

Interactive comment on “Long-term dynamics of monoterpene synthase activities, monoterpene storage pools and emissions in boreal Scots pine” by Anni Vanhatalo et al.

Anonymous Referee #1

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Comments by Reviewer

General comments: The authors present “Long-term dynamics of monoterpene synthase activities, monoterpene storage pools and emissions in boreal Scots pine”. It is important to evaluate the monoterpene emissions in boreal coniferous forest. However, I think that the interpretations of the data to reach conclusions are fine with the exception of very few data points (monoterpene emission data) used in this study. The manuscript must be revised by the authors for possible publication in Biogeosciences.

Specific comments: 1. P4 L23-24: High monoterpene emission rate might be caused by the mechanical disturbance when the terminal bud was removed. Did the authors

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check the time required for stabilizing the BVOC emission rate after cutting the terminal bud?

2. P8 L17-29: I think that the number of monoterpene emission data is very small (only a few days). Can the authors justify that this small data set is enough data to make the conclusions presented in this paper?

3. P9 L20-21: “The variation in the standard emission factors was large.” The authors did not show the relationship between monoterpene emission rate and temperature. In addition, did authors confirm that whether the coefficients β ($= 0.09$) is valid for monoterpene emission from Scots pine? Please mention.

4. P9 L24: Tarvaine et al., 2005; Hakola et al., 2006 (add ;).

5. Discussion: 1) I think that the amount of the monoterpene precursor (geranyl diphosphate: GPP or GDP) and the activity of monoterpene synthase are involved in monoterpene production and emissions. Please discuss the GPP in leaves.

2) The authors measured monoterpene emissions from Scots pine. δ -3-carene was the dominant compound in Tree #2, whereas α -pinene was the dominant compound in Tree #1. The composition of the identified monoterpenes was different for different trees (#1-#4). In addition, large tree-to-tree variations in standard emission factors were observed. However, the tree-to-tree variation was not included in the principal component analysis (PCA). Did authors confirm that whether the total monoterpene emission is valid for PCA analysis? I think that individual monoterpenes (e.g., δ -3-carene and α -pinene) should be applied separately in PCA analysis in order to better understand the dynamics related to monoterpene pools and monoterpene synthase activities. Please mention.

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