NATIONAL ATMOSPHERIC DEPOSITION PROGRAM
Preserving/Growing Long-term Monitoring

NATIONAL ATMOSPHERIC DEPOSITION PROGRAM
A Cooperative Research Support Program of the State Agricultural Experiment Stations (NRSP-3)
Federal and State Agencies
and Private Research Organizations

Van Bowersox

NTN Sites - 31 March 2005

NTN Sites - 31 March 2005

NTN Sites - 31 March 2005

NTN Sites - 31 March 2005

NTN Sites - 31 March 2005

255 sites + 3 “precision” sites

National Atmospheric Deposition Program
National Trends Network

Closed Sites

- IL19 – Argonne NL (DOE)
  Mar 80 – Sep 04
  CASTNet Site continues
- HI99 – HI Volcanoes NP (NPS)
  Nov 00 – Feb 05
- MN05 – Fond du Lac (Tribe/EPA R5)
  Nov 96 – Mar 05
- WI97 – Lac Courtes Oreilles (Tribe/EPA R5)
  Nov 01 – Mar 05

42 MDN/NTN co-located sites

NADP/NTN Sites
Land Grant Universities

49 sites at agricultural experiment stations

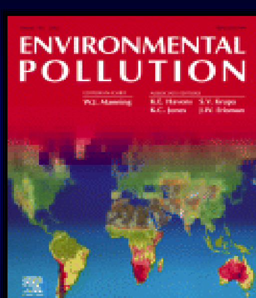
NADP/NTN Sites
Land Grant Universities

16 (5 confirmed) sites Hatch-sponsored

The NADP Vision

- Remain one of the nation's premier research support projects
- Serve scientists and educators

11 papers
from the
2003 Meeting
Volume 135 (3)
June 2005



Volume 135 (3). June 2005.

Editorial

The National Atmospheric Deposition Program:
25 years of monitoring in support of science and policy
An ammonia workshop: the state of science and future needs
James A. Lynch
Pennsylvania State University
Margaret Kerchner
NOAA Chesapeake Bay Office

Volume 135 (3). June 2005.

Trends

Spatial and temporal trends of precipitation chemistry in the United States, 1985–2002
Christopher M.B. Lehmann & Van C. Bowersox, NADP, ISWS
Susan M. Larson, University of Illinois

Trends in atmospheric ammonium concentrations in relation to atmospheric sulfate and local agriculture
Victoria R. Kelly, Gary M. Lovett, Kathleen C. Weathers and Gene E. Likens, Institute of Ecosystem Studies

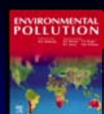
Nonlinear regression and ARIMA models for precipitation chemistry in East Central Florida from 1978 to 1997
David M. Nickerson and Brooks C. Madsen, University of Central Florida

Volume 135 (3). June 2005.

NH_3 Emissions & Deposition In Europe

Overview and assessment of techniques to measure ammonia emissions from animal houses: the case of the Netherlands
J. Mosquera and G.J. Monteny
Wageningen UR, Agrotechnology and Food Innovations, Netherlands
J.W. Erisman
Energy Research Centre of the Netherlands

Measuring ammonia emissions from land applied manure: an intercomparison of commonly used samplers and techniques
T.H. Misselbrook and R.A. Johnson
Institute of Grassland and Environmental Research, UK
F.A. Nicholson and B.J. Chambers
ADAS Gleadthorpe, UK



Volume 135 (3). June 2005.

Managing NH_3 Emissions

Managing ammonia emissions from livestock production in Europe
J. Webb
ADAS Research, UK
H. Menzi
Swiss College of Agriculture, Switzerland
B.F. Pain and T.H. Misselbrook
Institute of Grassland and Environmental Research, UK
U. Dämmgen
Institute of Agroecology, Germany
H. Hendriks
Ministry of Agriculture, Nature and Food Quality, The Netherlands
H. Döhler
KTBL, Germany

Volume 135 (3). June 2005.

Deposition Inputs to Coastal Waters

Atmospheric nitrogen inputs to the Delaware Inland Bays: the role of ammonia
Joseph R. Scudlark, Karen B. Savidge, and William J. Ullman
University of Delaware
Jennifer A. Jennings
Department of Natural Resources and Environmental Control, DE
Megan J. Roadman
Bermuda Biological Station for Research

Improved daily precipitation nitrate and ammonium concentration models for the Chesapeake Bay Watershed
J.W. Grimm and J.A. Lynch
Pennsylvania State University

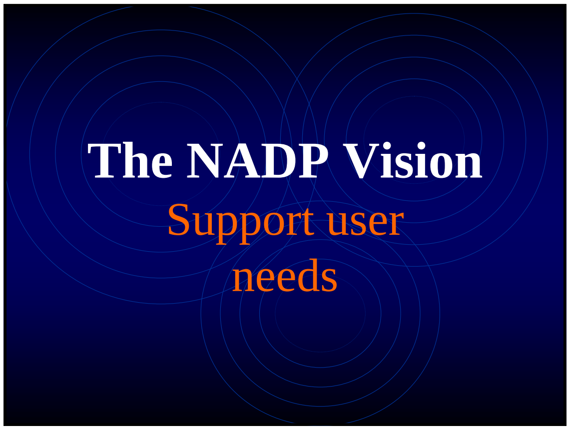
The NADP Vision

- Remain one of the nation's premier research support projects
- Serve scientists and educators
- Support informed decisions on air quality issues related to precipitation chemistry
- **Respond to emerging issues**

Threats to air, water, and food :

Biohazard

- *Soybean Rust*
- *Wheat Rust*


The NADP Vision
Support user
needs

Quality Management Report

Christopher Lehmann,
NADP QA Manager

NADP Interim Subcommittee Meeting
April 2005

Status Report on QA Activities

- Response to 2004 Quality Systems Review
- Laboratory Operations
- Field Operations

Response to July 2004 Quality Systems Review

- Reviews occur every 3 years. This was the first review.
- Purpose of review:
  - Ensures that NADP activities comply with the NADP Quality Management Plan.
  - Ensure that the NADP's Quality System is documented and fully implemented.
  - Ensures that NADP data is of sufficient quality to meet Data Quality Objectives (DQOs).

Review Details

- Review team:
  - Terry Schertz, USGS
  - Richard Grant, Purdue University
  - Martin Risch, USGS
- Review occurred on July 14-15 at NADP Program Office in Champaign, IL
- Review team's report presented at Fall 2004 NADP meeting

Review Findings and Response

- QMP was deemed adequate and "thorough in scope." Additional QA documents in preparation.
- Revised network QA Plan (completed draft by Spring 2006)
- Complete data management SOPs (completed in 2005)
- HAL QA Plan (draft complete)

Findings and Response, cont.

- "The typical approach is to keep adding requirements and details in the documentation, but the danger is that it will become too unwieldy to be useful. The difference will be critical to keeping the QMP in a role of supporting the work of NADP instead of eventually becoming more work than it is worth."
  - QA programs support NADP science

Findings and Response, cont.

- Procedures needed for phasing in new field equipment and evaluating changes in data quality for data users
  - Final decision on field equipment has not been made.
  - QAAG will assist in evaluating changes in data quality

Findings and Response, cont.

Development of Data Quality Objectives (DQOs)

- "If a DQO is established, there should be a reason why it must be met by NADP and a corrective action plan if it is not met.
- Given the wide ranging end-user objectives for the NADP data, the more appropriate approach may be to use available QC data to estimate the variability in the results and provide that information to the users.
  - The review team could not find a compelling reason for the NADP to do more than quantify the quality of the data.
  - That information would be a valuable addition to the available datasets and of great value to the data users.
- If the quality of the data is shifting significantly over time, then some corrective actions may be required, but the existing external QC programs have not indicated any such problem."

Findings and Response, cont.

- Data quality will be assessed and communicated in a format that meets needs of data users
- Benchmarks set to evaluate trends in data quality over time

Review Findings and Response

- Draft response reviewed by QAAG, recommend to Executive Committee that report be approved

Status of QA Activities: Laboratory Operations

- External review of HAL conducted in June 2003
  - HAL response approved by NOS/DMAS
  - HAL 1-yr followup report received, approved at Fall 2004 NADP meeting.
- CAL review should occur in Fall 2005
  - Same format as 2003 HAL Review
    - 2 reviewers of analytical operations
    - 2 reviewers of data management operations
    - Team leader
    - QA Manager

Status of QA Activities: Field Operations

- USGS External Quality Assurance Programs
  - Sample Handling Evaluation (SHE) Program and Intersite Comparison in NTN ended in 2004
  - System Blank Program in the MDN expanded to all sites in 2004
  - Field Audit Program in the NTN expands to all sites in 2005
  - 3 "long-term" collocated sites established as of October 2004

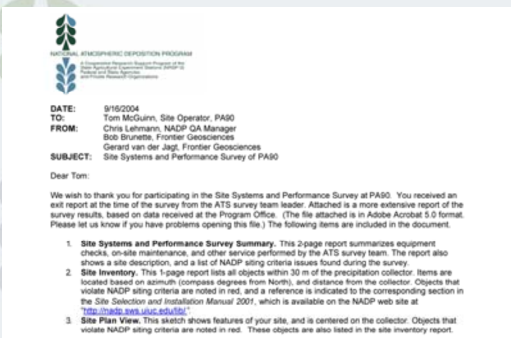
Status of QA Activities: Field Operations, cont.

