

**Network Operations Subcommittee (NOS) Meeting Minutes
2016 NADP Fall Meeting
November 1, 2016
Santa Fe, New Mexico**

Officers: NOS Chair: Richard H. Tanabe (Environment and Climate Change Canada)
Vice Chair: Gregory A. Wetherbee (USGS)
Secretary: David W. Schmeltz (USEPA)

November 1, 2016

Richard Tanabe called the meeting to order at 10:30 am.

1. **Approval of minutes from Spring 2015 (Madison, WI) meeting** - Richard Tanabe
Motion: Ludtke; second: Wetherbee; motion unanimously accepted.
2. **AMNet Update** - Mark Olson

Currently, 20 active sites; three site closures (ARA): AL19, GA40, FL96; three new installations: IN21, NJ30 (full speciation), NJ54 (GEM only); sites that lost funding: MI09, VT99, WI07; possible new sites: Halifax, MI09 (potentially moving from Pellston to Ann Arbor), MI52.

In the last 12 months, 22 sites visited, 4 required repairs; upcoming site visits include: AL03, MS12, OK99.

Changes to sites - GEM only - AK03, NJ54, NY06, NY43; 2537X upgrades - AL03, AL19, FL96, GA40, ME97, NJ30, NJ54, NY06, NY43, TW01.

Equipment - NJDEP donated 4 speciation systems to AMNet. 10 analyzers and components for 7 speciation systems purchased. Bondville will get an analyzer and will eventually transition to speciation. Surplus equipment available for establishing network sites.

Data availability – All of the 2015 data are available. Notes are needed for ME97. Data are still password protected. Some improvements in the database were made; the data management manual was updated.

Program review – AMNet was included in the Program Office review this year; Tim Sharac (EPA) visited WI to observe the lab, conduct a site audit at WI07, and reviewed the AMNet database; a complete report of the AMNet review will be available next Spring meeting.

Tekran User Group Meetings – Asia Pacific Tekran users workshop in Minamata, Japan Nov/Dec 2016; possible user group meeting at ICMGP July 2017

3. **AMoN Update** – Melissa Puchalski

Ninety-seven AMoN sites currently operate in 37 states, 3 sites in Canada, 1 in PR; New York has 4 new sites which are part of a larger continuous NO_y/NH₃ speciation project in NY to support of the NO_x/SO_x secondary standards; AMoN sites are needed in the NW to fill the large gap in monitoring coverage.

EPA is working with UT DEQ to look at wintertime PM formation in the Cache Valley in UT starting in Jan. Will use the Logan AMoN site (13 ug/m³). Interest in oxidized and reduced N, mass spec, VOCs, etc.

Travel blanks - out of control in 2013/2014. Concentrations exceeded ambient concentrations. Huge improvement in 2015 and 2016; using the travel blanks to calculate a network detection limit. mean + 2sigma at 95% confidence limit for that period (2016 detection limit calculated using 2015 data). Data below the detection limit are flagged. Although there is less confidence in the value, data are still valid; Canada is conducting a pilot study to look at AMoN and whether low concentrations sites will be above detection limit. Promising now that travel blanks are lower.

Quality control - Mean Relative Standard deviation shown for precision. The precision of the Radiellos exceed precision of annular denuders – the standard method for measuring NH₃. Precision is used to calculate the uncertainty. 2011 network expanded from ~20 sites to ~50 sites – started running as a network instead of a special study. Continue to have really good precision with the triplicates.

Network uncertainty - Calculate uncertainty based on previous 3 years of precision data. Ambient data are used to calculate the quartiles. Calculated as median (2*sigma) for previous 3-years of triplicates for each quartile. Table is included in the 2015 CAL report.

Regional trends – Melissa presented regional trends in ambient concentrations – broke it out into regions where concentrations were similar; significant increases at p < 0.05. Note, not due to increase in travel blanks in 2013, 2014 – still increasing in 2015. Tom Butler showed these trends in Acid Rain Special Ed paper – coming out in Dec. 2016.

Spatial variability study – field component of the study ended in 2015. Examining variability in ammonia concentrations around Bondville and Fort Collins. Bondville ~ 50 site pairs. Fort Collins ~150 site pairs; sites near CAFOs (Concentrated Animal Feeding Operation) excluded. Fort Collins has complex terrain and large point sources. At Bondville, good correlation observed between the sites up to ~120 km. Fort Collins – excluding sites within 20km of CAFO (FC10, Severance – 3.5km; FC08 – Kersey 7km, FC06 – Greeley 12km). EPA has a definition for large confined animal feeding operations. Is there a need to update the definition in the AMoN criteria? How do you determine location of large CAFO? Local contacts for the site; Melissa recommending a first step would be to update the criteria to agree with EPA's definition of a large CAFO.

