Evaluation of 2009 Emission Reduction for Northeast Ohio

OBJECTIVE

“Identify a list of alternative realistic “base case assumptions” for the future 2009 base case emissions inventory for Northeast Ohio”

- Title V Sources
- Economic Indicators
- Population Growth Estimates
- Other Emission Analysis
Alternative Emission Reduction for NEGU point sources

Total NOx emissions (lbs/day) of NEGU for the years of 2002, 2003, and 2004.

Box-Whiskers plot of NOx emissions (lbs/day) of NEGU for the years of 2002, 2003, and 2004.
Alternative Emission Reductions

- 25% NEGU low level point source reduction
- 28% **aircraft** emission reduction based on current trends (NOACA)
- **Commercial** non-road source category based on employment trends and population growth.
- **Residential** non-road mobile emissions county-based on population growth
- Emissions from agricultural equipment, ships and locomotives have not been modified since the current trends were not available
Replacement existing emission reduction with the alternative emission reduction for 2009

\[
(E2009_{\text{original}}) \times \left(\% \text{ contribution of source emissions}\right) \times \left(\% \text{ area occupied by each county in each grid cell}\right) \\
(1-%\text{reduction}) \times (E2002) \times \left(\% \text{ contribution of source emissions}\right) \times \left(\% \text{ area occupied by each county in each grid cell}\right)
\]
CAMx runs with the alternative emission reduction

- CAMx 4.3 and MM5 v3
- The alternative emission reduction was incorporated to BaseK v1 emission.
- The model simulations were performed for the summer months of 2002 (June 5 to August 31, 87 days) in a nested mode with a horizontal grid cell dimension of 36 km in a coarse domain and 12km fine grid covering northeast
- Postprocessing and RRFs: CAMxtrct, Avgcat, CAMxpost, and Combine2 programs for Geauga monitor
Results: Design Value Calculation for 2009

- The daily max 8-hr ozone values over 3 × 3 grids of “nearby grids of the monitor” to calculate RRFs.
- Average ppb
  Difference = 1.4 ppb for summer months

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<thead>
<tr>
<th>Julian</th>
<th>Date</th>
<th>2002</th>
<th>2009</th>
<th>2009ch</th>
<th>2009_LADCO_rff</th>
<th>2009_OU_rff</th>
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- mean rffs: 0.904742527, 0.890631729

DV: 99

2009 DV: 89.56951014

LADCO: 88.17254114

Geauga County Monitoring Site and 3X3 nearby Grid Cells

Comparison of Design Value

<table>
<thead>
<tr>
<th>Ozone (ppb)</th>
<th>2002</th>
<th>2009</th>
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<tbody>
<tr>
<td>LADCO</td>
<td>88.17</td>
<td>88.17</td>
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<tr>
<td>OU</td>
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</table>

LADCO-OU: 1.396969007
• Average ppb Difference = 1.4 ppb for summer months
Current 12 km vs. future 4km

Current 12km grid

Future 4km grid

Lake - land breeze effect, Cleveland area