

Interactive comment on “Top-down estimation of carbon monoxide emissions from the Mexico Megacity based on FTIR measurements from ground and space” by W. Stremme et al.

Anonymous Referee #2

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This paper presents a novel top-down estimation strategy to estimate the CO flux over the Mexico City Metropolitan Area (MCMA). The growth rate of CO around noon, under low ventilation, is calculated from measurements at the UNAM campus. This growth rate allows the derivation of an average surface emission flux at the site. Background CO in the basin is determined from measurements in Tecamac, which is supposedly at the edge of the MCMA. Space based measurements of CO (from IASI) are used to reconstruct the extent of the spatial distribution of CO. The authors come up with a CO emission estimate suggesting that the official inventory may have underestimated the CO emissions from the Mexico Megacity for the year 2008.

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Prediction scenarios for the future indicate that more people will live in megacities. With the current sluggish departure from fossil fuel dependence, the contribution of megacities to global anthropogenic gas emissions will be even more significant. Therefore, scientific studies such as this paper are important in the effort to quantify the current and future effects of megacities on the Earth's atmosphere and climate. I recommend that this paper be published after the major comments of Reviewer 1 and a few minor comments have been addressed.

Minor comments:

Two different SFIT versions are used for the ground based CO retrievals, why and what is the difference?

Fig. 3b: From the scattered red points, it is difficult to see that the average (black curve) could be obtained. Perhaps a different marker type/size would be more appropriate?

Fig. 4: the figure and the annotations are too small to read (unless zoomed in from the PDF). I think this can be as big as Fig 6.

L230: From the way the paragraph is written, it is not immediately clear to the reader how the time interval is chosen.

L236: How was the precision derived here?

L239: "systematic" > systematically

L302: "prf_1^VMR ": It is not shown where this was used.

L351: "The equations" > Equations

L352: "(K^j) belong" > (K^j) belongs

L415: "sensibility" > sensitivity

L423: "error" > errors

L425: the subscript "constrain1" is missing a "t"

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L430 put "(Eq. 1)" at the end of the sentence.

L460: Sentence starting from here up to L464: Restructure and separate into two sentences for clarity.

L485: "information of" > information on. "by the" > from the

L487: "emissions depends" > emissions depend

L529: There seems to be a missing unit for "15", I guess minutes (min) ?

L553: "within certain criteria" > within a certain criteria

L578: "focuses in" > focuses on

L583-589: Sentence construction should be improved for clarity.

L598: "affect significantly" > significantly affect

L601&602: "slightly" > slight

L651: The derivation of the mass ratio (17.3) from Wunch et al, 2009 is not immediately obvious at first read. A sentence explaining this would be helpful.

Supplement:

Table 4 caption: "meanvalue" > mean value

Table 4 footnote: fonts are too small

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 29915, 2012.

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