Atmos. Chem. Phys. Discuss., 14, C5324–C5325, 2014
www.atmos-chem-phys-discuss.net/14/C5324/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mapping CH_4 : CO_2 ratios in Los Angeles with CLARS-FTS from Mount Wilson, California" *by* K. W. Wong et al.

Anonymous Referee #1

Received and published: 26 July 2014

General comments

The authors use a Fourier Transform Spectrometer (FTS) located atop Mt. Wilson, California, to make slant column measurements above and reflected from the Los Angeles basin. From these measurements, they derive excess column abundance ratios of methane to carbon dioxide. Their instrument provides a unique long term remote sensing measurement of two important greenhouse gases. One of these greenhouse gases, methane, is underrepresented in the California Air Resources Board emission inventory. The FTS, in conjunction with other measurements throughout the basin, will help determine where these excess methane emissions are coming from. The authors specify two regions, Pasadena and eastern Los Angeles, with high excess methane to carbon dioxide ratios. Overall, this paper is relevant and helpful to the ongoing process

of identifying the sources of methane to the atmosphere in the Los Angeles basin.

Generally, this paper is well written and scientifically sound. My one general question deals with the uncertainty of comparing the reflected beam vs. the direct beam. How would a residual boundary layer below the altitude of Mt. Wilson affect the uncertainty of the excess CH4 or CO2 abundance? Along those lines, how would spatial variability in CH4 or CO2 in the atmosphere above 1.6 km affect the excess ratio?

Specific comments p. 17039, Line 15; do you have a citation for the $\pm$10% uncertainty?

p. 17040, Line 2; You should clarify that a column measurement is less influenced by local sources as long as these sources' emissions don't fill the boundary layer.

p. 17041, Section 4.1; Please add some discussion on the authors' assumptions for the slant column density of a gas above Mt. Wilson

Table 3; I don't see where this table is cited in the text.

Table 3; The uncertainties in this table should include the accuracy uncertainties as well as the fit uncertainties. This overall uncertainty should then be used in the average for the entire basin.

Table 4; Why not add the 2010 CalNex CH4:CO2 from Wennberg et al. (2012)?

Technical corrections "in-situ" is sometimes hyphenated, sometimes not throughout the paper

p. 17049, line 7; you seem to have one too many citations for "Y.-K. Hsu, personal communication"

p. 17053, line 19; change text to "an interesting"

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17037, 2014.