

Interactive comment on “Carbon Dioxide and Methane Measurements from the Los Angeles Megacity Carbon Project: 1. Calibration, Urban Enhancements, and Uncertainty Estimates” by K. R. Verhulst et al.

Anonymous Referee #2

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In the manuscript "Carbon Dioxide and Methane Measurements from the Los Angeles Megacity Carbon Project: 1. Calibration, Urban Enhancements, and Uncertainty Estimates," Verhulst et al. describe a network of 11 CO₂ and CH₄ measurements on towers and building tops in and near LA. They carefully detail their site selection and calibration strategies. In LA, the choice of background is particularly important because there is predominantly flow from the ocean in the spring/summer, whereas in the fall/winter the flow pattern is more variable. In the end, they found the SCI site to best represent the background air and used that in the calculation of CO₂ and CH₄ enhancements. The median midday urban enhancements reported are large (5.8 -

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13.8 ppm CO₂ and 40.2 - 81.4 ppb CH₄ for the urban/suburban sites) compared to both the estimated variability in the background and to the measurement uncertainties. Of course, the magnitude of these enhancements is dependent on the measurement heights, and the readers should be reminded of that. The authors also carefully describe the measurement uncertainties, and alternate calibration strategies.

This paper is very well-written and within the scope of Atmospheric Chemistry and Physics.

I recommend this paper for publication in Atmospheric Chemistry and Physics, with technical/minor revisions, listed below.

Abstract: "large CO₂ and CH₄ enhancements relative to a marine background to estimate"- remove "to"

Abstract: "roughly 20 ppm CO₂ and 150 ppb CH₄ during all hours" – specify averaged over all hours? Higher enhancements at night.

Abstract: "The largest component of the measurement uncertainty is due to the observations being elevated relative to the single-point calibration method." I understand the point of this sentence, but don't understand "elevated". Reword?

Section 2.3: also have G2201-i and G1101-i instruments listed in table, but not in text

Section 2.3: Did I miss how the instruments were calibrated in the lab, prior to deployment? If they weren't, I would expect significant slope errors.

Section 2.4: The sentiment of the first sentence is repeated a few sentences later -reword?

Section 2.4: Were the Scripps tanks calibrated to X2007 for CO₂ and X2004A for CH₄, like the NOAA tanks?

Section 2.4, second paragraph: Missing period in the last sentence.

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Section 2.4: The high mole fraction tank is mentioned in passing in the third paragraph. Suggest mentioning prior to this.

Section 3.1: First sentence is pretty obvious. Reword?

Tables 2 and 3: Could these be changed into a figure? Hard to process as tables.

Section 4.1: Why are the criteria for SD within one hour 0.3 ppm and 5 ppb CH₄? And why hour-to-hour difference 0.25 ppm CO₂ (why in general, and why slightly different than one-hour SD?) Why no hour-to-hour criteria for CH₄?

Section 4.3: It was surprising to me that after such detailed analysis, you ended up using SCI as background for all times.

Section 6.1.6, second paragraph: "CH₄ standards are very stable" is said three times within this paragraph – suggest rewording.

Section 6.1.6: "routine field measurements of standard tanks to date do not indicate significant drift in either gas" – do you determine this through the target tank results? Clarify.

Consider moving Tables 5 and 6 to supplement.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-850, 2016.