

Network Operations Subcommittee Meeting

Portland, OR

April 24th - 25th, 2012

- Motion to approve Fall 2011 minutes by Chris Rogers, second by Eric Prestbo. Minutes approved.

- USGS QA Report (Wetherbee)
 - Collocated sites at CA67/CA76 and CAN5/CAN6
 - HAL
 - Inter-laboratory-Comparison program Hg samples showed a slight negative bias (~1ng/L different). No problems with the blank samples and better % recovery (106%) with blind audit samples. This was the last blind audit program sample – the labs can determine the samples that are supposed to be “blind”.
 - MDN inter-laboratory comparison program has 4 new labs. Currently half of the GMOS labs participating and possibly 3 more will join. Trying to make this the GMOS lab inter-comparison program in addition to support of MDN.
 - Control blanks were below the HAL MDL.
 - Saw some contamination in the system blanks when the collector opens without measurable precipitation – okay for the QA program.
 - Using mass Hg (90%) for network max contamination. Three-year averages showed consistent mass – approximately 0.3 ng per MDN sample.
 - HAL results were good and consistent with previous years.
 - CAL
 - Seven labs participate in the inter-comparison. All analytes from the CAL were within control limits
 - Could not compare bromide – no other labs analyze for bromide. Compared to theoretical concentration. Saw a low bias from the 4 samples that were analyzed.
 - Control chart summary – CAL had 5 samples out of control for Na⁺ and 2 for Cl⁻. Note, CAL performance exceeded WMO laboratory (NILU) performance.
 - Control blanks were below CAL MDL
 - NYDEC dropped out of the inter-laboratory comparison program – no replacement yet
 - CAL performance is good, consistent with previous years

- AMNet Report (Olson)
 - Site number reduced from 22 sites to 19, one new site – WI07
 - EPA funding was cut from 9 sites, many sites just hanging on until something needs repair
 - MD08 and OH02 – looking for support but likely closing
 - NY20 funded by NYSRDA
 - VT99 now run by University of VT and looking for state support
 - EPA continues to fund the QA program

- This year site liaison will visit Eric Edgerton's sites, OK99, and NS01 – likely visit 5-8 sites depending on the sites that close
 - Data validation – nearly complete with 2011, but some sites have not submitted data
 - Mark will send Rick Artz slide showing data gaps.
 - Concentrations of GOM range from 0-55 pg/m^3 from sites – variability between urban vs rural, high vs low elevation, regional vs high source density sites
 - PO has an agreement with Environment Canada to estimate deposition velocity for AMNet sites
 - D. Schmeltz and D. Gay will be going to Taiwan to plan regional Hg meeting (9/2012)
 - GMOS has adopted AMNet SOPs, M. Olson will train GMOS site operators
 - Possibly include T. Sharac in the training so the AMNet has a back up site liaison
 - There is still a disconnect between regulations and funding for monitoring programs (M. Nilles)
 - *M. Risch and D. Gay will be presenting at the Mercury Science in the Great Lakes Workshop in May – opportunity to highlight missing link between funding/monitoring/regulations*
- Equipment Testing Update (Rhodes)
 - NTN shipping bottles
 - Historically, 40% of the sample bottles leaked during shipment
 - 500mL and 1 L bottles were tested in the latest round of tests. To simulate aging they were run through the dishwasher 15 times, shipped out to 5 'test' sites, returned to the PO, frozen and then shipped out again
 - Two 1L bottles had "A" leaks (< 10 mL) during shipping – could have been condensation
 - None of the 500mL bottle leaked
 - All bottles tested were below IDL limit for chemistry – most at 0 mg/L
 - Soft ("Squishy") 1L bottle did not leak – same cost as current bottle, both Nalgene, with same lids
 - 500mL bottles easier to ship internationally (e.g. Argentina)
 - The 1L bottle replacement for the entire stock would be $\$4.60/\text{bottle} \times 4,000 \text{ bottles} = \$18,400$
 - The CAL does not retire the bottles that leak – this would be a good place to start replacing old bottles with new bottles (R. Artz)
 - **Motion: The CAL will discard leaky bottles and lids and purchase the new 'squishy' bottles with new lids to replace the leaky bottles. Also, the CAL will mark the new bottles and lids to track any changes – leaks, contamination, etc. The CAL will purchase and use 500mL bottles for international shipping to NTN sites. (Motion by Wetherbee, second by Nilles, passed unanimously)**
 - MDN sample loss
 - The N-CON collector has very low sample loss, but the Aerochem collector has 10-60% loss. Sample evaporation from the Aerochem was tested with the two types of cooling fans: modified ACM and Loda (higher rpm)

