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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Climatology of pure Tropospheric profiles and column contents of ozone and carbon monoxide using MOZAIC in the mid-northern latitudes (24 N to 50 N) from 1994 to 2009" *by* R. M. Zbinden et al.

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The authors make the subject worth of studying by laying groundwork to guide readers into the topic. The paper is written in a clear, concise and simple language. However, I have few comments that I would like the authors to consider.

Since ZLd is the lowest height at which the MP and PTP deeply diverge and it illustrates the penetration depth of the tropopause height as well as stratospheric air contamination, the partial columns in the height between ZLd and ZDT (i.e., UTC(X, t)) sounds

more like the tropopause layer column. Caution should be taken in determining ZLd with few data (for example, Figure 6: China in January, February, April, December as well as Uaemi in October, November) since lack of enough data cause a significant error in the calculation of the monthly-averaged ZLd height.

The PTP was calculated (if ztop < zs < zDT) using Mfit(X, zïĂäïĄĎf , s), the best-fitted line from MOZAIC data using a linear regression on (TP(X,z,s)) ÌĚ , from 5 to 11 km for O3 and from 8 to 11 km for CO. What is the reason for using different height ranges for O3 and CO? Is there any particular reason for not using MP from the surface up to (ztop, if ztop < zDT and zDT, if ztop > zDT) ?

In calculating the monthly-averaged PTCm(X,t), the seasonal based ZDT is used instead of the monthly-averaged ZDT? Is it not possible to get the monthly-averaged ZDT? It would also be better if the authors reason out why they prefer to use seasonally-averaged profiles but monthly-averaged columns and partial columns. Please include the reason in the introduction section to guide readers.

It would be great if the author could mention in the paper the percentage of the MP data with 1. ZDT < Ztop 2. Ztop < ZDT < Zs 3. Ztop < Zs < ZDT

Please provide equation # for all equations in the paper

P14705L25 and P14706L1: "in USsouth and Uaemi between 1 and 4 km all over the months due to intense domestic traffic." This sentence needs clarification. I took me a while to understand what it meant. Did you mean that most of the data were collected using small aircrafts that flew well below the tropopause? Please rewrite this sentence because it is really vague. Can you please mention what percent of data of other sites were collected using such domestic flights and international flights.

P14708L16-17: "Intense photochemical activity is detected there in spring" Who detected it? How detected it? Please cite reference

P14710L16-17: " Over all these sites, a sharp May–June CO depletion highlights the

intense photochemical activity" How did you know? Please cite reference

P14710L16-17: " The July bump over USeast results from the impact of North American boreal fires, during the summer of 2004 (Turquety et al., 2007)". Is the July bump ONLY as a result of the fire in 2004? There were other intensive wild fires during the period of this climatology study, for example in 1995 and 2006. I expected a July bump in the USlake as well but I did not see it. Why?

The next section is to point out the minor error that I found on the manuscript.

Figure 3: Please put horizontal color bars that show the altitude at the bottom of each figure Figure 4: Please put legend in one of the figures Figure 5: Please put legend in of one of the figures

P14701L16: replace "]ztop,zDT]" with "[ztop, zDT]" P14701L19: replace "]ztop, zs]" with "[ztop, zs] " P14701L19: replace "]zs,zDT]" with "[zs, zDT]" P14703L23: replace "]ztop, zDT]" with "" [ztop, zDT]" P 14704L13: replace" only in March " with "during all months except March" P 14711L29: Replace "March" with "April". P 14713L20: Insert "below 0.5 km" between "CO" and "is" P 14719L13: replace "Tokyo [138.7–140.7o N, 35.6–37.6o E]" with "Tokyo [35.6–37.6o N, 138.7–140.7o E]" P14723L28: replace " Ld" with " ZLd" P14724L1: replace " Ld" with " ZLd" P14724L2: replace " Ld" with " ZLd" P14724L2: replace " overage" with " average"

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/13/C6207/2013/acpd-13-C6207-2013-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 14695, 2013.