Supplementary material: Source apportionment of the carbonaceous aerosol in Norway – Quantitative estimates based on $^{14}$C, thermal optical and organic tracer analysis

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Table S1: Concentrations of sugars and sugar-alcohols in PM$_{10}$ (ng m$^{-3}$)

<table>
<thead>
<tr>
<th>PM$_{10}$</th>
<th>Arabitol</th>
<th>Mannitol</th>
<th>Trehalose</th>
<th>Inositol</th>
<th>Erytritol</th>
<th>Sucrose</th>
<th>Fructose</th>
<th>Glucose</th>
<th>Ribose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
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<tr>
<td>Oslo day</td>
<td>20 ± 10</td>
<td>24 ± 8</td>
<td>10 ± 3</td>
<td>2.0 ± 0.6</td>
<td>3.3 ± 2.5</td>
<td>5.7 ± 3.0</td>
<td>4.7 ± 1.4</td>
<td>20 ± 7</td>
<td>1.5 ± 0.5</td>
</tr>
<tr>
<td>Oslo night</td>
<td>20 ± 9</td>
<td>26 ± 6</td>
<td>11 ± 5</td>
<td>1.6 ± 0.6</td>
<td>1.9 ± 1.9</td>
<td>3.6 ± 1.9</td>
<td>3.4 ± 1.4</td>
<td>17 ± 8</td>
<td>2.4 ± 1.1</td>
</tr>
<tr>
<td>Oslo 24 hour</td>
<td>20 ± 9</td>
<td>25 ± 8</td>
<td>10 ± 4</td>
<td>1.8 ± 0.7</td>
<td>2.5 ± 2.3</td>
<td>4.6 ± 2.7</td>
<td>4.0 ± 1.5</td>
<td>19 ± 8</td>
<td>1.9 ± 0.9</td>
</tr>
<tr>
<td>Hurdal day</td>
<td>25 ± 7</td>
<td>28 ± 10</td>
<td>18 ± 7</td>
<td>2.3 ± 0.9</td>
<td>3.2 ± 1.6</td>
<td>24 ± 22</td>
<td>5.2 ± 1.4</td>
<td>32 ± 18</td>
<td>0.6 ± 0.7</td>
</tr>
<tr>
<td>Hurdal night</td>
<td>40 ± 14</td>
<td>64 ± 21</td>
<td>32 ± 12</td>
<td>1.8 ± 0.7</td>
<td>8.2 ± 6.6</td>
<td>2.0 ± 0.6</td>
<td>4.5 ± 1.3</td>
<td>25 ± 9</td>
<td>2.8 ± 1.6</td>
</tr>
<tr>
<td>Hurdal 24 hour</td>
<td>32 ± 13</td>
<td>45 ± 24</td>
<td>25 ± 12</td>
<td>2.0 ± 0.6</td>
<td>5.6 ± 5.3</td>
<td>13 ± 19</td>
<td>4.9 ± 1.4</td>
<td>29 ± 15</td>
<td>1.7 ± 1.6</td>
</tr>
<tr>
<td>Winter</td>
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</tr>
<tr>
<td>Oslo day</td>
<td>2.7 ± 1.1</td>
<td>3.2 ± 0.8</td>
<td>6.0 ± 2.9</td>
<td>1.0 ± 0.7</td>
<td>n.d.</td>
<td>2.8 ± 1.1</td>
<td>3.5 ± 2.2</td>
<td>7.0 ± 2.4</td>
<td>1.4 ± 0.4</td>
</tr>
<tr>
<td>Oslo night</td>
<td>2.7 ± 1.0</td>
<td>2.6 ± 1.9</td>
<td>3.7 ± 2.1</td>
<td>0.6 ± 0.6</td>
<td>n.d.</td>
<td>2.8 ± 1.0</td>
<td>2.3 ± 1.0</td>
<td>6.1 ± 1.9</td>
<td>0.9 ± 0.4</td>
</tr>
<tr>
<td>Oslo 24 hour</td>
<td>2.7 ± 1.0</td>
<td>2.9 ± 1.4</td>
<td>4.9 ± 2.7</td>
<td>0.8 ± 0.6</td>
<td>n.d.</td>
<td>2.8 ± 1.0</td>
<td>2.9 ± 1.7</td>
<td>6.6 ± 2.1</td>
<td>1.2 ± 0.5</td>
</tr>
<tr>
<td>Hurdal day</td>
<td>0.77 ± 0.48</td>
<td>0.78 ± 0.42</td>
<td>1.73 ± 0.92</td>
<td>n.d.</td>
<td>n.d.</td>
<td>1.52 ± 0.97</td>
<td>1.02 ± 0.79</td>
<td>1.70 ± 0.99</td>
<td>0.25 ± 0.05</td>
</tr>
<tr>
<td>Hurdal night</td>
<td>0.71 ± 0.45</td>
<td>0.53 ± 0.38</td>
<td>1.11 ± 0.52</td>
<td>n.d.</td>
<td>n.d.</td>
<td>0.89 ± 0.64</td>
<td>0.53 ± 0.21</td>
<td>1.26 ± 0.50</td>
