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Biogeosciences Discussions

Interactive comment on "Contribution of understorey vegetation and soil processes to boreal forest isoprenoid exchange" *by* Mari Mäki et al.

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This manuscript describes a field study characterizing VOC emissions from a boreal forest floor. The study provides valuable new observations and insights. A novel aspect of the study is their approach to segregate roots from the rest of the system. The paper is well-written and this is an important topic of general interest to readers of Biogeosciences. I recommend the paper be published after the authors address the following points:

General: The text indicates that these emissions are an important component of forest emissions (for example, Page 2, line 35, Page 14, line 8, Conclusions section) but the authors have not really made the case for this. They do show that these emissions

become relatively more important in spring and fall but they are still small so the importance is not clear. In order to conclude that this is important, and should be the focus of future studies, the authors should provide some quantitative evidence that these low level emissions are significant with respect to their impact on atmospheric composition. This would also enhance the impact of this manuscript. Perhaps this could be done with a simple 1D modeling study or even referencing past studies that have already been conducted at this well studied site.

Specific: Page 2, line 33: While this statement is generally correct, it should be noted there is a wide range of solubility and reactivity for different terpenoid compounds.

Page 3, line 3: Clarify whether you mean that it changes the flux measured with an enclosure or the actual flux

Page 4, line 24: The third point is an objective but not a hypothesis

Page 5, line 1: what is the tree cover fraction at this site?

Section 2.2: Some analytical details should be given including the precision and accuracy of the flux measurements and whether there were any replicate samples to test the reproducibility of the tubes. How was the methanol flushed away? Were tests done to ensure that none of the VOC standards were removed in the process?

Section 2.3: the detection limit should also consider the detection limit of the VOC quantification.

Section 3.2: It is a bit difficult to follow the text in this section. I am not sure what is meant by the second sentence. Also, it is stated that understory vegetation is a monoterpene sink but then goes on to indicate that there was no difference when vegetation was present as long as there were fungi. If the presence of the fungi is the typical situation then this suggests that the vegetation is not a sink.

Section 3.3: The title of this section suggests this will focus on soil sources but instead it discusses vegetation which was the focus of the previous section.

Page 10. Line 4: rewrite the sentence to clarify what was observed in October. Was it high isoprene or high temperature/PAR?

Page 13, line 6 to 11: An alternative hypothesis is that the VOC are consumed by microbes living on the leaves. It seems to me that this just as likely as the possibility that they are absorbed on the cuticle.

Page 14, line 7: define/quantify what you mean by “decent”

Page 14, line 8: What is meant by “unsolved”

Page 14, line 30: How does this overcome the issue of measuring net exchange? The fast response instrument will still be measuring net exchange.

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