



# National Air Toxics Assessment (NATA)

Air Toxic Monitoring Workshop  
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## 2011 NATA – EPA TEAM

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# What is NATA?

- **Characterization of air toxics across the nation**
  - Nationwide screening assessment with *census tract* resolution for most hazardous air pollutants (HAPs) plus diesel particulate matter (DPM)
  - Emissions, modeled ambient concentrations and estimated *inhalation exposures* from *outdoor sources*
  - *Cancer and noncancer* risk estimates for about 140 HAPs with health data based on *chronic exposures*
- **Tool for EPA and State/Local/Tribal Agencies to prioritize pollutants, emissions sources and locations of interest**



# Background

- NATA history generally lines up with tri-annual NEI-- 1996, 1999, 2002, 2005
  - 2005 NATA released in March 2011
- Next version will be 2011 NATA
- Update requested by NACAA Air Toxics Committee in August 2012
- NATA is not a CAA requirement
  - Included in Urban Air Toxics Strategy
  - Prominent part of 2<sup>nd</sup> Air Toxics Report to Congress



## Clients for 2011 NATA

- States/Local Agencies/Tribes: set priorities
- EPA: set priorities, EJSCREEN, CFERST
- Other (academia) – over 100 references to NATA



# NATA Analytical Steps

Compile National Emissions Inventory (2011 NEI)

2011 NEI includes both stationary, mobile and natural sources (fires, biogenics).

NATA includes 178 HAPs and diesel particulate from mobile sources

Estimate ambient concentrations of air toxics across U.S.

Uses CMAQ and AERMOD to predict census tract ambient concentrations nationwide.

Estimate population exposures

Includes an exposure model (HAPEM7) to account for human activity data, commuting patterns, and near roadway exposures.

Characterize potential public health risks from inhalation

Census tract level cancer and noncancer risks nationwide.

