

North Carolina (NOC) National Estuarine Research Reserve
Research Creek Meteorological Metadata Report
January - December 2005
Latest Update: **October 17, 2023**

I. Data Set and Research Descriptors

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2. Entry verification

Meteorological information is sampled every 5 seconds from each instrument on the weather station and stored on a Campbell Scientific CR10X data logger. Data are output to a file in three arrays: array 15 stores 15 minute average, max and min data; array 60 stores hourly average, max and min data; and array 144 stores daily average, max and min data. The CDMO Data Logger Program (NERR_4.CSI) was loaded into the CR10X and controls the sensors. The CR10X then interfaces with the PC208W software supplied by Campbell Scientific.

Data are uploaded from the CR10X data logger or storage module to a Personal Computer (IBM compatible). Files are exported from PC208W in a comma-delimited format (.DAT) and opened in Microsoft Excel for pre-processing with the EQWin format macro that was developed by the CDMO to reformat the header columns, insert station codes, insert a date column (mm/dd/yyyy), correct the time column format and reformat the data to the appropriate number of decimal places. The pre-processed file is then ready to be copied into the EQWin weather.eqi file where the data are QA/QC checked and archived in a database. EQWin queries, reports and graphs are used to discover data set outliers (values which fall outside the range that the instrument is designed to measure) and large changes in the data. EQWin is also used to generate statistics, view graphs, create customized queries and reports of the data, cross query the water, weather, and nutrient data and finally export the data to the CDMO.

Any anomalous data were investigated and noted below in the Anomalous/Suspect Data Section. Any data corrections that were performed are noted in the Deleted Data Section below. The most common reported errors/anomalies in 2005 were precipitation differences greater than 5mm in 15 minutes and slightly negative PAR values. All errors were double checked with other data that could support such "anomalous" weather changes and were noted in the sections that follow.

Raw data files and EQWin databases were saved on multiple computers, archived on compact discs, and backed-up on the CDMO server. Paula Murray was responsible for error checking and compiling 2005 weather data.

3. Research Objectives

The principal objectives are to establish long-term monitoring of the weather in the vicinity of Masonboro Island, to obtain better data on storms and to be able to correlate the weather, water quality, chlorophyll and nutrient data. In addition, the weather data collected will be used in support of other ongoing projects within the Reserve and nearby area.

4. Research methods

The Campbell Scientific weather station samples every 5 seconds continuously throughout the year. These data are used by the CR10X to produce 15 minute averages, maximum and minimums (array 15), hourly averages, maximums and minimums (array 60) and daily averages, maximums and minimums (array 144) of air temperature, relative humidity, barometric pressure, rainfall, wind speed, and wind direction. Data are stored in a storage module connected to the CR10X and also downloaded hourly to a PC located in the NOCNERR lab via telemetry using the PC208W software package. Data are periodically compared to values recorded by other local weather stations to verify accuracy. Data are also quality checked using EQWin. The reports, graphs and queries of meteorological data are printed and reviewed. Anomalous data and errors are further investigated and data are corrected, deleted (if necessary) or left unchanged and noted in the metadata report.

The weather station and sensors are inspected monthly for cleaning and/or repair. Sensors are replaced and/or calibrated according to the manufacturer's guidelines (annually or biannually).

5. Site Location and Character:

The components of North Carolina's National Estuarine Research Reserve (from north to south) are: Currituck Banks, Rachel Carson, Masonboro Island, and Zeke's Island. They are located along the southeast Atlantic coast of the United States. Currently, only data from Masonboro Island and Zeke's Island components are transferred to the CDMO.

The meteorological site is located on Masonboro Island, 2.09 km from the NOC

NERR lab, and approximately 76.2 m from the Research Creek water quality deployment site. The weather station is located on an inactive dredge spoil island adjacent to Research Creek east of the Intracoastal Waterway. It is directly across the Intracoastal Waterway from Whiskey Creek, at 34° 9.328'N, 77° 51.054'W. The station sits at an elevation of approximately 4.88 m above sea level, slightly offset from the highest point of the spoil, which has a maximum elevation of approximately 5.8 m. The site has scrub surrounding the periphery, and grassy cover in the central areas. The weather station consists of a 3-meter aluminum tower that holds the wind sensor (wind speed and direction) at a height of 3.68 m and the Li-COR sensor at a height of 3.66 m. The temperature and relative humidity sensor is mounted on the tower at 2.39 m and the barometric pressure sensor, which is inside of the CR10X housing, is mounted at a height of 1.75 m. The rain gauge is located on a separate platform 7.62 m east south east of the tower and is mounted at a height of 1.79 m. The sensors were wired to the CR10X (Campbell datalogger) according to the protocol in the Meteorological Monitoring SOP. There are no surrounding objects that obstruct or shade the weather station.

6. Data collection period

Collection of meteorological data began on 15 March 1997 and continues through the present. Instruments were deployed prior to this date; however, data were for initial testing and verification of functions, and have since been discarded. The data collection period for 2005 began on January 1, 2005 at 00:15 and ended December 31, 2005 at 24:00.

