

Interactive comment on “Inter-comparison of four different carbon monoxide measurements techniques and evaluation of the long-term carbon monoxide time series of Jungfraujoch” by C. Zellweger et al.

Anonymous Referee #1

Received and published: 9 March 2009

General comments: The paper basically deals with two topics. The authors first describe instrument intercomparison of four different methods, and then analysis of long-term trend of CO at the JFJ station for the period 1996-2007. The intercomparison section is very robust and could independently be a good paper as a "Technical Note". I would rather appreciate that the authors combine this work with data analysis since adding technical details greatly demonstrate data quality of CO measurements at JFJ, based on which the authors' analysis largely stands. This effort makes the paper worth publication in ACP.

I have several comments that the authors should consider to improve the manuscript before publication in ACP.

Introduction, page2384, line20: "To date, no comprehensive CO instrument inter-comparisons have been published..." The authors cite several old papers for intercomparison results, but miss a recent paper by Japanese groups. Tanimoto et al. (2007) compared NDIR to GC/RGD, and three different NDIR instruments, including Horiba's CO monitor.

H. Tanimoto, Y. Sawa, H. Matsueda, A. Wada, S. Yonemura, H. Mukai, T. Wang, S. Poon, A. Wong, G. Lee, J.Y. Jung, K.R. Kim, M.H. Lee, N.H. Lin, J.L. Wang, C.F. Ou-Yang, C.F. Wu, Evaluation of standards and methods for continuous measurements of carbon monoxide at ground-based sites in Asia, Pap. Met. Geophys., doi:10.2467/mripapers.58.85, 58, 85-93, 2007.

e.g., page2388, line 5: The authors state "natural air" in several places What does this exactly mean? - zero air purified from ambient air (not synthetic air)? Please clarify.

Figure 6, section 3.2: The authors phrase "depletion". However, CO + OH is slow, unlike fast chemical titration of O3 with NO. Does it mean soil uptake? Or do the authors just technically phrase it? Please clarify.

page2395, line14: "the fit was close to linear..." In Figure 6 caption, the orange line is defined as the "linear" trend of the baseline data. Which is correct? Please clarify.

Figure 1, section 2.2.5: The gas standards are all balanced with natural air, except nitrogen for Horiba instrument. Why? Also I would like the authors to add if there is matrix gas effect with these four instruments.

In my opinion, another important messages from the technical section of this paper is that in addition to GC method, NDIR method can be used for long-term trend analysis, if we make appropriate zeroing and use hourly means data. This could be more emphasized in the paper.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Figure 7: The authors discuss interannual variations with this figure. However, the growth rate (or anomaly) can be more visible than simple comparison of the seasonal cycles. This can be easily done by looking at output of Figure 6. Please consider.

Figure 8: The authors suggest that the increasing Asian CO emissions may offset the CO trend in the FT over Europe, and that the modeled contribution maximizes during January-May. Does the CO trend at JFJ become further slower if only Jan-May data are plotted? I would encourage to see seasonal differences.

Technical errors: page2388, line13: acronyms NIST, NMI, NPL are not explained. Please check other acronyms, too.

page2393, line 6: It can bee -> It can be

Figure 8: CO mixing ratio ratios -> ratios

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 2381, 2009.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)