- U.S. EPA-supported Site Systems and Performance Surveys
  - 2004 reports issued through October (102 surveys conducted/77 reports issued)
  - 2005 reports received through February

Site Remedial Actions

1. Survey data received at Program Office
2. Site plan view prepared/updated
3. Survey data verified, site survey summary report issued to site operator, supervisor, and funding agency (goal: 3 months after receiving data)
4. Report responses documented (~2 months after report sent)
5. Site plan view, siting criteria posted to NADP web site (~6 months after survey)
6. All actions documented in database

Site Survey Summary Report



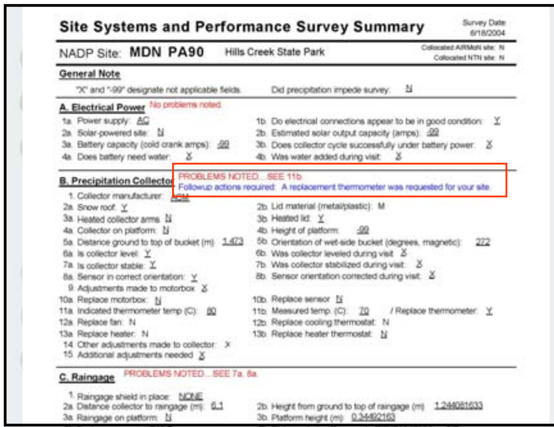
NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

DATE: 9/16/2004
TO: Tom McGuinn, Site Operator, PA90
FROM: Chris Lehmann, NADP QA Manager
Bob Brunette, Frontier Geosciences
Gerard van der Jagt, Frontier Geosciences
SUBJECT: Site Systems and Performance Survey of PA90

Dear Tom:

We wish to thank you for participating in the Site Systems and Performance Survey at PA90. You received an exit report at the time of the survey from the ATS survey team leader. Attached is a more extensive report of the survey results, based on data received at the Program Office. (The file attached is in Adobe Acrobat 5.0 format. Please let us know if you have problems opening this file.) The following items are included in the document.

1. **Site Systems and Performance Survey Summary.** This 2-page report summarizes equipment checks, on-site maintenance, and other service performed by the ATS survey team. The report also shows a site description, and a list of NADP siting criteria issues found during the survey.
2. **Site Inventory.** This 1-page report lists all objects within 30 m of the precipitation collector. Items are located based on azimuth (compass degrees from North), and distance from the collector. Objects that violate NADP siting criteria are noted in red, and a reference is indicated to the corresponding section in the *Site Selection and Installation Manual 2001*, which is available on the NADP web site at "http://nadp.sws.uiuc.edu/lib/".
3. **Site Plan View.** This sketch shows features of your site, and is centered on the collector. Objects that violate NADP siting criteria are noted in red. These objects are also listed in the site inventory report.



Site Systems and Performance Survey Summary

Survey Date 6/18/2004

NADP Site: **MDN PA90** Hills Creek State Park

Collocated AIRMoN site: N
Collocated NTN site: N

General Note

"X" and "-99" designate not applicable fields. Did precipitation impede survey: N

A. Electrical Power No problems noted.

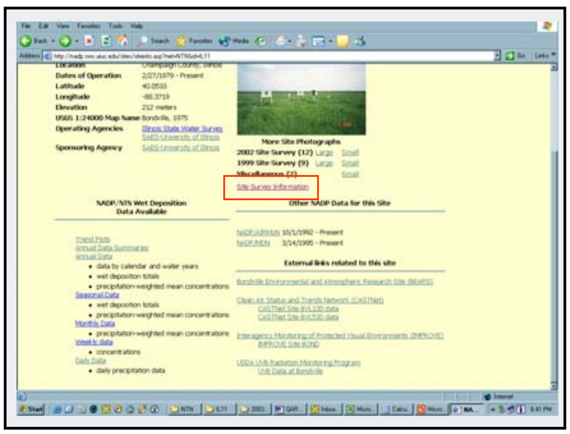
1a. Power supply: AC
1b. Do electrical connections appear to be in good condition: Y
2a. Solar-powered site: N
2b. Estimated solar output capacity (amps): -99
3a. Battery capacity (cold crank amps): -99
3b. Does collector cycle successfully under battery power: X
4a. Does battery need water: X
4b. Was water added during visit: X

B. Precipitation Collector PROBLEMS NOTED…SEE 11b.
Followup actions required: A replacement thermometer was requested for your site.

1. Collector manufacturer: ACM
2a. Snow roof: Y
2b. Lid material (metal/plastic): M
3a. Heated collector arms: N
3b. Heated lid: Y
4a. Collector on platform: N
4b. Height of platform: -99
5a. Distance ground to top of bucket (m): 1.473
5b. Orientation of wet-side bucket (degrees, magnetic): 272
6a. Is collector level: Y
6b. Was collector leveled during visit: X
7a. Is collector stable: Y
7b. Was collector stabilized during visit: X
8a. Sensor in correct orientation: Y
8b. Sensor orientation corrected during visit: X
9. Adjustments made to motorbox: X
10a. Replace motorbox: N
10b. Replace sensor: N
11a. Indicated thermometer temp (C): 80
11b. Measured temp. (C): 70 / Replace thermometer: Y
12a. Replace fan: N
12b. Replace cooling thermostat: N
13a. Replace heater: N
13b. Replace heater thermostat: N
14. Other adjustments made to collector: X
15. Additional adjustments needed: X

C. Raingage PROBLEMS NOTED…SEE 7a. 8a.

1. Raingage shield in place: NONE
2a. Distance collector to raingage (m): 6.1
2b. Height from ground to top of raingage (m): 1.244081633
3a. Raingage on platform: N
3b. Platform height (m): 0.34492163



Followup on Siting Criteria Issues

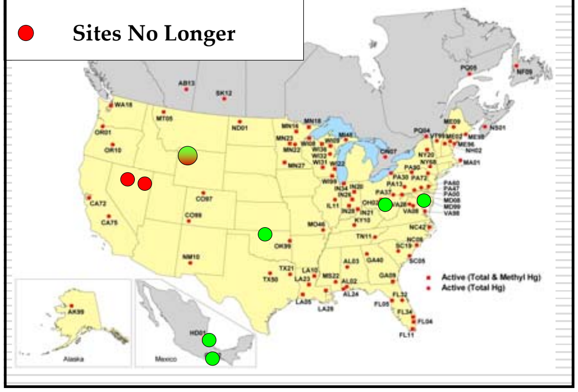
	SummaryReports Issued to Site	Sites Having Siting Criteria Issues	Remedial Actions Reported
2002 Surveys			
NTN	67	49	3
MDN	20	18	0
AIRMoN	3	3	0
Total	**90**	**70**	**3**
2003 Surveys			
NTN	72	53	4
MDN	29	28	1
AIRMoN	3	3	0
Total	**104**	**84**	**5**
2004 Surveys			
NTN	59	32	2
MDN	17	14	0
AIRMoN	1	1	0
Total	**77**	**47**	**2**

Mercury Deposition Network Update

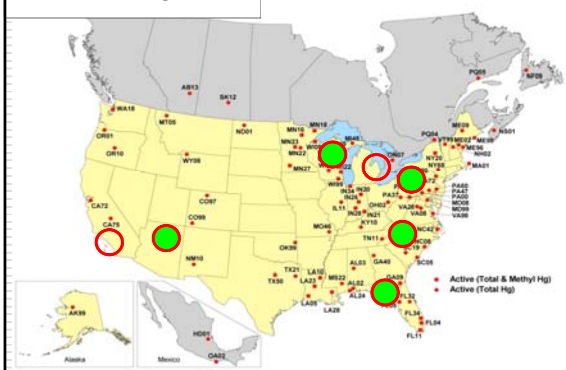
David Gay
Program Office

New Sites Since Fall

Sites No Longer

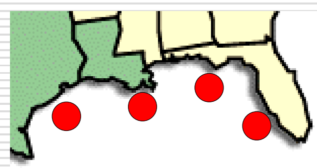


Sites Coming Soon



Some Interesting Possibilities

- USGS wants to add 10 to 15 along rivers
  - Two to three years, starting in MI by October
- EPA, Stennis Space Flight Center



MDN Data

- One data set
  - All stations
  - All years
  - All total Hg observations
  - On the web (nadp.sws.uiuc.edu)
- NEXT is Methyl Mercury (June 1)

MDN News

- MDN also on the EPA's VIEWS data site
  - http://vista.cira.colostate.edu/views/
- B. Larson added time (on and off) to dbase

MDN News

- First MDN Operators Training Class
  - October, 2004
  - In Seattle
  - 12 attendees
  - HAL did an exceptionally good job
  - Next class will be in June, 2005

Anybody know where this is?

