

MADIS and APRSWXNET/CWOP: Free Automated Near Real-Time QC for Your AIRNow Met Data

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Background

MET Field QC: Important but labor intensive

Wind is critical data -- also failure prone, difficult to audit

Enter MADIS:

NOAA's Meteorological Assimilation Data Ingest System [!!]

MADIS ingests data from many non-NOAA/NWS Mesonet stations

Creates a spatially dense met data set to assist with forecasting

Usually small, privately operated or DOT related stations

Generally do not have routine QC

MADIS applies buddy-system QC checks to these data

Models data for each station based on nearby stations

Generates modeled minus measured error data in real time

http://madis.noaa.gov/madis_sfc_qc.html

AIRNow is a MADIS Mesonet Provider as of Feb 2010

==> Makes YOUR met data available to NOAA/NWS and many others

Other MADIS Meteorological Surface Data Providers:

http://madis.noaa.gov/mesonet_providers.html

U.S. Air Force Academy

Alaska Department of Transportation

Alaska Mesonet

U.S. Army Aberdeen Proving Grounds

Citizen Weather Observers Program **APRSWXNET**

NOAA Air Resources Laboratory/Field Research Division

AWS Convergence Technologies, Inc.

Anything Weather Network

Colorado Avalanche Information Center

Colorado Department of Transportation

Colorado E-470 Public Highway Authority

DCNet

Florida Dep of Transportation

Florida Mesonet

Georgia Dep of Transportation

Goodland WFO Miscellaneous

GLOBE Program

Gulf of Maine Ocean Observing System

ESRL/GSD Ground-Based GPS

Hydrometeorological Automated Data System

Iowa Dep of Transportation

Iowa Environmental Mesonet [and so on...]

But...

Modeled QC results are not readily accessible in a user friendly form

They are out there if you know a few tricks and secrets...

The Free Lunch:

Citizens Weather Observing Program (CWOP) -- aka APRSWXNET

Public - private partnership to allow anyone to submit met data to MADIS

Originally created for amateur radio packet met data feeds

NESCAUM worked with CWOP to “expose” the MADIS AIRNow QC

CWOP value added:

Takes MADIS QC and repackages it into an accessible format

User friendly, “push” email system

Daily, Weekly, Monthly quality summaries and diagnostics

SLT Met systems can take advantage of CWOP QC

ID problems quickly and at no cost

Supplements, not replaces, traditional Met QC

Example of Normal Monthly Summary

Sign up at: <http://weather.gladstonefamily.net>

Date	UTC	Alt (mb)		Temp °F		Dew Pt. °F		Wind Dir degrees		Speed knots	
31-Oct-09	Errs	0/96		0/96		0/96		1/96		1/96	
31-Oct-	Mnt	+0.3	0.34	-1	1.39	+1	1.17	+0	66	+1.4	1.9

1st row, daily 'Errs': # of samples failing QC / total # samples for date

'Mnth' row: summary for preceding month

'mean | standard-deviation' for each observation during month

Mean error value: 'analysis - observed'

if observed value > modeled value, error is negative

Case Study:

May 2009 -- Monthly Summary for Acadia-SERC, DW2258

Date	UTC	Alt (mb)	Temp °F	DewPt °F	Wind Dir	Speed knts
31-MAY-2009	1802	1005.3 +0.18	52 +6.62	48 -1.91	211 -25	7.0 -0.8
31-MAY-2009	1817	1005.2 +0.28	51 +7.62	47 -0.70	178 +8	7.0 -0.8
31-MAY-2009	1832	1004.9 +0.58	52 +6.62	48 -1.76	198 -12	7.0 -0.8
31-MAY-2009	1847	1005.0 +0.48	52 +6.62	47 -0.50	200 -14	9.6 -3.4
31-MAY-2009	Errs	0/96	7/96	0/96	1/96	1/96
31-MAY-2009	Smry	+0.3 0.26	+1 3.60	-0 2.28	-27 60	-0.4 1.8
31-MAY-2009	Week	+0.4 0.35	+0 3.08	-0 2.55	-21 57	-1.1 2.6
31-MAY-2009	Mnth	+0.3 0.35	+1 3.21	-0 2.46	-17 49	-0.9 2.6

First 4 rows are “flagged” individual report interval data; **Temp too low.**

==> But -- DP is derived; T/RH are measured, so T is OK! [sea breeze]

Rows 5-6 are error count and bias/stdev for the day (31 May).

