

Dear CASTNET Site Operator:

This message is your **CASTNET: Eye on Air Quality** newsbrief for Spring 2012 (best viewed in HTML format in your e-mail reader)



### **SITE OPERATOR TIPS**

#### **Up channels before leaving your site**

During each weekly site visit on Tuesdays, standard procedure requires the site operators to down the flow and ozone channels while changing out the filter pack and performing checks on the ozone analyzer. See the screenshot of a Campbell Scientific data logger where the flow channel has been downed. The status of the desired channel can be changed by clicking on the true/false column across from the respective parameter listed under the “Down All Channels” column. A “true” status indicates that the channel is down, and conversely a “false” status indicates that the channel is up (see related screenshots).

Operators using an ESC data logger can determine if a channel is up or down by starting at the Home Menu, press <D> for the Real-Time Display Menu, then press <F> to display the data channels with flags. If the O3, O3CAL, and FLW channels are marked with a “D” flag to the right, the channels are offline (down). To up the channels, or bring them back online, begin at the Home Menu and select <C>Configuration Menu, <D>Configure (Data) Channels, then <E>Enable (Mark) Channel Online. Use the up and down keys to navigate and the spacebar to select channels. Press <Enter> to put the selected channels back online.

#### **Campbell Data Logger – Channel Down Screenshot**

SAL133 Numeric Display 1: Real Time Monitoring (Connected)								
<input type="button" value="Add..."/>  <input type="button" value="Delete"/>  <input type="button" value="Delete All"/>  <input type="button" value="Options..."/>  <input type="button" value="Stop"/>	RecNum	11,282,627	Batt Volt	12.95	Temp1 Blower B	false		
	TimeStamp	09:26:52	Panel Temp	21.22	Temp2 Blower B	false		
	wind direction	341.08	wind direction f		wind direction v	4,737.18	Down All Channels	false
	windspeed	4.36	windspeed f		windspeed v	0.00	windspeed down	false
	shelter temperature	18.40	shelter temperature f		shelter temperature v	0.00	shelter temperature down	false
	temperature	5.34	temperature f		temperature v	4.26	temperature down	false
	temperature2	6.44	temperature2 f		temperature2 v	5.14	temperature2 down	false
	temperature delta	-1.10	temperature delta f		temperature delta v	0.00	temperature delta down	false
	relative humidity	53.49	relative humidity f		relative humidity v	534.92	relative humidity down	false
	wetness	0.01	wetness f		wetness v	7.75	wetness down	false
	precipitation	0.00	precipitation f		precipitation v	0.00	precipitation down	false
	solar radiation	637.91	solar radiation f		solar radiation v	456.95	solar radiation down	false
	Transfer SR	0.00	transfer sr f		Transfer SR V	302.71	transfer sr down	false
	ozone	27.65	ozone f		ozone v	0.00	ozone down	false
	Transfer Ozone	NAN	transfer ozone f	N/A	Transfer Ozone V	NAN	transfer ozone down	N/A
flow rate	1.50	flow rate f		flow rate v	1,560.21	flow rate down	true	
so2	56.35	so2 f		so2 v	2,817.39	so2 down	false	

### ESC Data Logger – Channel Down Screenshot

```
ESC 88XX v5.31 ID:RM Choose(Space Toggle/Enter Select) 04/26/02 11:30:27
> O3 = 39 (D )
O3CAL = 0 (D )
FLW = 3.0 (D )

[example data logger screen showing channels down]
```

Unless specifically instructed by an AMEC or ARS technician to leave a channel down, all channels that were downed during the site visit must be upped before leaving the site.

Occasionally, a channel, sometimes two, is erroneously left down by a site operator during the weekly visits. This requires that extra time and effort be spent during subsequent data review to determine when channels were down, update data status flags, and document these and other corrective actions taken as a result.

Before leaving your site, please review the status of all channels and make sure that all channels that were downed during the site visit are restored to their original status.

