

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

Anonymous Referee #1

Received and published: 30 March 2016

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 MO-PITT 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.

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