Last 2 rows are bias/stdev for the week and month; Note wind dir error!!

Acadia-SERC CAMNET Wind direction error -- Case Study:

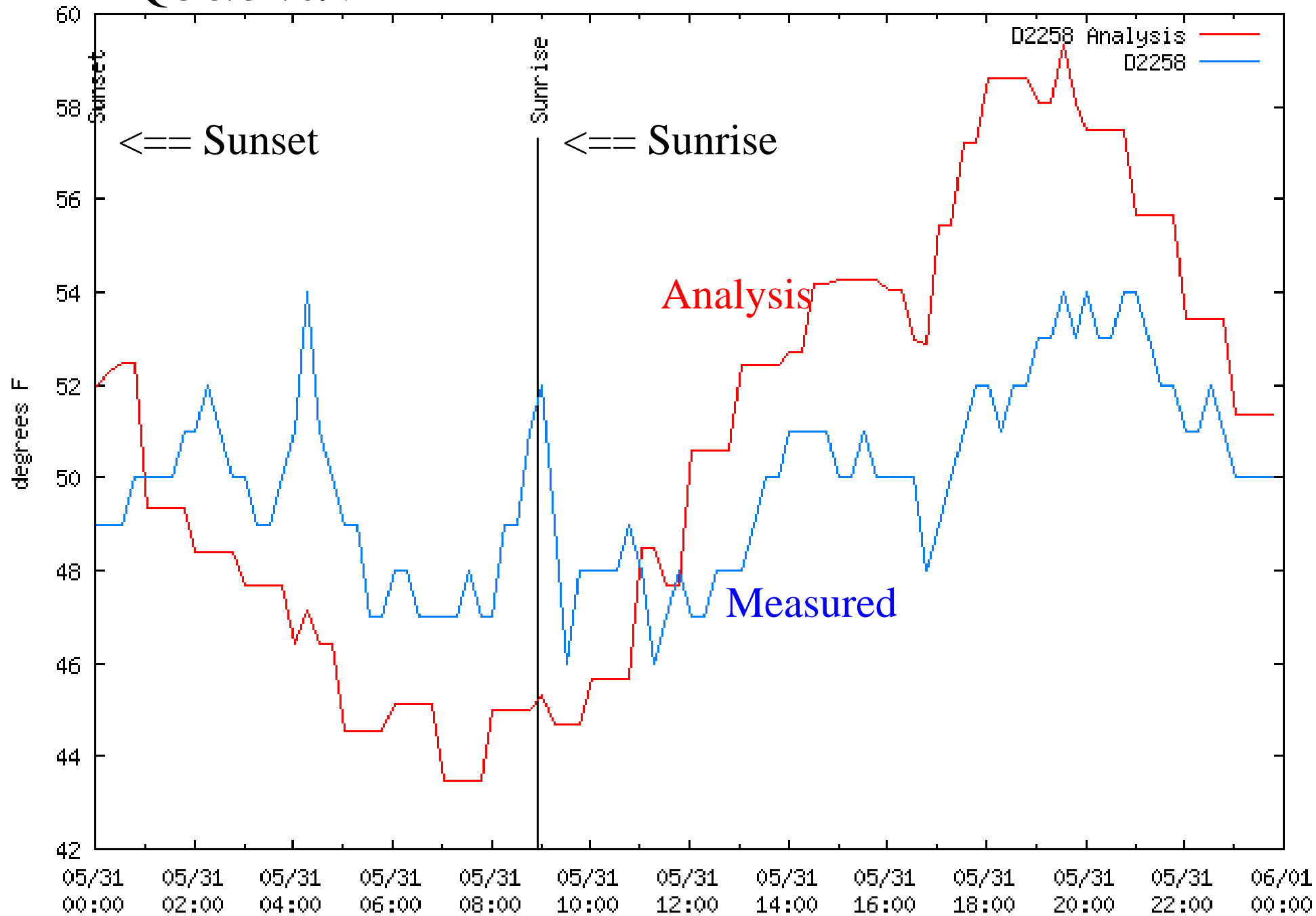
Reviewing a few months of QC reports indicated a chronic error of $\sim 25^\circ$