MDN News

- New MDN Website coming
  - Have text and graphics ready
  - Paste up/programming coming soon
- Bob Larson has plans to rework NTN, AIRMON and MDN web sites later

A Problem in the past…

- 6 Month Goal for quarterly data on Web
  - 2004 1st Quarter
    - on Web, on time
  - 2004 2nd Quarter
    - on Web
    - About 30 days late (my fault)
  - 3rd Quarter 2004
    - on Web, early (March 5)
- All have arrived from HAL on time
  - 3 months (we have 4th quarter)

Data Holes

- Addressing the gaps
  - From 2 hours to 1 week
- Update
  - 300 gaps identified
  - 35% cleared
    - 50% of these no real gap
  - 30% yet to call or receive information

MDN News

- I think the last data SOP is here in Savannah, in final form, for approval
  - Program Office Data Review SOP
  - Chris Lehmann has reviewed it
  - Going to DMAS today

MDN News

- Brochure


Monitoring Mercury Deposition

An Introduction to the Mercury Deposition Network

MDN News

- $500 Installation Charge
  - Virginia 98
  - Going to WI 10

  - All seem to like it,
  - it is costing the PO about $350 ($850 -$500)
  - Sampler gets put in very fast

A Topic For Discussion…

- Field Inter-comparison of Mercury Measurements
  - Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP).
  - Comparison of wet-deposition methods
  - Across Europe (no other U.S. participation)
  - Event based, for 6 months
  - Cost:
    - $12,000 to $14,000
    - Plus HAL cost of analysis

  - Interested?

Priorities for Next Months

- Goal Setting, HAL and PO, May

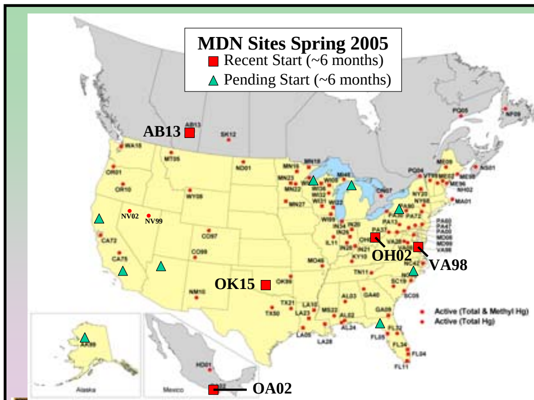
- Probable Priorities
  - Methyl Mercury
    - We are ready to complete
    - Put on web

  - HAL-specific Quality Assurance Project Plan
    - To finalize

NADP MDN HAL Report
Spring Meeting

Savannah, Georgia
April 12-13, 2005

Robert C. Brunette
MDN HAL Director



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www.Frontiergeosciences.com
NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/

Recent MDN Site Start-Ups

- OA02 Puerto Angel – Official 09/21/04 (09/30/03)
- AB13 ATCO Power - 09/28/04
- VA98 Harcum – 12/17/04
- OH02 Athens – Official 01/25/05 (05/0404)
- OK15 Cherokee-Newkirk – 03/01/05

Experimental Sites

- AL-EXP Birmingham – 12/22/04
- FL-EXP Pensacola – 2/08/05
- Puerto Rico – 04/02/05

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Pending New Site Start-Ups

- WI10
- FL14
- NH02
- CA94
- MI05

- N. Carolina
- Pennsylvania
- Maryland
- California
- Arizona
- Georgia
- Kentucky

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MDN Sites In Mexico

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Mexico MDN Sites

- OA02 Puerto Angel –
  - Started: 09/30/03 (Official 09/21/04)
- HD01 Huejetula –
  - Started: 09/30/03 (Official 08/10/04)
- Remote Sites
- Shipping Logistics And Cost – Quarterly
  - Field Sample Bottle Hg Blanks
  - Lab Sample Bottle Hg Spikes

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Potential MDN Site Closures/Restarts

- OR01/OR10 – Funding Issues (Dec 2004)
  - Sites are still operating
  - USGS to hand off funding to ODEQ Spring 05
- NV02/NV99 – Funding Issues (Feb 2005)
  - Potential new funding source
  - Short fall funding through May 05
- AK99 Ambler – Restart (Spring 2005)
  - Loss of site operator in remote region
  - Restart pending training of new site operator

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MDN Site Moves

- MDN site moved from WY07 to WY08
- Yellowstone National Park
- November 21-22, 2004
- New MDN Site Collocated with NTN
- HAL/PO Moved Site

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MDN Site Move –WY07 Yellowstone National Park

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MDN Site Move –WY07 Yellowstone National Park

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MDN Site WY08

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HAL Capacity And Preparation For Network Growth

- HAL Total Hg Wet Dep Samples To Date: ~27,000
- HAL Methyl Hg Wet Dep Samples To Date: ~ 2,000
- HAL Annual THg Analytical Load ~ 5000 Samples/Year
- HAL Analytical Capacity – 1800 Sample/Month (21K/Year)
- Currently - 6.0 FTE Dedicated MDN HAL
- 5 Additional Frontier Staff Trained In Support Positions
- Purchased Supplies To Support 10 New MDN Sites

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MDN HAL Staff Update

- **New Hire: Jason Karlstrom**

  MDN Research Assistant

  University Of Washington MDN: 02/08/05

  B.S. Cellular/Molecular Biology

- **Position Change: Nicholas McMillan**

  MDN Site Support Coordinator

  Full Time: 05/01/05

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MDN HAL Data Base Update

- MMHg Data Base Merged W/Total Hg DB:

  > Incorporated Into MDN Total Hg DB - 2002
  > Quality Code System Incorporated - 2002
  > MMHg Data Follows All Aspects Of THg Data
  > All MMHg Data Posted On MDN Download Site
  > MMHg Data Will Be Reported Quarterly w/THg

- Trace Metals Data Base – June 2005

  To be integrated into MDN THg and MMHg DB

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HAL Data Base Updates

Duplicate Data Entry Of Lab Data Sheets

- Microsoft Access Lab Data Sheet Format
- Utilizes Same Double Data Entry As MDN DB
- Total Hg Analysis Lab Data Sheet DDE: Jan 05
- Methyl Hg Analysis Lab Data Sheet DDE: Jan 05

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MDN Hg Data Delivery Schedule

MDN 4th Quarter 2004 (Total and MMHg Data):

- Preliminary Data to Operators: March 7, 2005
- Preliminary Data to Site Sponsors: March 7, 2005
- End Of Sponsor Review Period: March 21, 2005
- HAL Transmit DB to PO: March 25, 2005

MDN 1st Quarter 2005 (Total and MMHg Data):

- Preliminary Data to Operators: April 29, 2005
- Preliminary Data to Site Sponsors: April 29, 2005
- End Of Sponsor Review Period: May 14, 2005
- HAL Transmit DB to PO: May 14, 2005

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MDN Field QA Studies

- **MDN Ground vs. FAMS - FL34 – Ended Nov 04**

  FAMS Tower Based Vs. Ground Based MDN ACM

- **MDN Collocated ACM Study – WI08**
- **MDN Collocated ACM vs. MICB – WI31**
- **Collocated MDN Intercomparison – Mid 2005**
  - ACM
  - NCONN
  - MDN

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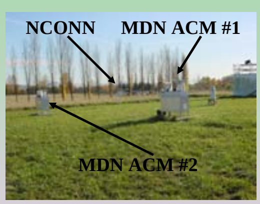
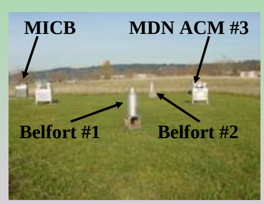
HAL/PO Collocated Intercomparison

NOAA Sand Point, Washington (WA18)





- 3 MDN ACMS
- 1 NCONN
- 1 MICB
- 2 Belfort Rain Gauge

- Stick Gauge
- Gas Phase Hg (7 Day)
- Particulate Phase Hg (7 Day)

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http://nadp.sws.uiuc.edu/mdn/

USGS MDN External Audit Program

- External Laboratory PE Sample Program
  - Single Blind
  - Implemented Nov-Dec 2003
- External System Blank Program
  - Single Blind
  - Implemented Nov-Dec 2003
- HAL To Continue 3 Lab Rainwater Comparison

HAL/PO Meeting – Jan 2005

- Follow-Up To Halifax, Fall 2005
- Finalize/Resolve HAL/PO MDN Audit Items
  - MMHg Data Coding
  - HAL Manual QA Coding SOP
  - HAL MDN QAPP
  - Maintenance On MDN ACM Collectors
  - HAL Network Equipment Depot
  - Belfort Rain Gauge – Replacement and Calibration
  - MDN Marketing
  - MDN Calculations

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MDN HAL 2003 Audit – Progress Report

- ***93%*** of HAL Audit Items ***"Resolved"***
- ***7%*** are ***"In Progress"***
  - Draft HAL MDN QAPP –04/05
  - Draft/Revised MDN Instruction Manual – 04/05
  - Revised Annual QA Report – 04/05
  - HAL DB User Manual – 06/05
  - Description Of HAL IT Procedures – 06/05

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HAL Site Operator Training Course

- **HAL Training Course: October 13, 2004**
  - Seattle, Washington
  - 2 Day Course
  - 11 MDN Site Operators Attended
  - Class and Field Instruction @ NOAA Sand Point (WA18)
- **HAL Training Course: Sept 14, 2005**
  - Seattle, Washington
  - 2 Day Course
  - Class and Field Instructions @ NOAA Sand Point (WA18)
  - Announcement May 2005

Frontier Geosciences Inc – NADP MDN HAL
www.Frontiergeosciences.com
NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/

MDN Network Equipment Depot

Parts Replaced In The Last 6 Months

Motorbox…….. 12 (13%)
Rain Sensor….. 11 (12%)
E. Recorders…. 1 (1%)
Clocks………... 3 (3%)
Belfort………... 1 (1%)

