Update on the NESCAUM Review and Assessment of the PAMS Network

(again)

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Presented at the NESCAUM APC meeting, September 21, 2010

The Issue:

Old Questions, new context.

Q: [How] do we use PAMS data; What can we do better?
        Not new Questions... Never get answered well.

Motivation for this effort: A _Dramatically_ New Context

MUCH has changed since the early 1990's
    NAAQS levels and forms
        125-ppb 1-h to presumably 70-ppb 8-h; 2ndary Std?
        longer PAMS season?
    NOx and VOC emissions trend downward
    What we can measure - new technologies

Background of the current review process

Early this year: Topic came up in informal discussions (Feb. AD Mtg)
anticipating large ozone NAAQS changes this fall

March: Charge to Nescaum Committees (APC and MAC)
        to review/assess PAMS in our domain
          ftp://airbeat.org/PAMS/PAMS-charge-2010-March17-draft.pdf

April: MAC call to discuss PAMS monitoring issues;
         Discussions with APC; Develop initial ideas
          ftp://airbeat.org/PAMS/PAMS-mac-15apr-call-summary.pdf

May: Update to Air Directors outlining the review process
          ftp://airbeat.org/PAMS /PAMS-Update-NESC-Dirs-Mtg-final-2010May.pdf

July: Joint MAC-APC call to focus questions
          ftp://airbeat.org/PAMS/7July-PAMS-call-notes_Rev15July.pdf

Aug.:   Two sub-group calls:
          Target species/measurement issues
          Data analysis
          ftp://airbeat.org/PAMS/PamsWG-23Aug-TargetSpecies-CallSummary.pdf
          ftp://airbeat.org/PAMS/PamsWG-24Aug-DataAnalysis-CallSummary.pdf

Sept: Joint APC/MAC call - followup of sub-group calls
          ftp://airbeat.org/PAMS/Nescaum-PamsWGcall_14sept10.pdf
          includes draft species lists

End of October: Summary to Air Directors

Nov. 3?   Final "revised" O3 NAAQS rule announced
          Proposed O3 implementation rule announced

All related background material for this review process is at:
    ftp://airbeat.org/PAMS/
    Literature, old reports, meeting summaries, etc.

Summary of results to date

Network design (siting):

    Discussion on hold for now...

    -- waiting for implementation rule info (November?)
        "New PAMS areas may be created depending on final level
        and classification approach selected"
        ftp://airbeat.org/PAMS/PAMS-EPA-Update_Weinstock.pdf [EPA, April 2010]

    -- Program Funding implications?

EPA has been ignoring and underfunding PAMS for a long time
    Will that change with a much tighter O3 NAAQS?
    EPA-OAQPS PAMS review process starting this fall (Cavender)

Measurements and Target Species:

Need to update old equipment/methods ($$)
    more reliable, more relevant species (biogenics)
    very limited EPA hardware $ (700k/y nationally)

Develop more focused list(s) of species for data analysis
    -- Subset of current 56 HAPS (~25?)
        shorter list is better if it works as well for models
    -- Relevant to O3 (MIR, abundance)
        also air toxics (for urban sites)
    -- Measured well over a wide range of sites
    -- Current status: still under development
        Multiple lists going forward

Core Species list is dependant on measurement method
    Newer methods can measure more/better (toxics, biogenics)
    Carbonyls measurement method[s] still unresolved

O3 Event Carbonyl intensive (3-hour) measurements:
   Should we continue? Not required. How used?
      R2 does not do; R1 did not do this year

PAMS carbonyls:
   Important for both O3 and air toxics (aldehydes)
   Currently 3rd day, summer only; data quality??
   Not from PAMS Auto-GC - separate method

Year-round Urban PAMS sites?
   Longer PAMS season?
   Add air toxics program relevant species
      Leverage air toxics pgm funding?

Data Analysis:

Spatial Scale -- OTC domain, NE urban corridor

Limited routine use - mostly VOC trends analysis

Occasionally used in models to check concepts and consistency

Emission inventories are a weak spot for models

Models can not do trends - too many changes over the years
    CB-4, CB-5, Moves

More biogenic species/data needed for models
    Anthropogenic VOCs trending down

Gopal's summary highlights many needs:
ftp://airbeat.org/PAMS/Gopal-PAMS-measurements-OTCdomain-draft-8sept10.pdf

<u>Exploratory Analysis by Tom Downs (ME-DEP):</u>

1997-2009 data, all NESCAUM PAMS sites
    3-month PAMS season only
    Focus on 6-9 am (source) and 3-6 pm (receptor) EDT periods
    Ratios, trends, % missing PAMS HC

Completed for all 19 sites; data and analysis results at:
http://www.maine.gov/dep/ftp/DEP_PAMS/NESCAUM_PAMS_DATA/
and
http://www.maine.gov/dep/ftp/DEP_PAMS/NESCAUM_PAMS_ANALYSES/

Some caveats for data screening / missingness

Encourage State staff to review data and analysis for their sites
    Tom welcomes feedback on any aspect of this effort

This "internal" analysis / data review could be an ongoing process
    Extend south to DC/VA? OTC coordination?

Other Regional Analysis Topics

Outsourced (if funds available)?
Handed off to EPA internally or externally?
    ($140k/year nationally off the top):

Event and/or Trend analysis for O3 and VOCs
    include control for seasonal met and transport wind patterns

Review core science in NAS 1991 "Rethinking the O3 problem"
document: did we get any answers yet?
ftp://airbeat.org/PAMS/Rethinking_the_Ozone_Problem_in_Urban_and_Regional_Air_Pollut
ion_NAS1992.pdf

Are VOCs more of a transport or local issue now - or both?
    VOCs mixing with urban NOx, reacting and transporting?

NOx dis-benefits as mobile and stationary source controls kick in?

<u>Upper Air Met: do we still need it?</u>

Probably. WRF/MM5 good model input, but need some validation.

Limited sites in NE (MA and NJ); 2 in MD, nothing upwind:
http://madis-data.noaa.gov/cap/profiler.jsp?view=neus

Existing systems in NE are very very old
    -- funding for (expensive) maintenance is tenuous

Consider new approach - new methods (ceilometer lidar?)
    Cheaper, more reliable, "good enough" data
    Funding not in the pipeline

Example of rural total NMOC 1995-2008 (Source: EPA-R1)

Average 1-hour measurements of TNMOC (ppbC) recorded at four New England Type 3 and 4 PAMS sites during the summer months (June, July, and August) for the period 1995 through 2008.

$$y = -1.3649x + 2755.6$$