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Evaluating low-cost NDIR CO_2 sensors for atmospheric observations in rural settings

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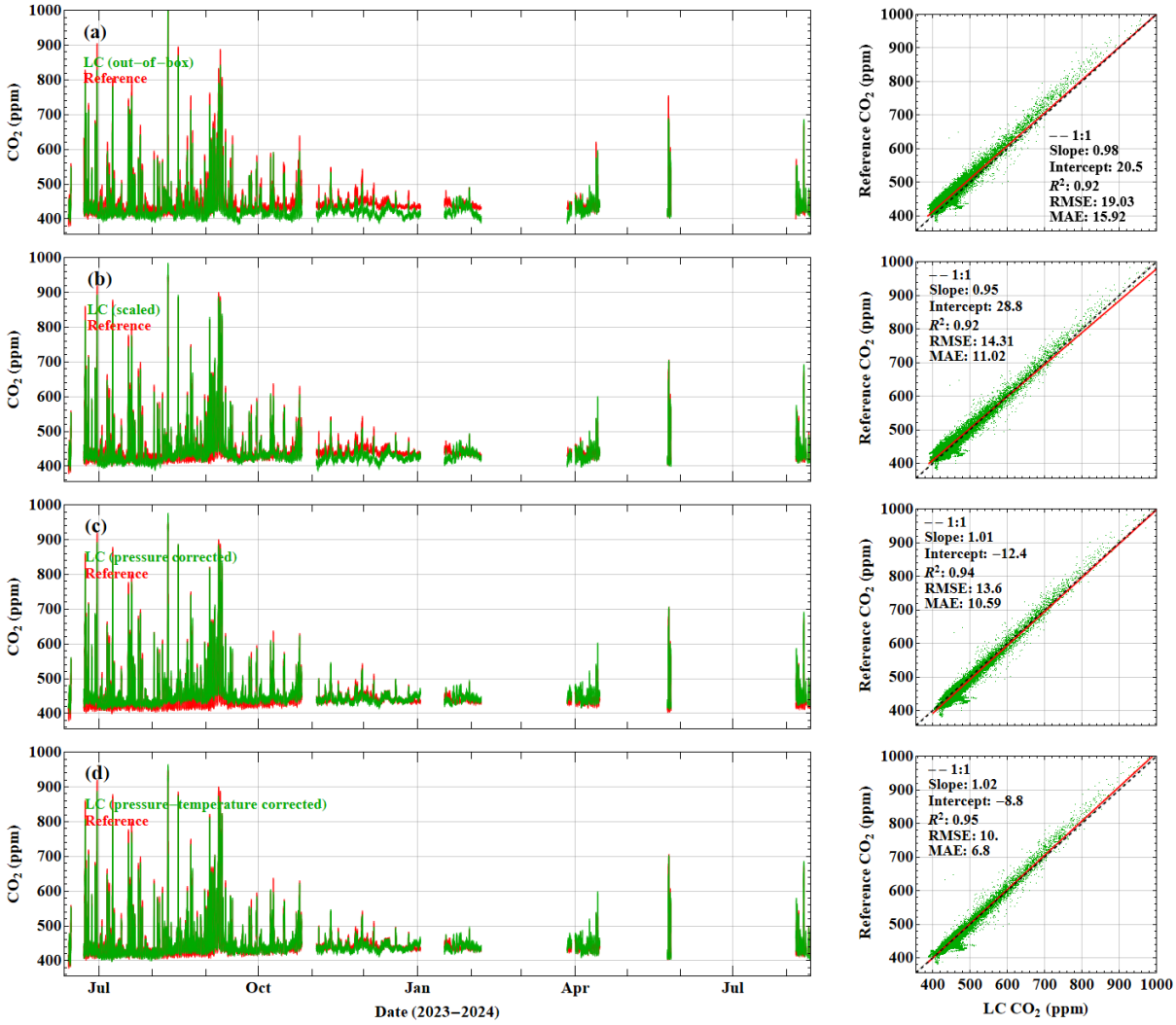


Figure S1: Results of different calibration stages for the LC AirGradient S8 CO_2 signal for the period 22 May 2023 to 31 August 2024 at the rural location. (a) Factory calibration, (b) simple linear calibration using a fixed period (1-18 August 2023), (c) pressure only correction of the out-of-box signal and (d) pressure and temperature correction of out-of-box signal. Gaps in data are due to power outage and sensor offline due to loss of Wi-Fi connectivity at the rural site.

