# $PM_{2.5}$ Chemical Speciation Network Carbon Monitoring

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Region 4 Monitoring Meeting

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# $PM_{2.5}$ Speciation Carbon Conversion

- Speciation Trends Network (STN)
  - 54 Trends sites: Largely static urban monitoring stations and protocols for sampling and analysis
- Speciation State and Local Air Monitoring Stations (SLAMS)
  - Currently ~150 sites: monitors for state and local agency directed monitoring objectives
- Changes in the network to address inconsistencies in carbon sampling and analysis procedures used in urban STN/SLAMS and rural IMPROVE programs
  - Field blank collection and subtraction also to change

# Carbon Data Comparability Issues

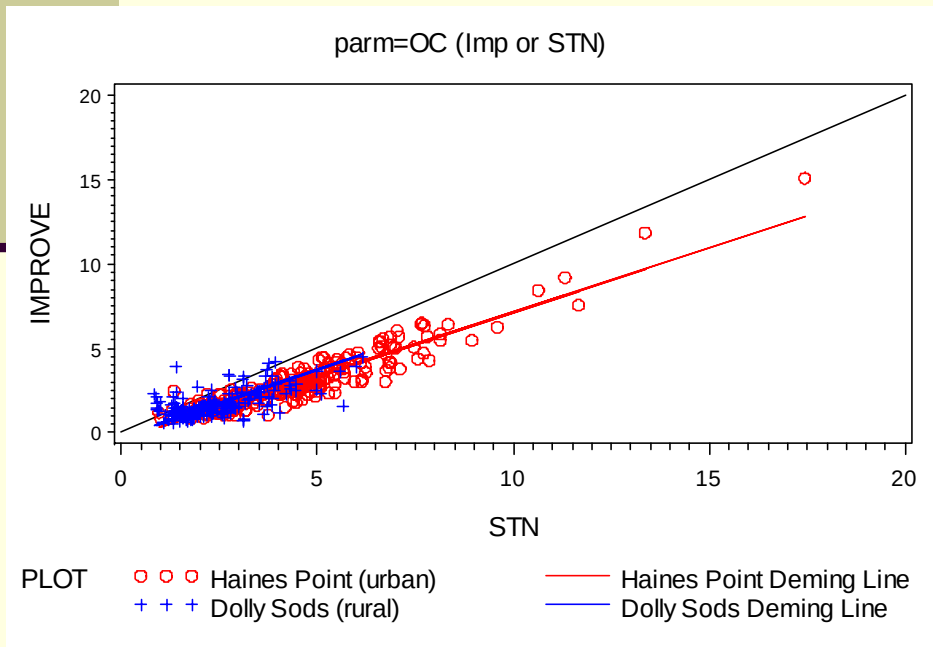
- A Brief History…
  - Elemental Carbon (EC) differences highlighted by Chow et al., 2001
    - Factor of 2 difference in EC
  - Data users comparing urban (speciation) and rural (IMPROVE) monitoring data for modeling, air quality data analyses, control strategy development, …
  - Question posed to CASAC on strengths and weaknesses of converting the network (December 2004)
  - The CASAC subcommittee on monitoring strongly recommended changes to the network "to achieve fully *comparable* data"
  - EPA/OAQPS began communicating plans for changes to carbon in late 2004 (e.g., $PM_{2.5}$ Speciation Newsletter)

