

Dear Dr. Nizkorodov

We would like to thank you and the reviewers for the effort to improve the quality of our manuscript.

We have tried to answer the questions the best we can and please find below our response to the main issues raised.

The reviewer 2 was concerned about the oxidation rates of monoterpenes and calculated that in relation to the monoterpene reactions towards OH radical and ozone they could not have reacted while travelling from the sawmill, for example. However, in his calculations, he forgot the reaction with nitrate radical. Lifetimes in relation to nitrate radical vary from 14 min (limonene) to 1 h (β -pinene) and since NO₂ is emitted simultaneously with monoterpenes from sawmill (Hakola et al., 2012), NO₃ could oxidize monoterpenes. We are aware that there are a lot of issues affecting oxidation of VOCs; VOC lifetimes, local anthropogenic sources etc., and therefore correlating acid concentrations with their parent precursors is impossible and we never intended to express such relationship. However, we think that showing their similar seasonal trends is valuable and gives confidence on our results. As we stated in our manuscript the daily variation in VOC mixing ratios is quite modest compared to the seasonal variability, and therefore it is justified to show VOC and acid concentrations together. We also used this data to calculate seasonal ratios of acids and monoterpenes to show that possibly more acids are partitioned to the particle phase in winter than to the gas phase and vice versa during warm seasons. These statements are general, but since we had to collect for several days, more detailed analysis is not possible.

The reviewer 2 expressed his concerns about comparing chamber results with yields observed in our study. We understand his concern and since the chamber experiments really do not bring additional information, we decided to remove the chapter about chamber experiments (lines 262-272).

The reviewer 2 was also concerned about the comparison between PM₁ fraction and the measured acid concentrations. We added the correlation coefficients (r^2) in the text. We changed wording "somewhat correlated" to "weakly correlated". We also changed the first sentence of the paragraph to "The highest seasonal means for PM₁ were observed in summer, together with the highest terpenoic acid concentrations (Table 1), but the measured terpenoic acids explained only small fraction of total PM₁ mass, 0.2% in winter and 0.7% in summer." We wanted to show that the share of these acids is very small in the content of PM₁.

We did all the technical corrections, except that we did not add CAS numbers to the Figure 1, since we do not know which stereo isomers we were measuring. Our column did not separate them. Also, we do not know the isomeric form of pinic acid standard. We also did not change the name of our instrument from DMPS to SMPS, since the correct name for our system is DMPS.