Supplementary Material

**GPU-HADVPPM4HIP V1.0: higher model accuracy on China's domestically GPU-like accelerator using heterogeneous compute interface for portability (HIP) technology to accelerate the piecewise parabolic method (PPM) in an air quality model (CAMx V6.10)**

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**Figure S1.** O₃ concentrations outputted by CAMx model for Fortran (F), HIP C(HIP), and HIP C with OpenMP (HIP_OMP) versions. Panels (a) is from Fortran version. Panels (b) is from HIP C version. Panels (c) is from HIP C with OpenMP version. Panels (d) is the output concentration differences of Fortran and HIP C versions. Panels (e) is the output concentration differences of HIP C and HIP C with OpenMP versions. Panels (f) is the output concentration differences of Fortran and HIP C with OpenMP versions.
**Table S1.** The physical and chemical numerical methods selected during CAMx model simulation.

<table>
<thead>
<tr>
<th>Process</th>
<th>Numerical Methods</th>
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</thead>
<tbody>
<tr>
<td>Horizontal advection</td>
<td>PPM (Colella and Woodward, 1984)</td>
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<tr>
<td>Vertical diffusion</td>
<td>K-theory 1&lt;sup&gt;st&lt;/sup&gt; order closure</td>
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<tr>
<td>Aqueous-phase oxidation</td>
<td>Regional Acid Deposition Model (RADM-AQ, (Chang et al., 1987))</td>
</tr>
<tr>
<td>Inorganic aerosol thermodynamic partitioning</td>
<td>ISORROPIA (Nenes et al., 1999)</td>
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<tr>
<td>Gas-Phase Chemistry</td>
<td>Carbon Bond 2005 (Yarwood et al., 2005)</td>
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<td></td>
<td>EBI solver (Hertel et al., 1993)</td>
</tr>
</tbody>
</table>
Dry deposition

Resistance model for gases (Zhang et al., 2003)

and aerosols (Zhang et al., 2001)

Wet deposition

Scavenging model for gases

and aerosols (Seinfeld et al., 1998)

Reference