AMoN data are not currently used in TDEP maps. AMoN provides useful information for understanding where sites represent a regional signal and where they are influenced by point sources primarily. Interpolated concentration maps will likely require many sites.

Siting criteria checklist – For sites not visited by EEMS. Melissa proposes the PO send the checklist to the site operator. Operator would submit 6 photos back to the PO, including a site overview, sample housing, and cardinal directions from sampler; recommends that NADP begin sending out siting criteria checklist once per year (each summer when crops are planted) to request updates about the site. We aren't receiving information from the site visits to some AMoN sites; some AMoN sites are only visited once every three years.

4. **USGS External Quality Assurance** – Greg Wetherbee

In 2016, Wetherbee published three papers: 2 USGS reports + journal article; for 2017, Wetherbee has three papers in progress, each in review. Launching a Network for Urban Atmospheric Nitrogen Chemistry (NUANC). Project started October 1. 4 of 5 NTN sites installed. Progress on expansion of NTN into Cuba and Mexico. NTN interlab: Added UNAM, Mexico and CEAC, Cuba; MDN interlab - no changes in 2017; Co-located sampler program: New CO11/11CO sites, Arvada, CO part of NUANC ; Field Audit and System Blank – No changes for 2017.

5. **Equipment Testing** – Mark Rhodes

Precipitation gages - HACH Environmental, Inc. discontinued manufacturing the Ott Pluvio2 precipitation gage. It has been replaced with the OTT Pluvio2 – L. Mechanically, the L version is the same as the Pluvio2; however, the internal electronics have been updated in the L, the operating specs are the same or better, plus the L lasts longer. The PO did thorough bench testing and found the L performed very well.

Motion 1: Accept the OTT Pluvio2 – L rain gage for network use. -- Motion unanimously accepted.

HACH also manufactures an OTT Pluvio2 – S. The S version costs ~\$350 less than the L version and has a smaller profile and lower capacity.

Motion 2: PO purchase and bench-test the OTT Pluvio2 – S rain gage for possible network use. -- Motion unanimously accepted.

Thies sensor – Thies sensor in A and B modes are being tested. In the A mode, the heater is always on and the control temperature is 8°C. In the B, mode the heater is activated when precipitation is detected. The control temperature is <8°C. The sensor was tested in the freezer. Temperature while triggering is 5°C. Temperature without triggering is 0.8°C in A mode and -10.3°C in B mode.

PETG – Bottle testing continues. ACM vs N-CON collector; and glass vs PETG. Data from WA18 suggests good agreement between collector types. Less agreement between PETG and glass, although data are preliminary. Depending on the results from Phase I, Phase II of the study will look at modified sample trains.

Total phosphorus - 4 sites: CO96, IL11, MT05, WI31; 4 samples per site (08/16 – 10/04);

Compared NTN orthophosphate as P, NTN total P, and MDN total P

Filter blank is not a source of P (0 µg phosphorus); 5 dirty filters: 0-2 µg of phosphorus; 1 dirty filter: 8 µg of phosphorus

9 samples < DL for all 3; other samples – a mixed bag

Good agreement between NTN_TP and MDN_TP at WI31 for one sample period.

Also, good agreement between NTN and NTN_TP at 131 for the other sample period.

6. **A proposal to leverage NADP to fill critical dust deposition data and knowledge gaps** – Dr. Janice Brahney, Utah State University

Direct measurements of the total atmospheric dust load to ecosystems are rare, cover only a small area, and are typically of a short duration. Only wet deposition and particles below $10\mu\text{m}$ are routinely monitored. However, the bulk of dust material occurs in size fractions greater than $20\mu\text{m}$.

Dr. Brahney presented a proposal for a pilot study in collaboration with NADP. A method for retrieving gravitational deposition from dry buckets using a series of mesh inserts has been provisionally tested. Dr. Brahney requests the $0.45\mu\text{m}$ filters from NTN wet deposition analyses from the CAL to perform analyses at Utah State University. Data collected from the wet and dry NTN samples using the dry side ACM buckets will be compared to nearby dust-on-snow samples collected through the Colorado Dust on Snow (CODOS) program, and from nearby IMPROVE and CASTNET sites that monitor the deposition of particles below $10\mu\text{m}$. Finally, samples collected from co-located total suspended particulates (TSP) and particulates $< 10\mu\text{m}$ samplers in Utah will be compared. The pilot study aims to determine whether or not the NADP network can be used to provide spatially and temporally comprehensive data on total atmospheric dust load; and specifically, phosphorus deposition.

