

Interactive comment on “Interpreting Space-Based Trends in Carbon Monoxide” by Sarah A. Strode et al.

Anonymous Referee #1

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The manuscript describes a small series of numerical experiments to understand previously reported trends in column CO from the MOPITT satellite instrument. It is a thoughtful interpretation of the MOPITT data. The manuscript would benefit from more detail in places, detailed below, but it is suitable for publication in ACP.

Detailed comments:

- 1) The manuscript title would benefit from being more specific.
- 2) MACCCity or MACCCITY? Be consistent.
- 3) This reader thought the abstract would benefit from being punchier. What is the punchline? Is it that getting column ozone right is important for understanding column CO trends?

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4) Line 71. It would be useful for the reader to be more specific about assumptions/data used to build MACCCity. Maybe a few sentences so the reader is not required to immediately chase up details elsewhere.

5) Line section 2.1. This reader believes it would be useful to show an example MOPITT averaging kernel. Just for my own curiosity, is there a difference in the averaging kernel over eastern China during 2010?

6) Line 90: What did the authors assume when calculating the autocorrelation?

7) Line 91: By deseasonalizing the column data by fitting sines/cosines the authors are implicitly assuming stationarity of these data. Do the authors believe this is a valid assumption over a decade-long time series during which the phase and amplitude of the seasonal cycle changes?

8) Line 93: Months with insufficient data? How do the authors define this criterion?

9) Line 95: Do the authors sample the model along the orbit tracks?

10) Minor comment: a few instances where the references should be inline but are not. I expect the typesetting process will pick this up.

11) Section 2.2: Would be useful if the authors provide some regional emission estimates of CO, particularly for pertinent regions.

12) Equation 1. The usual convention is lower-case bold typeface for vectors and upper-case bold typeface for matrices.

13) This reader is confused why the authors included two sets of statistics: 2000-2010 and 2000-2011. If the results from these two sets had been significantly different I would have probably suggested a major re-analysis of the data. But they are not so I suggest (and only suggest) the authors summarize the value of the additional data in a few sentences and report only 2000-2010.

14) Line 186 and elsewhere: The authors won't need reminding that a model-data

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correlation r of just over 0.7 is required for the model to describe 50% of the observed variation. In some places the authors extol correlations of X (much less than 0.7) while in other places the author extol the squared correlation values of Y .

15) Line 265: What is responsible for the observed and model total column anomaly in 2010?

16) Line 271: "can be" or "is"?

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-87, 2016.