General comments:

This paper reported a low-cost sensor CO2 network consisting of 56 sites of Zurich. The sensors require in-field training for model calibration and further post-processing steps to calibrate drifts and exclude outliers. Validated against parallel reference measurements from the mid-cost sensor network, the hourly mean root mean squared error was 13.6±1.4 ppm and the mean bias 0.75±1.67 ppm, which is a reasonably good performance. I think this study falls in the scope of AMT, but the MS needs further substantial revisions for potential publication in this journal.

Major comments:

1. The environmental corrections are linear, while for factors of temperature and pressure, the responses can be non-linear (in Section 2.4), and air pressure seems not included in the processing, more discussions and tests are needed.
2. NDIR sensors are sensitive to vibrations during potential rough handling (e.g. transport, and setup), this may be the reason why climate chamber models not suitable for filed calibration;
3. The LP8 sensors may have a SenseAir automatic baseline correction (ABC) algorithm for the manufacture product raw

accuracy, need to close it before the authors' model calibrations. Potential jumps may be seen in Fig.8b and 8c, peaks and valleys (e.g. around 2022-10; 2023-01; 2023-09; 2024-02). Please introduce this in Section 2.4.2;

4. In line 188, do the 3-12 weeks long enough to cover all typical T, RH, P variability through the year? Especially for the relative short 3 weeks;
5. In line 316, the authors excluded temperatures below 0 ℃, please provide the fractions deleted by this factor, this may not be a major problem for this study, but for many places in winter, this problem largely reduced the sensor use areas and needs further development in algorithm or adding heater;
6. In lines 374-376, need to point out and discuss the shortcomings of larger summer and winter biases in further atmospheric inversions;
7. In lines 403-406, the published paper of Cai et al., (2025) reported their final corrected RMSE of 1.6 ppm (daily) to 2.4 ppm (30-month) in the abstract, need to update the reference (https://amt.copernicus.org/articles/18/4871/2025/) and parameters.
8. In lines 431-432, for some sites and some seasons, the RMSE/Bias can be larger than the spatial gradients signal, and it needs to be

cautious when explain certain signals and further use in inversions;

9. Consider add some analyses or discussions on local or public inventories (ODIAC), e.g. in section 3.2, in Fig. 10 (correlations of high concentrations and emissions?);
10. The writing and expression need further improvements in the fluency and grammar errors.

Minor comments:

Keep consistent in figure title capitalization.

Line 126, may be not suitable to say commercially available to avoid potential advertisement?

Line 144-145, can be deleted.

Section 2.3 and 2.4 both have data processing?

Line 147, can briefly introduce tests in the climate chamber.

Line 152, update Cai et al., (2025) for published version.

Line 185-186, if climate chamber tests are not useful, may be not to include them in future works?

Line 203, be replaced by median value or set null, which is more reasonable?

Line 206, “aggregation” is better replaced with “averaged”.

Line 207-208, why not used in this paper?

Line 225, introduce the reference gas (e.g. accuracy).

Line 237, show/describe the typical differences of second and lowest?

Line 242, show same cases of the almost identical ones in supporting information?

Line 285, also stronger sink by vegetation uptake in summer.

Line 302, **linearly-**interpolated?

Fig.6c, why correlation become worse after calibration for outlier?

Line 379-380, seems there are temperature impacts.

Line 425-427, add some explanations.

Line 430, IDW first appeared in Line 234-235;

Line 434-435, add typical sites.

Fig.10 caption, add time periods.

Fig.11 Add shading areas as in Fig.12 to show rush hours.

Fig.11 change “fall” to “autumn” to keep consistency with previous figures.

Line 449 higher emissions from heating?

Line 483 week to weekdays?

Line 546, no industrial or other emissions? Explore inventories if possible.

Line 550, negligible at certain distance?