

Dear CASTNET Site Operator:

This message is your **CASTNET: Eye on Air Quality** newsbrief for Winter 2013
(best viewed in HTML format in your e-mail reader)



NETWORK NEWS

WARMS network joins CASTNET

The Bureau of Land Management Wyoming State Office (BLM-WY) operates the Wyoming Air Resources Monitoring System (WARMS) network, a seven-station network that monitors air quality in the northeast and north-central portions of the state. BLM-WY has recently authorized ARS, the WARMS contractor, to upgrade and augment instrumentation at several of the stations to meet CASTNET protocols. Collected and validated data will be consistent with all other CASTNET stations.

The WARMS network began in 2000 to assess existing air quality conditions, evaluate long-term air quality trends, and provide data for the development of models and impact analyses. Additional funding has recently allowed BLM-WY to upgrade some of the instrumentation and integrate five of the stations into the CASTNET program:

- Basin (BAS601) recently received new, regulatory ozone instrumentation and an upgrade to its filter pack system.
- Newcastle (NEW602) recently received regulatory ozone instrumentation and an upgrade to its filter pack system.
- Buffalo (BUF603) recently received an upgrade to its filter pack system.
- Sheridan (SHE604) recently received non-regulatory ozone instrumentation and an upgrade to its filter pack system.
- Fortification Creek is a new site that is yet to be installed. This site will include a 6 m tower (unlike the 10 m towers used at other CASTNET sites) and will include a CASTNET filter pack system.

Additionally, BLM-WY has resumed operation of meteorology at the current Pinedale CASTNET site (PND165).

ARS has modified the Basin and Newcastle sites to meet CASTNET monitoring protocol requirements and installed new instrumentation at the Buffalo and Sheridan sites. The Fortification Creek site is scheduled for installation in February. AMEC's laboratory will provide filter media, pre-loaded filter pack assemblies, and filter analysis services for the filter packs, in conformance with CASTNET protocols. Ozone data will be validated by ARS and filter packs will be sent to AMEC for analysis.



Newcastle (NEW602) WARMS Site

Ozone and filter pack concentrations at the Maine Howland Research Forest

CASTNET began collecting ozone and filter pack measurements at the Howland Research Forest AmeriFlux site (designated HOW191) in Maine in September 2011. This study represents the first collaboration between the two long-standing national networks. AmeriFlux's goal is to measure ecosystem level exchanges of carbon dioxide, water, energy, and momentum. AmeriFlux sites use a 30 m tower to enable flux measurements in the lower boundary layer. CASTNET is interested in similar atmospheric processes for ozone, sulfur and nitrogen species.

Hourly average ozone concentrations were collected at eight elevations on a 30 m scaffold tower during second quarter 2012 at the HOW191 site. The tower is located in a 20 m natural canopy of hemlock-spruce-fir (66 percent), aspen-birch (23 percent), and hemlock-hardwood (11 percent) mixtures. The site is situated in a mature, lowland evergreen forest with trees between 40 and 160 years old. Ozone concentrations are measured at 2, 6, 10, 14, 17, 20.5, 23.5, and 28 m. The inlet for the sampler at 28 m is above the canopy, and the inlet at 23.5 m is near the top of the canopy. All other sampler inlets are located within the canopy. Filter pack sampling systems are operated at 2 and 23.5 m.

Design for the ozone system centered on the use of a single ozone analyzer and site transfer standard in conjunction with a solenoid system to allow for all eight levels to be measured using the same analyzer. Even though the measurement heights vary from 2 m to more than 28 m above the ground, the residence times for all levels are less than 20 seconds and there are no indications of line loss. While not a regulatory ozone site, the analyzer is challenged in a similar manner by performing daily checks using a calibration gas created by the site transfer standard and delivered through-the-probe at the 23.5 m inlet.

2012 data show ozone values measured at 28 m to be consistently higher than those measured at 2 m, and early morning concentrations are lower than midday values (likely because of nighttime scavenging). Finally, the mid-afternoon values for the 1400 hour, which are the highest and most uniformly distributed by height, are steadily influenced by daytime ozone production and atmospheric mixing of ozone from aloft. A standard CASTNET 10 m sampling tower is located in a clearing at the HOW132 site, which is approximately five kilometers east of HOW191. The ozone values from the 28 m inlet at HOW191 and the 10 m inlet at the HOW132 site are comparable.

Comparison of the filter pack concentrations from the two sampling heights at HOW191 and the standard CASTNET 10 m filter pack at HOW132 indicate that the 28 m values (above canopy) are reasonably comparable to the 10 m values, though total nitrate concentrations measured at HOW132 were typically higher than the 28 m values at HOW191. Concentrations measured at 2 m have been lower than the above-canopy values.



Ozone sampling solenoid system at HOW191



Inlet view from top of HOW191 tower

CASTNET is growing!