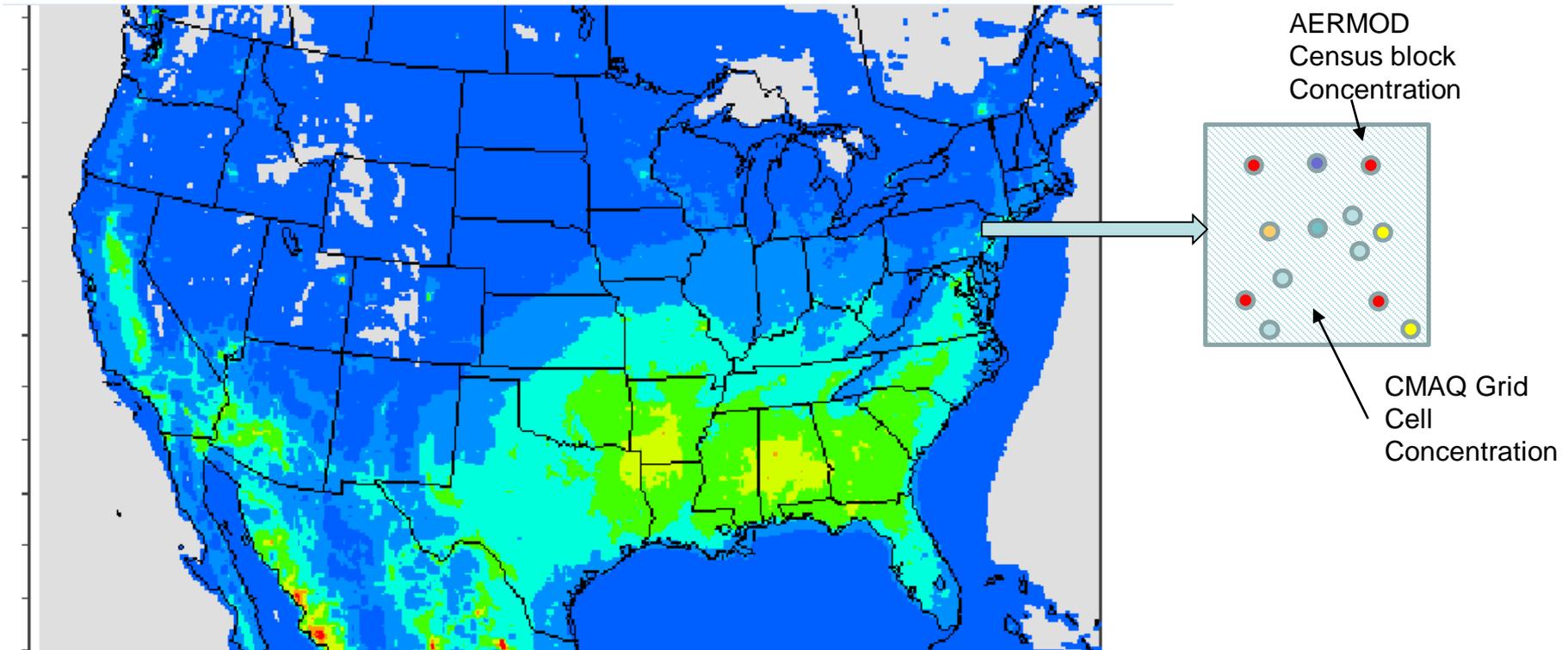


# Updates and Improvements: 2011 NATA

- 2011 NATA based on 2011 National Emissions Inventory (NEI) Version 2
  - Includes more detailed emissions for ports, airports, and oil and gas sectors
  - Estimates mobile emissions based on MOVES 2014 model
  - Major improvements to fire emissions and biogenics
- Hybrid modeling approach for key pollutants
  - Integrates results from regional-scale photochemical model (CMAQ) with near-field dispersion model (AERMOD) in a mass consistent manner to optimize treatment of reactive and transported pollutants with fine scale resolution
  - Similar to Detroit multi-pollutant study application
- Enhanced mapping tools including the EPA's GeoPlatform

# Hybrid – combine CMAQ & AERMOD in each grid cell

4





# What data will be available?

- Emissions Data
  - County and facility level
- Ambient and Exposure Concentration Data
  - 178 pollutants at census tract level
  - Pollutant and source group summaries
- Cancer and Noncancer Risk
  - About 140 pollutants at census tract level
  - Pollutants and source group summaries
  - Cancer risks in a million
  - Noncancer risks expressed as Hazard Index
- Tabular (Excel, Access) and Graphical Outputs (NATA web App)
- NATA does NOT present facility level risks



# NATA Schedule

- Expect public release in late 2015
  - S/L/Ts will have about a week to preview data before the public release

The image displays a composite of three screenshots related to the 2011 National Air Toxics Assessment (NATA). On the left is a map interface showing emission sources and monitoring data for the Boston Harbor area. The top right shows the EPA website's navigation menu and a section titled 'National Air Toxics Assessments' with a 'What is NATA?' heading. The bottom right is a detailed spreadsheet showing various data points for different regions and pollutants, including columns for 'Total Cancer Risk' and 'Non-Cancer Risk'.

