

## ***Interactive comment on “Flux measurements of biogenic VOCs during ECHO 2003” by C. Spirig et al.***

**U. Kuhn (Referee)**

kuhn@mpch-mainz.mpg.de

Received and published: 27 October 2004

### GENERAL COMMENTS:

The scientific question concerning VOC fluxes addressed in the paper are well within the scope of ACP. The paper presents novel scientific aspects, both in technical concepts (Eddy Covariance) and in flux observations over complex forest terrain. The scientific methods and assumptions of the manuscript are valid and clearly outlined, and the overall presentation well structured.

The basics in theory and experimental setup of the applied Eddy Covariance system are well described and potential problems of the procedures thoroughly analyzed. Tests of the setup for flux measurements and the analytical system were well elaborated. The detailed description and discussion of the applied methods are a crucial

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

part of the manuscript and thus merits the length of the M&M section.

The applied procedure to use PTR-MS measurement frequencies of only 0.5 - 0.25 Hz, with the drawback of neglecting high-frequent concentration changes, approves the capability of using the PTR-MS for investigations on forest canopy-scale flux rates of biogenic VOC. The underestimation introduced by the loss of high-frequency VOC flux contributions (damping procedure) were determined and taken into account by the authors.

The introduced data selection due to quality criteria seems to be well elaborated. In an inhomogeneous and patchy mixed forest stand the quality control of data is a critical issue, and the authors did a good job in accounting for that. The plausibility of the flux measurements are supported by top-down intercomparison with enclosure measurements carried out at the same site (see below).

Shortcomings in applying the approach over areas of smaller roughness are stated.

The results are described concisely and are well presented in the diagrams.

#### SPECIFIC RECOMMENDATIONS:

I would suggest including a diagram showing results of the footprint analysis in conjunction with Figure 1; or at least a windrose, with the distribution of wind direction during the period of the EC flux measurements. So the reader can easily get an idea of the relevance of the different source regions in this patchy mixed forest (complementary to the discussion of footprint analysis).

I would suggest to give more details for the top-down calculations of the standard emission factor, so to allow their reproduction by fellow scientists (e.g. give the value for specific leaf area used). With a total LAI of 3.0 for the west tower (as given on page 6606 and 6622), a respective portion of 44% for oaks around the west tower (as given on page 6624), plus assuming a specific leaf weight of 90 g/m<sup>2</sup> for this site (personal communication), I come up with isoprene emission rates of 40 instead of 32  $\mu\text{gC g}^{-1}$

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

h-1. Please clarify, and give all data required.

As the technical and theoretical details of the approach is a critical issue of the manuscript, both in M&M and in the discussion section, the authors might think about including EC and PTR-MS into the title, so to better attract this community. However in the era of search engines this is not a critical issue.

#### TECHNICAL CORRECTIONS:

page 6610, effects of inlet lines: give the concentration range applied, as chromatographic effects may be dependent on it. Do the analyzed concentrations correspond to the values expected from the gas standard?

page 6618: replace “Excel” by “MS-Excel”; or use a more general term (spreadsheet).

page 6625: add “observed” in case that these were real measurements of Hofzuma-haus et al. (2003).

Figure 5: with my version 5.0 of ACROBAT READER, I surprisingly did not find the blue line on the screen, but was happy to find it on the printout.

Figure 6: I would suggest changing the solid blue or black line into a dashed line, so to be able to differentiate all three lines also on a b&w printout.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6603, 2004.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)