<td>0.60 ± 0.44</td>
</tr>
<tr>
<td>Hurdal 24 hour</td>
<td>0.74 ± 0.45</td>
<td>0.65 ± 0.40</td>
<td>1.42 ± 0.79</td>
<td>n.d.</td>
<td>n.d.</td>
<td>1.20 ± 0.85</td>
<td>0.78 ± 0.61</td>
<td>1.48 ± 0.79</td>
<td>0.43 ± 0.35</td>
</tr>
</tbody>
</table>
Table S2: Calculated contributions to total carbon ($\mu$g C m$^{-3}$) from LHS analysis, PM$_{10}$, Summer. B.E. is best estimate (50th percentile), range is 10th-90th percentiles of LHS results.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B.E.</td>
<td>Range</td>
<td>B.E.</td>
<td>Range</td>
</tr>
<tr>
<td>EC$_{bb}$</td>
<td>0.04</td>
<td>(0.00–0.08)</td>
<td>0.13</td>
<td>(0.04–0.18)</td>
</tr>
<tr>
<td>EC$_{ff}$</td>
<td>0.37</td>
<td>(0.25–0.46)</td>
<td>0.64</td>
<td>(0.36–0.86)</td>
</tr>
<tr>
<td>OC$_{bb}$</td>
<td>0.15</td>
<td>(0.08–0.17)</td>
<td>0.53</td>
<td>(0.32–0.68)</td>
</tr>
<tr>
<td>OC$_{ff}$</td>
<td>0.29</td>
<td>(0.17–0.38)</td>
<td>0.90</td>
<td>(0.63–1.13)</td>
</tr>
<tr>
<td>OC$_{BSOA}$</td>
<td>2.33</td>
<td>(2.00–2.58)</td>
<td>1.61</td>
<td>(1.26–1.89)</td>
</tr>
<tr>
<td>OC$_{PBAP}$</td>
<td>0.99</td>
<td>(0.71–1.21)</td>
<td>0.71</td>
<td>(0.50–0.90)</td>
</tr>
<tr>
<td>OC$_{pbs}$</td>
<td>0.75</td>
<td>(0.50–0.92)</td>
<td>0.34</td>
<td>(0.23–0.41)</td>
</tr>
<tr>
<td>OC$_{pbc}$</td>
<td>0.23</td>
<td>(0.12–0.38)</td>
<td>0.38</td>
<td>(0.18–0.59)</td>
</tr>
</tbody>
</table>
Table S3: Calculated contributions to total carbon ($\mu$g C m$^{-3}$) from LHS analysis, PM$_{10}$, Winter. B.E. is best estimate (50th percentile), range is 10th-90th percentiles of LHS results.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>B.E.    Range</td>
<td>B.E.    Range</td>
<td>B.E.    Range</td>
<td>B.E.    Range</td>
</tr>
<tr>
<td>EC$_{bb}$</td>
<td>0.13 (0.05–0.21)</td>
<td>0.29 (0.11–0.45)</td>
<td>0.30 (0.08–0.50)</td>
<td>0.28 (0.10–0.42)</td>
</tr>
<tr>
<td>EC$_{ff}$</td>
<td>0.24 (0.08–0.36)</td>
<td>0.67 (0.30–1.00)</td>
<td>0.74 (0.33–1.08)</td>
<td>0.58 (0.23–0.88)</td>
</tr>
<tr>
<td>OC$_{bb}$</td>
<td>0.56 (0.43–0.69)</td>
<td>1.22 (0.93–1.48)</td>
<td>1.28 (0.92–1.63)</td>
<td>1.16 (0.94–1.36)</td>
</tr>
<tr>
<td>OC$_{ff}$</td>
<td>0.42 (0.28–0.56)</td>
<td>1.06 (0.70–1.41)</td>
<td>1.27 (0.88–1.67)</td>
<td>0.88 (0.55–1.20)</td>
</tr>
<tr>
<td>OC$<em>{bb}$ + OC$</em>{BSOA}$</td>
<td>0.72 (0.61–0.82)</td>
<td>1.59 (1.37–1.78)</td>
<td>1.76 (1.50–1.96)</td>
<td>1.40 (1.20–1.59)</td>
</tr>
<tr>
<td>OC$_{BSOA}$</td>
<td>0.15 (0.02–0.29)</td>
<td>0.38 (0.04–0.67)</td>
<td>0.48 (0.04–0.92)</td>
<td>0.24 (0.03–0.45)</td>
</tr>
<tr>
<td>OC$_{PBAP}$</td>
<td>0.13 (0.07–0.20)</td>
<td>0.10 (0.04–0.11)</td>
<td>0.10 (0.04–0.12)</td>
<td>0.09 (0.03–0.13)</td>
</tr>
<tr>
<td>OC$_{pbs}$</td>
<td>0.01 (0.00–0.03)</td>
<td>0.02 (0.00–0.07)</td>
<td>0.03 (0.00–0.08)</td>
<td>0.02 (0.00–0.07)</td>
</tr>
