

Interactive comment on “Role of needle surface waxes in dynamic exchange of mono- and sesquiterpenes” by J. Joensuu et al.

Anonymous Referee #1

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General comments: One of the motivations for this study is non-stomatal ozone deposition. Significant non-stomatal ozone fluxes have been frequently observed, but a general explanation has not been given yet. While there are no obvious reaction sites for ozone reaction in leaf surface waxes, dissolved or attached terpenes could react effectively with ozone. This idea has been around for a while, but although it was not entirely supported by first experiments, a thorough characterization of the system is still missing and might enable more successful experiments in the future. From this background, the present contribution adds importantly to the knowledge of the fate of terpenes shortly after synthesis and their possible role in ozone deposition. The authors compare the composition of mono- and sesquiterpenes emitted from pine shoots with their abundance in needle waxes. There are common compounds but also some compounds which appear only in one of the compartments. Alternative ways of transport

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are discussed. Although the general message of the manuscript is clear, the presentation of the results doesn't seem appropriate to me. Fig. 1 C shows results for compounds where no detection limits are given (α -humulene, aromadendrene). Especially the part with missing standards for some of the compounds measured remains weak and the high amount of sesquiterpenes claimed (up to 50%) doesn't seem to be sufficiently corroborated. Which of the three mentioned compounds (cadinene, cubebene, murolene) would be most abundant? There were also very high differences between repetitions of the same tree (e.g., Tree 2, myrcene: 9, 6, and 372 $\mu\text{g m}^{-2}$; Tree 4, limonene: 15, 355, and 60 $\mu\text{g m}^{-2}$). While notable variations between the emissions are mentioned in the discussion, these differences are not discussed. Have similarly large differences been reported before or how could they be explained? Could this be an indication that the solvent was not equally effective?

Specific comments: Due to the indicated artifact and some other unexplained structures, Figure 1C is not very fortunate. It should be possible to find a better series of photographs, or sketch to illustrate the relevant features.

P, 5, L. 21: Were the 'handheld pumps' operated by persons and how could they do this evenly for 30 minutes? If they were machine controlled, why were they handheld?

Technical corrections: P. 2, l. 30: 'or', not 'on'

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