

## ***Interactive comment on “Emission of monoterpenes from European beech (*Fagus sylvatica* L.) as a function of light and temperature” by T. Dindorf et al.***

### **Anonymous Referee #2**

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Dindorf et al measured monoterpene emissions on 1 twig of 1 tree on 3 days in 2002 and on 6 days in 2003, and even during this short period the sampling methodology was changed. The authors use the data to calculate emission factors and extrapolate to VOC Emissions of whole Europe

General comment: I do not think that it is acceptable to carry out measurements on 1 twig of 1 tree on totally 9 days at 1 season during 2 years and extrapolate to the VOC balance of Europe. At its maximum this could be a short communication of the main data.

There is no evaluation about the chamber effect on microclimate. On clear days there must be significant over-temperatures in these cuvettes. The authors report 44°C in

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the chamber in the wet year of 2002. I have never seen such temperature under natural conditions, even in the dry year of 2003. The authors must show the natural microclimate.

There is no evaluation to what extent the sample branch represents the conditions within the crown, nor between trees. There is a huge variation in  $\delta^{13}\text{C}$  between trees, there is variation with shade, and variation in N. Without additional sampling of the variation of parameters within and between trees it is impossible to judge, if this branch represents the system.

One could make many additional comments, but this is difficult, because the authors failed to number the lines of their manuscript.

Abstract: it is very qualitative. There are no hard data. The mentioning that at ONE occasion on ONE branch there was a midday depression cannot be the main result. This could just be the result of an overtemperature and a sick branch in the cuvette. The last sentence of the abstract indicates that this is a research report rather than a publication.

Introduction: Needs to be re-written. It is very general, with many over-statements. Again, it does not end with a hypothesis, but with a statement of a research report to a funding agent

Experimental: You mean Methods?

There is no justification about the selection of that ONE branch. The microscopic inspection whether this is a sun leave is not very useful. The specific leaf area would be more meaningful. There are no supporting data on N-concentration, starch,  $\delta^{13}\text{C}$  and others to be able to relate these measurements to any other investigation, and the documentation of the climate outside the cuvette during measurement (Fig. 9) indicates that temperatures in the cuvette were 10K higher than T outside. This will result in a sick branch.

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There is no zero test of the VOC measurement. If two cuvettes run in parallel this could lead to shifts in flow, which lead to apparent uptake or release. There is no test of the system in the field. It is unfair to the reader to refer to an unpublished paper with respect to sampling methodology.

Page 5: Occasionally you sampled in glass tubes and this led to a loss of VOCs. I suggest to omit those data.

Page 5: I strongly object to extrapolate data taken on few days, in part by equipment that led to losses in VOC, and extrapolate to whole Europe.

Page 6: What was the climate and the average leaf temperature of the canopy under natural conditions? You must quantify the cuvette effect. Fig. 3: You should change the curve type. The data do not support an optimum curve

Page 8: Please define of how you calculate the standard emission factor. Referring to SEF, G97 is not sufficient. The data you state cannot be derived from the figure.

Page 9: In order to judge the interpretation of a storage pool, one would need data on the C-status of the leaf, and on the conditions in the cuvette.

Page 9: Artificial darkening for 30 minutes is not sufficient, because you have light induced respiration for part of the time, and you do not only change light but also temperature. The experiment is not well defined and should be omitted.

Page 10: The variation of the SEF shows, that you only describe the ad hoc experimental conditions, and not a long-term standard. Since the cuvette runs at a unrealistic temperature, the calculation of a SEF is not justified. You should avoid to even mention SEF, because it does not reflect a “standard”.

Page 11: The midday depression is not apparent from Fig. 7 which does not show a time course. I would not be surprised to see a midday depression based on these data, but the real question is, if this is an experimental artifact. The chamber temperature must be at canopy leaf temperature.

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The extrapolation towards a European VOC balance is out of scale for this investigation

The paper contains huge paragraphs, without any interrupt, but dealing with lots of different thoughts. I think this needs to be totally revised

In summary: any other international journal would reject a paper based on few days sampling of ONE branch on ONE tree. The extrapolation to a full season and to whole Europe is unacceptable. For any publication of these data, the cuvette effect must be demonstrated, and zero measurement with empty cuvettes must be shown. At present this seems to be a research report to a funding agent, but not a serious publication. The results could be summarized in a short communication at its best.

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Interactive comment on Biogeosciences Discussions, 2, 137, 2005.

**BGD**

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