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Supplement of

BAERLIN2014 – stationary measurements and source apportionment at an urban background station in Berlin, Germany

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Section S1. NMVOC data:

As stated in the main text of the paper, to be able to make reasonable comparisons with previous work regarding the contribution of different compound classes to the measured mixing ratios of NMVOCs, as well as the OH reactivity attributed to these NMVOCs, a subset of the compounds was selected and used in the analysis. This subset was based on a number of different papers in the literature, and those compounds that were regularly included in OH reactivity calculations (e.g., (Dolgorouky et al., 2012; Gilman et al., 2009; Goldan et al., 2004; Liu et al., 2008)). This includes 57 NMVOCs, and while this does not capture the complete OH reactivity, it allows for more equal comparisons with other studies. The 57 NMVOCs included, are as follows:

Alkanes: cyclohexane, cyclopentane/2,3-dimethylbutane, ethane, heptane, methylcyclohexane, methylcyclopentane, n-decane, n-hexane, n-octane, n-pentane, propane, 2-methylbutane, 2-methylheptane, 2-methylhexane, 2-methylpentane, 2-methylpropane, 2,2-dimethylbutane, 2,3-dimethylpentane, 3-methylpentane

Alkenes and alkynes: cis-2-butene, cis-2-pentene, ethyne, i-butene, 1-butene, propene, trans-2-butene, trans-2-pentene, 1-pentene, 1,3-butadiene, 2-methyl-1-butene, 2-methyl-2-butene, 3-methyl-1-butene

Aromatics: benzene, ethylbenzene, i-propylbenzene, m-ethyltoluene, m-/p-xylene, n-propylbenzene, o-ethyltoluene, o-xylene, p-ethyltoluene, styrene, toluene, 1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene/t-butylbenzene, 1,3,5-trimethylbenzene

Oxygenated: acetaldehyde, acetone, ethanol, MEK, methanol, 2-propanol

Biogenics and their oxidation products: α-pinene, β-pinene, isoprene, methacrolein, methylvinylketon

