SEMAP Modeling
Plans and Status

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Georgia EPD – Air Protection Branch

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Overview

• WRF, SMOKE, CMAQ/CAMx
  – Modeling Years □2007 and FY (TBD)
• Future Year Projections for O$_3$, PM$_{2.5}$, RH
• Emission Sensitivities

• SEMAP states will **not** have any moderate or serious ozone nonattainment areas & all PM2.5 monitors are meeting the NAAQS.
  – None of this modeling will be used in SIPs.
Meteorological Modeling

• WRF Model Set-Up
  – 36-km CONUS and 12-km Eastern US
  – 35 Vertical Layers
  – Four-Dimensional Data Assimilation
  – Morrison (moisture physics), PX (land surface), and ACM2 (PBL)

• Modeling Centers
  – NC DENR and IA DNR

• Model Performance Evaluation
  – Atmospheric and Environmental Research (AER)
  – NC DENR and GA EPD
WRF Modeling Domain
Emission Inventory

• Emissions Inventory Contractors
  – AMEC/Alpine \(\rightarrow\) Point source (EGU and non-EGU), fire, and on-road mobile (MOVES) emissions.
  – TranSystems \(\rightarrow\) Area and non-road emissions.

• “Actual” Emission Inventory (2007) - Final
  – Used for model performance evaluations

• “Typical” Emission Inventory (2006-2008) - Final
  – EGUs and fires
  – Used for model projections and RRF calculations

• Future Year Inventory – TBD
  – ERTAC model for EGU point
  – Growth & Control factors for non-EGU point, area, and MAR
  – Rerun NONROAD
  – Inventory mode ratio method for MOVES (proxy FY)
Emission Density Plots

Draft

Final

Shelby Co., TN
Emissions Modeling

• GT/UNC - SESARM contractor
  – Create SMOKE inputs (NIF to ORL format)
  – Run SMOKE and SMOKE-MOVES
  – Create biogenic emissions
  – Add Canada/Mexico and other RPO Emissions

• Part 75 data replacement for CEMS
  – Details on next slide

• All 2007 SMOKE files are finished, except area sources.
2007 Air Quality Modeling

• GT/UNC - SESARM contractor
• 2007 annual modeling performed with CMAQ and CAMx (36/12 km)
  – Model Performance Evaluation
  – Diagnostic Sensitivity Testing (if MPE poor)
• CMAQ Model Options
  – In-line plume rise for point sources
  – Additional new crustal species
  – In-line lightning NOx
  – In-line bi-directional NH3 flux (?)
CMAQ Modeling Domain
SEMAP 12-km Modeling Domain
FY Air Quality Modeling

• FY (TBD) annual modeling
  – Projections of ozone, PM2.5, and regional haze
  – Follow EPA’s RRF approach

• Emission Sensitivity Modeling
  – NOx and VOCs for 10 SEMAP states and neighboring RPOs
  – 30% emission reductions
  – CMAQ or CAMx?
    • CAMx Options: DDM and/or 4-km Flexi-nesting
Georgia NOx vs. VOCs

Georgia Sensitivities: Summer

Red numbers indicate number of days used in RRF calculations
# VOC/NOx Sensitivity Updates

<table>
<thead>
<tr>
<th>Previous Sensitivity Modeling</th>
<th>Planned Sensitivity Modeling</th>
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<tbody>
<tr>
<td>CMAQv4.4</td>
<td>CMAQv5.0</td>
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<tr>
<td>1-Month Summer Episode</td>
<td>Entire Ozone Season</td>
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<tr>
<td>VISTAS 2009 OTW BaseD</td>
<td>SEMAP 2007 and/or FY</td>
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<tr>
<td>SEMAP-wide VOC Reductions</td>
<td>State-wide VOC Reductions</td>
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<tr>
<td>County/State NOx Reductions</td>
<td>State-wide NOx Reductions</td>
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<tr>
<td>MOBILE6</td>
<td>MOVES</td>
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<td>Absolute Difference</td>
<td>RRF Approach</td>
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<tr>
<td>&gt;70 ppb Cutoff</td>
<td>&gt;65 ppb Cutoff</td>
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<tr>
<td>Brute Force</td>
<td>DDM?</td>
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<td>12 km grid</td>
<td>4-km flexi-nest grid?</td>
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# DRAFT Modeling Schedule

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<thead>
<tr>
<th>DRAFT Schedule for SEMAP</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td><strong>Emissions Inventory - Base Year (Actual)</strong></td>
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<tr>
<td><strong>Emissions Inventory - Base Year (Typical)</strong></td>
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<td><strong>SMOKE Modeling - Base Year (Actual)</strong></td>
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<td><strong>CMAQ Diagnostic Sens./Configuration Testing</strong></td>
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<td><strong>Emissions Inventory - FY1 OTB Future Year</strong></td>
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<td><strong>CAMx Emission Sens. - FY1 OTB Future Year</strong></td>
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The schedule indicates key activities and their corresponding dates for the years 2011 and 2012.
Contact Information

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