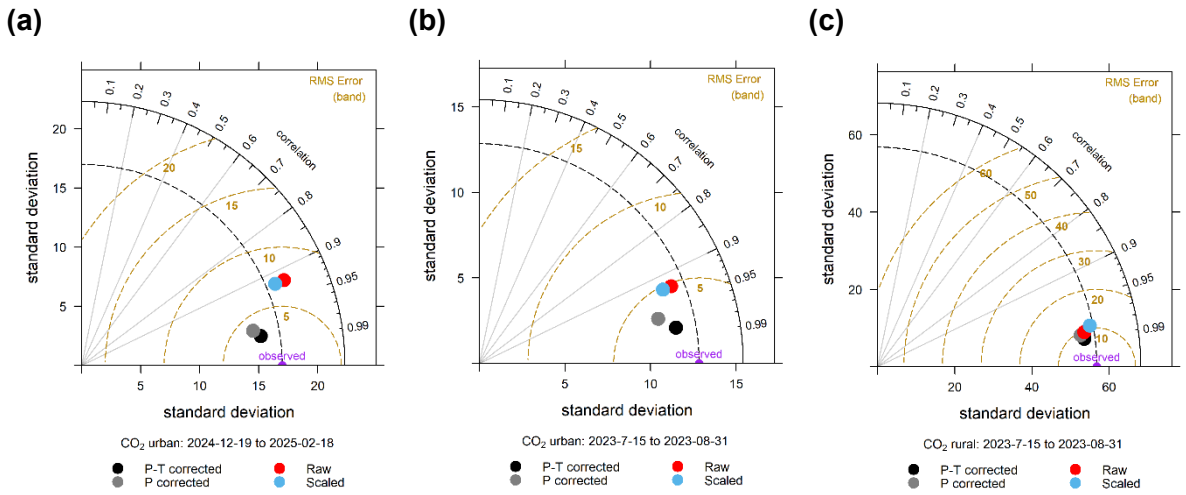


Figure S2: Taylor diagram comparing raw, scaled, pressure corrected, and pressure-temperature corrected CO_2 measurements for the LC AirGradient S8 with co-located reference observations at the urban and rural sites. Panels show results for (a) 19 December 2024-18 February 2025 at the urban site, and (b) 15 July-31 August 2023 at the urban site, and (c) 15 July-31 August 2023 at the rural site. The reference observations are shown as the solid purple semi-circle ("observed"). Data points located closer to the reference indicate better agreement with the reference measurements.

