

Interactive comment on “Evaluation and enhancement of a low-cost NDIR CO₂ sensor” by Cory R. Martin et al.

Anonymous Referee #1

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The presented article address the application of low-cost NDIR CO₂ sensors for urban measurement networks aimed at assessment of CO₂ fluxes over an urban areas using inverse modelling technique. While such sensors has not enough precision in case of background studies, their application in urban areas where amplitude of atmospheric CO₂ mixing ratios is order of magnitude higher is possible. These circumstances make the presented study an important contribution to the construction of such measurement networks. Authors focused on evaluation of several copies of SenseAir K30 NDIR CO₂ sensor. Authors demonstrated that all the sensors fulfill the technical specification of manufacturer however this specification is not enough in above application. A series of long term measurements showed that application of correction factors determined by two statistical approaches, subsequent univariate and multivariate linear regression analysis significantly improve the sensor performance.

Detailed comments:

p.1 I.15: there is no info on RMS of research-grade analyzer used by authors which is compared to low-cost

p.4 I.3 Why authors decided to use such narrow range of CO₂ mixing ratios. In real urban environment values close to 500 ppm or more are frequently observed.

p.6. L23 it is not clear why the calibration strategy has been changed during the experiment. Why some standards were flushed for 10 min and other for one hour?

p.11 I.19 Authors decided to use natural synoptic variability to perform a regression analysis aimed at determination of correction factors taking into account the influence of temperature, humidity and pressure variability of NDIR sensors on CO₂ measurements. Such procedure requires long time and is depended on existing natural variability. To standardize and shorten the procedure maybe a construction of special environmentally controlled chamber should be taken into account?

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Discussion paper

