

Interactive comment on “Increased Northern Hemispheric carbon monoxide burden in the troposphere in 2002 and 2003 detected from the ground and from space” by L. N. Yurganov et al.

Anonymous Referee #2

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(1) General comments:

The paper by Yurganov et al. presents an update of atmospheric CO burdens for the High Northern Hemisphere between January 2002 and December 2003. It follows in structure and layout a recent paper from the same first author (Yurganov et al., 2004). This paper was presented in the Journal of Geophysical Research and contains more thoughtful and detailed explanations that seem to be missing in the paper presented here. The paper presented here adds 2 more years worth of data. In this sense it is helpful for the monitoring of global CO burdens but it is not unique or especially innovative. Two tables (Table 1 and 2) are directly copied out of the JGR paper, 6 figures are just extended by two more years. The only new approach is the comparison

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with MOPITT data. Unfortunately this data is also not put into best use since only the average over the total High Northern Hemisphere is used, as already pointed out by referee No. 1.

(2) Specific comments:

Page 5002: A map (additional to Table 1) with the locations of all measuring stations would be helpful

Page 5004: In September 2002 AOD and CO observations from MODIS were enhanced due to forest fires. For 2003 the authors state “forest fires started burning in May”. Was this determined by MODIS data as well? If so, it would be good to say this in the paper.

As already pointed out by referee No. 1 an effort should be made to include 2003 in situ data.

Page 5005: The process how CO burden anomalies are derived needs to be described clearer (it is much better described in the JGR paper). It is also not obvious to me why the stations were grouped in TC (total column stations at low altitudes) and BL (in situ boundary layer stations) combined with FT (free troposphere in situ AND column).

Page 5006: Using GEOS-CHEM with 1998 meteorology. Though I understand the necessity to use sometimes meteorology from previous years for modelling, in this case when anomalies and interannual variability are discussed, an assessment of the influence of using older meteorology should be made at least.

Page 5007: ATSR fire counts. In order to explain anomalies in 1999, 2000, and 2001 the authors suggest that the varying nature of wildfires could cause differences in CO emission factors. This sounds a bit ‘hand waving’. Is there any way to support this argument by for example looking into soil type of the burning regions or difference in CO emissions from different fire types?

“normal” emission seasonal cycle. The authors put ‘normal’ in quotation; however, in a

scientific journal it would be better to describe the used emissions instead of assuming that 'normal' can be understood by everybody. 'Normal' is also used further down on the page and in the figure caption of figure 4.

The conclusions to this paper are a bit thin. They authors end with 'that it is most likely that wildfires are responsible for the CO build up'. A closer look and quantifications of the areas burned, type and timing of fires as they suggested in their JGR paper would be desirable here.

Table 3: 'Accuracy' means here the standard deviation between the two and respectively 3 numbers. I would prefer either stdev or variability

Figure 1: A uniform scale of the x and y-axis would make comparison easier. Since only the data between 2000 and 2004 is discussed the authors might want to consider if they want to display only this time period.

(3) Technical corrections:

Page 5004: Instead of "Specifically, there were 1 (12), 1 (6), and 7 (10) such days in July, August, and September, respectively (numbers in brackets indicate the total observational days for each month)." Maybe something like: there were 1 out of 12 days in July, 1 out of 6 days in August and 7 out of 10 days in September that exceeded the summertime 2002 daily values...

the paper Edward et al. (1994) is cited but is not listed in the references

Page 2006: DeMore et al. 1997

Page 5008: Dettler et al., comma in front of journal title

Page 5009: Edwards et al., 2004 cite with doi number and without acceptance date

Page 5010: Zhao et al., remove one comma after Strong

Page 5016: Figure 3, it would help to print 'top panel, left axis' and 'middle panel, right

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axis' and 'bottom panel, left axis' in bold or underlined in order to help the reader

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