Northeastern Monitoring Studies:

A Summary of Non-Routine Haze-Relevant Monitoring Activities in the MANE-VU domain

George Allen, NESCAUM

RPO National Technical Workgroup Meeting
St. Louis, MO  November 4, 2003
3 Major Categories of recent, ongoing, or scheduled projects:

MANE-VU sponsored and/or coordinated
  Winter Balloon Boundary Layer Characterization
  Rural, High-Elevation Intensive Aerosol Monitoring Network
  CAMNET (expansion, makeover)
  SIRD database expansion/linkage

AIRMAP/NEAQS (UNH/NOAA)
  Ongoing NH AIRMAP measurements
  Intensive Summer NEAQS 2004

NESCAUM: SOAP
  In-progress organic aerosol speciation (NY metro area)
Winter Balloon Boundary Layer Characterization

MANE-VU Sponsored Pilot, January 2004:
  Rich Clark, Millersville University  (NEOPS participant)

Characterize winter boundary layer up to 1 KM with tethered balloons
  Both stationary AND profile modes, simultaneously

Profile:  gives vertical detail on met and aerosol # and scattering (d^0 & d^3)
  TSI 3007 CPC and DustTrak on profile AND on ground
  Tells where to go with stationary platform

Stationary:  aerosol sample (PM2.5 on Teflon filter)
  for later chemical analysis
  ==> Sulfate!  PM2.5!
  On both stationary balloon and at ground level
  Many other measurements (gases, BC) on ground
Where? Millersville PA NADP/MDN site:
Looking for Leverage...

Small Aircraft, Lidar (PSU?), Profiler, etc.
PM/Haze Rural “Transport Supersites” in MANE-VU domain

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

[Athens and Shenandoah are only concepts at this time]
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] PM2.5
  - Surface Met [wind, temp, RH, rain, ?]
  - IMPROVE or 'IMPROVE protocol' measurements for carbon, ions and PM2.5; STN? FRM?
  - HazeCam in the general area

- MANE-VU and/or other funding sources (103 $?) would add:
  - Continuous SO4 (HSPH/TEI method)
  - Hourly EC/OC/BC w/ OP (Sunset Lab NDIR method)
  - NGN-2 (wet) nephelometer and trace SO2 (as needed)
  - Wish-List items
Wish List

- The following measurements are desirable but not essential:
  - NGN-3 dry PM2.5-cut neph
  - NO/NOy, trace level CO, O3
  - 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) NH3, HNO3, strong H+, SO4=, and NO3-
    using denuder/filter-pack methods (HEADS); Calculate NH4+
- **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

- **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
• 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 Kejimkujik National Park in southern NS
CAMNET Update

www.hazecam.net -- Soon to expand from 6 sites to 11 or more:

By next summer:
  Baltimore and Frostburg (western MD)
  Moosehorn NWR and Presque Isle ME
  Mohawk Mt., NW CT

Possible new sites:
  Blue Hill (Boston - 600 feet) – Mt. Washington 140 miles
  Martha’s Vineyard [??]

Site needs redesign - first of many ARS-run visi-cam sites
  [MW and SE camnets, Forest Service fsvisimages.com, others]
Learn (and steal!) from more recent site designs...
SIRD - June 2001 to Dec 2002 National Data Warehouse

EPA Supersites Program and related studies – “everything” nationwide
  UMD-Ondov
  MANE-VU 2002 base year dataset

http://supersitesdata.umd.edu

Current status: active later this week with EPA Supersites data
  Other data to follow later this month
  Submit your data if it’s not already in!
    To: Don Ondov dondov@patmedia.net

Potential linkage with DOE/NETL (Kevin Crist Ohio U.) Web data tools
good leverage but not in original scope of work...
AIRMAP / NEAQS

Two related programs out of UNH/NOAA:

AIRMAP is ongoing work
  focus more on ozone than PM or haze
  3-4 sites in NH
  http://airmap.unh.edu

NEAQS is a 2004 summer intensive
  very haze relevant
  transport focus, eastern US domain
  www.al.noaa.gov/neaqs/
NOAA Platforms and Facilities

NOAA WP-3D Lockheed Orion

Research Vessel Ronald H. Brown

Remote Sensing

Aircraft

Profilers & Lidar Network
Intercontinental Transport Of Ozone and Precursors (ITOP)

University of East Anglia, University of Leeds, University of Leicester, University of Cambridge, University of Reading, University of Manchester
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More details on NEAQS program elements

Online at:
ftp://gust.sr.unh.edu/pub/submissions/airmap/2004_planning

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2. Any data, plots or model results unpublished can not be displayed publicly or quoted without authors permission since some of it may be preliminary
Speciation of Organics for Apportionment of PM$_{2.5}$ in the New York City Metropolitan Area (SOAP)

PIs: McDow & Mazurek

Four Sites: Chester, Elizabeth, Queens, Westport

Collocated with STN

Sample collection 1 in 3 June 2002-May 2003

Special attention to blanks

Filter extraction to begin 11/03

Composites: 10 total composites, Seasonal (4 from all sites), 5 other seasonal composites, Precision composite (also a fall 3-site comp), Quebec Fire filter (3 sites)