NPS staff confirmed the error (it was ~ 25 deg) and corrected the sensor.

All this from a couple of hundred miles away...

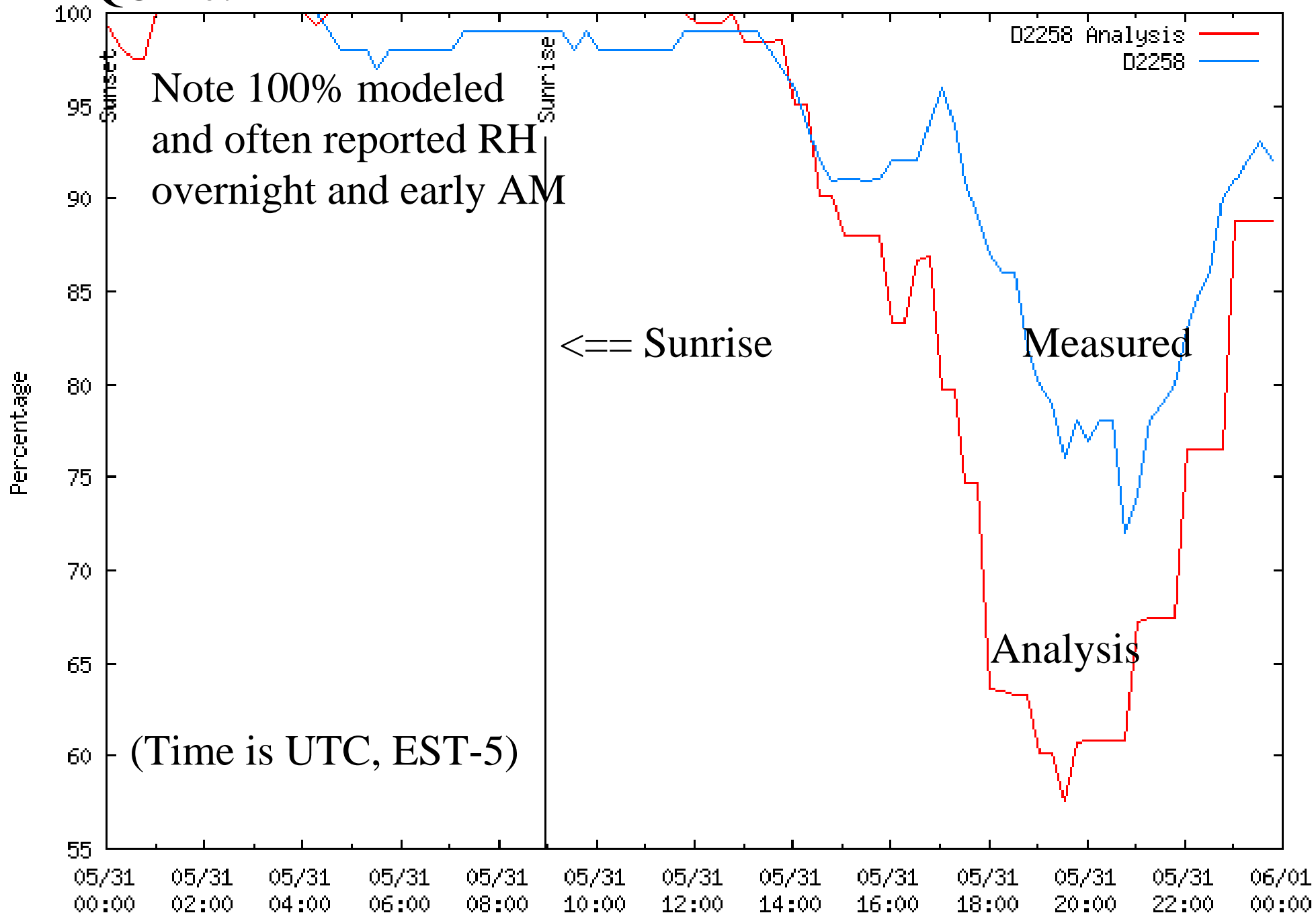
CWOP QC reports provide a paper trail for when a sensor goes bad!

