Atmos. Chem. Phys. Discuss., 5, S2007–S2009, 2005
www.atmos-chem-phys.org/acpd/5/S2007/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observation of 2-methyltetrols and related photo-oxidation products of isoprene in boreal forest aerosols from Hyytiälä, Finland" *by* I. Kourtchev et al.

I. Kourtchev et al.

Received and published: 7 August 2005

We would like to thank reviewer #1 for the time and effort spent in evaluating our paper. The comments have been helpful and have improved the paper.

Reviewer: Authors used oil films to remove particles larger than 1 μm in the Dekati impactor and then they collected the smaller particles on the quartz filter. I want to know the type of oil used, e.g., silicone or petroleum-derived oil (boiling point, or average molecular weight) because I am afraid that oils partly evaporated and adsorbed on the quartz to cause a positive artifact of OC. This seems to be likely due to the result, that is, although isoprene oxidation products in summer are only one order magnitude more

abundant than those in fall (table 1). How do you explain that OC stay rather constant value. In fact, the GC/MS chromatogram shows some hump around 40-50 min (Fig. 1). I suspect that you may have a serious hump at the end of the chromatogram, which may be derived from the contamination of oily materials on the quartz filter. Authors can mention about the potential artifact on OC or deny it. If this is the case, the discussion on Fig. 4 needs to be modified.

Response: The grease used in the Dekati impactor was Apiezon L, a hydrocarbon-based product with a melting point between 42 and 52°C, which can be used in high-vacuum applications; information has been included in section 2.2 (Aerosol sampling) of the revised manuscript. If this grease partly evaporated and adsorbed on the quartz filter, as the reviewer suggests, this would indeed cause a positive artifact of the OC. However, we found no evidence for this: we carefully checked the high temperature part of our GC/MS total ion chromatograms and found no indications for the elution of oily substances; all we found were compounds due to bleeding of the silicone phase (95% methyl 5% phenyl) which is used as stationary phase in the GC/MS column but this bleeding at high temperature is normal and was found to be similar for the loaded and blank filters. With respect to the OC in fall, which despite of about 20 times lower particulate concentrations of oxidized biogenic VOCs, is still relatively high (it is only a factor of about 2 lower than in summer), a likely explanation is an increased impact of organic substances released by biomass burning. Based on the higher concentrations of levoglucosan, a marker for biomass burning, it is clear that this process is more important in fall than in summer (29.1 ng m-3 in fall versus 10 ng m-3 in summer). The following clarifying sentence has been added to section 3.2 (Quantitative data for selected polar organic species) of the revised manuscript: “It also explains why the OC is still relatively high in fall despite a lower impact from oxygenated biogenic VOCs since in addition to levoglucosan there are other organics emitted during the wood burning process (e.g., humic-like substances) that contribute to the OC.”

Reviewer: The first paragraph of the conclusion section (page 2958, line 25 to line 16

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on the next page) is a repetition of the result section. The paragraph could be removed or shortened as a part of summary and conclusion.

Response: As suggested by the reviewer, the first paragraph of the Conclusion section has been shortened and reduced to one sentence in the revised version.

Reviewer: Meteorological conditions (ambient temperature, relative humidity, etc) should be included in Table 1 if they are available. Authors can discuss the data in relation to the meteorological factors, which should reinforce the points raised in this paper.

Response: As suggested by the reviewer, available meteorological parameters (temperature, ozone concentrations and rainfall) have been added to Table 1. Further, to section 3.2 (Quantitative data for selected polar organic species) of the revised manuscript the following sentence has been added: "During the summer period the day-time maximum temperatures and ozone concentrations were quite high (Table 1), which are indicative of high concentrations of photo-oxidants and favorable conditions for fast oxidation of and aerosol formation from isoprene."

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2947, 2005.