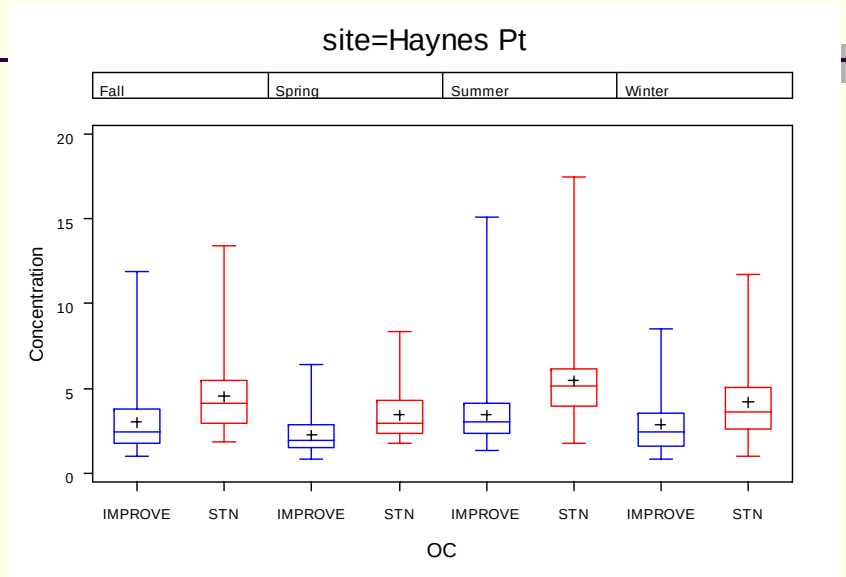
# Carbon Data Comparability Issues

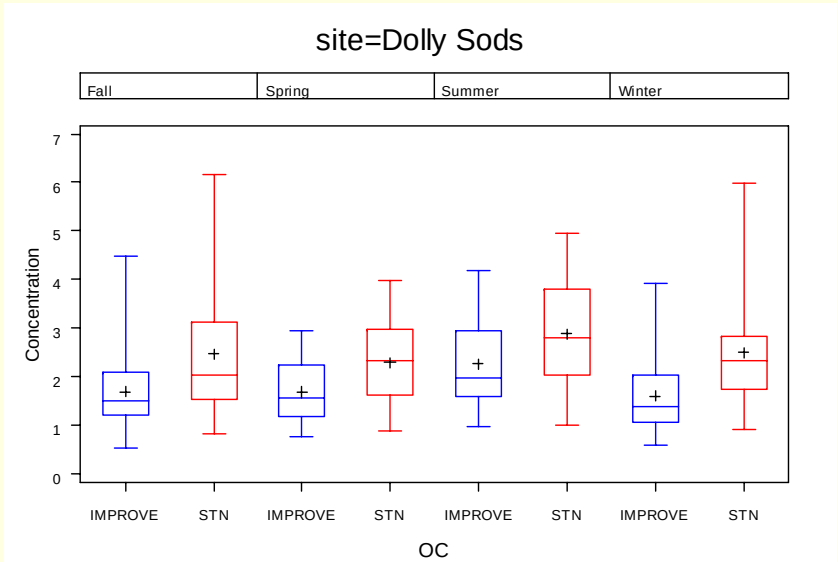
- A Brief History…
  - 15 City STN-to-IMPROVE comparison study
    - Preliminary data analysis from first 6 cities
      - ORD/OAQPS analysis of first year data in 2003 and OAQPS reassessment of full data set in 2005
      - Factor of 2 not observed for EC in urban locations; however, bigger differences found for EC in rural locations
      - Significant differences in OC observed due to filter face velocity/flow rate
    - Results from additional 9 sites not yet evaluated

# Organic Carbon Comparison

- **Sampler and filter-face velocity effects due to flow differences**
- **IMPROVE ~22 LPM; and MetOne ~ 7 LPM**
- **IMPROVE OC un adjusted for blank**