Frontier Geosciences Inc – NADP MDN HAL
www.Frontiergeosciences.com
NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/

HAL/PO Trace Metals Initiative

Trace Metals (In addition to Mercury):

- Increasing number of MDN and Non MDN sponsor interest.
- HAL redesigned the ACM in order to utilize the second chimney.
- HAL designed a trace metals sample train adapted to MDN ACM
- 2003 – Digital SOPs For MDN ACM Conversion & Field Ops
- Continuing Research W/ ICP-MS-DRC and HG-AFS
- Initiative To Include TM As Part Of MDN
- Publication or Paper To Support TM White Paper

Frontier Geosciences Inc – NADP MDN HAL
www.Frontiergeosciences.com
NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/

MDN Trace Metals Initiative

MDN Trace Metals Study Sites: 1997 - 2005

Trace Metals Studies And Elements

MDN Site ID	Dates	Metals	MDN Sponsor
WA18	1997-2005	As, Ag, Be, Cd, Cr, Cu, Mg, Mn, Ni, Pb, Se, Tl, V,	Frontier (HAL)
MN16, MN18, MN23, MN27	1999-2000	MDN ACM Mod & Trace Metal Sample Trains	MPCA
CA72, SJ02, MZ03	1999-2000	Cr, Ni, Cu, Cd	SFEI
IN20, IN21, IN28	2000-2001	As, Be, Cd, Cr, Mg, Mn, Ni, Pb, Se	Indiana USGS
PA13, PA30	2001-2003	As, Cd, Cr, Cu, Mn, Ni, Pb, Se, Zn	PSU
PA13, PA30, PA60, PA90	2003-2005	As, Cd, Cr, Cu, Mn, Ni, Pb, Se, Zn	PSU
ME96	2001-2004	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	US EPA
IL11	2000-2001	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	ISWS
VA08, VA28	2005	MDN ACM Mod & Trace Metal Sample Trains	VA USGS
LA05, LA10, LA23, LA28	2005	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	LA DEQ
NM10	2002-2003	MDN ACM Mod & Trace Metal Sample Trains	UNM

Trace Metals Production Method

	HAL (Frontier) - Trace Metals MDL and Reporting Limits (RL)					Per Sample Conc. Range	Typical Industry MDL and RL			
Element	GF-AAS MDL (ng/L)	HG-AFS MDL (ng/L)	ICP-MS MDL (ng/L)	ICP-DRC-MS MDL (ng/L)	ICP-DRC-MS RL (ng/L)	Of Trace Metals Measured in Rainwater (ng/L)	ICP-A/OES MDL (ng/L)	ICP-MS MDL (ng/L)	ICP-MS RL (ng/L)	HAL RL Lower Than Industry
Cd	-	-	6	3	10	10-330	300	9	200	20 x lower
Cr	50	-	58	6	10	10-374	2000	43	500	50 x lower
Cu	350	-	23	16	50	50-2668	400	140	500	10 x lower
Fe	-	-	7900	383	500	-	5900	3677	20000	40 x lower
Mg	-	-	610	484	500	-	14400	497	20000	40 x lower
Mn	-	-	47	13	20	20-8270	400	30	500	25 x lower
Ni	990	-	15	9	20	20-502	1200	74	500	25 x lower
Pb	250	-	15	7	10	10-1389	1400	190	1000	100 x lower
Se	-	31	150	15	30	30-429	6700	94	500	16 x lower
V	-	-	60	16	30	-	400	29	200	7 x lower
Zn	130	-	35	38	100	97-5414	2300	1679	4000	40 x lower
Co	-	-	9	3	20	-	300	8	200	10 x lower
As	-	33	110	9	30	20-343	1800	218	500	17 x lower

GF-AA = Graphite Furnace - Atomic Absorption Spectrometry
HG-AFS = Hydride Generation - Atomic Fluorescence Spectrometry
ICP-MS = Inductively Coupled Plasma - Mass Spectrometry
ICP-DRC-MS = Inductively Coupled Plasma - Direct Reaction Chamber - Mass Spectrometry
ICP-OES = Inductively Coupled Plasma - Optical Emission Spectrometry
ICP-AES = Inductively Coupled Plasma - Atomic Emission Spectrometry

- One Digestion And Analysis For All Metals
- Capable Of Measuring Se and As
- Reporting Limits 7-100 times lower than ICP-A/OES

HAL Trace Metals Publication

"Using Direct Reaction Chamber Cell Technology To Determine The Full Suite Of Metals In Rainwater"

- Spectroscopy: Jan 2005
- Gurleyuk, Brunette, Howard, Scheider, Thomas…

Publications

"Transformations, Air Transport, and Human Impact Of Arsenic from Poultry Litter"
- Environmental Forensics: Nov 2004
- O'Connor, Irgolic, Sabrsula, Gurleyuk, Brunette….

"Using DR Cell Technology To Determine the Full Suite Of Elements in Rainwater"
- Spectroscopy: Jan 2005
- Gurleyuk, Brunette, Howard, Scheider, Thomas…

"Wet Deposition Of Mercury In the U.S. And Canada, 1996 to 2003: Results From The NADP Mercury Deposition Network"
- Manuscript pending submission
- Sweet, Prestbo, Gay, Brunette

"Estimated Variability Of NADP/MDN Measurements Using Collocated Samplers"
- Manuscript pending submission
- Weatherbee, Gay, Brunette, Prestbo, Sweet

Central Analytical Laboratory (CAL) Report
April 2005

Site Operations

\# of Sites

NTN: 258 active sites (includes 3 collocated sites 03AZ, 98WI, 99VT)

- Since Sept 04:
- New: 03AZ , 99VT ,98WI
- Closed: 07NM, 22TX, HI99, IL19,MN05, WI97
- First decline since 1996 (99%)

AIRMoN: 8 active sites

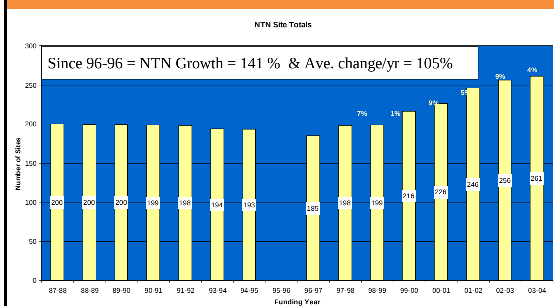
- down from 10 in 2002

\# Samples

1200-1300 samples/month

- site supplies (~300 of each cleaned and prepared for shipment every week)

NTN Growth



Site Operations (cont)

Protocol changes (details in NOS)

- NTN: 1st year with NO NTN Field Chemistry, ended 1-1-2005
  - New protocols, new FORFs, monthly field printouts
  - Sites continuing field chemistry requesting solutions

2005 Field Operations Training Course: May 3-5, 2005

- no field chemistry training; increased time for field equipment training VOM included
- 1.5 days plus welcome mixer
- enrollment reduced to 15 attendees to accommodate budget constraints and test new format

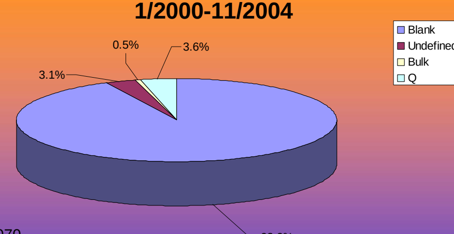
2006 CALendar in planning; pictures and descriptions requested

Shipping protocol changes—4-in-1 (details in NOS)

- now ~62% of network; 100% by Dec. 2005

CAL Site Liaison- New hire in 2005

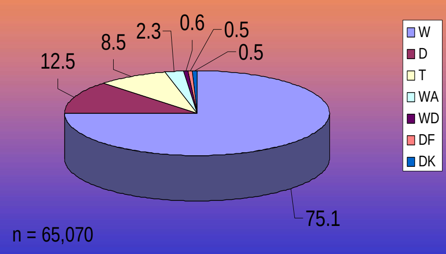
NTN SP Codes
1/2000-11/2004



n =65,070

Year	2000	2001	2002	2003	2004 (thru Nov.)
B	0.3 %	0.2 %	0.4 %	0.6%	0.8%
U	3.1%	2.6 %	3.3 %	3.4 %	3.0 %
Q	3.9%	4.0%	3.7%	3.5%	2.9%
None	92.7 %	93.2 %	92.6 %	92.4 %	93.3%
Total	12,157	12,560	13,425	13,700	13,228 (~14,430/yr)

NTN Sample Types (%)
1/2000-11/2004



Lab Operations

Analytical sample load = 14,000++ analyses/year plus lab QA

Critical need for efficient procedures, cross-training at all levels, and analytical instrument and computer systems redundancy and backup

Equipment updates

On-track for updating aging equipment, provide for backup instruments, and provide for research capability

•New IC (sulfate, nitrate, chloride) coming on-line mid year

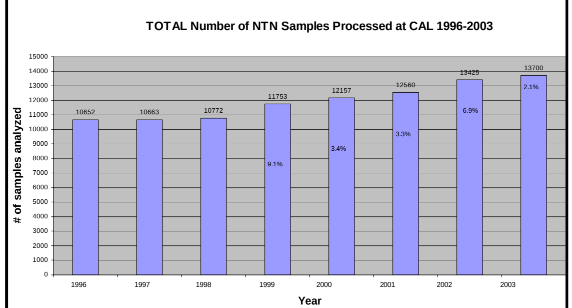
CAL will follow a protocol similar to AAS-ICP evaluation; details at NOS

Critical need:

•New bucket, lid, bottle washer next major purchase in 2005

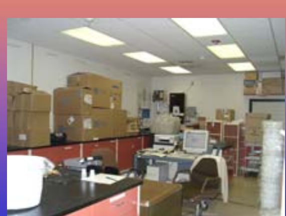
•Facility redesign cost for sample supply washer in 2005

Lab Operations



Lab Operations

- New ISWS building construction
  - will provide much needed shipping and receiving space in 2005
  - Disruptions in 2004-5
  - Temporary quarters until Oct. 2005?