For information on individual mixing ratios by location, see Bonn et al. 2016.
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Compounds or m/z measured</th>
<th>Detection limits</th>
<th>Sampling interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA Instruments</td>
<td>Ethene, Ethyne, Ethane, Propene, Propane, Propyne, Acetaldehyde, 2-Methylpropane, Methanol, 1-Butene/i-butenе, 1,3-Butadiene, n-Butane, trans-2-Butene, cis-2-Butene, 1,2-Butadiene, Ethanol, 3-Methyl-1-butene, 2-Methylbutane, Acetone, 1-Pentene, 2-Propanol, 2-Methyl-1-butene, n-Pentane, Isoprene, trans-2-Pentene, cis-2-Pentene, Propanal, 2-Methyl-2-butenе, Acetic acid methyl ester, 1,3-Pentadiene, Cyclopentadiene, 2,2-Dimethylbutane, 2-Butanol, 1-Propanol, Cyclopentene, Methacrolein, Cyclopentane/2,3-dimethylbutane, 2-Methylpentane, Methyl vinyl ketone, Butanal, 1-Hexene, 3-Methylpentane, 2-Methyl-1-pentene, n-Hexane, trans-2-Hexene, cis-2-Hexene, 1,3-Hexadiene, Methylcyclopentane, 2,4-Dimethylpentane, Methylcyclopentene, Benzene, 1-Butanol, Cyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Pentanal, Cyclohexene, 1,3-Dimethylcyclopentane, 1-Heptene, 2,2,4-Trimethylpentane, Heptane, 2,3-Dimethyl-2-pentene, Octene, Methylcyclohexane, 2,3,4-Trimethylpentane, Toluene, 2-Methylheptane, 4-Methylheptane, 3-Methylheptane, Hexanal, Acetic acid butyl ester, n-Octane, Dimethylcyclohexane isomer, Ethylbenzene, m/p-Xylene, Heptanal, Styrene, 1-Nonene, o-Xylene, n-Nonane, i-Propylbenzene, α-Pinene, n-Propylbenzene, m-Ethyltoluene, p-Ethyltoluene, 1,3,5-Trimethylbenzene, Sabinene, o-Ethyltoluene, Octanal, β-Pinene, 1,2,4-Trimethylbenzene/1-butylbenzene, n-Decane, 1,2,3-Trimethylbenzene, Limonene, Eucalyptol, Indane, 1,3-Diethylbenzene, 1,4-Diethylbenzene, Butylbenzene, n-Undecane, n-Dodecane, n-Tridecane</td>
<td>5-20 ppt (see Urban 2010, Table 3.3 for individual LOD)</td>
<td>Intermittent (non-continuous) samples</td>
</tr>
<tr>
<td>Cartridge samples</td>
<td>Isoprene, 2-methyl-3-butenol, α-pinene, camphene, β-pinene, 3Δ-carene, p-cymene, 1,8-cineol, limonene, terpinolene, 4-acetyl-1-methylcyclohexane, nopinone, bornylacetate, longicycene, iso-longifolene, β-caryophyllene, aromadendrene, α-humulene, Benzene, Toluene, Ethylbenzene, p/m-xylene, styrene, o-xylene, propylbenzene, 3-ethyltoluene, 4-ethyltoluene, 1,3,5-trimethylbenzene, 2-ethyltoluene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, hexane, heptane, octane, nonane, decane</td>
<td>3-60 ng/m³ (see main text and Mäki et al. (2017) for more details)</td>
<td>Intermittent (non-continuous) samples</td>
</tr>
<tr>
<td></td>
<td>RH (%)</td>
<td>O₃ (µg m⁻³)</td>
<td>NO (µg m⁻³)</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Temp (°C)</td>
<td>-0.71 [-0.72, -0.70]</td>
<td>0.82 [0.81, 0.83]</td>
<td>-0.28 [-0.31, -0.26]</td>
</tr>
<tr>
<td>RH (%)</td>
<td>-0.76 [-0.77, -0.74]</td>
<td>1 [0.15, 0.20]</td>
<td>0.17 [0.14, 0.20]</td>
</tr>
<tr>
<td>O₃ (µg m⁻³)</td>
<td>1 [-0.41, -0.36]</td>
<td>0.58 [0.56, 0.59]</td>
<td>0.72 [0.70, 0.73]</td>
</tr>
<tr>
<td>NO (µg m⁻³)</td>
<td>1 [0.56, 0.59]</td>
<td>0.58 [0.70, 0.73]</td>
<td>0.72 [0.51, 0.55]</td>
</tr>
<tr>
<td>NO₂ (µg m⁻³)</td>
<td>1 [0.81, 0.83]</td>
<td>0.82 [0.62, 0.65]</td>
<td>0.63 [0.49, 0.53]</td>
</tr>
<tr>
<td>CO (mg m⁻³)</td>
<td>1 [0.70, 0.72]</td>
<td>0.71 [0.57, 0.60]</td>
<td>0.59 [0.14, 0.19]</td>
</tr>
<tr>
<td>Benzene (µg m⁻³)</td>
<td>1 [0.78, 0.80]</td>
<td>0.79 [0.21, 0.26]</td>
<td>0.23 [-0.20, -0.11]</td>
</tr>
<tr>
<td>Toluene (µg m⁻³)</td>
<td>1 [0.14, 0.20]</td>
<td>0.17 [-0.19, -0.10]</td>
<td>-0.06 [-0.11, -0.01]</td>
</tr>
<tr>
<td>PM₁₀ (µg m⁻³)</td>
<td>1 [0.14, 0.20]</td>
<td>0.17 [-0.19, -0.10]</td>
<td>-0.06 [-0.11, -0.01]</td>
</tr>
<tr>
<td>MLH (m)</td>
<td>1 [0.48, 0.57]</td>
<td>0.53 [0.43, 0.52]</td>
<td>0.12 [0.08, 0.16]</td>
</tr>
<tr>
<td>PKW at MC220 (count)</td>
<td>1 [0.93, 0.94]</td>
<td>0.94 [0.93, 0.94]</td>
<td>0.12 [0.08, 0.16]</td>
</tr>
</tbody>
</table>
Figure S1. Diurnal variation in air pollutants and MLH measured in Neukölln, and traffic counts from the MC143 and MC220 locations.
Figure S2. Mixing ratios measured for benzene (top) and toluene (bottom) by the individual cartridge and canister samples, and the continuous PTR-MS and BLUME network. Units are pptv.
Figure S3. Fractional contribution of the individual NMVOCs measured by canister sample (GC-MS) to m/z 59 (left) and m/z 107 (right) for the 18 individual samples taken in Neukölln during the campaign.
Figure S4. Back trajectories calculated by filter, organized by filter group.