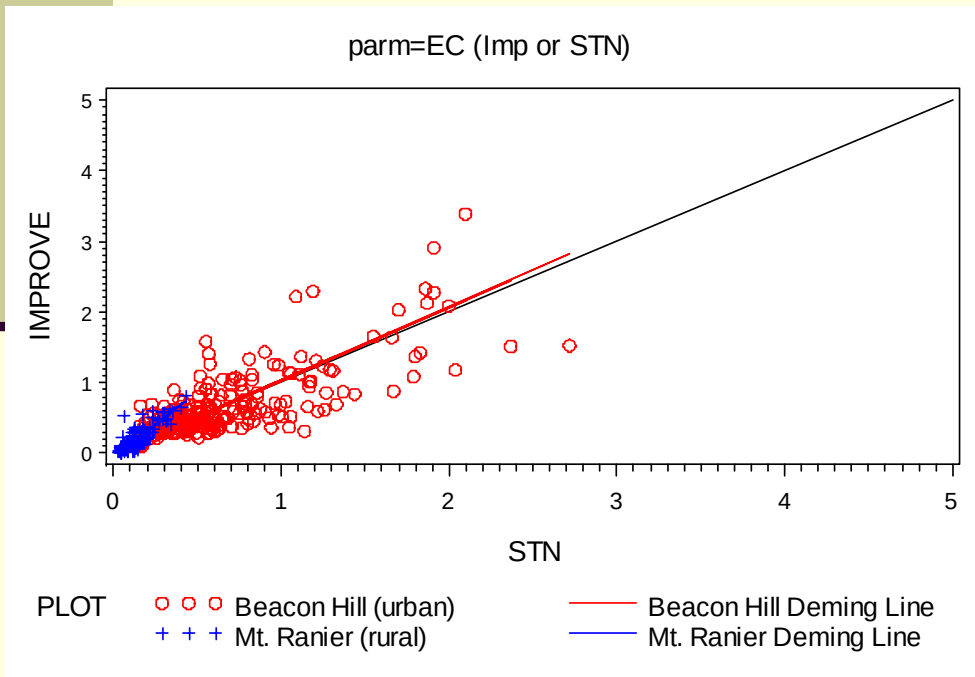


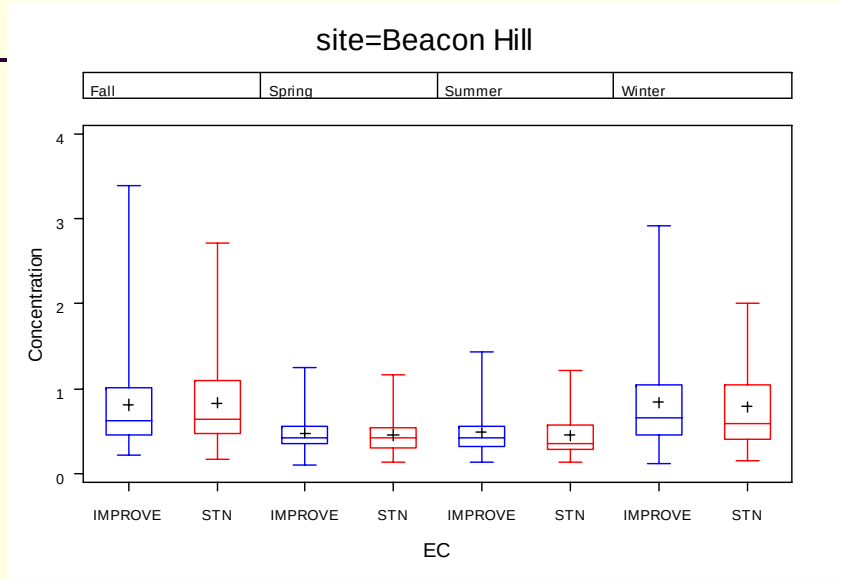



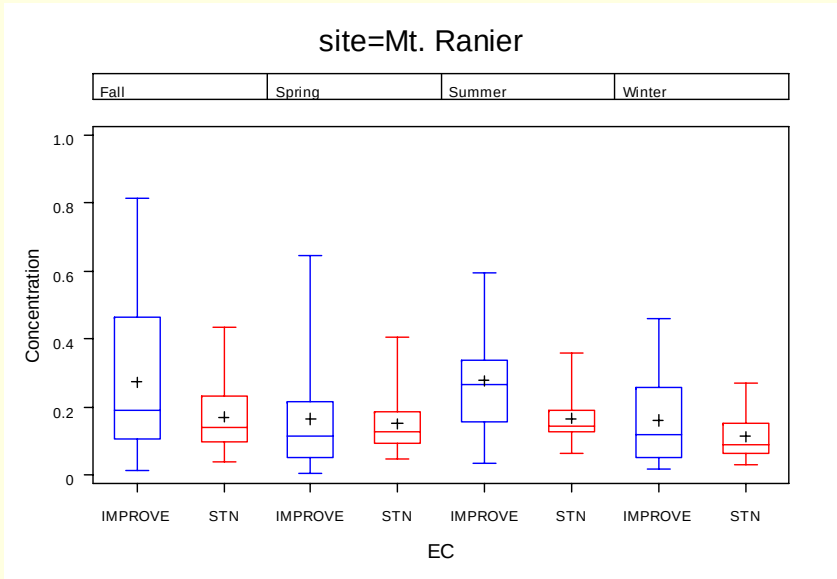



# Elemental Carbon Comparison

- **EC compares better in urban areas, but large amount of scatter**
- **Rural EC at lower concentrations <0.3 µg/m3**



# $PM_{2.5}$ Speciation Carbon Conversion

- Logistical Plans
  - EPA is managing the coordination and implementation