### Campbell Data Logger – Channel Up Screenshot

SAL133 Numeric Display 1: Real Time Monitoring (Connected)								
Add...	RecNum	11,282,880	Batt Volt	12.95	Temp1 Blower B	false		
	TimeStamp	09:31:05	Panel Temp	21.20	Temp2 Blower B	false		
Delete	wind direction	333.11	wind direction f		wind direction v	4,626.57	wind direction do	false
	windspeed	6.52	windspeed f		windspeed v	0.00	windspeed down	false
Delete All	shelter temperatu	18.24	shelter temperatu		shelter temperatu	-0.16	shelter temperatu	false
	temperature	5.34	temperature f		temperature v	4.26	temperature dow	false
Options...	temperature2	7.10	temperature2 f		temperature2 v	5.66	temperature2 dov	false
	temperature delta	-1.76	temperature delta		temperature delta	0.00	temperature delta	false
Stop	relative humidity	50.82	relative humidity		relative humidity	508.16	relative humidity	false
	wetness	0.01	wetness f		wetness v	7.42	wetness down	false
	precipitation	0.00	precipitation f		precipitation v	0.00	precipitation dow	false
	solar radiation	645.36	solar radiation f		solar radiation v	462.29	solar radiation d	false
	Transfer SR	0.00	transfer sr f		Transfer SR V	310.89	transfer sr down	false
	ozone	29.24	ozone f		ozone v	0.00	ozone down	false
	Transfer Ozone	NAN	transfer ozone f	N/A	Transfer Ozone V	NAN	transfer ozone do	N/A
	flow rate	1.50	flow rate f		flow rate v	1,560.71	flow rate down	false
	so2	56.33	so2 f		so2 v	2,816.56	so2 down	false

### ESC Data Logger – Channel Up Screenshot

```
ESC 88XX v5.31 ID:RM Choose(Space Toggle/Enter Select) 04/26/02 11:30:27
> O3 = 39 ( )
> O3CAL = 0 ( )
> FLW = 3.0 ( )

[example data logger screen showing channels up (online)]
```

### Filter pack field blanks

CASTNET measurements and supporting activities are routinely assessed in order to ensure that CASTNET data can be used with confidence and that CASTNET continues to produce information of the highest quality. As described in the CASTNET Quality Assurance Project Plan (QAPP), various checks are in place to verify that sample integrity is maintained. This process begins with filter acceptance testing and continues throughout all stages of filter handling to ensure that materials in contact with sample media do not affect the analytes of interest in a way that could bias results. These materials must be traceable to a point to enable documentation of their contact with the sample. In addition to other quality control checks, sample integrity is maintained by incorporating testing of laboratory blanks and field (trip) blanks for the dry deposition samples.

As described in Section 3.1.3 of the current CASTNET QAPP, field blanks are prepared once each quarter for each sampling site. The filter packs used for the field blanks contain a nonstandard quick connect that cannot be installed on the tower. The field blanks that are sent to each site are clearly identified with labels informing the site operator not to remove the filter pack from the resealable plastic bag. When the field blank is received back from the site, it is unpacked and extracted following the standard procedures. A field blank's trip to and from the site provides a way to quantitatively check that contamination is not introduced to the sampling media during the packing, shipping, and unpacking process.

When you receive a field blank at your site, it will be sent in the same shipping tube as the regular, weekly filter pack. Leave the field blank in the shipping tube, and return it with the same sample with which it arrived after the required collection week period ends. Identification (ID) numbers for the field blanks will be similar to the Lab ID for the regular filter pack with the exception that the field blank number ends in "4" instead of "1." For example, the filter pack field blank for week 17 that will be going to site ABT147, CT is Lab ID 1217004-01, and the filter pack sample for week 17 is Lab ID 1217001-01, both indicating the same on-date. However, only the filter pack sample (1217001-01) should be removed from the shipping tube.

