

# **Aerosol/Visibility Related Rural “Transport Supersites” in the Northeast U.S. under the MANE-VU Program**



George Allen, NESCAUM  
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## PM/Haze Rural “Transport Supersites” in MANE-VU domain

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- Multiple sites (3 or more) with detailed PM and visibility-related measurements
  - high-elevation (1000 - 3000 ft), rural, transport characterization
    - ==> contrast “Fresh” vs. Aged secondary aerosols
  - highly time-resolved (1-h) aerosol composition measurements
- Hourly aerosol composition data provide enhanced insight into:
  - regional aerosol generation and source characterization
  - factors that drive short-term visibility
  - aerosol model performance and evaluation

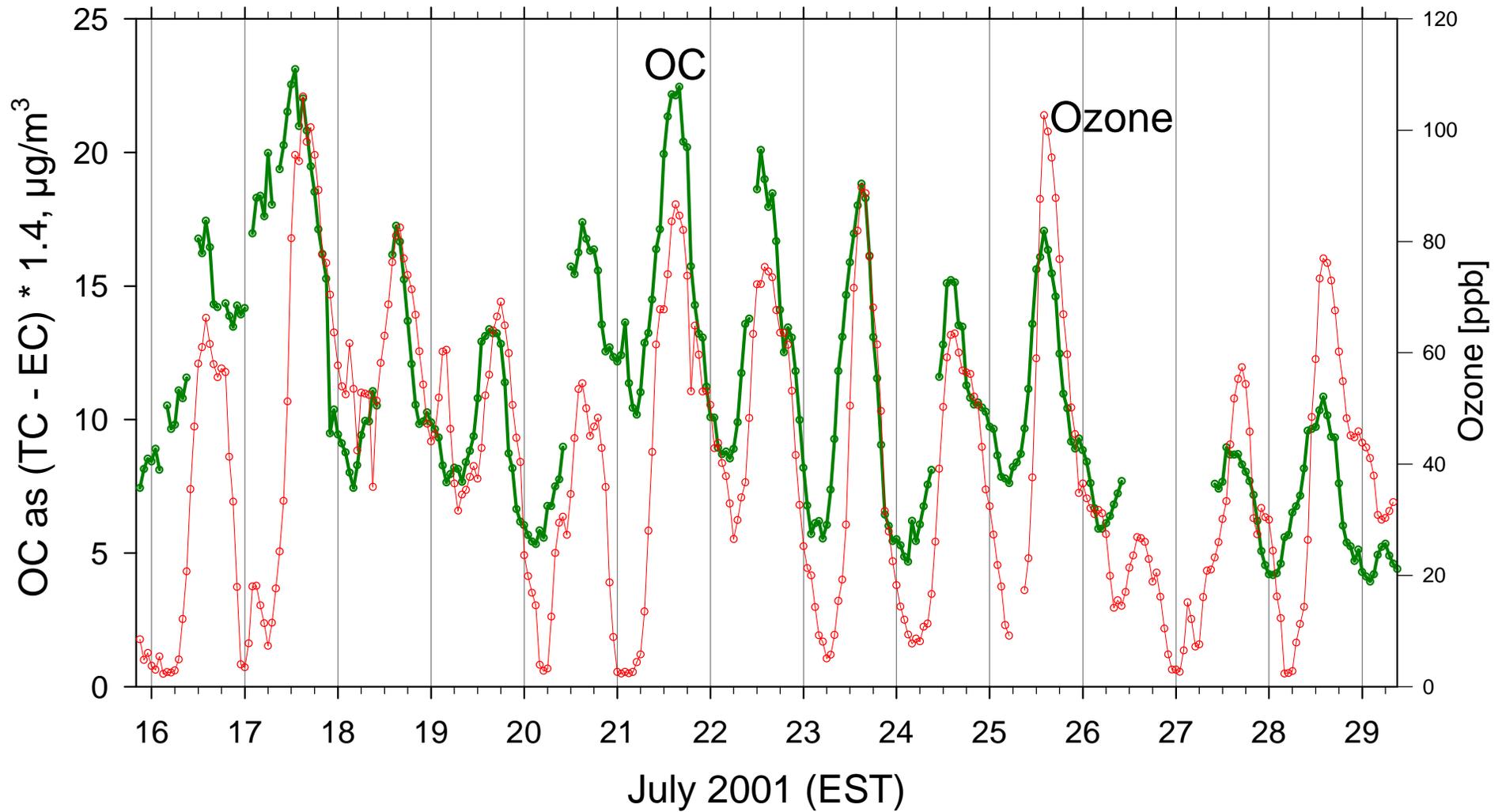
Examples of hourly carbon data demonstrate the additional information that can be obtained that is often lost with daily sampling:

Philadelphia OC and Ozone peak at the same time of day every day during summer - indicative of a secondary regional OC component.

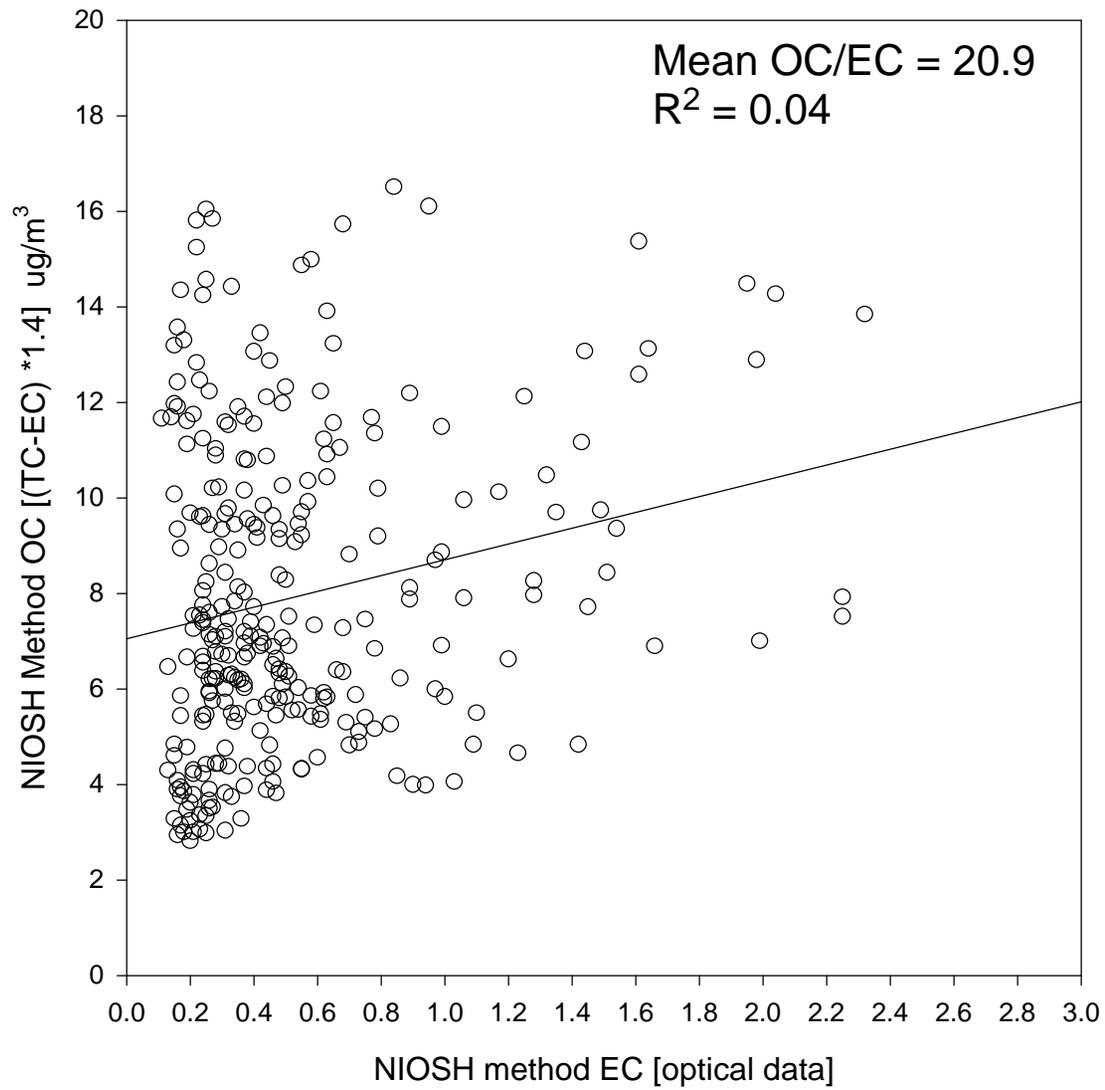
Phila hourly EC and OC are completely decoupled – EC is a local ground-level source [tailpipe].

