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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Origin of anthropogenic hydrocarbons and halocarbons measured in the summertime European outflow (on Crete in 2001)" *by* V. Gros et al.

Anonymous Referee #1

Received and published: 22 May 2003

This paper describes hydrocarbon and selected halocarbon results from a ground-based station during an intensive study of European air pollution in summer 2001. The manuscript first evaluates the characteristics of the sampling site in terms of proximity to individual sources. The authors then go on to shown, based on air mass origin analysis and chemical ratios, that several distinct anthropogenic sources influenced the atmospheric composition in Crete. Comparison of the propane observations to a global model reveals that the model mixing ratios are systematically too low, probably due to an underestimation of the eastern European propane emissions in the EDGAR database. The authors employ their observations to make the case for continued use and emission of methyl chloroform in Europe. They also report an episode linked to heavy agricultural use of methyl bromide as a soil fumigant in Italy. The paper makes

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a useful contribution to the literature, is well written and is arranged in a clear and intelligent way. I recommend publication in ACP once the following comments and minor changes specified below have been addressed.

Specific Comments

Page 1899, line 22. The authors might be interested in the work of Colman et al., 1998 who also applied Junge variability theory to methyl bromide and methyl chloride. They found very little evidence for an ocean source or sink for either gas, even for samples collected in the S Pacific marine boundary layer. However the influence of natural and oceanic (ie non-industrial) emissions was more uncertain according to the analysis of Johnston et al., 2002.

Page 1910, line 2. I agree that emissions of CH3Br from biomass burning are variable depending on the different fuel types. However, based on an average CO enhancement for Period 3 of about 100 ppb (shown in the companion paper by Salisbury et al.) and the emission factors vs CO published by Andreae et al 1996 and Blake et al., 1996, I calculate a maximum expected CH3Br enhancement of only 1-2 ppt. This enhancement is only a little above the stated analytical precision (of about 7% = 0.7 pptv).

Technical Comments

Abstract. I recommend that the authors add a short description to explain what they gained from looking at the variability versus lifetime relationship (not just that the data "describe a linear relationship"). E.g., "...We evaluated the characteristics of the sampling site in terms of proximity to individual sources by plotting the measured variability of these species against lifetime. The resulting linear relationship suggests that the sampling site is representative of intermediate conditions between a remote site and one that is in the vicinity of a wide variety of sources. Our analysis of air mass origin and chemical ratios also shows that several distinct anthropogenic sources influenced the atmospheric composition over Crete...."

ACPD

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Please be consistent with nomenclature - eg CH3Br and CH3Cl are referred to as bromo and chloromethane in some places and methyl bromide and chloride in others (eg page 6-7).

Page 1909, line 9. Change to "..uncertainty associated with current MCF emissions..." Page 1910, lines 3-4. I suggest the authors add a reference to the earlier description of the different sampling periods as follows: "...period 3 where biomass burning influences predominated (Section 3.2)."

Fig 2 caption. I recommend that the fact that the plot employs two different propane mixing ratio scales be noted here.

References:

Colman JJ. Blake DR. Rowland FS. Atmospheric residence time of CH3Br estimated from the Junge spatial variability relation, Science. 281(5375):392-396, 1998 Jul 17.

Johnston NAC. Colman JJ. Blake DR. Prather MJ. Rowland FS. On the variability of tropospheric gases: Sampling, loss patterns, and lifetime - art. no. 4111. [Article] Journal of Geophysical Research-Atmospheres. 107(D11):4111, 2002 Jun.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1893, 2003.