In the northeastern United States, CASTNET recently added three new filter pack-only sampling sites in an acid-sensitive eco-region. The region was selected based on the eco-system's sensitivity; current monitoring infrastructure, including CASTNET and NCore monitoring stations; long-term water quality monitoring programs, including National Atmospheric Deposition Program (NADP)/National Trends Network (NTN); and collaboration with other federal agencies. The filter pack-only sites were installed at the Underhill, VT (UND002) rural NCore/NTN site and at Nicks Lake, NY (NIC001) and Whiteface Mountain, NY (WFM105), which are New York State Department of Environmental Conservation monitoring sites. The basic suite of measurements being deployed at the small-footprint, filter pack-only sites includes a flow tower for filter pack sampling and a 9-meter temperature probe with a data acquisition system and communications system housed in a weather-resistant container.

To gain additional information about nitrogen pollutants within this northeastern eco-region, total reactive oxides of nitrogen (NO_y) measurements were added to the existing CASTNET site at Huntington Wildlife Forest, NY (HWF187). Overall, measurements in this eco-region will include NO_y measurements, CASTNET filter pack measurements, NADP's Ammonia Monitoring Network (AMoN) concentration measurements, and NADP's National Trends Network (NTN) and Atmospheric Integrated Research Monitoring Network (AIRMoN) wet deposition measurements. These measurements will be used to determine the feasibility of using a multi-pollutant approach as defined in terms of an aquatic acidification index (AAI).

In the western United States, additional CASTNET filter pack monitoring locations were added to an eco-region encompassing the Wyoming/Colorado area. Five Bureau of Land Management Wyoming State Office (BLM-WY)-operated WARMS sites adopted CASTNET-protocol filter pack sampling. See the related WARMS article in this issue of Eye on Air Quality for additional information. NO_y measurements will be added to existing CASTNET sites within this western eco-region during the winter and spring as weather permits. These sites are Rocky Mountain National Park, CO (ROM206) and Pinedale, WY (PND165). NADP/NTN and AMoN sampling takes place at or near the sites in this eco-region, also providing a multi-pollutant approach to measurements.

NO_y measurements will be added to a fourth existing CASTNET site that is located in the Ohio River Valley at Quaker City, OH (QAK172). This site has measured some of the highest annual average pollutant concentrations in the network. The NO_y measurements will enhance studies of nitrogen concentration and deposition values at the QAK172 site.

OPERATOR TIPS

Now is the time to refresh filter pack supply and logistics

The New Year is a perfect time to ensure that your station is in order. Take the time to confirm that the order of your filter packs is correctly sequenced and that you have an adequate supply of reserve filters on-site. Also be sure to document filter pack changes on your log sheet.

Reminder: Inform your contractor (AMEC or ARS) when an auditor has shown up at your monitoring location and has performed a station audit. You do not need to call during the audit, but let us know soon after an audit was performed and send along the audit results. A large, yellow sign hangs in each NPS station as a reminder, instructing auditors and operators to send the results to ARS. If the auditor found something awry we can quickly investigate and/or correct the problem before too many data are affected.

Backup operators must be current, too!

Backup operators, who perform filter pack changes and site servicing when the primary CASTNET operator is away, must stay current on proper operations. Ideally, backup operators should visit the monitoring station at least once every other month with the primary operator to ensure that proper procedures are being followed by both individuals.

Winter awareness is essential for safe and efficient station servicing

With shorter and darker days, colder temperatures and icy walkways, be sure to dress appropriately for the conditions when heading out to perform service checks at your station. Station visits may take a bit longer in the winter, so be equipped with a warm coat, gloves, and a hat. Walk slowly and check for icy conditions.

Document conditions in your station logbook with the presence of any snow or ice at your station or on your monitoring equipment. These log notes provide operations and laboratory staff with important information about the operating conditions of your station equipment. Brush snow off of sensors and other equipment if possible. However, leave ice accumulations alone; breaking ice off of instrumentation may cause damage. Just make a note of it in your station log and field staff will take remedial action if necessary.

IMPORTANT!!! If your station filter pack has accumulated snow or ice, call the AMEC lab for instructions. If you observe moisture or ice inside the inlet tubing, please call your support contractor for instructions on removing the moisture.

OUTSTANDING SITES

National Park Service (NPS) sites that achieved 95% - 100% validated ozone data for September through November 2012 and U.S. Environmental Protection Agency (EPA) sites that achieved 95 - 100% validated ozone data for August 2012 through October 2012:

ACA416, ME ALH157, IL ANA115, MI ASH135, ME	CHE185, OK CKT136, KY CND125, NC COW137, NC	GRS420, TN HOW132, ME JOT403, CA KEF112, PA	MOR409, WA OXF122, OH PAL190, TX PED108, VA	PSU106, PA ROM406, CO SAL133, IN SEK430, CA
BBE401, TX CAN407, UT CDR119, WV CDZ171, KY CHA467, AZ	DCP114, OH DEN417, AK GLR468, MT GRC474, AZ	LAV410, CA MCK131, KY MEV405, CO MKG113, PA	PET427, AZ PIN414, CA PND165, WY PNF126, NC	SND152, AL SUM156, FL VIN140, IN WST109, NH YOS404, CA

Please contact us with topics and tips of what you want us to explore next time in your **CASTNET: Eye on Air Quality** newsbrief.

For monitoring site assistance, please contact:

NPS CASTNET sites: contact Air Resource Specialists – Telephone: 1-800-344-5423 (Mountain Time)

EPA CASTNET sites: contact AMEC – Telephone: 1-888-224-5663 ext. 2602 or ext. 6620 (Eastern Time)