<tr>
<td>OC$_{pbc}$</td>
<td>0.12 (0.07–0.18)</td>
<td>0.07 (0.00–0.07)</td>
<td>0.06 (0.00–0.08)</td>
<td>0.07 (0.03–0.10)</td>
</tr>
</tbody>
</table>
Table S4: Calculated contributions to total carbon (µg C m⁻³) from LHS analysis, PM₁, Summer. B.E. is best estimate (50th percentile), range is 10th-90th percentiles of LHS results.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>B.E.</td>
<td>Range</td>
<td>B.E.</td>
<td>Range</td>
</tr>
<tr>
<td>EC_{bb}</td>
<td>0.04</td>
<td>(0.00–0.06)</td>
<td>0.11</td>
<td>(0.03–0.18)</td>
</tr>
<tr>
<td>EC_{ff}</td>
<td>0.33</td>
<td>(0.20–0.43)</td>
<td>0.43</td>
<td>(0.24–0.59)</td>
</tr>
<tr>
<td>OC_{bb}</td>
<td>0.15</td>
<td>(0.09–0.17)</td>
<td>0.48</td>
<td>(0.33–0.59)</td>
</tr>
<tr>
<td>OC_{ff}</td>
<td>0.34</td>
<td>(0.20–0.46)</td>
<td>0.79</td>
<td>(0.59–0.98)</td>
</tr>
<tr>
<td>OC_{BSOA}</td>
<td>1.96</td>
<td>(1.89–2.01)</td>
<td>1.12</td>
<td>(0.98–1.27)</td>
</tr>
<tr>
<td>OC_{PBAP}</td>
<td>0.05</td>
<td>(0.03–0.09)</td>
<td>0.02</td>
<td>(0.00–0.06)</td>
</tr>
<tr>
<td>OC_{pcs}</td>
<td>0.03</td>
<td>(0.00–0.06)</td>
<td>0.01</td>
<td>(0.00–0.06)</td>
</tr>
<tr>
<td>OC_{pbc}</td>
<td>0.02</td>
<td>(0.00–0.06)</td>
<td>0.01</td>
<td>(0.00–0.06)</td>
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</tbody>
</table>
Table S5: Calculated contributions to total carbon (µg C m$^{-3}$) from LHS analysis, PM$_1$, Winter. B.E. is best estimate (50th percentile), range is 10th-90th percentiles of LHS results.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>B.E.</td>
<td>Range</td>
<td>B.E.</td>
<td>Range</td>
</tr>
<tr>
<td>EC$_{bb}$</td>
<td>0.14 (0.05–0.22)</td>
<td>0.26 (0.09–0.41)</td>
<td>0.25 (0.09–0.38)</td>
<td>0.30 (0.11–0.45)</td>
</tr>
<tr>
<td>EC$_{ff}$</td>
<td>0.21 (0.06–0.33)</td>
<td>0.51 (0.21–0.77)</td>
<td>0.56 (0.22–0.85)</td>
<td>0.44 (0.17–0.67)</td>
</tr>
<tr>
<td>OC$_{bb}$</td>
<td>0.61 (0.46–0.75)</td>
<td>1.10 (0.86–1.30)</td>
<td>1.05 (0.79–1.29)</td>
<td>1.16 (0.92–1.37)</td>
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<tr>
<td>OC$_{ff}$</td>
<td>0.41 (0.27–0.54)</td>
<td>0.80 (0.50–1.10)</td>
<td>0.96 (0.66–1.26)</td>
<td>0.66 (0.39–0.92)</td>
</tr>
<tr>
<td>OC$_{BSOA}$</td>
<td>0.17 (0.02–0.32)</td>
<td>0.27 (0.03–0.47)</td>
<td>0.29 (0.03–0.53)</td>
<td>0.23 (0.03–0.42)</td>
</tr>
<tr>
<td>OC$_{PBAP}$</td>
<td>0.05 (0.03–0.06)</td>
<td>0.02 (0.00–0.06)</td>
<td>0.04 (0.00–0.06)</td>
<td>0.01 (0.00–0.06)</td>
</tr>
<tr>
<td>OC$_{pbs}$</td>
<td>0.02 (0.00–0.03)</td>
<td>0.01 (0.00–0.06)</td>
<td>0.02 (0.00–0.06)</td>
<td>0.01 (0.00–0.06)</td>
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<tr>
<td>OC$_{pbc}$</td>
<td>0.03 (0.02–0.05)</td>
<td>0.01 (0.00–0.06)</td>
<td>0.03 (0.00–0.06)</td>
<td>0.01 (0.00–0.06)</td>
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