

Interactive comment on “The summertime Boreal forest field measurement intensive (HUMPPA-COPEC-2010): an overview of meteorological and chemical influences” by J. Williams et al.

J. Williams et al.

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Received and published: 5 September 2011

We thank reviewer 3 for their thoughtful comments and careful consideration of our manuscript.

1) The reviewer suggests mentioning in brief some of the early results and including papers in preparation in the manuscript so as to highlight where in the special section the detailed analysis will emerge. We have therefore included the following additional information and references to forthcoming publications. In section 2.1

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- “Results are presented by Nölscher et al. 2011a within this special issue and these show average summer daytime OH reactivities to be ca. 12 s⁻¹ with significant fractions (~40%) unassigned. Furthermore, two alternative instruments for measuring reactivity (Proton Transfer Reaction Mass Spectrometer, PTR-MS and Gas Chromatography with Photo Ionization Detector, GC-PID) were compared during the campaign (Nölscher et al. 2011b).”

- In section 2.2

- “The OH intercomparison revealed significant differences between the LIF and CIMS OH measurement, the former being up to a factor of ten higher (Novelli et al. 2011).”

In section 2.4

- “A comparison of vibrational sum frequency generation spectra of organic particles collected during HUMPPA-COPEC to those from the Tropics has shown marked differences (Ebben et al. 2011). In the Boreal forest the secondary organic aerosol is similar in composition to aerosol generated from α -pinene.”

In section 2.6

- “To investigate whether such reactions impacted ambient enantiomeric distributions during HUMPPA-COPEC, the enantiomeric monoterpenes were examined directly from the chamber (the emission signature, see Yassaa et al. 2011), from the ambient gas phase measurements (subject to photochemistry), and on the particle phase (e.g. by vibrational sum frequency and second harmonic generation analysis, see Ebben et al. 2011).”

New references

Ebben, C. J. Martinez, I. S. Shrestha, M. Buchbinder, A. M., Corrigan, A. L., Guenther, A. Karl, T. Petäjä, T. Song, W. W. Zorn, S. R. Artaxo, P., Kulmala, M., Martin, S. T., Russell, L. M., Williams, J. and Geiger, F. M.: Contrasting organic aerosol particles from boreal and tropical forests during HUMPPA-COPEC-2010 and AMAZE-08 using

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coherent vibrational spectroscopy Atmos. Chem. Phys. Discuss., 11, 16933-16966, 2011.

Nölscher, A., Williams, J., Sinha, V. and Lelieveld, J. OH reactivity in and above a Boreal forest. ACPD, HUMPPA-COPEC 2010 special section, manuscript in preparation, 2011a. Nölscher, A., Sinha, V., Williams J.: Using a GC-PID detector for ambient OH reactivity measurements. AMTD, manuscript in preparation, 2011b

Novelli, A., Hens, K., Rudolf, M., Martinez, M., Harder, H., Petäjä, T., Kulmala, M., Lelieveld, J.: A field comparison of LIF and CIMS techniques for OH measurement in a boreal forest, manuscript in preparation, 2011.

Yassaa, N. Williams, J., Bäck, J., Kulmala, M., Lelieveld, J. Emissions of enantiomer-ic terpenes and sesquiterpenes measured from cuvettes ACPD, HUMPPA-COPEC 2010 special section, manuscript in preparation, 2011.

Technical comments

“m” is now used throughout table 1 for the PTR-MS masses

For consistency with all other molecules in the table C10H16 and C15H24 are retained. Ozone time resolution and detection limit has been added.

CO time resolution and detection limit has been added. (Note the CO instrument was indeed a UV based instrument, not IR).

Time resolution and detection limits for the terpene measurements have been added EC/OC time resolution and detection limits have been added.

Table 1 heading “gas phase measurement” should indeed stop after the aerosol section begins. This was introduced during typesetting and will be corrected during proofs.

Footnote “c” has been removed

CO2 units changed to ppmv

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The caption for table 3 has been made more precise through the following text– “The percentage distribution within the sectors (NW, SW, SE, NE) for the 10th July-12 August (period of the HUMPPA-COPEC campaign) are shown for the years 2005-2010.”

Figure 1 has been made larger by repositioning the images. Furthermore the text in Figure 1c has been enlarged. This point was also made by reviewer 1.

Typo corrected to 16.8.

Figure 10a and 10b will be set above each other so as to expand each frame.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 15921, 2011.

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