### **Data logger time prevails**

One sign of spring for most people in the United States is the change to Daylight Saving Time. Clocks are set forward an hour in March and remain at that time until fall when it is time to revert back to Standard Time. While this is true for most states, it should be noted that CASTNET sites do not follow Daylight Saving Time. The data logger for each site is set to local Standard Time. To ensure continuity from week to week, **please only use data logger time** when completing the Site Status Report Form and any other site documentation.

### **Requesting supplies**

As a site operator for CASTNET, you can count on us to provide what you need for your weekly visits to your site. AMEC provides supplies for all EPA-sponsored sites; ARS provides supplies for all NPS-sponsored sites. If you are running low on supplies, let us know on your Tuesday call. You can also call us at another time or send us an email. Additionally, you can request supplies directly on the Site Status Report Form (SSRF) that is included with the filter pack.

The types of supplies usually requested include gloves, Teflon filters, log books, and shipping labels. Silica gel is also commonly requested for EPA-sponsored sites. In general, we will provide or reimburse your expenses for nearly any item required at a site. To obtain supplies for EPA CASTNET sites: contact AMEC Telephone: 1-888-224-5663 ext. 2602 or ext. 6620 (Eastern Time). To obtain supplies for NPS CASTNET sites: contact Air Resource Specialists Telephone: 1-800-344-5423 (Mountain Time).

## **NETWORK NEWS**

### **Highlights from the CASTNET summit meeting**

In March, EPA, NPS, and their contractors (AMEC and ARS, respectively) met for a joint summit meeting in Jacksonville, FL to discuss ways to further integrate the EPA and NPS sites, future upgrades to the network, data issues, and special study results. Some highlights from the meeting are described below.

#### *Howland, ME Direct Deposition Study at AmeriFlux*

The AmeriFlux network was designed to measure carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) vapor fluxes at sites throughout North, Central, and South America. The Howland, ME AmeriFlux site is located approximately 2 miles from the Howland CASTNET site (HOW132). The AmeriFlux site is located in a small clearing in an old growth forest with a canopy height of approximately 20 meters (m). There is a 30 m tower, which is used to perform flux studies at the site. EPA's Clean Air Markets Division (CAMD), AMEC, and EPA's Office of Research and Development have deployed CASTNET filter packs at two heights (2 m and 23.5 m) on the AmeriFlux tower. In addition, an ozone analyzer was installed with a solenoid-trigger system to switch between eight sampling inlets at different heights on the tower to measure hourly samples of the ozone profile extending above and below the canopy.

Greg Beachley (CAMD) presented the preliminary results from the study that showed a diurnal fluctuation and episodes of decreasing ozone concentrations with decreasing inlet height. EPA is assessing whether the current meteorological equipment at the site is capturing all of the data that will be necessary for modeling the flux at the site. The data collected from this study will be used to evaluate the Multi-Layer Model (the model used by CASTNET calculate deposition velocities) and re-parameterize it if necessary. If this study provides improved flux estimates for CASTNET, EPA will consider installing similar systems at additional AmeriFlux sites in the future.

#### *CASTNET Regulatory Ozone Monitoring*

All EPA- and NPS-sponsored CASTNET ozone monitoring data are being submitted to EPA's Air Quality System (AQS) and will be used to calculate "design values" (i.e., the air quality status of a region relative to the National Ambient Air Quality Standards, or NAAQS). This has required equipment upgrades and more conservative quality assurance (QA) procedures to be implemented. In 2010, it was noted that there was a slight bias in the collocated ozone data at the Rocky Mountain National Park collocated sites ROM406/ROM206. Since then, several changes have been made to both the EPA- and NPS-sponsored sites to remove any differences in the equipment setup and data QA. The NPS and its contractor, ARS, are updating the NPS site ozone transfer standards to become Level 3 transfer standards, where the level indicates how far removed from the primary standard (i.e., Level 1) the transfer is. As of May 2011, all EPA-sponsored sites have Level 3 site transfer standards. Another difference in sample systems is that EPA sites still use knockout bottles to collect any condensation that forms within the sample line, whereas the NPS sites do not. EPA will remove the knockout bottle at ROM206 to see if the 2 parts per billion (ppb) bias we currently see is reduced. In addition, AMEC will perform a calibration at an NPS-sponsored site, and ARS will perform a calibration at an EPA-sponsored site using their respective equipment in April to determine if there is a difference in their transfer standards. Note, even with the small bias in the data at ROM406/ROM206, the data are still within the 40 CFR Part 58 monitoring requirements.