BC from multiple Boston area sites show traffic influence in urban areas but not outside of the urban area.

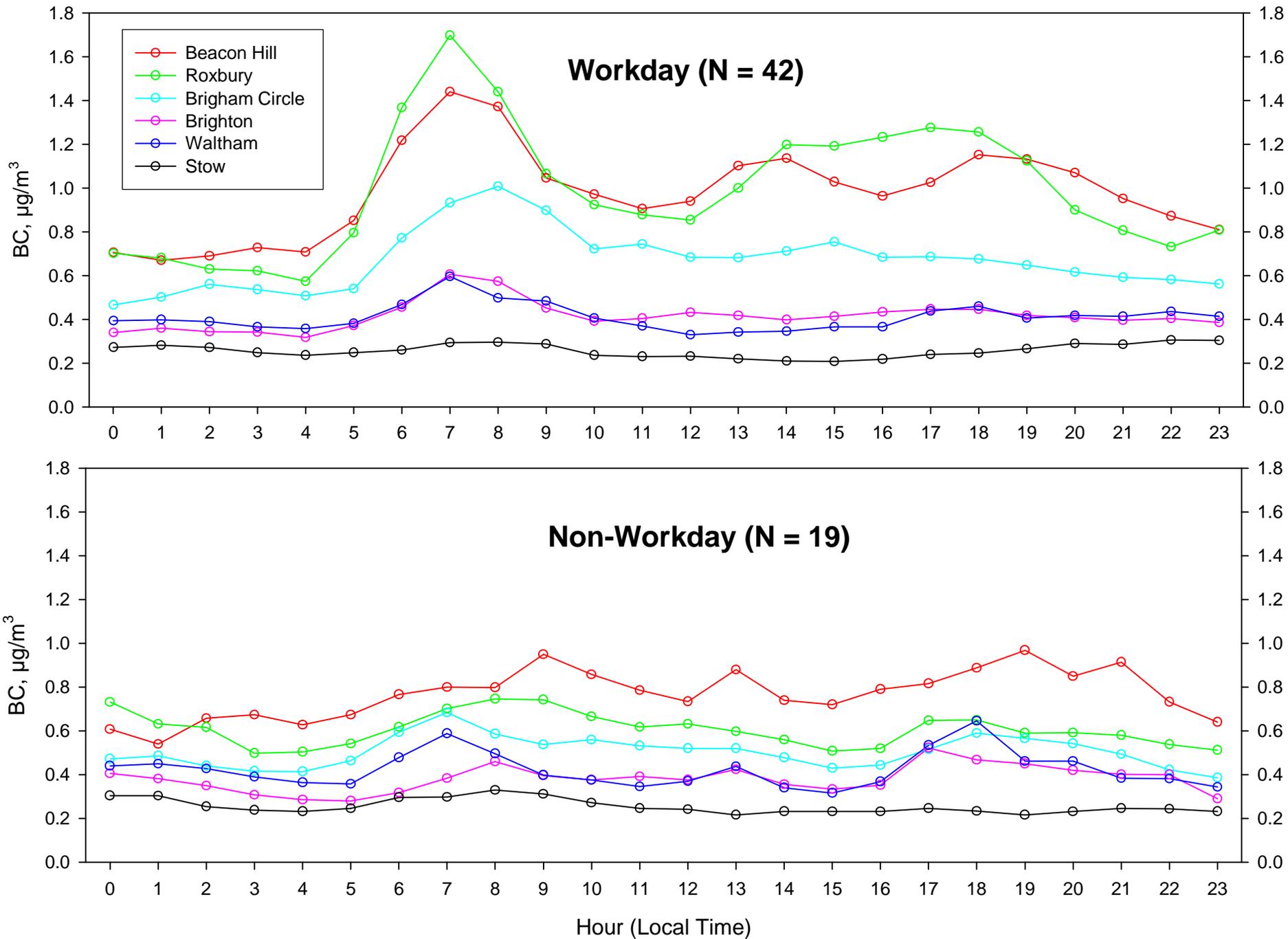
# Sunset Labs 1-Hour Organic Carbon and Ozone Philadelphia-Baxter (NEOPS)



