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## Reply on RC1

Hannele Hakola et al.

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Author comment on "High variations of BVOC emissions from Norway spruce in boreal forests" by Hannele Hakola et al., Atmos. Chem. Phys. Discuss.,  
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### **We thank reviewer 1 for valuable comments and have tried to take them into account when rewriting the introduction and experimental sections.**

- 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 introduction has been rewritten.*

- 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 purpose of this study is to find out if the existing measurement data could help finding representative emission rates for emission inventory and atmospheric impact research. We try to seek for example if the age of tree or a growing location would affect emissions and should be taken into account in atmospheric modelling research. This has been written in the introduction.*

- 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 Even in the section titled, "2.1 New, unpublished emission measurements" the old measurements are discussed (see lines 190-191).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 section has been partly rewritten, also numbering has now changed.*

- 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.

*The introduction has been rewritten taken into account the questions raised by the reviewer. The effect of growing location and the age of trees is discussed in chapter 3.2.6. It is true that we do not have replicates at all sites, the young trees were only measured in southern Finland in Hyytiälä, but 3 older trees were measured at both sites. The results were varying a lot.*

*The study was meant to be done with the existing data, therefore the sampling approach is not always best possible.*