Supplement of

Atmospheric aerosol compositions and sources at two national background sites in northern and southern China

Qiao Zhu et al.

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(a) Lake Hongze factor=2 fpeak=0

SV-OOA
O/C: 0.39
H/C: 1.70
N/C: 0.02
OM/OC: 1.69

LV-OOA
O/C: 0.87
H/C: 1.40
N/C: 0.02
OM/OC: 2.31

C_{x+y}H_yO_z + C_{x+y}H_yN_p + C_{x+y}H_yO_zN_p + H_xO + C_{x+y}H_y

59.5%

40.5%
(b) Lake Hongze factor=4

Factor1
O/C: 0.93
H/C: 1.33
N/C: 0.02
OM/OC: 2.37

Factor2
O/C: 1.02
H/C: 1.50
N/C: 0.04
OM/OC: 2.53

Factor3
O/C: 0.41
H/C: 1.67
N/C: 0.03
OM/OC: 1.71

Factor4
O/C: 0.25
H/C: 1.75
N/C: 0.01
OM/OC: 1.49
Figure S1 Mass spectrum profiles, time series, average composition pie chart and diurnal pattern of 2 factors (a) and 4 factors (b) based on PMF analysis, and diagnostic plots of the chosen (3 factors) PMF solution (c) at NCB: (1) Q/Qexp vs number of factors; (2) Q/Qexp vs. FPEAK for the solution with optimal number of factors; (3) Q/Qexp vs. SEED; (4) mass fraction of PMF factors vs. FPEAK; (5) the distribution of scaled residuals for each m/z; (6) the time series of the measured and the reconstructed organic mass; (7) correlations of time series and mass spectra among PMF factors.
(a) Mount Wuzhi factor=3

Factor 1
- O/C: 0.79
- H/C: 1.42
- N/C: 0.04
- OM/OC: 2.21

Factor 2
- O/C: 0.52
- H/C: 1.60
- N/C: 0.01
- OM/OC: 1.84

Factor 3
- O/C: 1.37
- H/C: 1.06
- N/C: 0.03
- OM/OC: 2.96

Mass Conc. (g m⁻³)

Fraction of OA Signal

m/z (amu)

CₓHᵧOz
CₓHᵧOz
CₓHᵧOz
CₓHᵧOzNp
CₓHᵧ
+ HxO
(b) Mount Wuzhi factor=2 fpeak=0 diagnostic plots

**Figure S2** Mass spectrum profiles, time serious, average composition pie chart and diurnal pattern of 3 factors (a) based on PMF analysis, and diagnostic plots of the chosen (2 factors) PMF solution (b) at SCB: (1) Q/Qexp vs number of factors; (2) Q/Qexp vs. FPEAK for the solution with optimal number of factors; (3) Q/Qexp vs. SEED; (4) mass fraction of PMF factors vs. FPEAK; (5) the distribution of scaled residuals for each m/z; (6) the time series of the measured and the reconstructed organic mass; (7) correlations of time series and mass spectra among PMF factors.
Table S1 A comparison of elemental ratios between Aiken-Ambient (A-A) method and Improved-Ambient (I-A) methods in China.

<table>
<thead>
<tr>
<th>Site</th>
<th>Site Category</th>
<th>O:C_{A-A}</th>
<th>O:C_{I-A}</th>
<th>H:C_{A-A}</th>
<th>H:C_{I-A}</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>Urban</td>
<td>0.33</td>
<td>0.41</td>
<td>1.49</td>
<td>1.63</td>
<td>[Huang et al., 2010]</td>
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<td>Shanghai</td>
<td>Urban</td>
<td>0.31</td>
<td>0.40</td>
<td>1.73</td>
<td>1.92</td>
<td>[Huang et al., 2010]</td>
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<tr>
<td>Shenzhen</td>
<td>Urban</td>
<td>0.30</td>
<td>0.39</td>
<td>1.63</td>
<td>1.83</td>
<td>[He et al., 2011]</td>
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<td>Kaiping</td>
<td>Urban Downwind</td>
<td>0.47</td>
<td>0.60</td>
<td>1.48</td>
<td>1.64</td>
<td>[Huang et al., 2011]</td>
</tr>
<tr>
<td>Heshan</td>
<td>Urban Downwind</td>
<td>0.40</td>
<td>0.50</td>
<td>1.49</td>
<td>1.63</td>
<td>[Gong et al., 2012]</td>
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<tr>
<td>Jiaxing(summer)</td>
<td>Urban Downwind</td>
<td>0.28</td>
<td>0.36</td>
<td>1.76</td>
<td>1.94</td>
<td>[Huang et al., 2013]</td>
</tr>
<tr>
<td>Jiaxing(winter)</td>
<td>Urban Downwind</td>
<td>0.33</td>
<td>0.43</td>
<td>1.56</td>
<td>1.73</td>
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</tr>
<tr>
<td>Lake Hongze</td>
<td>Rural/Background</td>
<td>0.53</td>
<td>0.67</td>
<td>1.36</td>
<td>1.52</td>
<td>This study</td>
</tr>
<tr>
<td>Mount Wuzhi</td>
<td>Rural/Background</td>
<td>0.75</td>
<td>0.98</td>
<td>1.17</td>
<td>1.31</td>
<td>This study</td>
</tr>
</tbody>
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