Lab Operations (con't)

June 2004—Dionex Ion Chromatography system purchased to replace 10 year old Dionex 500 systems for nitrate, sulfate, & chloride

Dionex 500 systems ~ 10 yrs old

Will be back-up & research instrument

Dionex ICS 2000, Reagent-free IC

Hydroxide chemistry will improve signal to noise & chloride resolution

New data reduction software

Lab Operations *(con't)*

LIMS: major upgrade completed

- new FORF entry format from elimination of field chemistry
- bar-coded site ID in use for sample log-in
- communicates with bar-coding at sample receiving to track
  - transfer data between databases

Additional updates required as new equipment comes on-line

QA/QC

CAL QA report status

2002 – completed and out for review

2003-2004 – in preparation, combined report, target Dec.2005

MDLs procedure to compute periodic MDLs (yrly minimum) using long-term low-level internal blind QC sample (~ 10^{th} percentile level). Good representation of 'real' samples. Stats done quarterly.

Data Management Operations

Data transfer to PO—on schedule

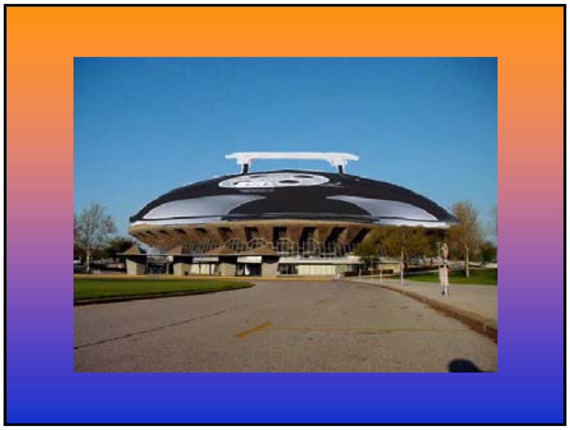
- NTN Data to PO through early December 2004
- AIRMoN Data to PO through mid- March 2005

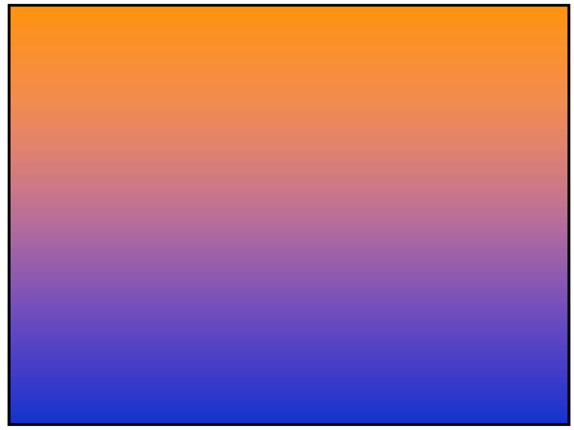
New NTN FORF, data entry, and data review programming changes completed (no field chemistry)

Pending: new format for monthly site reports

Research

- 4-in-1 shipping protocol continuing–report at NOS
- Total & organic nitrogen measurements continuing–report at NOS
- Total phosphorus continuing—MDL ~ 30 ppb by ICP evaluating in-line digestion with FIA for P_{total}
- Trace metals—measurements continuing in routine NTN samples
- Biological agents of interest (fungal diseases)—PO report
- IC method development continuing—report at NOS
- WMO sample preparation continuing
- Evaluation of pH electrodes and meters—continuing
- Perchlorate in precipitation--new





NADP Electronic Reporting Form

Why

- First step towards electronic rain gages
  - Download data from gages
  - Analyze gage/collector performance
- Onsite data checking
  - Completeness
  - Accuracy
  - Checking data at the source
- Labor savings
  - Data entry
  - Follow up on incomplete field forms

Two Options

- PDA with field office PC + Printer
- PDA without field office PC

- Cost responsibility
  - PO supplies PDA
  - Site supplies desktop computer + printer
  - PO supplies desktop application

PDA application

- Collect field data (dates/times/conditions/precip)
- Covers all three networks
- Modular design allows new rain gages to be dropped in.
- Internal database stores:
  - Site information
  - Operator information
  - Sample history
  - Maintenance calendar
- Minimize freeform data entry

Desktop Application

- Data Entry
  - Correct/modify anything entered with PDA
  - Free form notes
- Functions
  - Sample Vol / ER / Precip Analysis
  - Field form print out
  - Transfer data via Internet w/ confirmation

Option 1: PDA with desktop computer in field office

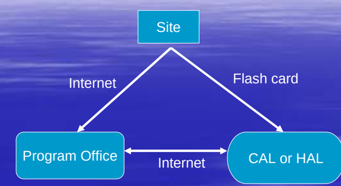
- Initial data entry in field with PDA
- Additional notes and diagnostic information using PC
- PC can print paper copy for operator records
- Data transfer via Internet with confirmation

- Fallback: flash/paper

Option 2: PDA without desktop computer in field office

- Initial data entry in field with PDA
- Transcribe to paper in field office (possibly print partially completed form)
- Data transfer: flash card/paper
- Fallback: paper

Data Transfer



- Sites will transfer data to Program office via Internet, or to lab via flash card
- Data will be synchronized between Program Office and Lab databases several times per day.

Field Form Standardization

- Form an Ad hoc group to standardize field form language across networks
  - Particularly the site operations block
  - NTN: Harlin, Dossett
  - AIRMoN: Rothert
  - MDN Brunette, Van der Jagt
  - Mediator: Lehmann
  - Unresolved issues will be decided by the Exec Committee in June.

Site Operations

NTN	AIRMoN	MDN
Sensor heater and motor box operated properly and the event recorder indicates the collector opened and closed promptly for each precipitation event		Sensor heater and motor box operated properly
Raingage operated properly during the week	Raingage operated properly during the sample period	Raingage operated properly during the week (Clocks, pens, inks, etc)
Collector opened and closed at least once during the week, other than for testing	Collector opened and closed at least once during the sample period	Event recorder worked properly and indicates the collector lid opened and closed promptly for each precipitation event

Proposal for Trial

- July 1 – Deploy at Bondville
  - July 1 NTN
  - Aug 1 MDN
  - Sept 1 AIRMoN
  - Debug and get user feedback
- Oct 1 – Deploy at five additional sites
  - 2 NTN only
  - 2 MDN only
  - 1 NTN-MDN colocated
  - 1 All (Bondville)
- Some with, some without lab PC
- Report at 2006 Spring meeting
- Phase in during FY06

NADP Siting Criteria

Ad-hoc committee report:
Chris Lehmann (chair)
Gary Stensland
Bob Larson
Greg Wetherbee
Preston Lewis
Rick Artz
Martin Risch
Scott Dossett

Some History….

- August 2001: "NOS chair will appoint an ad-hoc group to … review the siting criteria specifics and make recommendations on any needed changes to these specifications."
- Reports given at ~5 meetings outlining status of proposed revisions.
- March 2004: Revised draft of siting criteria distributed to NOS.

Our Approach

- We took a "fresh look" at original siting criteria (1978) and revisions thereafter.
  - Considered "old" criteria, and incorporated where appropriate
  - Provided additional detail and specifications
  - Incorporated NADP Site Classification & Site Characterization schemes
  - Preparing white paper to accompany siting criteria that outlines approach and rationale.

Today's Discussion

- Draft set of criteria has been distributed—Does this fulfill our committee's charge?
- Want feedback on individual criteria, either here or on NADP forums site.
- Final vote on new siting criteria document at Spring 2005 meeting?

Siting Criteria Document

I – Introduction
  – Purpose of siting criteria

II – Site Classification: Urban (U), Suburban (S), Rural (R), & Isolated (I)
  – Differing criteria based on site classification

III – Siting Rules and Guidelines
  – Rules: New sites must comply fully or seek exception. Existing sites follow Remedial Action Plan
  – Guidelines: Beneficial, but not required.

Siting Criteria Document

IV – Siting Criteria
- A. General Criteria (guidelines)
- B. Regional Criteria (> 1km)
- C. Local Criteria (< 1 km)
- D. On-Site Criteria (< 30 m)

Siting Criteria Document

V – Remedial Action Plan

- New sites: Sites should strive to meet all GUIDELINES. New sites not meeting all RULES must seek exception via petition submitted to NOS.
- Existing sites: Sites surveyed approximately once every three years. Sites not meeting RULES should seek compliance, or receive exception via NOS petition. Data from sites not meeting RULES and/or GUIDELINES will be flagged.