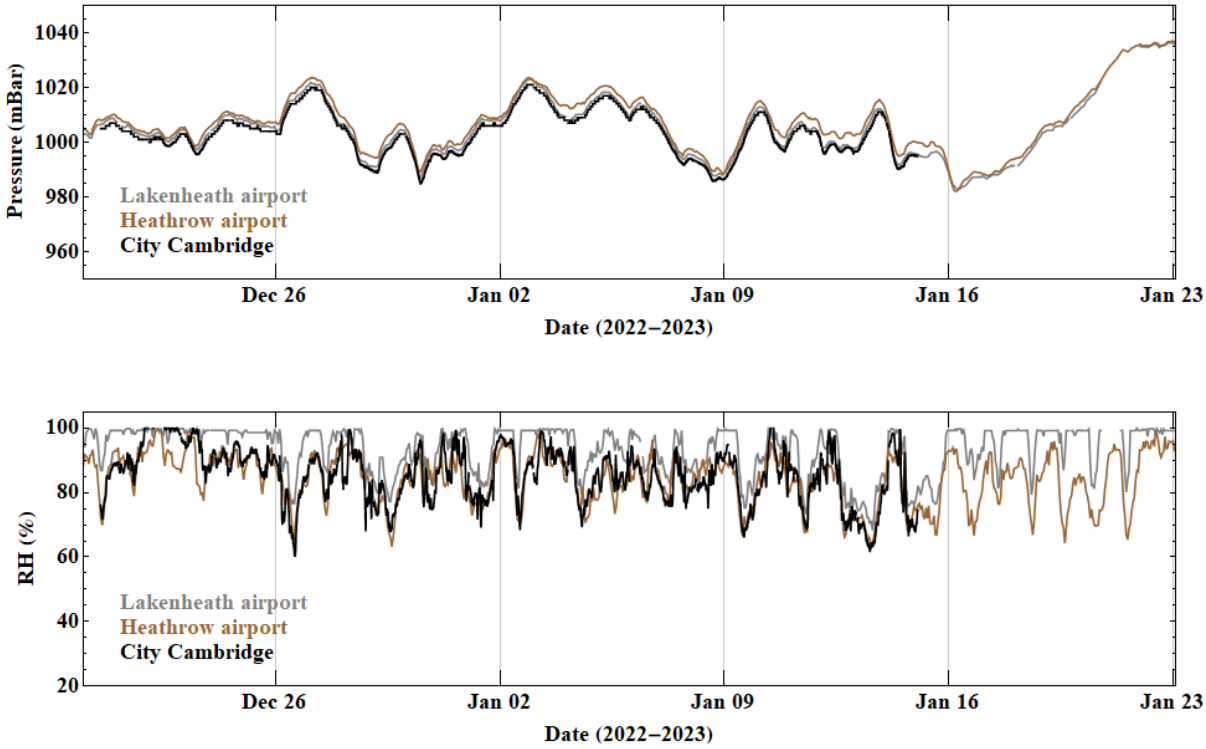


Figure S3: Ambient pressure and RH reading from two airports (Lakenheath and London Heathrow) approximately 125 km apart compared to reference meteorological

station at the urban study location which is approximately 15 km from Lakenheath airport covering the period from 20 December 2022 to 22 January 2023.