TEMP QC 5/31/09: Temperature for D2258 on 2009-May-31 (time in UTC)



RH QC Plot

Relative Humidity for D2258 on 2009-May-31 (time in UTC)



View of Mt. Desert Island, Acadia NP
from the Schoodic Peninsula. Wx station (DW2258)

7:00 am EDT, 5/31/09 (www.hazecam.net)





CWOP Information for DW2258 (D2258) in Winter Harbor, ME US

The following information is known about DW2258. If you think that any information is incorrect, then please follow the instructions for correcting that data item.

It is *possible* that this page will report a problem where no problem exists. If you believe that this has happened, then please contact me (address at the bottom of this page) and explain *clearly* why you think this page is in error. Note that any changes that you make may take a few days to show up here, so please give it a week before commenting.

Registered Location

Latitude: 44° 20' 10" N (deg min sec), 44.3362° (decimal), 4420.17N (LORAN)
Longitude: 68° 3' 43" W (deg min sec), -68.0620° (decimal), 06803.72W (LORAN)
Elevation: 36 meters (118 feet) -- validated against 28 meters (91 feet) from NED 1/3rd arc-second: Eastern Contiguous U.S.
Location: Winter Harbor, ME US
County: Hancock, ME
Forecast Office: [Caribou \(CAR\)](#)
Station type/software: [Davis Vantage Pro 2 with Weatherlink](#)
Website: http://home.comcast.net/~g_allen/History_Monitor.htm

The site location should be at the mark shown -- or very close. Clicking within the map area (or you can drag the 'DW2258' marker) will display the latitude/longitude of that point.

If the displayed location (or elevation) *of the weather observing location* is incorrect, please drag the marker to the right location (or click in the right location), and then [send the updated information](#). Please note that we are trying to spot either the Stevenson Screen (or equivalent) or the location where the barometric readings are taken.

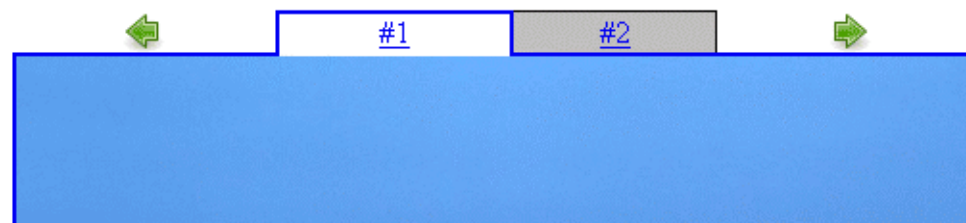
NOTE: The *Registered Location* is the location that the station owner provided when they signed up with CWOP.

The station (or view from the station) is shown here. You can choose the view direction to see the surroundings. Other information (and somewhat larger images) can be found by clicking on the picture.

You can try to find photographs from the area surrounding the site marker by clicking on [Find nearby photographs](#). (There may be some)



[Larger](#) [Smaller](#) [Google Earth](#) Show 1 no-data sites.