NADP Vision

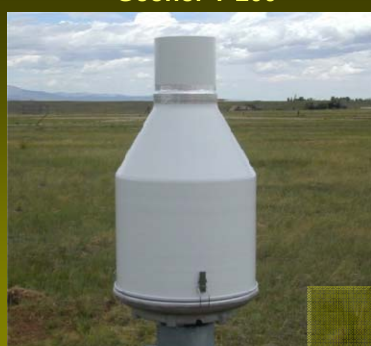
- Remain a premier research support project
- Serve data and information needs of scientists and educators
- Support informed decisions on air quality issues related to precipitation chemistry
- Respond to emerging issues

➢ **Maintain an efficient measurement system**

→ Replacement ?

Belfort B5-780

Geonor T-200



Ott Pluvio

NOAH III

NOAH IV

NOAH IV

NOAH IV

NOAH IV

Gage records signal when optical sensor detects X particles/time

NOAH IV

Performance Requirements for NADP Gage Replacement

Range (capacity)	
Resolution (sensitivity)	Accuracy
Real-time Reporting	False Reporting
Operational & Withstanding Temperature Limits	Operational & Withstanding Wind Limits
Reliability, Maintainability, Availability	Data Reporting & Failure Indication
Grounds Maintenance	Power Requirements

Range or Capacity

OTT ETI
X X+ Capacity: $\geq$ 25 cm (9.84 inches) liquid equivalent depth (unattended)

Comment : Gage capacity is lowered, when antifreeze is added to keep the bucket contents from freezing. This lowers the capacity of the Ott gage below 25 cm.

Resolution or Sensitivity

OTT ETI
X+ X+ Reporting resolution: 0.02 cm. Sensitivity to precipitation onset: 0.02 cm.

Comment : Both gages can “sense” precipitation amounts as small as 0.0025 cm (0.001 in) but have been set to report 0.025 cm (0.01 in).

Accuracy

OTT ETI
X? X Lab Accuracy: within 0.05 cm over entire range & at rates up to 2.5 cm in 5 minutes. Field Accuracy: within 5% or 0.05 cm of NWS stick gage measurements

Comment : Old Ott gage exceeded requirement; new Ott gage has a calibration problem. ETI meets requirement.

Real-time Reporting

OTT ETI
X- X Report precipitation amounts in "real time," current to within 5 minutes of polling.
X X No delays due to precipitation freezing in gage orifice.

Comment : Output from Ott gage is delayed due to signal processing.

False Reporting

OTT ETI
X X? No reported amounts in the absence of precipitation.

Comment : ETI gage has had no false positives, however the optical sensor needs to be tested under warm weather conditions when there are insects. New Ott gage is virtually free of false positives.

Failure Indication

OTT ETI
X X Status report to the data logger indicating condition of important gage functions

Comment : Both gages report temperature, battery voltage, and reference depth.

Wind and Temperature

OTT ETI
X- X- **Temperature: accurate at - 45C to + 50C & can withstand - 50C to +55C.**
X- X- **Wind: accurate at 15 m/s steady & 25 m/s gusts and can withstand 30 m/s steady & 60 m/s gusts.**

Comment : Load cell temperature range only goes to -30C. Neither gage is likely to go undamaged in 60 m/s (~133 mph) gusts.

Reliability, Maintainability, Availability

OTT ETI
X X **Reliability: time between failures >500 days**
X- X- **Periodic maintenance interval ≥ 90 days**
? ? **Availability: mean time to repair or maintain < 30 minutes**

Comment : Ott has had one temperature sensor failure. ETI has had one optical sensor get zapped by lightning. Ott battery needs to be re-charged in < 90 days in cold weather. ETI runs fine on AC but requires solar re-charge on DC.

Grounds Maintenance Power Requirements

OTT	ETI	
X	X	Grounds: use mower or string trimmer up to base without damage
X	X	Power: 110VAC or 12VDC with max consumption <5 amps @12VDC

Comment : Ott runs only on 12 VDC. ETI runs fine on AC but requires solar re-charge on DC.

TALLY

OTT	ETI
4 X-	3 X-
7 X	7 X
1 X+	2 X +
2 X?	2 X?

Data Communications / Query Options

	Ott	ETI
Laptop	X	X
PDA – IRDA	X	X
Satellite	O	O

Belfort B5-780

→

Replacement ?

How does the site operator evaluate collector & gage performance?

How do we ensure that wet–only deposition samples are being collected?

Belfort B5-780

?
→
?

Ott Pluvio

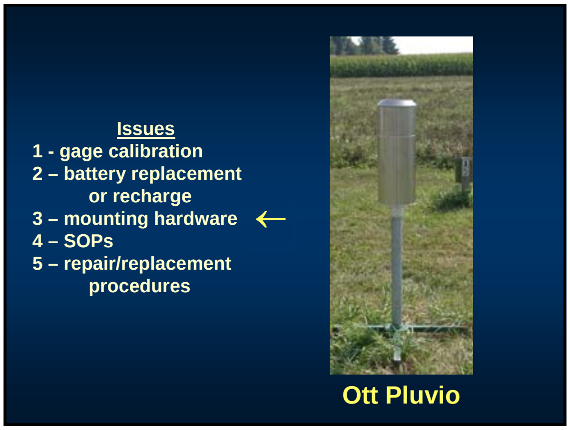
Data logger acquires 1-min.: cumulative depth, one-min. depth, temp., collector status (i.e., open or closed).

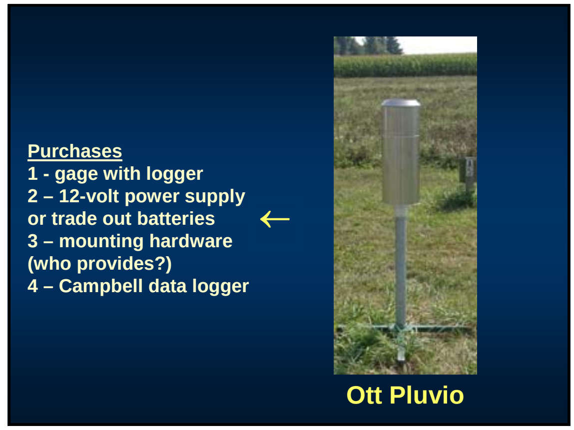
How to determine collector power? reduce the ~250K data points to a usable record?

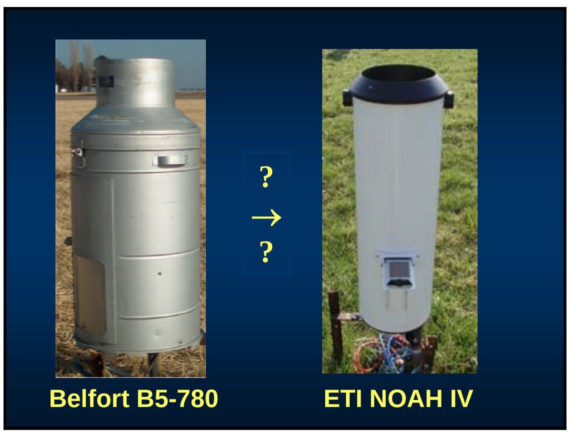
Need programmable data logger? Campbell 10X?

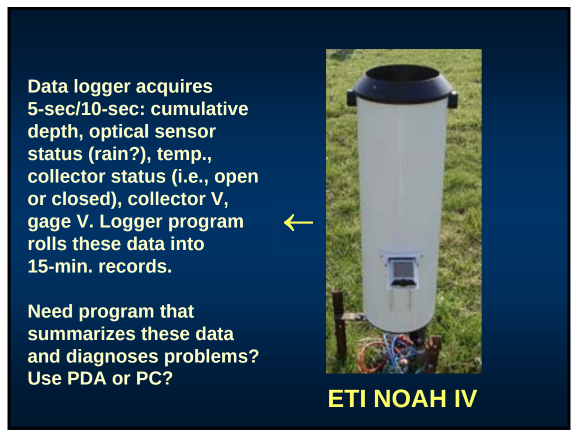
←

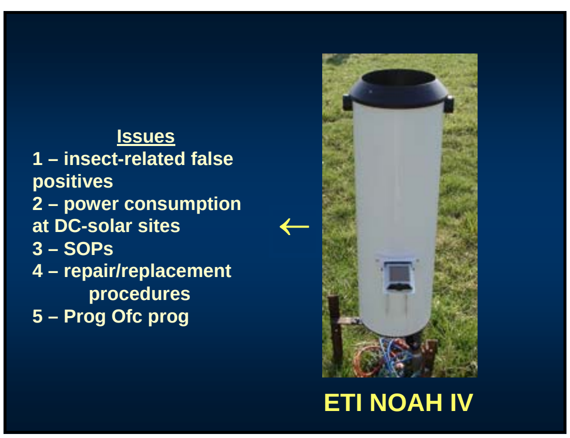
Ott Pluvio


Issues
1 - gage calibration
2 – battery replacement
or recharge
3 – mounting hardware ←
4 – SOPs
5 – repair/replacement
procedures
Ott Pluvio


Purchases
1 - gage with logger
2 – 12-volt power supply
or trade out batteries ←
3 – mounting hardware
(who provides?)
4 – Campbell data logger
Ott Pluvio


?
→
?
Belfort B5-780
ETI NOAH IV


Data logger acquires
5-sec/10-sec: cumulative
depth, optical sensor
status (rain?), temp.,
collector status (i.e., open
or closed), collector V,
gage V. Logger program ←
rolls these data into
15-min. records.
Need program that
summarizes these data
and diagnoses problems?
Use PDA or PC?
ETI NOAH IV


Issues
1 – insect-related false
positives
2 – power consumption
at DC-solar sites ←
3 – SOPs
4 – repair/replacement
procedures
5 – Prog Ofc prog
ETI NOAH IV


Purchases
1 - gage = $3,100 ←
2 - logger = $1,250
ETI NOAH IV

→ How to proceed with replacement ?