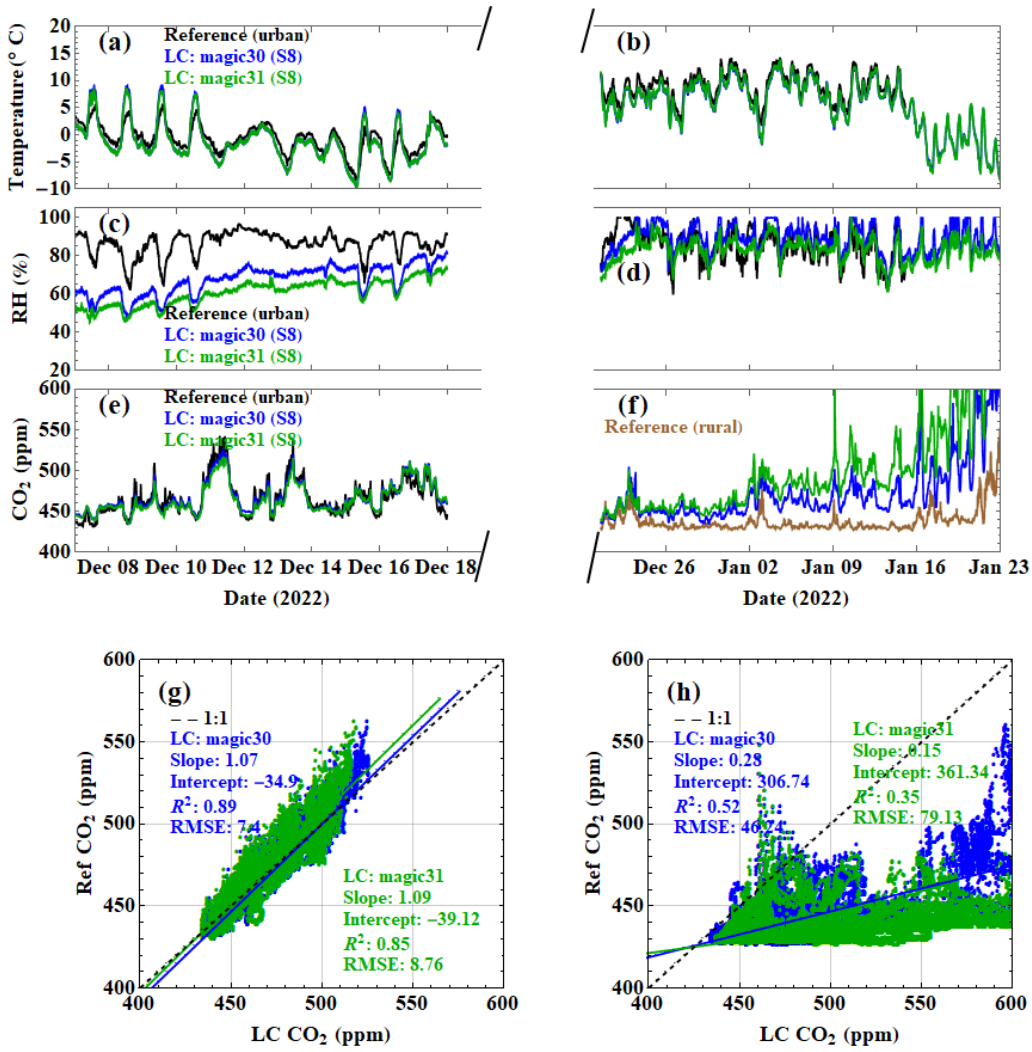


Figure S4. Comparison of paired LC Magic-K33 units with the reference instrument during urban and rural deployments. (a, b) temperature, (c, d), RH, (e, f) CO_2 time series and (g, h) scatter plots for the CO_2 at the urban (7-18 December 2022) and rural (20 December 2022-22 January 2023) sites, respectively.

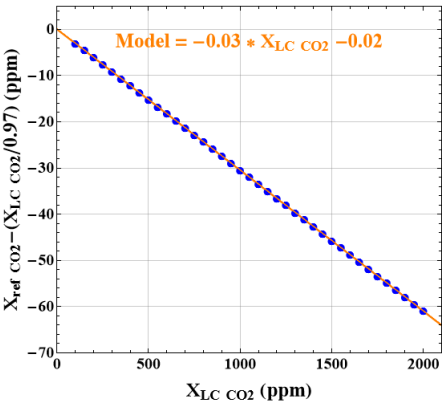


Figure S5. Scatter plot showing the fit used in derivation of the *offset (at P_0)* used in the pressure correction algorithm.