(a) Group A
NOAA HYSPLIT MODEL
Backward trajectories ending at 0900 UTC 17 Jul 14
GDAS Meteorological Data

Job ID: 179123  Job Start: Thu Mar 19 20:20 UTC 2015
Source 1  lat.: 52.48000  lon.: 13.431000  height: 5 m AGL
Trajectory Direction: Backward  Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 15 Jul 2014 - GDAS1
NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 08 Aug 14
GDAS Meteorological Data

Source * at 52.49 N 13.43 E

Meters AGL

--- 60 1200 1800 2400 3000 3600 4200 4800 5400 6000 6600 7200 7800 8400 9000 9600 10200 10800 11400 12000 12600 13200 13800 14400 15000

Job ID: 179410
Job Start: Thu Mar 19 20:49:03 UTC 2015
Source 1 lat.: 52.490000 lon.: 13.431000 height: 5 m AGL
Trajectory Direction: Backward Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 00Z, 6 Aug 2014 - GDAS1
NOAA HYSPLIT MODEL
Backward trajectories ending at 1500 UTC 10 Aug 14
GDAS Meteorological Data

Source: at 52.49 N 13.43 E

Meters AGL

Job ID: 179458
Job Start: Thu Mar 19 20:50:36 UTC 2015
Source 1 lat: 52.480000 lon: 13.431000 height: 5 m AGL
Trajectory Direction: Backward Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 10 Aug 2014 - GDAS1
NOAA HYSPLIT MODEL
Backward trajectories ending at 0800 UTC 14 Aug 14
GDAS Meteorological Data

Source * at 52.49 N 13.43 E

Meters AGL

Job ID: 179483    Job Start: Thu Mar 19 20:52:50 UTC 2015
Source 1    lat.: 52.489000    lon.: 13.431000    height: 5 m AGL
Trajectory Direction: Backward    Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 0 Aug 2014 - GDAS
NOAA HYSPLIT MODEL
Backward trajectories ending at 1500 UTC 18 Aug 14
GDAS Meteorological Data

Source * at 52.49 N 13.43 E

Meters AGL

Job ID: 179534  Job Start: Thu Mar 19 20:54:43 UTC 2015
Source 1  lat.: 52.489000  lon.: 13.431000  height: 5 m AGL
Trajectory Direction: Backward  Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 15 Aug 2014 - GDAS1
NOAA HYSPLIT MODEL
Backward trajectories ending at 1000 UTC 20 Jun 14
GDAS Meteorological Data

(c) Group C
NOAA HYSPLIT MODEL
Backward trajectories ending at 0600 UTC 23 Jun 14
GDAS Meteorological Data
NOAA HYSPLIT MODEL
Backward trajectories ending at 1300 UTC 25 Jun 14
GDAS Meteorological Data

Source at 52.49 N 13.43 E

Meters AGL

Job ID: 178136  Job Start Thu Mar 19 10:24:37 UTC 2015
Source 1 lat.: 52.490000  lon.: 13.431000  height: 5 m AGL
Trajectory Direction: Backward  Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 22 Jun 2014 - GDAS1
(d) Group D
NOAA HYSPLIT MODEL
Backward trajectories ending at 1900 UTC 23 Jul 14
GDAS Meteorological Data
NOAA HYSPLIT MODEL
Backward trajectories ending at 0900 UTC 26 Jul 14
GDAS Meteorological Data

Source * at 52.49 N 13.43 E

Meters AGL

---

Job ID: 179310
Job Start: Thu Mar 19 20:42:48 UTC 2015
Source lat.: 52.480000 lon.: 13.431000 height: 5 m AGL
Trajectory Direction: Backward Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 22 Jul 2014 - GDAS1
Group E
NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 02 Jul 14
GDAS Meteorological Data

Source * at 52.49 N 13.43 E

Meters AGL

0 500 1000 1500

00 06 12 18 00 06 12 18 00 06 12 18 00 06 12 18
07/02 07/03 07/04 06/30 06/29 06/28 06/27

Job ID: 175891  Job Start: Thu Mar 19 16:40:57 UTC 2015
Source 1  lat.: 52.480000  lon.: 13.431000  height: 5 m AGL
Trajectory Direction: Backward  Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Jul 2014 - GDAS1
Single filter B17
(g) Single filter B19
(h) Single filter B30

B30

NOAA HYSPLIT MODEL
Backward trajectories ending at 0700 UTC 01 Sep 14
GDAS Meteorological Data

Source: 52.49 N 13.43 E

Meters AGL

0 5 10 15 20 25 30 35 40

06/01 06/02 06/03 06/04 06/05 06/06 06/07 06/08 06/09 06/10 06/11 06/12

Job ID: 179548
Job Start: Thu Mar 19 21:13:12 UTC 2015
Source 1 lat: 52.49000 lon: 13.43100 height: 5 m AGL

Trajectory Direction: Backward
Duration: 72 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z, 1 Sep 2014 - GDAS