- An alternate glassware configuration was tested with the fan running continuously. The sample loss was < 0.5% for both collectors. Sample loss is likely a combination of the cooling fan and the thistle tube configuration. Test was run for 8 weeks with 8 different sets of glassware – little sample loss.
 - Proposed changes – use the N-CON thistle tube w/ the ACM collector which requires using a longer funnel and/or the sample bottle must be raised in the collector
 - Is the raised sample bottle and N-CON thistle tube just creating a better seal – can we just improve the seal that current thistle tube creates to prevent the sample loss?
 - Proposed changes would require a change to the cooler’s packing.
 - For this study, Mark used > 250mL of acid pre-charge. Previously, some weeks >50% sample was lost during the week. With current configuration, < 0.5% sample lost during the week.
 - The HAL will work with the PO to redesign the thistle tube to minimize modifications to the padding in the coolers.
 - Belfort raingage tests
 - Belfort wanted new raingage reconsidered by NADP.
 - Cost of the Belfort is ~\$4000 w/o heater, DC power, and no data logger
 - Previously, ETI and Noah IV gages were tested with very good results
 - Belfort performed poorly during the same tests – manufacturer recommends starting with 5.4 lbs pre-charge, test showed you actually need 7.2 lbs before test response is equal to the target value.
 - Discussion on what gages the climate networks are using = Belforts and GEONOR
 - NADP requires that a data logger be included with the raingage.
 - The Belfort does not pass phase I testing. No further testing necessary.
- AMoN update (Puchalski/Rhodes/Lehmann)
 - Network status – 53 active sites, no sites shut down since last meeting
 - 35 AMoN sites collocated with CASTNET
 - Variability between triplicates remains at ~10%
 - Travel blanks are coming back with higher concentrations than field samples at some sites, not dependent on region, sampling time period, sampler body, or storage location.
 - Initially thought placing the samples in a vacuum desiccator improved sample blanks, but the door was being opened too frequently to make it effective
 - The CAL will soak the samplers for 24 hours, dry for 48 hours. The bodies were then tested in the lab. First tests showed good results, but low #n so far and the bodies were not shipped to a field site.
 - Looked at new sampling bodies versus old/used/unwashed sampler bodies under the SEM – no difference
 - Looked at blue versus white bodies – obvious difference in porosity, however the manufacturer states the bodies should be the same except for the dye. Chris (Lehmann) will discuss with the manufacturer later this spring when he visits Italy for a conference.