Belfort B5-780

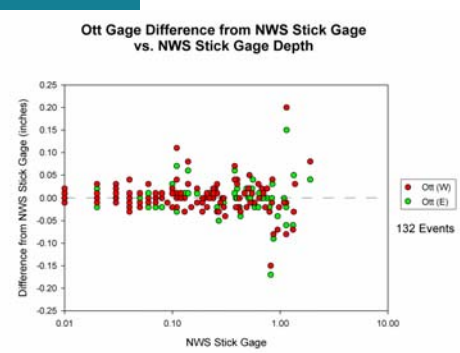
Statistic	NOAH III (East)	NOAH III (West)		
Number of Events	59	59		
Mean Precipitation (inches)	0.47(8)	0.48(6)		
Median Precipitation (inches)	0.19(0)	0.19(0)		
Total Precipitation (inches)	28.19	28.70		
Paired t-Test	**Mean Difference**	**p-value**	**Hyp: Mean Difference = 0**	**RMS value**
NOAH III(E) vs. NOAH III(W)	-0.00(8) ± 0.00(4)	0.0000	Reject	0.01(5)
Wilcoxon signed-rank test		**p-value**	**Hyp: Mean Difference = 0**	
NOAH III(E) vs. NOAH III(W)		0.0000	Reject	

Statistic	NOAH III (East)	NOAH III (New)		
Number of Events	28	28		
Mean Precipitation (inches)	0.39(8)	0.39(1)		
Median Precipitation (inches)	0.65(5)	0.65(0)		
Total Precipitation (inches)	11.14	10.94		
Paired t-Test	**Mean Difference**	**p-value**	**Hyp: Mean Difference = 0**	**RMS value**
NOAH III(E) vs. NOAH III(N)	0.00(7) ± 0.00(5)	0.0125	Reject	0.01(7)
Wilcoxon signed-rank test		**p-value**	**Hyp: Mean Difference = 0**	
NOAH III(E) vs. NOAH III(N)		0.0188	Reject	

Statistic	Ott (East)	Ott (West)		
Number of Events	132	132		
Mean Precipitation (inches)	0.29(1)	0.28(9)		
Median Precipitation (inches)	0.13(0)	0.13(5)		
Total Precipitation (inches)	38.38	38.13		
Paired t-Test	**Mean Difference**	**p-value**	**Hyp: Mean Difference = 0**	**RMS value**
Ott(East) vs. Ott(West)	0.00(2) ± 0.00(3)	0.1829	Do Not Reject	0.01(6)
Wilcoxon signed-rank test		**p-value**	**Hyp: Mean Difference = 0**	
Ott(East) vs. Ott(West)		0.0736	Do Not Reject	

Statistic	Ott 1	Ott 2	NWS Stick
Number of Events	132	132	132
Mean Precipitation (inches)	0.28(9)	0.29(1)	0.28(9)
Median Precipitation (inches)	0.13(5)	0.13(0)	0.13(0)
Total Precipitation (inches)	38.13	38.38	38.13

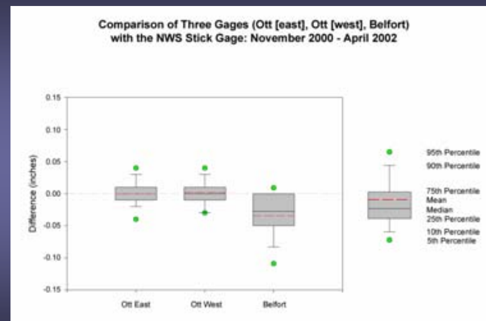
Paired t -Test	Mean Difference	p-value	Hyp: Mean Difference = 0
Ott 1 vs. Ott 2	-0.00(2) ± 0.00(3)	0.1829	Do Not Reject
Ott 1 vs. Stick	0.00(0) ± 0.00(5)	1.0000	Do Not Reject
Ott 2 vs. Stick	0.00(2) ± 0.00(4)	0.5274	Do Not Reject
Wilcoxon signed -rank test		**p-value**	**Hyp: Mean Difference = 0**
Ott 1 vs. Ott 2		0.0810	Do Not Reject
Ott 1 vs. Stick		0.9843	Do Not Reject
Ott 2 vs. Stick		0.7642	Do Not Reject



Gage Calibration Test

Weight	NOAH III White			NOAH III Grey			Ott - Pluvio		
	Expected Value	Reported Value	Difference	Expected Value	Reported Value	Difference	Expected Value	Reported Value	Difference
1st	0.0886	0.08	-0.0086	0.0886	0.08	-0.0086	0.1437	0.14	-0.0037
2nd	0.3788	0.38	0.0012	0.3812	0.38	-0.0012	0.6299	0.63	0.0001
3rd	0.0886	0.09	0.0014	0.0886	0.09	0.0014	0.1437	0.15	0.0063
4th	0.3763	0.38	0.0037	0.3788	0.38	0.0012	0.6112	0.61	-0.0012
5th	0.0874	0.09	0.0026	0.0886	0.08	-0.0086			
Total	1.0197	1.02	0.0003	1.0258	1.01	-0.0158	1.5285	1.53	0.0015

To meet the calibration test requirements, these differences must be less than 0.0197 in (i.e., 0.05 cm).



Ott East vs West

Statistic	Ott (East)	Ott (West)	
Number of Events	132	132	
Mean Precipitation (inches)	0.29(1)	0.28(9)	
Median Precipitation (inches)	0.13(0)	0.13(5)	
Total Precipitation (inches)	38.38	38.13	

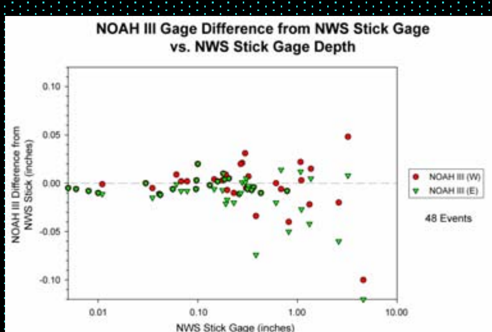
Paired t-Test	Mean Difference	p-value	Hyp: Mean Difference = 0	RMS value
Ott(East) vs. Ott(West)	0.00(2) ± 0.00(3)	0.1829	Do Not Reject	0.01(6)

Wilcoxon signed-rank test	p-value	Hyp: Mean Difference = 0
Ott(East) vs. Ott(West)	0.0736	Do Not Reject

Statistic	NWS Stick	NOAH III (W)	NOAH III (E)
Number of Events	73	73	73
Mean Precipitation (inches)	0.47(3)	0.46(9)	0.46(3)
Median Precipitation (inches)	0.19(1)	0.19(0)	0.19(0)
Total Precipitation (inches)	34.50	34.22	33.82

Paired t-Test	Mean Difference	p-value	Mean Difference = 0
NOAH III (W) vs. NOAH III (E)	0.00(6) ± 0.00(2)	0.0019	Reject
NOAH III (W) vs. Stick	-0.00(4) ± 0.00(3)	0.0905	Do not Reject
NOAH III (E) vs. Stick	-0.00(9) ± 0.00(7)	0.0005	Reject

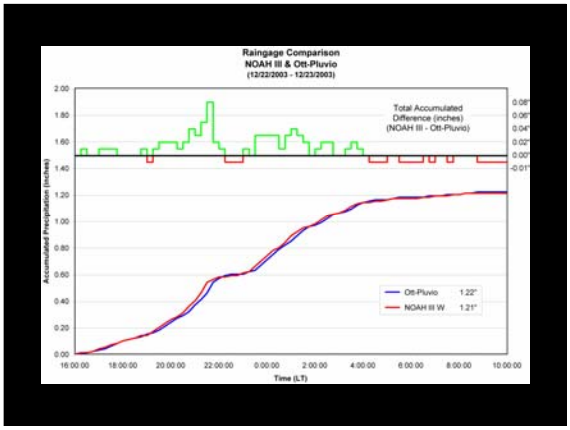
Wilcoxon signed-rank test	p-value	Mean Difference = 0
NOAH III (W) vs. NOAH III (E)	0.0010	Reject
NOAH III (W) vs. Stick	0.0301	Do Not Reject
NOAH III (E) vs. Stick	0.0001	Reject

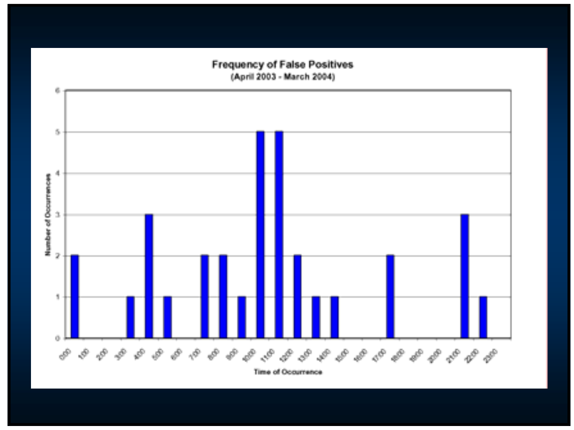


Statistic	NOAH III (East)	NOAH III (Combined)	
Number of Events	87	87	
Mean Precipitation (inches)	0.42(2)	0.42(6)	
Median Precipitation (inches)	0.16(0)	0.16(0)	
Total Precipitation (inches)	36.70	37.02	

