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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantitative long-term measurements of VOC concentrations by PTR-MS: annual cycle at a boreal forest site" *by* T. M. Ruuskanen et al.

T. M. Ruuskanen et al.

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We thank the reviewers for their constructive criticism. Below you find detailed answers to the points raised. The page, line and Figure numbers refer to the paper published in ACPD.

We have now clearly stated the scientific aims of the study in the Introduction. These are: 1) How do the concentrations of the studied compounds at our remote rural site compare with the ones presented from remote arctic on the other hand and in the rural central Europe on the other hand. 2) How well do the previously reported short term measurements represent the variation in the VOC concentrations. 3) Is there significant interannual variation in the VOC concentrations and can we associate them to either

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biogenic or anthropogenic origin.

1: The calibration and volume mixing ratio method were indeed described in the paper by Taipale et al. In this paper only stability of the system is briefly discussed. The purpose and aims of the paper are now stated in the 'Introduction'.

2: The table 1 is omitted from the revised manuscript. We have investigated the detection limits during the measurement period and we removed measurement points from Figure 6 that are under the typical detection limits, the calculation method and examples values are presented in Taipale et al. (2008). The average detection limits are listed in the Table 3 of the revised manuscript. We feel that even the data below the detection limit should be shown in the time series, as if we filtered this data (effectively zeroes) out, we would bias the statistics. The Figure 9 is removed from the manuscript.

3: We moved the section dealing with PTR-MS stability to methods and our purpose of showing the long term stability and data quality assurance to introduction. 'As this is one of the first long term VOC concentration data sets recorded with PTR-MS, we need also to explore the stability of the measurement system in order to assure the quality of the data.'

4: We moved the introductory section into methods under '2.4 Calculation of VOC volume mixing ratio'

The seasonal behaviour of methanol, acetone and acetaldehyde mixing ratios in the boreal region are not well known and the knowledge on diurnal variations is based on limited data sets. Therefore our data shows how representative these previously reported measurements have been. Interannual variability of methanol, acetaldehyde and acetone mixing ratios is not described before and this paper gives first look at this significant variation, as well as points out the reasons for this.

Page 90, line 20-21: In the revised manuscript we have revised our conclusions on the sources of methanol. Based on trajectory analysis and the interannual variations

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in both methanol and inorganic gases we estimate that a significant part is secondary production from anthropogenic precursors. We feel that Figure 3 is needed to describe the conditions at the measurement site and therefore we retain it in the revised manuscript.

The measurements at different height are made in order to be used in 1-D model validation. They are mentioned here so that the community knows that such data exists. However, they are beyond the scope of this paper.

We have largely rewritten the conclusions and removed the original opening line.

We have revised the Figures as requested.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 81, 2009.