Supplement of

Alkyl nitrates in the boreal forest: formation via the NO$_3^-$, OH- and O$_3$-induced oxidation of biogenic volatile organic compounds and ambient lifetimes

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Table S1: Rate coefficients and branching ratios used for the calculations of $P_{\Sigma AN}$

<table>
<thead>
<tr>
<th>VOC</th>
<th>$k$(NO$_3$) at 298 K (molecules cm$^{-3}$ s$^{-1}$)</th>
<th>$\alpha$NO$_3$</th>
<th>$k$(OH) at 298 K (molecules cm$^{-3}$ s$^{-1}$)</th>
<th>$\alpha$RO$_2$</th>
<th>$k$(O$_3$) at 298 K (molecules cm$^{-3}$ s$^{-1}$)</th>
<th>$\alpha$O$_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$-pinene</td>
<td>6.2×10$^{-12}$ $^1$</td>
<td>0.15 $^2.5$</td>
<td>5.3×10$^{-11}$ $^1$</td>
<td>0.18 $^6$</td>
<td>9.6×10$^{-17}$ $^1$</td>
<td>0.80 $^1$</td>
</tr>
<tr>
<td>$\beta$-pinene</td>
<td>2.5×10$^{-12}$ $^1$</td>
<td>0.40 $^2.3$</td>
<td>7.6×10$^{-11}$ $^1$</td>
<td>0.24 $^2$</td>
<td>1.9×10$^{-17}$ $^1$</td>
<td>0.30 $^1$</td>
</tr>
<tr>
<td>$\Delta$-carene</td>
<td>9.1×10$^{-12}$ $^1$</td>
<td>0.77 $^3$</td>
<td>8.8×10$^{-11}$ $^2$</td>
<td>0.23 $^2$</td>
<td>4.9×10$^{-17}$ $^1$</td>
<td>0.86 $^1$</td>
</tr>
<tr>
<td>d-limonene</td>
<td>1.2×10$^{-11}$ $^1$</td>
<td>0.67 $^2.5$</td>
<td>1.7×10$^{-10}$ $^1$</td>
<td>0.23 $^2$</td>
<td>2.2×10$^{-16}$ $^1$</td>
<td>0.75 $^1$</td>
</tr>
<tr>
<td>isoprene</td>
<td>6.5×10$^{-13}$ $^1$</td>
<td>0.70 $^1$</td>
<td>1.0×10$^{-10}$ $^1$</td>
<td>0.07 $^4$</td>
<td>1.28×10$^{-17}$ $^1$</td>
<td>1.00 $^1$</td>
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<tr>
<td>unattributed</td>
<td>-</td>
<td>0.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

$\alpha$NO$_3$: yield of AN in the reaction of the BVOC with NO$_3$ in air.

$\alpha$RO$_2$: yield of AN in the reaction of the peroxy radical (formed in OH + BVOC + O$_2$) with NO.

$\alpha$O$_3$ is the yield of peroxy radicals formed in the reaction of each BVOC with O$_3$ in air.


Figure S1: Overview of meteorological measurements during IBAIRN. The grey shaded regions represent nighttime.
Figure S2: Calculated OH reactivity ($k_{\text{OH}}$) and O$_3$ reactivity ($k_{\text{O3}}$) from VOC measurements.

$k_{\text{BVOC}}$ (biogenic VOCs) consists of $\alpha$-pinene, $\beta$-pinene, $\Delta$-carene, $d$-Limonene, isoprene, and camphene.

$k_{\text{OVOC}}$ (oxidised VOCs) consists of propanoic acid, butanoic acid, isopentanoic acid, pentanoic acid, hexanoic acid, 1-pentanol, 1-penten-3-ol, cis-3-hexen-1-ol, 1-hexanol.

$k_{\text{VOC}}$ (remaining VOCs) consists of benzene, toluene, p/m-xylene, styrene, o-xylene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, hexane, pentanal, hexanal, methacrolein, 4-acetyl-1-methylcyclohexene, nopinone, heptanal, octanal, nonanal, decanal, ethane and propane.
Figure S3: Aerosol surface area during IBAIRN.
Figure S4: Upper: AMS-nitrate versus NOx (5th-22nd Sept 2016).
Lower: AMS-nitrate versus the total ANs production rate colour-coded with AMS-organic mass.
Figure S5: Campaign averaged relative contribution of the measured organic nitrates as measured by the I-CIMS (assuming equal sensitivity across the mass-range).