Motion 3: To approve the Utah State University proposal by Dr. Janice Brahney to use the dry side bucket of NADP ACM collectors for a pilot dust deposition study at up to 20 sites and report back to NOS at the 2017 Fall meeting. -- Motion unanimously accepted.

For this project to move forward, several tasks were identified: The Program Office will need to provide a letter to site sponsors which explains that Dr. Brahney will be contacting them about this project, also noting the study is approved by NADP. Dr. Brahney would then need to contact the site sponsors directly to tell them about the study and ask for their support for operators to participate. Some sponsors might want their operators to receive some financial compensation for any extra work, which Dr. Brahney is prepared for. Dr. Brahney will need to work with the PO to identify potential sites for the study, and with the CAL, USGS and others on the lab and field SOPs and QA.

Mark Nilles noted that ACM sites participating in this study are not precluded from upgrading to N-CON collectors at any time. These sites are not locked in to the older equipment, but Dr. Brahney has the option to collocate the ACMs with the N-CONS.

7. **CAPMoN update** – Richard Tanabe

Measurements and sites remain status quo. There is some transition of technical and administrative support:

CAPMoN will be responsible for technical support of 34 sites (i.e. day to day operation of sites), administrative support of operator contracts for all sites, and administrative support of approx. 2/3 of

the sites for utilities, leases, etc. CAPMoN introduced a toll-free number for operators across the country; and CAPMoN Ticket System procedures have been changed to provide operators more information on any requests by them or on issues at their sites.

Status of the Environment and Climate Change Canada NADP sites: 7 MDN (renewed Apr/16); 3 AMoN (renewed Nov/16); one NTN; CAN5 (NTN) and NS01 (MDN) relocated.

External QA Programs - Environment Canada Proficiency Testing Program (NWRI) - Study PT108 the CAPMoN Lab was rated "very good."

Norwegian Institute for Air Research (NILU) EMEP Lab Inter-comparison - Round 33 the CAPMoN Lab received "satisfactory" rating for all ions

The World Meteorological Organization (WMO)/Global Atmospheric Watch (GAW) - Lab Inter-comparison Study (LIS) 2016 54 Ring Diagram; USGS Interlaboratory Comparison Program - Awaiting formal results

Equipment testing - Collector inter-comparison at Egbert (ON07) - 2 prototype wet-only collectors; 2 MIC C300 wet-only collectors

Precipitation gauges - ETI NOAA IV (MDN); Ott Pluvio2 (Installation next week); ECCC Standard Rain Gauge (daily)

Transition to weekly sampling at select sites -Initial daily-weekly inter-comparison sites - Egbert, ON – Started June 1st; Algoma, ON – Started September 30th; Jackson, NS – 3rd site; results by Spring Meeting.

8. Automated pH/Conductivity Instrument – Chris Lehmann

The TitrEC instrument has been tested at the CAL over the year. Analysis of the test solutions shows results within the acceptable range, with some outliers and potential bias. Greg Wetherbee moved that the CAL transition to the Titrec beginning January 1, 2017 for pH measurements. Mark Rhodes thought that date was premature as there are still outstanding questions related to the influence of temperature during extended use, and unexplained bias in the data. Wetherbee amended the motion to allow for continued investigation.

Motion 4: Approve the use of the Titrec for pH measurements beginning January 1, 2017 and for the CAL to continue to investigate factors contributing to shifts in the data and report back to NOS at the 2017 Spring meeting. Motion seconded by Artz. Motion carried with one vote against. Mark Rhodes opposed the motion, suggesting not enough testing has been done; the January 1, 2017 date is too soon.

9. NOS Secretary Nominations & Election – Greg Wetherbee

There were no floor nominations for the NOS secretary. While there were some new faces at the NOS meeting, nobody new was eager to join the NOS administration. In a-not-so-unplanned move, Wetherbee nominated our current NOS chair - Richard Tanabe – to serve another term. This was

seconded by Mark Rhodes. Tanabe gleefully accepted the nomination again to the delight of all in attendance.