Atmos. Chem. Phys. Discuss., 11, C1091–C1092, 2011
www.atmos-chem-phys-discuss.net/11/C1091/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "

Seasonal variation of trans-Pacific transport of carbon monoxide (CO) in the upper troposphere: MLS observations and GEOS-Chem and GEM-AQ simulations" *by* J. J. Jin et al.

Anonymous Referee #1

Received and published: 22 March 2011

My review is given in the supplement.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/11/C1091/2011/acpd-11-C1091-2011-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 3219, 2011.

Review of "**Seasonal variation of trans-Pacific transport of carbon monoxide (CO) in the upper troposphere: MLS observations and GEOS-Chem and GEM-AQ simulations**" by Jin et al.

General comment:

The aim of the paper is to characterize the transport of "pollution" from Asia to America across the Pacific. The authors use Aura/MLS observations to document the CO seasonal distribution in the UT and to validate CTMs simulations. The use of tagged CO with one of the two models enable to quantify the contribution of different sources to the UT CO budget in different region from Asia to the US coast. Finally, sensitivity simulations performed with deep convection switched off are made to determine the impact of deep convection on CO transport to the UT and across the Pacific. The subject of the paper is perfectly suited to ACP and the methodology used is generally correct to address the objectives. Nevertheless, I have some important concerns about important points concerning the methodology and the discussion of the results that are addressed below. Furthermore, I am not satisfied with the quality of the English. Many –if not most of the- sentences are not clear, the syntax is approximate and there are too many typos and errors. Because of its poor English, this paper should not have been published in ACPD as it is. I think that a paper written by authors from US and Canadian institutions should reach much higher language standards.
I therefore recommend publication of the manuscript in ACP after the specific comments detailed below are addressed and after the quality of English is largely improved.

Specific comments:

- the word "pollution" is used throughout the paper when CO distribution and transport are concerned. "CO is a tropospheric trace gas" emitted by pollution sources and an O3 precursor but CO itself is harmless for health and crops and is not affecting directly air quality. It is stated in the introduction that CO is a tracer of pollution which is correct. Therefore, more care should be taken concerning the intensive use of the word "pollution" when dealing with CO.

- P3225L14-P3226L6, section 3.1: the description and first interpretation of the latitude-time cross-sections of MLS CO is a bit confusing. The issue of biomass burning over Southeast Asia is mentioned once for "spring" and once for fall at the end of the paragraph. Furthermore, "fast upward transport" or "deep convection" are mentioned to lift the products of fires to the UT, without further information, as if it was always the case all over Asia. I think that things could be easier to understand if some details were given regarding (i) the seasonal variations of SE Asia BB (ii) monsoons and convective seasons in the different part of Asia. The latest statement about NH CO is not providing information concerning the subject of the paper and it would be better to briefly describe the CO variations in the lower troposphere over Asia in relation with the CO sources.

- P3225L15-17: The authors correlate "January-March" high tropical CO in the UT to "spring" BB emissions in Southeast Asia. As mentioned below in the text, boreal spring extends from March to May rather than from January to March!

- P3225L23: the Subtropical Westerly Jet (SWJ) should be introduced here for the first time to explain the "eastward transport".

Fig. 1.