AIRNow data in MADIS-CWOP as of 22 April 2010:

AN104	Bridgeport	CT CTDEP
AN105	Greenwich	CT CTDEP
AN106	Danbury	CT CTDEP
AN107	Stratford	CT CTDEP
AN108	Westport	CT CTDEP
AN109	East Hartford	CT CTDEP
AN110	East Hartford - High Street	CT CTDEP
AN111	Thomaston	CT CTDEP
AN112	Cornwall	CT CTDEP
AN113	Middletown	CT CTDEP
AN114	New Haven - Criscuolo Park	CT CTDEP
AN115	Waterbury	CT CTDEP
AN116	Madison	CT CTDEP
AN117	Groton Fort Griswold	CT CTDEP
AN118	Mansfield-DOT	CT CTDEP
AN119	Stafford	CT CTDEP
AN120	Abington	CT EPAOAP
AN250	Auburn-Lewiston Airport	ME MEDEP
AN251	Presque Isle Regional Office	ME MEDEP
AN252	MICMAC	ME MICMAC
AN253	Cape Elizabeth	ME MEDEP
AN254	Bar Harbor - Cadillac Mtn.	ME MEDEP
AN255	Acadia NP - McFarland	ME MEDEP
AN256	Augusta State Airport	ME MEDEP
AN257	Owls Head Municipal Airport	ME MEDEP
AN258	Bangor Air National Guard	ME MEDEP
AN259	Penobscot Nation	ME PENOBSCOT
AN260	Howland	ME EPAOAP
AN261	Sipayik	ME TRIBALENV
AN262	Ashland	ME EPAOAP
AN276	TRURO	MA MADEP
AN277	Fairhaven	MA MADEP
AN278	LYNN	MA MADEP
AN279	NEWBURY	MA MADEP
AN280	Haverhill	MA MADEP

AN281	CHICOPEE	MA MADEP
AN282	WARE	MA MADEP
AN283	STOW	MA MADEP
AN284	E. Milton - Blue Hill	MA MADEP
AN285	BOSTON-KENMORE	MA MADEP
AN286	Boston - Long Island	MA MADEP
AN287	Boston - Roxbury	MA MADEP
AN288	Worcester	MA MADEP
AN289	Uxbridge	MA MADEP
AN380	Laconia	NH NHDES
AN381	Keene	NH NHDES
AN382	Lebanon	NH NHDES
AN383	Woodstock	NH EPAOAP
AN384	Manchester	NH NHDES
AN385	Nashua - Gilson Rd.	NH NHDES
AN386	Miller State Park	NH NHDES
AN387	Concord	NH NHDES
AN388	Portsmouth	NH NHDES
AN389	Odiorne State Park	NH NHDES
AN390	Claremont	NH NHDES
AN391	East Orange	NJ NJDEP
AN392	Flemington	NJ NJDEP
AN393	Rider University	NJ NJDEP
AN394	Wash. Crossing	NJ EPAOAP
AN395	Chester	NJ NJDEP
AN396	Elizabeth Trailer	NJ NJDEP
AN397	Huntington Wildlife	NY EPAOAP
AN398	St Regis Mohawk	NY TRIBALENV
AN399	Connecticut Hill	NY EPAOAP
AN615	Bennington	VT VTAPCD
AN616	Underhill	VT VTAPCD
AN617	BRLNGTN2	VT VTAPCD
AN618	Burlington	VT VTAPCD
AN619	RUTLAND	VT VTAPCD

For more CWOP - MADIS information:

List of AIRNow and all other public MADIS met stations:

http://madis.noaa.gov/public_stntbl.csv

CWOP Email report Sign up at: <http://weather.gladstonefamily.net>

Site QC info: <http://weather.gladstonefamily.net/cgi-bin/wxsite.pl>

And: <http://weather.gladstonefamily.net/qchart/an111?date=20100425>

WXQC Mailing list:

<http://weather.gladstonefamily.net/mailman/listinfo/wxqc>

CWOP home page: <http://www.wxqa.com/>

MADIS Web Services Portal: <http://madis-data.noaa.gov/index.html>

NOAA contact: Russell Chadwick Russell.B.Chadwick@noaa.gov