Sunset Labs Hourly OC vs. EC  
Philadelphia PA, July 15-29 2001



**Figure 4. Diurnal BC Jan 04 - Mar 06, 2003**



## What's in a PM/Visibility Transport "Supersite"?

- Core year-round components that need to be in place:
  - Site infrastructure [power, shelter space, operators, etc]
  - Continuous [hourly] PM<sub>2.5</sub>
  - Surface Met [wind, temp, RH, rain, ?]
  - IMPROVE or 'IMPROVE protocol' measurements for carbon, ions and PM<sub>2.5</sub>
  - HazeCam in the general area
- MANE-VU and/or other funding sources (103 \$?) would add:
  - Continuous SO<sub>4</sub> (HSPH/TEI method)
  - Hourly BC/TC (Sunset Lab NDIR method)
  - NGN-2 (wet) nephelometer and trace SO<sub>2</sub> (as needed)
  - Wish-List items

## Wish List

- The following measurements are desirable but not essential:
  - NGN-3 dry PM<sub>2.5</sub>-cut neph
  - NO/NO<sub>y</sub>, trace level CO, O<sub>3</sub>
  - Profiler (starting from ~2500 feet for Frostburg MD) - Acadia?
  - Continuous PM-coarse?

For at least one site:

- NWS ASOS visibility sensor system [Belfort 6230a]
- Integrated (24-hour) NH<sub>3</sub>, HNO<sub>3</sub>, strong H<sup>+</sup>, SO<sub>4</sub><sup>=</sup>, and NO<sub>3</sub><sup>-</sup> using denuder/filter-pack methods (HEADS); Calculate NH<sub>4</sub><sup>+</sup>

