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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal variation in vertical volatile compounds air concentrations within a remote hemiboreal mixed forest" *by* S. M. Noe et al.

S. M. Noe et al.

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The reviewer states: *"The main weakness of the manuscript is the inadequate description of the sampling. Was ozone removed from the sampling line? If not, especially sesquiterpene and limonene concentrations have degraded during sampling."*

We agree and as that topic is set by all reviewers, we will extend the description of the sampling procedure in a revised version of the manuscript. One point we would like to mention, the object of interest was the concentration of BVOC in ambient atmosphere within a forest canopy. That includes the fact that there is ozone degradation

(chemical sink) and emissions (sources) of several parts of the ecosystem (soil, leaf litter, stems, living leaves) during the time of sampling and we see an "apparent" ambient BVOC concentration.

It is surprising that isoprene does not show much variation within the forest although the only expected source is the leaves. Do you have any comments about that? Spruces have branches also low, could they be the main isoprene emitters at the site?

The spruces might be one main source of isoprene. There are also some poplars, willow and oak trees in the suppressed tree layer but scarce.

High concentrations of monoterpenes close to the ground show that emissions from forest floor are also important especially during spring and early summer.

Yes, indeed, we agree with that finding.

The authors mention that they also measured sesquiterpenes, but these results are not shown. It would be interesting to see them as well.

We found ambient sesquiterpene concentrations in June, July and August, highest at 16 m and lower at 20 m during the hottest days of the seasonal measurements. We will provide a table with the results in a revised version of the manuscript. However, we did not focus on sesquiterpenes during the profile measurements but found it remarkable that they could be detected, even without using an ozone scrubber. We have given a justification about the sampling without ozone scrubber in the answers to reviewer #3 and given that the reaction rate of sesquiterpenes are about 100 times faster than those of monoterpenes (Bonn and Moortgat, 2003), we can expect a loss rate of about 1-2% by the sampling procedure.

1. Please, describe the sampling procedure in more detail. How many samples were collected, what was the deviation between the three replicates taken, was ozone removed from sampled air?

The autumn and winter measurements were conducted at one day, that met the requirements, we negotiated by ourselves, cloudless and pressure above 1000 hPa. During spring and summer, we have usually extended measurement campaigns in the forest and there have been done several days of measures per month. We chose again always one day that met the requirements. Per height, we conducted 4 samples, each 30 minutes which covers the time from 11:00 to 13:30 EST including change of sample tubes and climbing. In the manuscript we said "at least three samples" because in some cases we had the occurrence that a sampling was not completed by a pump failure and also the GCMS analysis was once interrupted by a power cut and we lost a sample. The deviations are given in the supplemental tables.

We will describe the sampling procedure in more detail in the revised version of the manuscript as that is an issue that has been pointed to by all reviewers.

2. Figure 3 is unclear and it would be nice to see a Table in addition to the figure.

The tables are given as supplements, as reviewer #2 suggest to include them into the main text that might also solve that issue.

3. Aaltonen et al. have now published the article about monoterpene emissions from the forest floor and can now be refered to (Aaltonen et al., Agricultural and Forest Meteorlogy 151 (2011) 682-691)

That citation will be included into a revised version.

4. Please, show sesquiterpene results too.

See comment above.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14607, 2011.