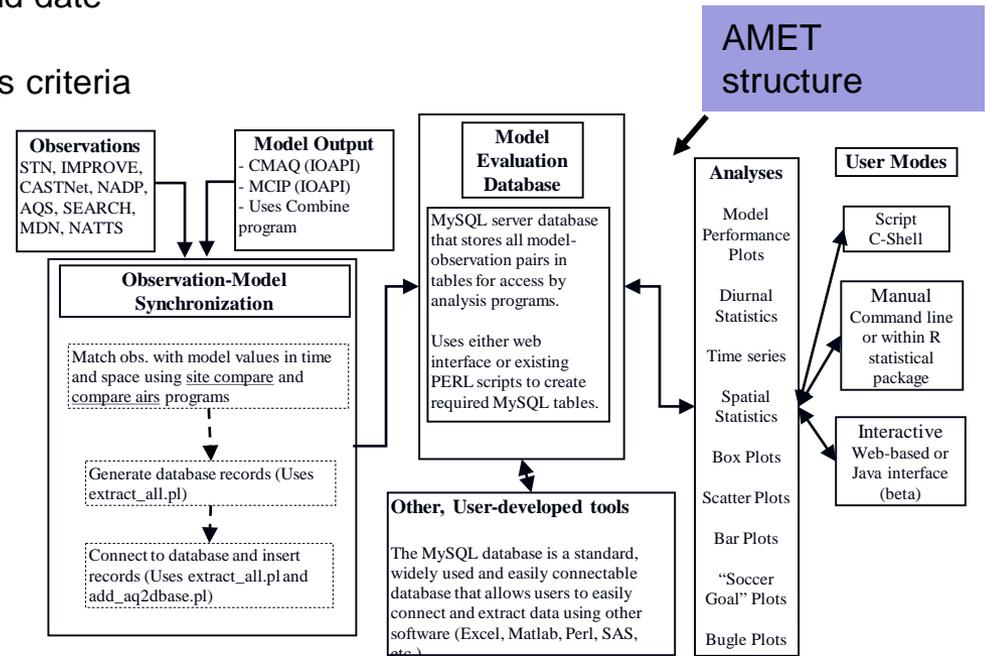
**What is NATA?**  
The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing comprehensive evaluation of air toxics in the U.S. EPA developed the NATA as a state-of-the-science screening tool for State/Local/Tribal Agencies to prioritize pollutants, emission sources and locations of interest for further study in order to gain a better understanding of risks. NATA assessments do not incorporate refined information about emission sources, but rather, use general information about sources to develop estimates of risks which are more likely to overestimate impacts than underestimate them. NATA provides estimates of the risk of cancer and other serious health effects from breathing (inhaling) air toxics in order to inform both national and more localized efforts to identify and prioritize air toxics, emission source types and locations which are of greatest potential concern in terms of contributing to population risk. This in turn helps air pollution experts focus limited analytical resources on areas and/or populations where the potential for health risks are highest. Assessments include estimates of cancer and non-cancer health effects based on chronic exposure from outdoor sources, including assessments of non-cancer health effects for Diesel Particulate Matter (PM). Assessments provide a snapshot of the outdoor air quality and the risks to human health that would result if air toxic emissions levels remained unchanged.

... cancer estimates and noncancer ... the public in early 2011.