  - EPA is using a contractor to procure, install and train operators on URG-3000N sampler use
  - The contractor (with EPA) is coordinating installation with Region/State agencies
  - Once installations are complete, analysis will be switched to the new TOR analysis
    - All sites will move to new analysis at once
    - Concurrent STN TOT and new sampling and TOR analysis will be done for about two months

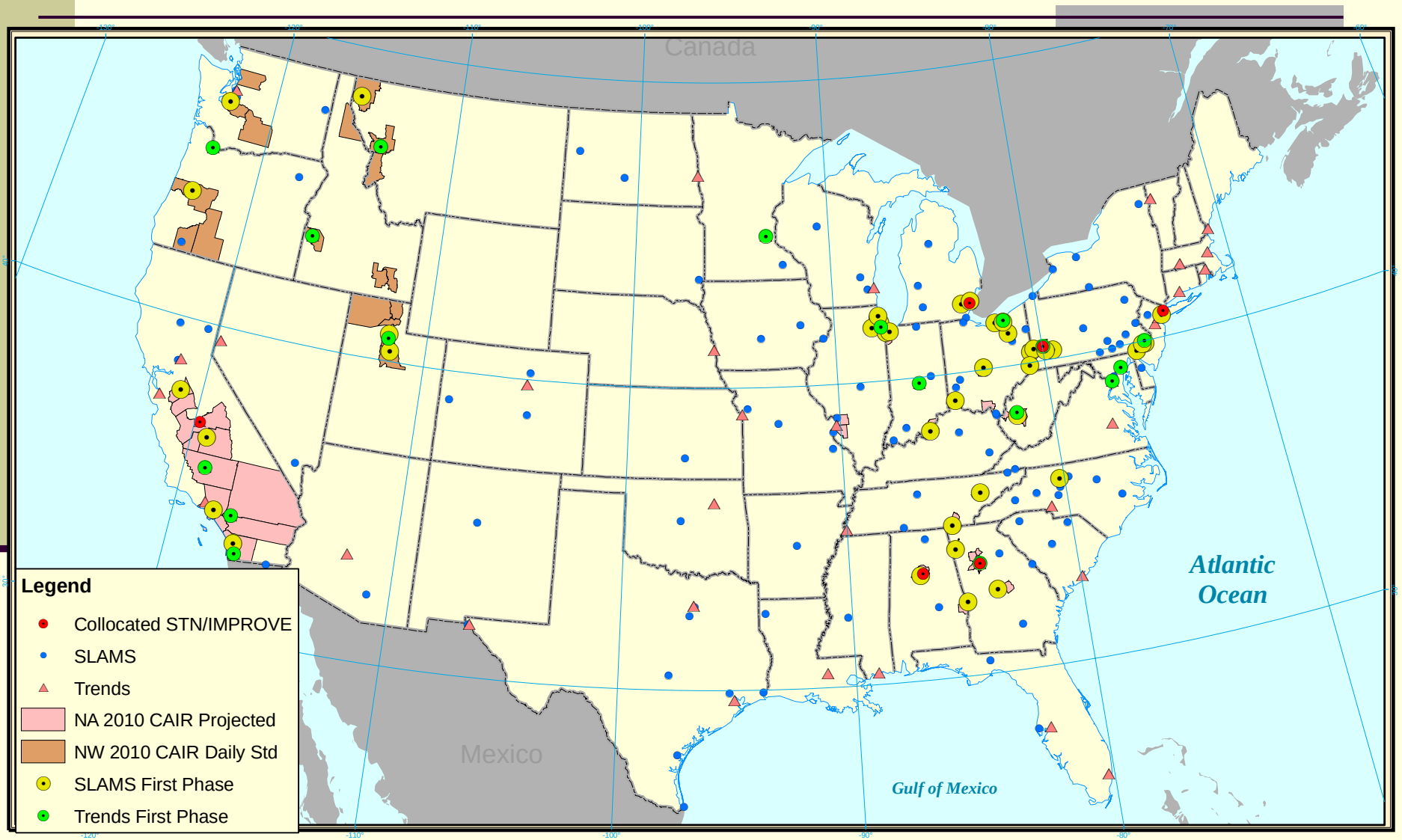
# $PM_{2.5}$ Speciation Carbon Conversion