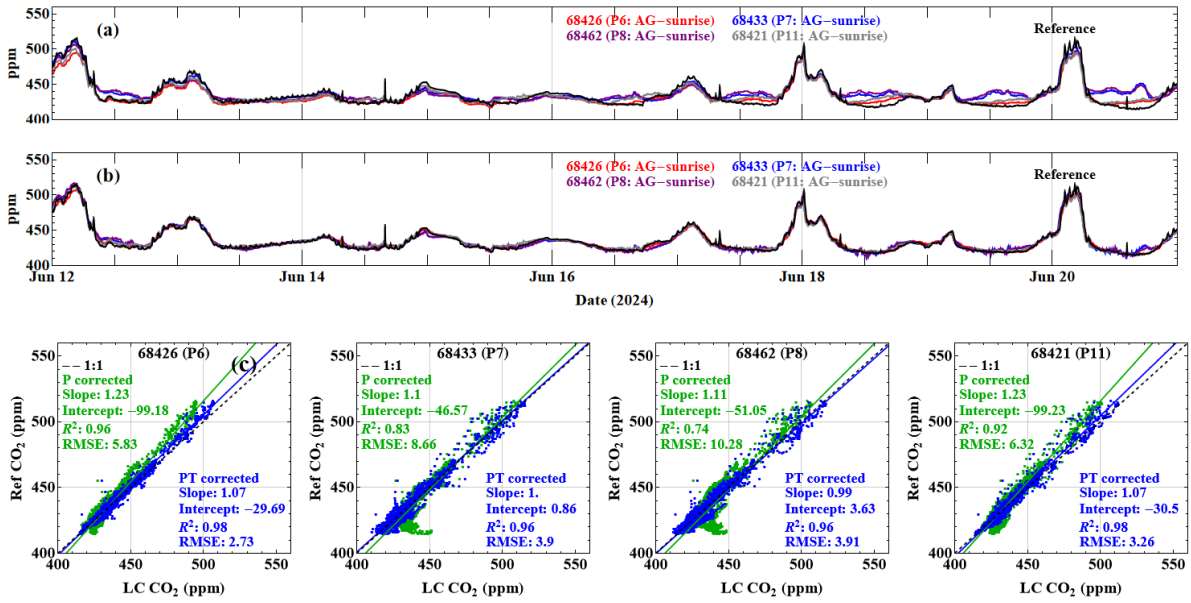


Figure S6. Temperature effects and corrections for LC AirGradient Sunrise CO_2 devices during network deployment for the laboratory deployment 12-20 June 2024. (a) Pressure-corrected CO_2 relative to the reference during laboratory co-location, (b) pressure- and temperature-corrected CO_2 relative to the reference, and (c) relationship between the corrected CO_2 and reference measurements in (b).

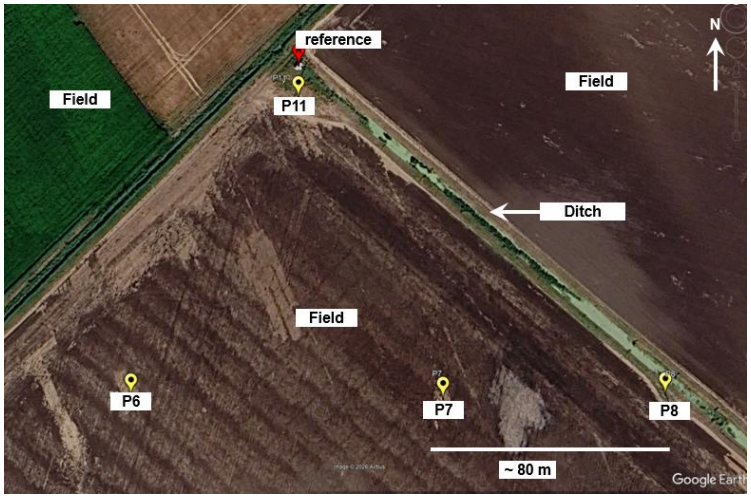


Figure S7. Map showing the distribution of the network of four LC AirGradient Sunrise at the rural site. Background imagery in from Google Earth Pro (Imagery © 2026 Google; map data © 2026 Google).

Table S1. Temperature correction fit parameters for the AirGradient (Sunrise CO_2) devices used in the network deployment at the rural (farm) location.

Node ID	$A_{Sunrise}$	$B_{Sunrise}$	$C_{Sunrise}$
68433	0.94	1.07	1.99×10^{-10}
68437	0.97	1.09	2.36×10^{-13}
68461	0.85	1.03	7.35×10^{-5}
68436	0.88	1.02	5.30×10^{-4}