Paired t-Test	Mean Difference	p-value	Hyp: Mean Difference = 0	RMS value
NOAH III(E) vs. NOAH III(C)	-0.00(4) ± 0.00(3)	0.0262	Reject	0.01(6)

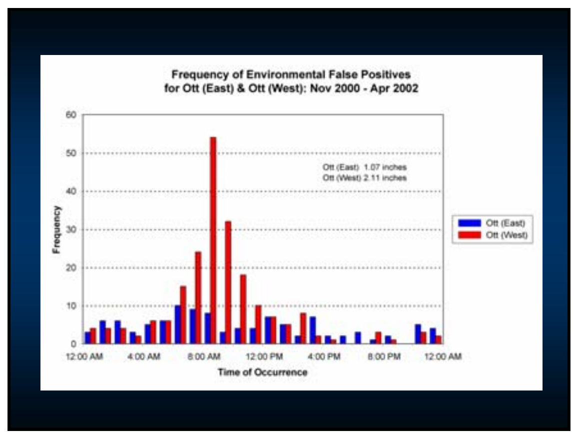
Wilcoxon signed-rank test	p-value	Hyp: Mean Difference = 0
NOAH III(E) vs. NOAH III(C)	0.0108	Reject





Possible Explanation for False Positives
(April 2003 – March 2004)

Reason	Amount
Antifreeze	0.12”
Temperature	0.15”
Wind	0.03”
Fog	0.02”



Can we repair these instruments?

NOAH III Components

Campbell CR10X Datalogger	~ $1,500
Tedea-Huntleigh Model 1010 Load Cell	~ $220
Battery & Charger	~ $100
0ptical Sensor	?

Ideal Network Design

- Identify the user objectives
  - The use of data from the network has grown out of just regional assessments, but what are they?
- Analyze the existing network to identify gaps for meeting those objectives
- Locate key sites that fill in the gaps.

Current Data Access Query

Intended Use:

Please select the category that best describes how you will use this data

Research / Assessment:
- Atmospheric Deposition
- Ecosystem Processes
- Watershed Studies
- Aquatic Effects
- Terrestrial Effects
- Materials Effects

Education:
- College/University
- K-12
- Individual
- NSTA module user
- Other

Brief description of specific application

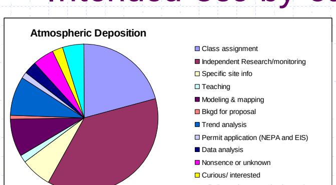
Ideal Network Design Phase 1

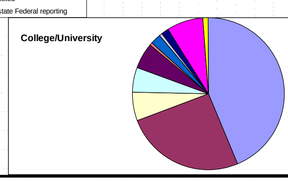
NTN	baseline study	10
NTN	Baseline value for comparison with experimental N deposition plots a	4
mdn	basic interest	1
NTN	Basis for rain fall determination in accelerated leach test	3
NTN	Bayesian Spatial Model	1
NTN	Bayesian Spatial Model	7
NTN	bd	1
NTN	be	2
NTN	because	2
NTN	BEE 427 Lab #1	1
NTN	Being used as a class project on history of acid deposition.	4
NTN	bghghfhffg	1
NTN	bghghfhffg	4
NTN	bhbjk	5
NTN	big hall storm with acid rain	3
NTN	Biogeochemistry class project	1
NTN	Biogeochemistry class project	8
NTN	Biogeochemistry Homework	1
NTN	biogeochemistry lecture	1
NTN	biological soil crust research	1

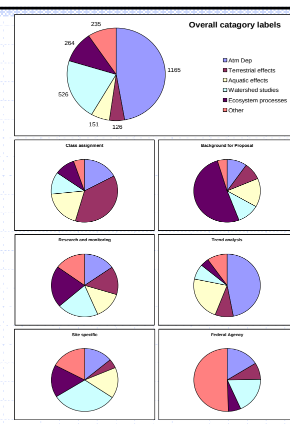
Intended use categories

1. Class assignment
2. Independent research/monitoring
3. Specific site info
4. Teaching
5. Modeling and mapping
6. Background for proposals
7. Trend analysis
8. Permit applications including NEPA and EIS applications
9. Data analysis
10. Nonsense or unknown
11. Curious/interested
12. Tribal, local, state reporting
13. Federal agency

Intended Use by Category







Tell us about you:

- Academic/Private Research or Teaching
- College/University Student
- Individual
- K-12 student
- Site Sponsor/Operator
- State/Local/Federal Researcher or Employee

Watcha goin to do?

- Background for a proposal or new project
- Characterize geographic or temporal trends in deposition (NRSP-3(1))
- Class assignment, project of paper
- Data for statistical analysis exercise
- Educational teaching or presentation
- GIS(Geographic information systems)/Mapping
- Literature citation for manuscript or publication
- Model development or evaluation
- Other ______________________
- Permit application, Environmental Impact Statement (EIS) or National Environmental Protection Act document (NEPA)
- Rainfall for a specific location
- Thesis/dissertation
- Tribal, local, state or federal reporting

Area of interest

- Animal health, domestic, wild, and aquatic (NRSP-3(2c))
- Aquatic ecosystems
- Atmospheric processes including deposition
- Determination of source-receptor relationships (NRSP-3(2f))
- Human health (NRSP-3(2d))
- Materials, effects of deposition (NRSP-3(2e))
- Other ______________________
- Productivity of terrestrial ecosystems, managed and natural (NRSP-3(2a))
- Public education and outreach (NRSP-3(3))
- Visibility (NRSP-3(2f))
- Water chemistry, surface, ground and estruaries (NRSP-3(2b))
- Watershed studies

chance of rain on wedding day.

Correlating bird productivity with acid rain

corrosion rates on galvanized hardware

data may be used in data report

Data to be used to update data published in text for a chemistry for non-science majors course.

deposition of salts for outdoor sculpture

dumb schoolwork

Enhgineering studies to determine condensate treatment

Example of high quality data record

for a solution on a motive for my damaged argriculture

"I am requesting these for the whole purpose of my research.

i'll use it to become rich and famous!! BUAHAHAHHAHAHAHA

Just for a comparison with my own data from Oz.

Learnding

N inputs to food webs of pitcher plants

Some inane APES assignment.

The usual

for a good time

see if NADP data is useful

still searching for trends. you know this is the coolest data set ever!

to turn in to a professor

Establishing a Timetable and Procedure for NADP Meeting Planning

Interim, Executive and Technical Committee Meetings

Purpose of Proposal

- Establish meeting venues and dates in a more timely fashion.
- Get approvals for travel and contracts through the UI and SWS system sooner.
- Still retain choice in meeting location but avoid destinations that are not financially or logistically optimal.
- Have meeting & sleeping room costs established earlier.

General Meeting Considerations

- Near a large metropolitan airport
- Transportation available from the airport to the meeting location
- Costs of air travel
- Establish local contact to facilitate hotel and field trip details.
- Room rates must be within the federal government per diem.
- Location in relation to previous meetings

Proposal for Interim Subcommittee Meetings

- January 2005 - Program Office initiates an email dialogue with chairs and vice-chairs of the subcommittees
- 3 or 4 suggestions decided on by this group then the Program Office investigates costs
- Spring 2005 - Two choices picked by group presented at the Interim Meeting to decide on the location for the next year's meeting
- Program Office negotiates meeting space contract for 2006 Interim Meeting

Budget Advisory & Executive Committee Meeting Timetable

- March 2005 – Chair of BAC and Vice-Chair of Executive Committee begin email dialogue with the Program Office
- Summer 2005 - Two choices presented to Executive Committee for Summer 2006
- Program Office negotiates meeting space contract for 2006 meeting

Technical Committee Meeting and Scientific Symposium

- March 2005 – NADP Chair, Vice Chair, Secretary and Past Chair begin email dialogue initiated by the Program Office.
- The 2005 Secretary will be responsible for the program of the 2006 meeting.
- Summer 2005 – One or more choices presented to Executive Committee for Fall 2006
- Program Office negotiates meeting space contract for 2006 meeting
- Announcement made at 2005 Technical Committee meeting for 2006 meeting location

Proposed Timeline

Interim Meeting January 2005	Program Office initiates email dialogue with chairs and vice-chairs
Spring 2005	Choices presented at Interim Meeting – Location decided for 2006 Interim Meeting
Spring/Summer 2005	Program Office negotiates meeting space of 2006 meeting
BAC/EC Meeting March 2005	Program Office initiates email dialogue with chair of BAC and Vice-Chair of NADP
Summer 2005	Choices presented at BAC/EC meeting
Fall 2005	Program Office negotiates meeting space of 2006 meeting
Technical Committee Meeting March 2005	Program Office initiates email dialogue with NADP Chair, Vice-Chair, Secretary and Past Chair
Summer 2005	Choices presented at BAC/EC meeting
Summer 2005	Program Office negotiates meeting space of 2006 meeting
Fall 2005	Announcement made at 2005 Technical Committee Meeting for 2006 Technical Committee Meeting