To ensure the required audits are being performed and the proper paperwork is submitted to EPA's Office of Air Quality Planning and Standards (OAQPS), Tim Sharac (CAMD) presented a document outlining these procedures. The document was circulated prior to the meeting, and key questions that still remained were answered during this discussion. When this document is finalized, it will be posted on the CASTNET Web site ([www.epa.gov/castnet](http://www.epa.gov/castnet)).

#### *Calculating Deposition Velocities*

In addition to measuring air pollutant concentrations, CASTNET has historically collected hourly meteorological measurements that are used as input to the Multi-Layer Model, a numerical model used for estimating dry deposition to ecosystems in the atmospheric boundary layer. The Multi-Layer Model utilizes meteorological data to model the deposition velocity of a component, (i.e., its rate of deposition). As of January 2011, meteorological parameters are measured at only four of the EPA-sponsored CASTNET sites: PAL190, TX; CHE185, OK; BVL130, IL; and BEL116, MD. Temperature measured at 9 meters has been retained at all sites in order to calculate flow rates. In order to replace missing deposition velocity values caused by missing and discontinued meteorological parameters and improve data completeness, a new method has been developed for replacing "missing" deposition velocities. Gary Lear (CAMD) outlined the data replacement scheme, which includes taking a 5-year average deposition velocity for every hour and using that average to replace any missing values. While all the results were not final at the summit, final results will be presented at the National Atmospheric Deposition Program (NADP) Total Deposition Science Committee meeting on April 23rd in Portland, OR. The Multi-Layer Model will still be run for the NPS and EPA sites that still operate meteorological equipment. EPA will only provide seasonal and annual flux values on the CASTNET Web site.

While the data replacement method will be used in the near-term, EPA and NPS will explore other methods for estimating dry deposition. The Community Multi-Scale Air Quality Model (CMAQ) has been proposed as one source of dry deposition velocities. However, several obstacles remain before CMAQ is routinely used in CASTNET. Foremost among them are the long lag times between measurements and model runs (typically more than two years) and the frequent revisions to the model itself.

Finally, to wrap up the meeting, we discussed what the future of CASTNET might look like from an EPA and NPS perspective. There was overall agreement that we need to continue to explore ways to provide dry deposition values that are more useful than modeling alone, to position ourselves to be relevant under any new EPA regulations (e.g., a nitrogen oxides (NO<sub>x</sub>)/sulfur oxides (SO<sub>x</sub>) secondary standard or a revised ozone NAAQS), and

continue to build and maintain partnerships (i.e., climate monitoring, Bureau of Land Management, etc.). Overall, the joint summit was successful, and everyone agreed that meeting was worthwhile and helped us improve our vision for the future of the network.

## **OUTSTANDING SITES**

National Park Service (NPS) sites that achieved 95%-100% validated ozone data for December 2011 through February 2012 and U.S. Environmental Protection Agency (EPA) sites that achieved 95%-100% validated ozone data for April 2011 through July 2011:

ACA416, ME ASH135, ME BBE401, TX BWR139, MD	GRB411, NV GRC474, AZ GRS420, TN HOW132, ME	PET427, AZ PIN414, CA PNF126, NC PSU106, PA
CAN407, UT CDR119, WV CHE185, OK COW137, NC	JOT403, CA KEF112, PA KNZ184, KS LAV410, CA	ROM406, CO SEK430, CA SHN418, VA UVL124, MI
DCP114, OH DEN417, AK ESP127, TN GLR468, MT	LRL117, PA MAC426, KY MEV405, CO MOR409, WA	VOY413, MN WST109, NH YEL408, WY 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.

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For monitoring site assistance, please contact:

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