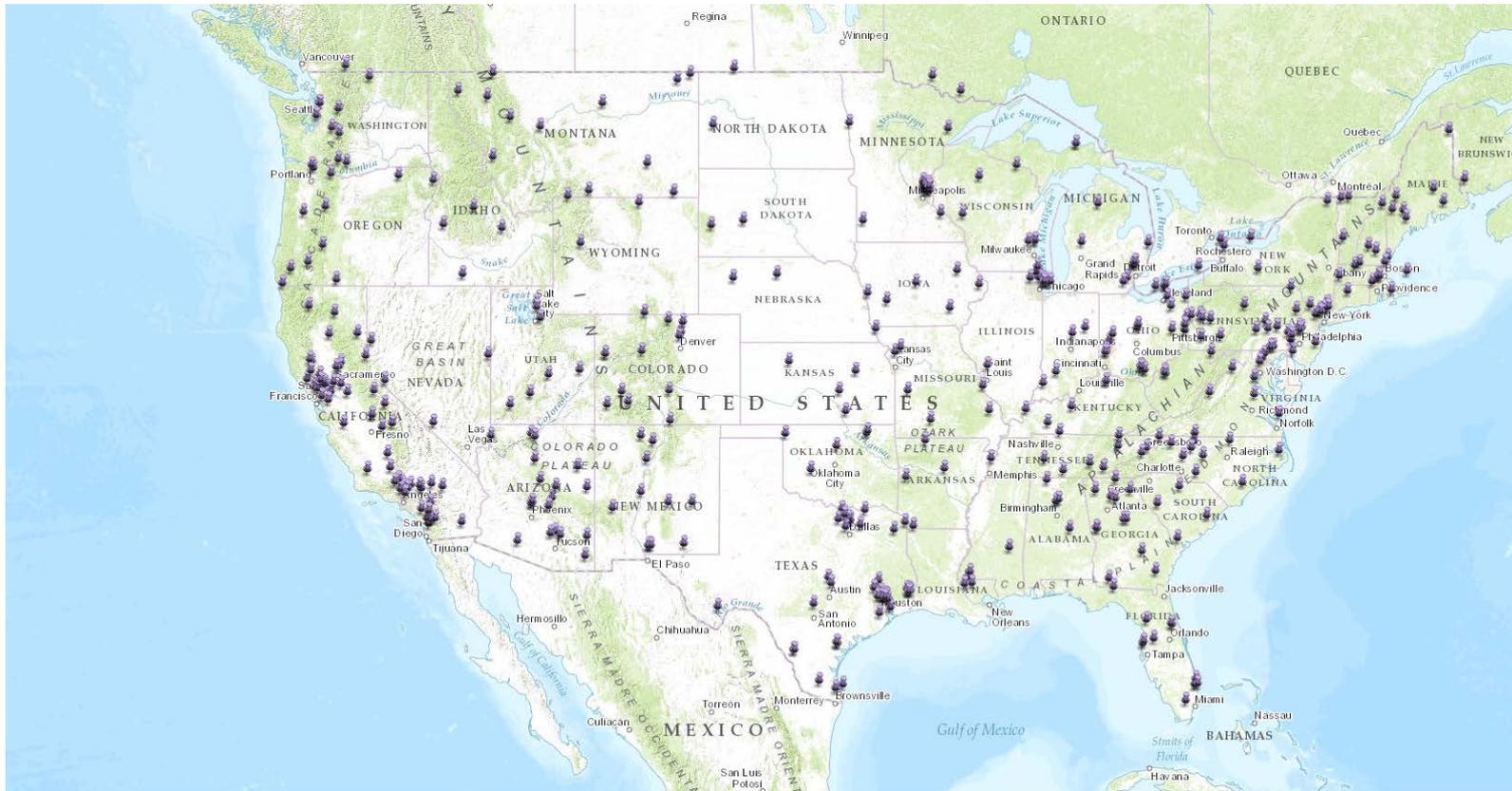
# 2011 NATA: Model Evaluation Approach

- Model-to-monitor comparisons:
  - CMAQ vs Hybrid (CMAQ+AERMOD)
  - 2011 HAP data -- Air Monitoring Archive (ERG)
    - Recognize limited pollutant & geographic coverage although high risk HAPs are observed
  - Paired spatial and temporal obs/model data
    - Site Compare & Atmospheric Model Evaluation Tool ([www.cmascenter.org](http://www.cmascenter.org))
      - Pairing data based on lat/lon and date
    - Annual/seasonal comparison
      - Applying obs data completeness criteria
    - Analysis Products
      - Scatterplots
      - Spatial bias/error plots
      - Timeseries plots
      - Bar charts/plots
      - Box plots
      - Statistics
      - Region-specific





