Atmos. Chem. Phys. Discuss., 8, S4803–S4807, 2008
www.atmos-chem-phys-discuss.net/8/S4803/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Polar organic tracers in $PM_{2.5}$ aerosols from forests in eastern China" *by* W. Wang et al.

W. Wang et al.

Received and published: 14 July 2008

We would like to thank Dr. C. Oliveira for useful and constructive comments.

In response to the comments (1 and 2) made on the organization of the paper, the following changes will be made in the revised manuscript:

1) Page 12438, line 22 - Site descriptions.

This section has been substantially shortened, as suggested. Each site has been described in a separate paragraph. The section now reads as follows:

"Study sites were located in four forests in eastern China along the north latitude from 42° to 18° (see Figure 1). The boreal-temperate Changbai Mountain Forest Ecosystem Research Station (42° 24' N, 128° 28' E, 763 m a.s.l., Jilin Province) is surrounded by 200 km2 of condensed pine/hardwood forest with as dominant species pine (Pinus

koraiensis), oak (Quercus mongolica), spruce (Picea koreana) and maple (Acermono). It is about 680 km to the west of Changchun (with a population of about 7 million), the capital city of Jilin province. This site is called Changbai, hereafter.

The temperate site was inside a water fir (Metasequoia glyptostroboides Hu and Cheng) plantation in the Dongping National Forest Park (30° 50' N, 121° 40' E, ~ 0 m a.s.l., Chongming island, Shanghai). It has an area of about 3 km2, is surrounded by orchard and grassland, and is 28 km away from Shanghai Municipal center (about 20 million inhabitants). This site is called Chongming, hereafter.

The subtropical Dinghu Mountain Forest Ecosystem Research Station (23° 10' N, 112° 32' E, 320 m a.s.l., Guangdong Province) is a monsoon evergreen broadleaf forest with some needle tree species covering an area of about of about 11 km2. The vegetation mainly consists of hairy chestnut (Castanopsis chinensis Hance), Chinese cryptocarya (Cryptocarya chinensis), white gironniera (Gironniera subaequalis Plnanch) and schima (Schima superba Gardn. Et Champ). It is situated about 85 km to the west of Guangzhou (the capital city of Guangdong Province with a population of 7.5 million). This site is called Dinghu, hereafter.

The fourth site was in the Jianfengling Long-term Research Station of Tropical Forest Ecosystem (18° 40' N, 108° 49' E, 820 m a.s.l., Hainan Province). It is a tropical evergreen monsoon forest with an area of 475 km2, dominated by the species narig (Vatica mangachapoi), white olive (Canarium album) and white tea (Coelodepas hainanensis). It is about 315 km from Haikou, the capital city of Hainan Province. This site is called Hainan, hereafter. The central and western parts of Hainan island are mainly mountainous. The whole mountain area has an unsymmetrical circular distribution, which makes that the sampling site is situated in a rain forest basin. Therefore, the concentration of SOA from the photooxidation of isoprene and alpha-pinene is expected to be high at this site, unlike at coastal sites."

2) Page 12441, section Results and Discussion, Tables.

ACPD

8, S4803–S4807, 2008

In response, the 4 tables have been merged into one table.

Several suggestions were made to more fully exploit the obtained results. In response to these comments (3 - 12), the following changes/additions will be made in the revised manuscript:

3) Tables 1 to 4

The following additional information will be provided in the footnote of Table 1.

* the compound was only detectable in one sample, no concentration range was available;

- not detected, the detection limit was ~ 50 pg/m3 for pinic acid, ~ 20 pg/m3 for norpinic acid;

due to rain, only one nighttime sample was collected at Chongming.

4) Page 12440, line 6

Additional information on the sampling periods will be provided:

"All sampling periods were selected taking into account the meteorological conditions and the maximum solar radiation, as well as high temperatures. The sampling periods were 23 - 29 July 2007 in Changbai, 12 - 19 June 2006 in Chongming, 2 - 14 August 2006 in Dinghu, and 20 - 27 November 2006 during the dry season in Hainan."

5) Page 12442, line 3

This issue was addressed on page 12445, line 14 to 16:

"The relatively low sum concentration of isoprene oxidation products (4.7 ng/m3) is probably due to isoprene emissions from surrounding orchards and less from water fir at the Chongming site."

6) Page 12442, lines 11 to 14

ACPD

8, S4803–S4807, 2008

The highest day-time average concentration of the 2-methytetrols was 131 ng/m3 and 60 ng/m3, for the Changbai and Hainan sites, respectively, while the corresponding night-time average concentration was 113 ng/m3 and 50 ng/m3. A diel variation of the 2-methyltetrols with highest concentration during day-time was found for the study sites (Table 1).

We have checked the original spectra and calculations for Hainan, it was verified that the day-time maximum SUM (2-methyltetrol concentration) was 86 ng/m3, and the night-time maximum was 92 ng/m3. We do not have a clear explanation for the latter high maximum.

7) Page 12442, line 28

The brackets have been removed.

8) Page 12443, lines 9 to 24

In response, a sentence has been added:

"Furthermore, the C5-alkene triols, compounds related to the 2-methyltetrols, were also detected at the four study sites. Their diel variations roughly follow those of the 2-methyltetrols."

9) Page 12444, line 2

Similar results were obtained for the Chongming site (not shown, due not enough data points).

10) Page 12446, lines 1 to 2

This issue was addressed on page 12437 line 28 - 29 till page 12438 line 1:

"The concentrations of oxidation products of isoprene and alpha-pinene as well as of other marker compounds that provide information on aerosol sources, i.e. fungal spores (Lewis and Smith, 1967; Bieleski, 1982) (arabitol, mannitol), plant pollen

ACPD

8, S4803–S4807, 2008

(Pacini, 2000) (glucose and fructose), and the oxidation of unsaturated fatty acids (Kawamura and Ikushima, 1993; Yu et al., 2005) (malic acid), were measured."

as well as on page 12446 line 8 - 10:

"Isoprene oxidation products, mannitol (similar to arabitol) and glucose (similar to fructose) gave the same diel pattern with the highest concentration during day-time."

Additional information on correlations between sugars will be provided.

11) Page 12446, line 16

The correction has been made.

12) Page 12446, line 6

In order to address the issue of the different OC/EC ratios, a sentence after page 12446 line 15 will be inserted:

"The similar high OC/EC ratios (~ 12) for Changbai and Hainan indicate pristine forest regions that are mainly influenced by biogenic emissions, while the lower OC/EC ratios (5 - 6) for Chongming and Dinghu are likely due to traffic exhaust or biomass combustion at these sites. It is noted that both Chongming and Dinghu are in densely populated regions."

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 12435, 2008.