- Triplicate variability – University of Illinois statistics consulting class looked at different factors that might affect the variability including # of times a body was used, land use, meteorology (CASTNET) and grouped these variables together
 - Controlling variables were wind speed and # of times the bodies were used
 - CAL will look to see if there is a threshold for the # of times the bodies are used – the only factor they can control
 - CAL has triplicate denuder data from Bondville to compare with the triplicate Radiello data
 - CAL/EPA will summarize triplicate variability in the CAL's 2011 QA report
- Site Survey Status Report and Summary of 2011 Surveys (Hebert)
 - Site survey summary – 93 NTN sites, 36 MDN sites and 4 AIRMoN sites were surveyed in 2011
 - Belfort gages that are still in use still look good
 - Grid sensors are variable – some heat when they shouldn't be. They are not replaced on site by EEMS. Question of whether EEMS should carry extra sensors if they need to be replaced
 - Focused on training site operators to use gloves, hold handles of the bucket, properly use the balance
 - The survey is just a snapshot of what the site is over the 3-year period in between visits. Should they quantify instead of qualify the status? Need to include guidelines for quantifying natural versus artificial landscape – different surveyors see these differently
 - Deployed a low-cost, small footprint ammonia sampler at GA40 – will deploy at Duke Forest in North Carolina site also
- NTN Analytical Priorities (Rhodes)
 - Recommendation (from the 2011 CAL Review) to reprioritize the analytes for NTN for low volume samples (2% of total # of samples). Currently analyze pH and conductivity first which takes 8mL. Is it more important to analyze for S, N species first?
 - Look into diluting the sample to 30mL or process in a different order. Tracy will present results for precision between diluted and non-diluted samples in the fall
 - We will lose pH and conductivity with dilution. Is this acceptable?
 - Do not invalidate data when all analytes in that sample are not measured – discuss with DMAS. The sample would not be ion balanced, used for QA of data
- USGS Co-located Sampler Program, the Mysterious “Dry” Exposure Issue (Wetherbee)
 - CA50/50CA (ACM versus N-CON) used to adjust historic data with new electronic raingages (e-gages)
 - MA01/01MA (ACM versus N-CON) coastal issues. Likely need to adjust historical ACM concentrations using geographic components
 - Higher catch in the N-CON collector, but at MA01/01MA the Aerochem collector has a higher catch because of the building located at the site. Consistently higher concentrations in the N-CON collector, similar to results from VT99 and IL11

- CAL uses 6 hours of dry exposure time as criterion for an undefined invalid sample
- OTT Pluvio does not have particle counter to sense when precipitation occurs
- Dry exposure is “overestimated” when the N-CON collector is used with the e-gages, i.e. measured depth carries over until reaches 0.01”. N-CON sensors more sensitive than gages. Collectors are open while gage is not registering a large enough change in mass. **Motion: Sample validation procedures for N-CON MDN collectors shall be primarily based on whether the collector lost power while open combined with operator assessment of collector’s mechanical condition, in order to determine when to invalidate samples due to undefined or bulk mode status. Dry exposures logged by raingage shall only be used as backup and as supplemental information for sample invalidation. (Motion by Karlstrom, second by Wetherbee)**
- Tom B. and Bob L. are working on automatic flagging code that HAL can use

NOS/DMAS

- Mapping Errors (Larson)
 - Site specific errors determined by bootstrapping/cross-validation technique – each point is removed from the interpolation and then predicted based on remaining data
 - Looked at the root mean square error – consistent from year to year for each analyte
 - Regional errors – southwest had the greatest RMSE for most analytes, SO_4^{2-} highest error in the east, which is expected because SO_4^{2-} is highest in the eastern region
 - Precipitation is not interpolated, so a different approach had to be used to look at errors in the calculated precipitation error. Lower residuals from NADP + PRISM than from NADP only
 - Results are posted at <http://napd.isws.illinois.edu/dl/interpolation/>
 - Possibly look at coastal influence and lee sides of mountains in Rocky Mtn. region
- Sample Validation and QR Coding for NTN (Bergerhouse)
 - There are differences in the way NTN and MDN samples are flagged (QR codes)
 - Proposal to make NTN samples with incomplete chemistry valid, instead of invalid as they are coded now
 - Replace the NTN SL & SP codes with code similar to the MDN, AIRMoN and AMoN networks. The current system is redundant and confusing
 - **Motion: The CAL will implement the new QR coding system with changes in descriptions. They will report on the implementation process in the fall. (Motion by Wetherbee, second by Hebert, motion passed)**
 - **Motion: NTN samples with incomplete chemistry will be released on the web as valid data and added to the maps going forward. (Motion by Mishoe, second Wetherbee, motion passed)**
 - B. Larson will evaluate how the addition of NTN samples with incomplete chemistry would affect the historical data