Atmos. Chem. Phys. Discuss., 6, S4770–S4773, 2006
www.atmos-chem-phys-discuss.net/6/S4770/2006/

Atmospheric
Chemistry
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Discussions

Interactive comment on “Evaluation of organic markers for chemical mass balance source apportionment at the Fresno Supersite” *by* J. C. Chow et al.

Anonymous Referee #2

Received and published: 21 November 2006

Evaluation of organic markers for chemical mass balance source apportionment at the Fresno Supersite

Chow et al.

General comments

The manuscript is an original contribution on source apportionment of aerosol organic markers by means of chemical mass balance. The vast number of samples, the detailed sampling and analytical methodology, and the extensive CMB simulations deserve recognition. I encourage the publication of the paper in the case of correction,

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modification and/or clarification of some critical aspects, which are pointed out in the following points.

One of the aspects open to criticism is the excessive utilization of abbreviatures throughout the manuscript, which forces the reader to keep in mind the source codes of Table 2 and other definitions provided in the text.

Another aspect deserving consideration is the omission of comparative results pertaining to the diverse sampling periods (00:00-05:00, 05:00-10:00, 10:00-16:00, and 16:00-24:00) to evaluate different source contributions. The source profiles for the 00:00-05:00 sampling period are the only that have been discussed.

Specific comments

- Page 10344, Methods. A general description of the sampling site is completely missing.

- Page 10345, lines 2-4. “Two- to four-ring polycyclic aromatic hydrocarbons (PAHs), methoxy-phenol derivatives, alkanes, and organic acids are present in both the gas and particle phases while hopanes, steranes, and high molecular weight organic acids and alkanes areĚ” Generally, hydrocarbons of low molecular weight, e.g., methane, ethane, and propane, are gases; those of intermediate molecular weight, e.g., hexane, heptane, and octane, are liquids; and those of high molecular weight are found in the particulate phase. It is important to define the partition between the gaseous and the particulate phases in a more rigorous way.

- Page 10345, line 7. “Ě samples were extracted in DCM and 10% diethyl ether in hexaneĚ”. How were the extractions done (Soxhlet, ultrasonicationĚ)? Also, give information on the solvent volumes.

- Page 10345, lines 26-27. “Organic compounds included PAHs, polar compounds, hopanes, steranes and long-chain alkanesĚ.”. The type of organic compounds analyzed was previously given at the beginning of the paragraph.

- Page 10346, line 5. Samples were collected based on forecasts of high PM2.5 conditions. What were the criteria for classifying the PM levels as high? How was done the forecast? Was this done based on EPA models and standards?

- Page 10346, lines 8-9. It is stated that the 10:00-16:00 PST period was chosen to evaluate mixing down of aged/secondary aerosols, and that the 16:00-24:00 PST period was for assessing the evening traffic, cooking, and home heating. The 10:00-16:00 period includes the lunch time. Previsibly, it is also very affected by cooking operations. Why was it considered that only the 16:00-24:00 period was influenced by cooking? On the other hand, the time zone abbreviation (Pacific Standard Time) may not be obvious to all the readers.

- Page 10347, lines 16-28. Its is stated that indeno(123-cd)pyrene, benzo(ghi)perylene, and coronene are useful components for distinguishing diesel from gasoline exhaust contributions. However, it is not clear how this separation is done. Are the 3 PAHs only emitted by gasoline exhaust? Do the concentration ratios between the 3 PAHs differ from gasoline to diesel emissions? The paper of Zielinka et al. (2004) does not clarify this matter with objectiveness and the one of Fujita et al. (2006) is not yet available.

- Page 10348, 2nd paragraph. Hardwood and softwood profiles were determined from oak, eucalyptus, almond, and tamarack. It is not obvious why the emission profiles from wood burning of these species were chosen. Are these frequently burned species in Fresno? There are other emission profiles for white oak, red maple, sugar maple, Douglas fir, loblolly pine (Fine et al., 2004, Env. Eng. Sci.), and other temperate climate conifers (Oros and Simoneit, 2001, Appl. Geochem., 16, 1513) or deciduous trees (Oros and Simoneit, 2001, Appl. Geochem., 16, 1545) abundant in the USA.

- Page 10348. Lines 252-23. Rogge et al. (1991) and Simoneit (1989). These citations are not listed in the Reference list, at the end.

- Page 10350. First paragraph. The reaction of cholesterol with ozone is pointed out as a possible cause for detecting this tracer at very low levels. The estimated cooking contribution was done by using palmitoleic acid as organic tracer. However, this unsaturated fatty acid has a double bond, which is subjected to a faster attack of ozone than that of cholesterol. Thus, the explanation given for cholesterol is not entirely valid.

- Page 10355, last paragraph. Provide the linear regression equations and r2 for both graphs of Figure 1. How many samples were averaged for each time period?

Technical corrections

- Page 10346, line 22. “Ě central California. (Chen et al., 20063)”. Delete the dot after California. - Page 10347, line 6, and throughout the text. Change R2 to r2. - Footnote of Table 2. Change hard wood to hardwood. - Which was the CMB version that has been used? Was it the CMB 8.2?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 10341, 2006.