# 2011 Air Toxic Monitors

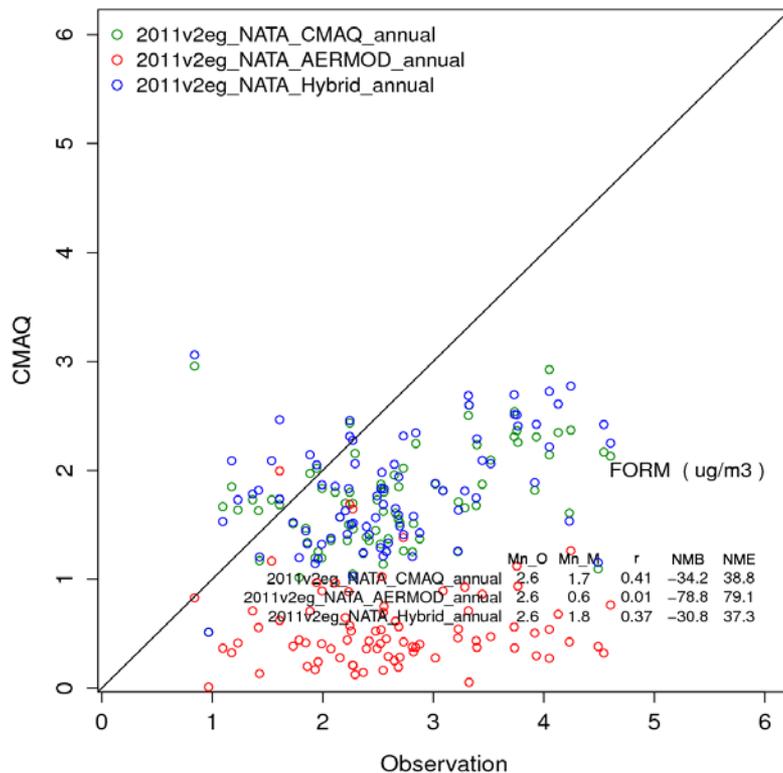




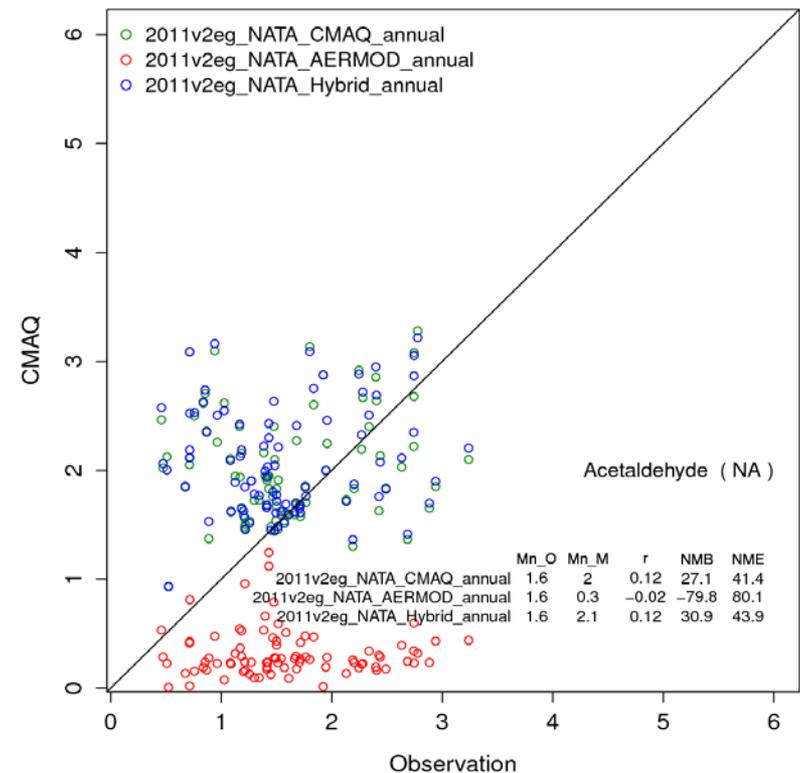
# 2011 NATA: Model Evaluation Examples

## CMAQ vs AERMOD vs Hybrid

### Annual Formaldehyde



### Annual Acetaldehyde