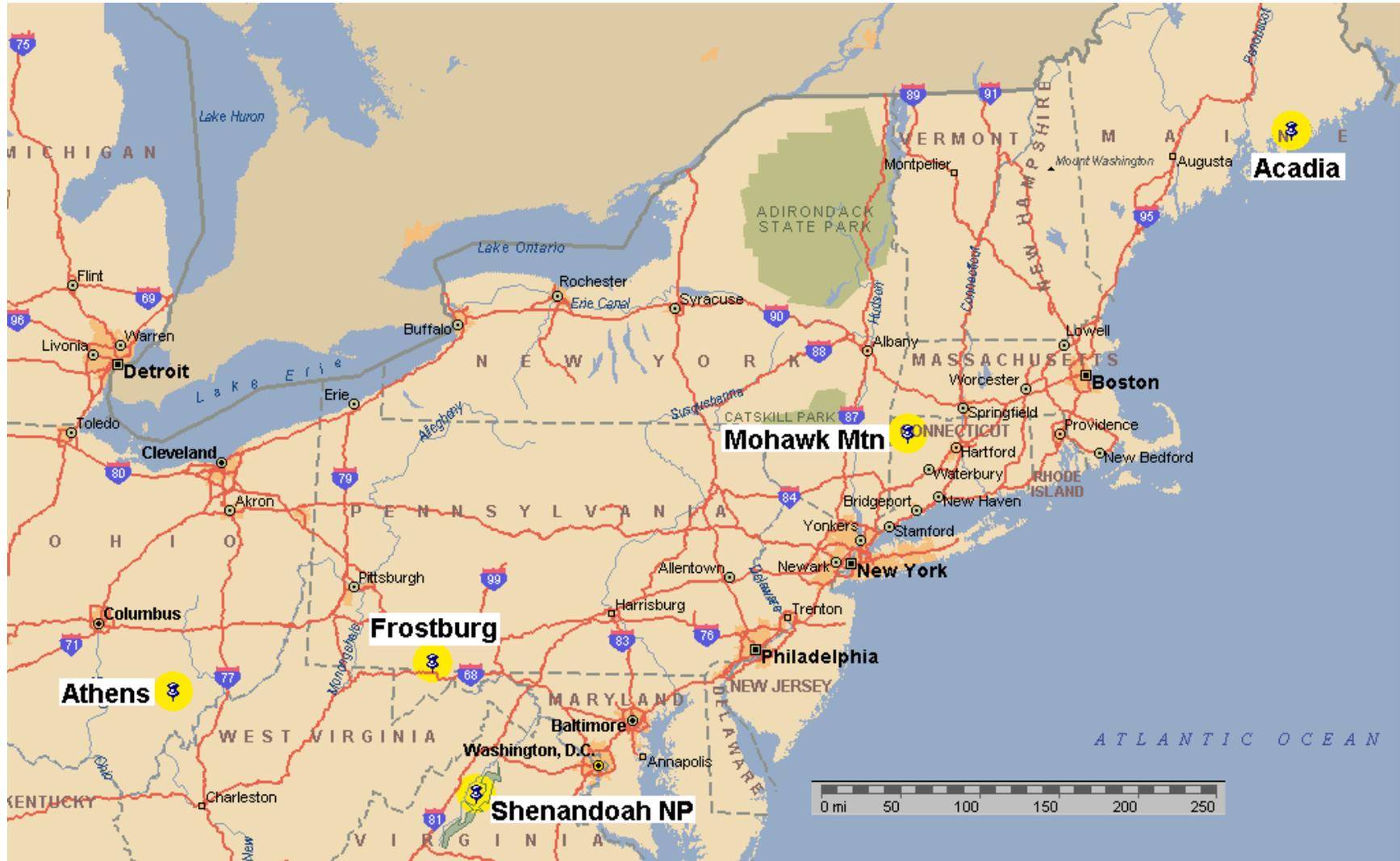
- **Time Line:**

- Site infrastructure in place Summer/Fall 2003
- Phase-in of intensive monitoring methods Fall '03 to Spring '04
- IMPROVE Protocol site for Frostburg: March 2004
- Goal: all methods at 3 sites operational before start of NEAQS/AIRMAP 2004 intensive in June 2004.

- **Planned sites:** (in SW-NE line)

- Near-Source: Frostburg, Western MD (MDE/UMD)  
[in between Dolly Sods and Arendtsville]
- Mid-Source: Mohawk Mtn, northwest CT (CT-DEP)
- Far-Source: Acadia NP - coastal, Class I (ME-DEP/NPS)
- NJ?? either Brigantine or near Delaware Water Gap

# Planned MANE-VU and potential other non-Mane-VU site locations:



[Athens and Shenandoah are only concepts at this time]

- Other Possible “far-source” sites in MANE-VU domain:
  - Pinnacle St. Park, Addison NY (ASRC/NY-DEC)
  - Brigantine NJ - coastal, Class I
  - Underhill VT (Mt. Mansfield), northern VT
  - Whiteface MT (northeast NY)
  - Northern NH: Mt. Washington or Cannon Mt.
  - Pack Monadnock, southern NH (AIRMAP leverage?)
  - AIRMAP site in central NH – Castle Springs
  - Quabbin Reservoir (central MA)
  
- Other potential non-MANE-VU upwind sites:
  - Athens OH (Ohio University) [Quaker City?]
  - Shenandoah NP (existing Big Meadows IMPROVE site)

Nova Scotia: Env. Can. site in Kejimikujik National Park in southern NS

