM_{2.5} sensor from Panasonic here. Could they also clarify which sensors were used for CO and NO measurements?

The measurements for CO used the CO-B4 and NO/NO₂ measurements used NO-B4/NO₂-B43F sensors from Alphasense. The text has been modified as “*The sensors used in CUPI-G are a palm-sized optical PM_{2.5} sensor developed by Panasonic, a CO-B4 Carbon Monoxide Sensor, and an NO-B4 Nitric Oxide Sensor developed by Alphasense.*”

Line 155: There is no corresponding reference for Mangaraj et al. (2025) in the reference list. In addition, it would be helpful to include a comparison between the low-cost sensors and high-precision reference instruments, even if only in the Appendix.

Thank you for pointing this out. All references have been cross-checked and verified for consistency. A new figure (Figure S1) has been added to the supplementary information, comparing CO mole fractions from CUPI-G with those from a standard high-precision instrument.

Line 284: Figure 2 has been updated to include CH₄ and CO. I assume that CO₂ and CH₄ were measured by the Picarro instrument and CO was measured by the CO-B4 sensor. It is better to state the information in the figure caption.

The figure caption has been modified as follows: “ *Figure 2: (a) Hourly averaged time series of atmospheric (a) CO₂, (b) CH₄, and (c) CO mole 285 fraction for the study period (February 2023 to January 2025) over Sonipat. The thick black 286 line represents the background mole fraction estimated using the ADVS method. CO₂ and CH₄ measurements were made using Picarro GHG analyser and CO measurements were made using CUPI-G sensor.*”

Line 405: It is interesting to see the differences between the in situ observations and the satellite measurements. However, I am not sure that the term “regional-scale enhancements” is appropriate here, since satellite observations are generally more suitable for regional-scale patterns, whereas in situ techniques are better suited for detecting local sources. It may be more appropriate to use “local enhancements” or “local emissions” instead.

We agree with the reviewer that the term local enhancements would be better suited and the text had been modified as “*This post-monsoon enhancement from crop residue burning at the monitoring station, along with additional transport from Punjab, highlights the limitations of high-resolution satellite data in capturing local enhancements.* ”