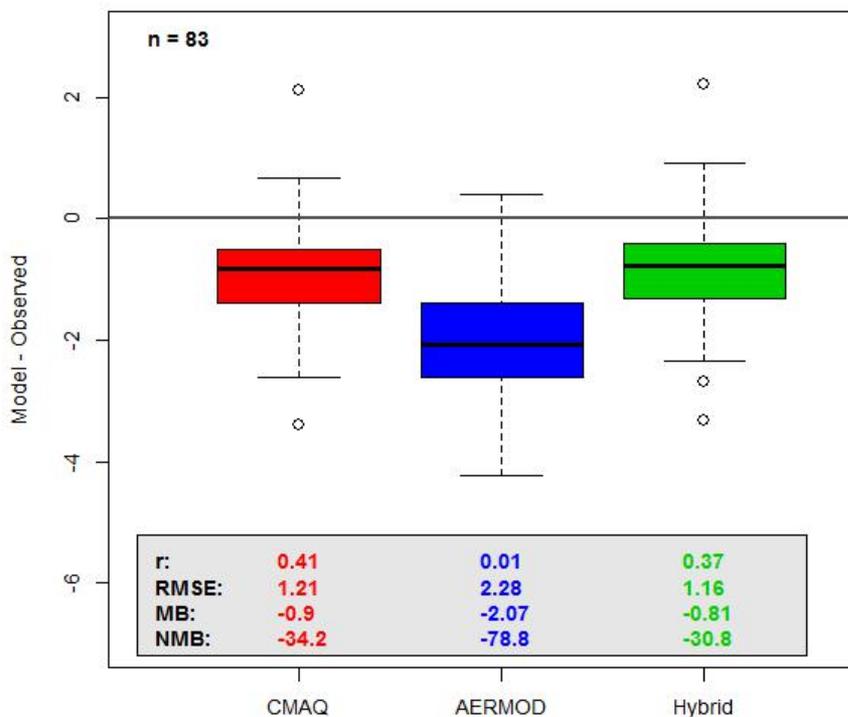




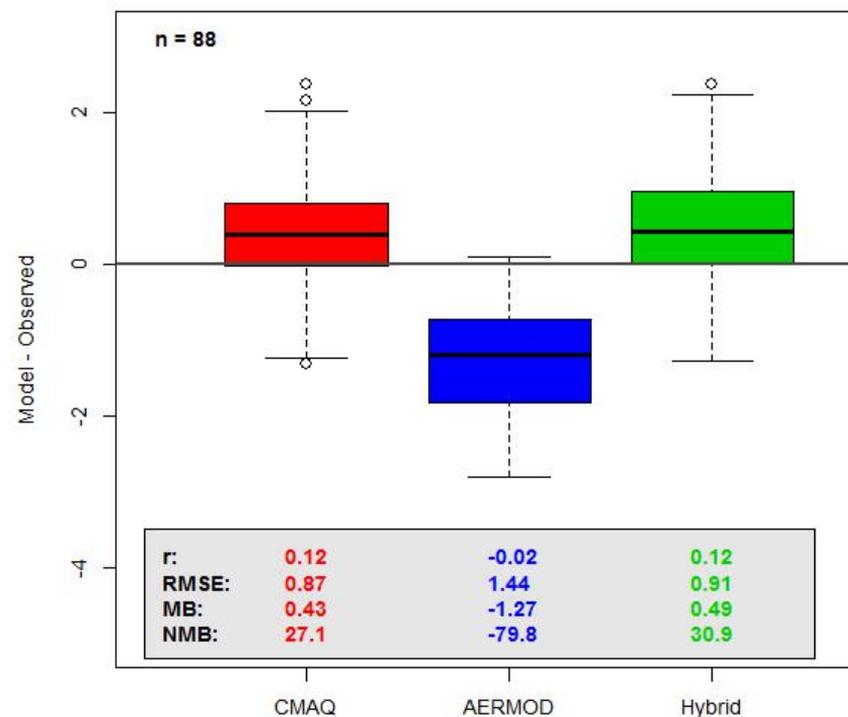
# 2011 NATA: Model Evaluation Examples

## Boxplots of Model Bias

### Annual Formaldehyde



### Annual Acetaldehyde





**QUESTIONS ?**