- Logistical Plans (continued)…
  - Sampling modules, cassettes, and analysis will continue to be supported and supplied by RTI
  - Resources to fund conversion are provided by savings in speciation shipping costs
  - Repeat process for rest of the network in batches of ~50
- Expect to complete first phase of conversion in May 2007

# Phase 1 Selection Rationale

- Approach used projected non-attainment in 2010
  - Trends and SLAMS in NA counties based on 2010 CAIR projections using the annual standard (15 ug/m3)
  - Trends and SLAMS in NA counties in the Northwest and Utah based on 2010 CAIR projections using a daily standard of 35 ug/m3
- Sites in MD, DC, NJ and NY corridor selected based on $PM_{2.5}$ design values
- Six sites where health studies are ongoing 2004-2014
- Total of 57 Trends/SLAMS
  - 17 Trends with 2 collocated sites in CA
  - 40 SLAMS

# 1st Phase Trends and SLAMS



# Phase 1 Sites in Region 4

- Total of 7 Sites
  - Trends
    - 010730023 N. Birmingham, Alabama
  - SLAMS
    - 370670022 Winston-Salem, North Carolina
      - Health Study Site
    - 011130001 Phenix City, Alabama
    - 130210007 Macon, Georgia
    - 132150011 Columbus, Georgia
    - 211110043 Louisville, Kentucky
    - 470931020 Knoxville, Tennessee

# Sampling and Analysis

- URG-3000N Carbon Sampler
  - Identical to the IMPROVE sampler *except:*
    - Mass flow control
    - Sampler operation and troubleshooting support provided by URG
    - Modules loaded/provided by RTI
  - Differs from typical sampler
    - 22.8 LPM flow rate
    - 25-mm Pallflex Quartz filter
- Carbon Analysis
  - IMPROVE_A TOR method
  - Blank collection and subtraction

# Project Status

- About 30/57 sites installed so far
  - Rest of sites scheduled for April 30th completion
- Planning for May 1st start date
  - Wrapping up logistics with RTI
- Working on URG3000N SOP for mid-April
- Issues and Problems so far:
  - Few sites not prepared for installation (space and power issues)
  - Handful of sampler startup issues
  - Some agencies without FTS to check 22 LPM
  - Lead time on parts/supplies from vendor

# Questions