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Interactive comment on "Simple proxies for estimating the concentrations of monoterpenes and their oxidation products at a boreal forest site" *by* Jenni Kontkanen et al.

Anonymous Referee #1

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The manuscript entitled "Simple proxies for estimating the concentrations of monoterpenes and their oxidation products at a boreal forest site" by Kontkanen et al., describes a method to calculate the mixing ratio of monoterpenes and their oxidation products using a simple proxy method. The method was applied to a huge data set from 2006 – 2013. I recommend publishing in ACPD after addressing the following issues.

General comments The manuscript is very interesting and well written. It contains a clear description of the proxy method. However, some information are still missing, in particular details about the PTR-MS measurements.

A clear description how the measured concentration of monoterpenes and their oxidation products was obtained is missing. The description should address the following

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Discussion paper

points: - What is the definition of [MT]measured? - Which compounds were considered for PTR-MS measurements to obtain [MT]measured? - How was the PTR-MS calibrated and which compounds were used for calibration? - Are the data of the PTR-MS corrected for temperature and RH dependency? This might be very important for summer and winter measurements. - How was the concentration of monoterpenes and oxidation products calculated? - Oxidation products have often a different response factor than their precursor compounds. Was this considered for calculation?

Minor comments

Page 3, line 10: The authors stated that few data were available which were obtained during measurements campaigns. Is there any comparison of the PTR-MS with other methods/instruments to validate the PTR-MS data?

Page 4, line 13: The approach considers reaction with O3, OH and NO3 as well as condensational sink. Is there a reason that the photolysis is not considered for the calculation? In particular, this might be very important for oxidation products such as pinonaldehyde, nopinone etc.

Page 28, Figure 9: According to the calculations O3 is the most important sink for monoterpenes as well as for monoterpene oxidation products. This is surprising as the rate constant for OH+monoterpene is in general much faster than with O3. What is the reason for this observation? Furthermore, it was stated that a-pinene is the most important monoterpene. The first-generation oxidation product is pinonaldehyde. As pinonaldehyde does not contain any C-C double bond is cannot react with O3. This is the same for few other oxidation products like nopinone. Why is OH radical reaction not considered for monoterpene oxidation products?

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