Atmos. Chem. Phys. Discuss., 9, C877–C879, 2009
www.atmos-chem-phys-discuss.net/9/C877/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of volatile organic compounds (VOCs) in Asian and North American pollution plumes during INTEX-B: identification of specific Chinese air mass tracers" *by* B. Barletta et al.

Anonymous Referee #3

Received and published: 17 May 2009

ACP Discuss. May 2009 Characterization of Volatile Organic Compounds in Asian and North American pollution plumes during Intex-B : identification of specific Chinese air mass tracers. By Barletta et al.

General comments. Based on a considerable data base of VOC obtained by sampling aboard two planes, the authors propose a set of tracer compounds for the identification of specific Chinese emissions vs those of other Asian origin. US plumes were also examined. I find the distinction between Chinese and Asian plumes not very convincing, for the following reasons: 1. The set of compounds assigned as tracers of Chinese

plumes have very small mixing ratio differences from those assigned to Asian plumes. From Table 2 : OCS mixing ratio of Chinese plume differs from that of Asian plume by 5%. For Halon- 1211 the difference is 2.5%. For CH3Cl the difference is 3.3%. All these differences are well within the experimental uncertainty. The difference is indeed large for the last tracer 1,2 DCE 73%. However, this large difference would have been greatly reduced had it not been for #4 and #5 Chinese plumes with exceptionally high concentrations of all pollutants measured. 2. The "pollution plumes" assignment criteria "had passed over source regions" and "not all elevated concentrations were included. . ."are rather vague. All except one Chinese plumes are based on only 5-7 samples and the Asian plumes crossed China in 4 out of 5 plumes. 3.Pollution plumes originating in China and other Asian countries after 5-7 days of traveling up to mainland US, would have been so much dispersed to make distinction extremely difficult.

I suggest the paths of all back trajectories, Chinese, Asian, US, be shown in separate graphs, indicating heights and the sampling positions where they were crossed by the plane flights. A detailed presentation of plumes #4 and 5 would strengthen the manuscript, and could be the segregation point of all Asian plumes ("Chinese" and "Asian" as used in the present manuscript, to be all merged under Asian. Perhaps the Japanese plume should be treated separately.) Evidence regarding the enhanced production/usage of the suggested tracers in certain regions of China that are crossed by plumes #4 and 5 would support the measurements.

Detailed comments.

Introduction: The sentences "The INTEX-B mission. . .out of Honolulu and Anchorage" are also repeated in Experimental. Experimental is more appropriate place. Text referring to ozone formation, greenhouse and health effects should be minimized. All associated references are unnecessary as this is not the topic of the present manuscript. Page 7755: What is the meaning of the variable transport times indicated for Asian plumes in Table 1? Can not the exact times be derived from the back trajectories? Page 7757: ". . .the CFCs were higher in 2004 (Fig. 4)" Examination of Fig 4, however,

ACPD
9, C877–C879, 2009

shows hardly any difference.

Although the CFCs in general, may be declining the difference for CFC-11 between 2004 and 2006 is only 1.8%. The same applies for Freon 12, for which the difference between these two years is only 0.5%. These differences, well within the experimental uncertainty, do not justify the term “decline”. “All the measured CFC replacement compounds were enhanced in US plumes.” This is not evident from Table 2. This statement is only valid for Freon 134a. The other CFCs had similar concentrations in all plumes, within the measurement uncertainty. Page 7758 : “ It appears the Chinese plumes #2 and 3 were diluted compared to the other plumes. . .”. However, Table 3 actually shows that the Chinese plumes #4 and 5 stand out, with the remaining three been similar. As I proposed before plumes #4 and 5 need detailed evaluation. Table 3 is a required complement of the presentation of plumes and unlike another reviewer I suggest be preserved.

“Both the Asian and Chinese plumes were elevated in HCFC-134a, but with lower enhancement compared to background:” This sentence is hard to understand: where is “lower” referring to? It was stated before in Manuscript that in US plumes HCFC were elevated. Are the two statements connected ?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 7747, 2009.