

Atmos. Chem. Phys. Discuss., referee comment RC1
<https://doi.org/10.5194/acp-2022-478-RC1>, 2022
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Comment on acp-2022-478

Anonymous Referee #1

Referee comment on "High variations of BVOC emissions from Norway spruce in boreal forests" by Hannele Hakola et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2022-478-RC1>, 2022

Summary: Hakola et al present a comparison of old and new BVOC emission measurements from Norway spruce across various regions in the European boreal forest. They also model particle formation from the emissions data. They found that sesquiterpene emissions are generally higher than predicted in MEGAN. They also show variability in whether Norway spruce is an isoprene-emitter. Detailed BVOC emission measurements represent an important contribution to the field. However, the research approach and analysis presented in this paper are not ready for publication for reasons outlined below. The research presented contains fundamental flaws in justification, clarity, and technical approach.

Major Concerns

- The paper lacks adequate context in the introduction. The authors start with a discussion of OH reactivity, but that is not the focus of the paper. One of the highlights of the research is probably the modeling of aerosol formation and growth, but there is no justification presented in the introduction for this research. The introduction was generally very difficult to read due to lack of logical flow and many grammatical errors.
- The paper lacks clear research questions and/or objectives. They establish there is some uncertainty about BVOC emission rates from Norway spruce due to variation in previous measurements, but the new measurements really don't address that. They are also highly variable. There is no justification for the modeling work. The manuscript would be strengthened by clearly outlining research questions/objectives and aligning the figures with those questions/objectives. As written, it lacks clear purpose.
- The experimental section is very difficult to follow. It goes back and forth between discussing the new measurements and the old measurements. Even in the section titled, "2.1 New, unpublished emission measurements" the old measurements are

discussed (see lines 190-191). Also, this should be labeled section 2.2, not 2.1. And the section labeled 1.1 in the experimental section should be 2.1.

- The introduction states that the study is investigating if growing location or age of tree can explain variation in emission measurements (line 87), but this isn't clearly addressed with the analysis. Furthermore, it does not appear that they had enough replicates of both old and young trees across all sites to even address this question. Addressing this question requires measurements from both old and young trees at multiple sites, which they do not have. Thus, there is a disconnect between the methods and one of the only clear objectives stated in the paper. The research objectives need to align with the sampling approach, but that is not the case.