7. Distribution

National Oceanic and Atmospheric Administration (NOAA)/Estuarine Reserves Division (ERD) retains the right to analyze, synthesize and publish summaries of the NERRS SWMP data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publication in which any part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the ERD, OCRM, National Ocean Service (NOS), NOAA. The data enclosed within the package/transmission are only as good as the quality assurance/quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR weather data and metadata can be obtained from the Research Coordinator at the individual NERR site (see section I. 1. Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (see personnel directory

under the general information link on the CDMO home page) and online at the CDMO home page <http://cdmo.baruch.sc.edu/>. Data are available in text tab-delimited format.

8. Associated researchers and projects

Meteorological data will be used to augment other research components of the System Wide Monitoring Program (SWMP) that currently include water quality, chlorophyll and nutrient monitoring. The principal objective of the water quality monitoring is to record long-term water quality data in order to observe and document any physical and chemical changes or trends in water quality over time. The objective of the chlorophyll and nutrient monitoring study is to ascertain the annual and tidal fluctuations in nutrient and chlorophyll a levels surrounding the four water quality sites.

Additional projects are ongoing and continually changing. Check with the Research Coordinator or other contact person for an updated list of research (see section I.1.).

II. Physical Structure Descriptors

9. Sensor specifications

Parameter: Precipitation

Units: millimeters (mm)

Sensor Type: Ecoharmony tipping bucket rain gauge

Model # TB4

Range: 0 to 600 mm/hr

Accuracy: 0.01 inches per bucket tip; +/- 3% for intensities from 25-600 mm/hr

Date of last calibration: 06/09/05

Parameter: Temperature

Units: Celsius

Sensor Type: Platinum resistance temperature detector (PRT)

Model #: HMP45C

Range: -40°C to 60°C

Accuracy: +/- 0.2°C @ 20°C

Date of last calibration: 05/18/04 (installed on 01/05/05)

Parameter: Relative Humidity

Units: Percent

Sensor Type: Vaisala HUMICAP© 180 capacitive relative humidity sensor

Model # HMP45C

Range: 0 to 100% non-condensing

Accuracy: 20°C +/- 2% RH (0 - 90% RH), +/- 3% RH (90 - 100% RH)

Temperature dependence of RH measurement: +/- 0.05% RH/°C

Date of last calibration: 05/18/04 (installed on 01/05/05)

Parameter: LI-COR Quantum Sensor

Units: mmol m⁻² (total flux)

Sensor type: High stability silicon photovoltaic detector (blue enhanced)

Model #: LI190SZ

Light spectrum waveband: 400 to 700 nm

Temperature dependence: 0.15% per °C maximum

Operating Temperature: -40°C to 65°C; Humidity: 0 to 100%

Range: 1% up to 10,000 µmol s⁻¹m⁻², 400-700 nm

Accuracy: 5 µA per 1000 µmol s⁻¹m⁻², with a stability of <± 2% change per year

Date of last calibration: 09/07/04 (installed on 01/05/05)

Parameter: Wind Speed and Wind direction

Units: meters per second (m/s); degrees

Sensor type: Vaisala Ultrasonic Wind Sensor

Model #: 425

Range: 0 to 65 m/s (0 to 144 mph, 0 to 125 knots); 0 to 360°

Accuracy: ±0.135 m/s (±0.3 mph, ±0.26 knots) or 3% of reading, whichever is greater; ±2°

Date of last calibration: N/A (no calibration required) installed new on 07/15/02

Parameter: Barometric Pressure

Units: millibars (mb)

Sensor type: Vaisala Barometric Pressure

Model #: PTB101B

Range: 600 to 1060 mb

Accuracy: +/- 0.45 mb

Date of last calibration: 05/20/04 (installed on 01/05/05)

Storage Module

Model#: SM192

Storage capacity: 192,896 bytes

Operating range: Temperature: -35°C to +65°C

Processor: Hitachi 6303

Baud rates: 300, 1200, 9600, 76800

Memory type: user selectable for either ring style (default) or fill and drop.

Power requirements: 5 +/-0.4 VDC @ 100mA

Storage Module

Model#: SM4M

Storage capacity: 2 million low-resolution data values

Program storage: stores up to 8 programs with a total capacity of 128 KB

Processor: Hitachi H8S

Operating System: 64 KB, flash memory based, user downloadable

Operating range: Temperature: -35°C to +65°C

Baud rates: 9600, 76800

Memory type: user selectable for either ring style (default) or fill and drop.
Power requirements: 5 +/-0.3 VDC @ 100mA

Campbell Scientific CR10X Wiring Panel has 128K of flash memory (EEPROM), in which it stores the operating system and it's program (that it uses to run the weather station). Additionally, there are 128K of SRAM, which it uses to run the program and store its measurements and for final data storage.

10. Coded variable definitions

Sampling station:	Sampling site code:	Station code:
Research Creek	RC	nocrcmet

11. Anomalous/Suspect Data

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Fifteen minute sample rainfall amount differences of over 5 mm in 15 minutes can occur during storms and indicate intense precipitation bursts during hurricanes, tropical storms, thunderstorms or frontal passages.

The following precipitation data appear to be correct:

Date	Time	Julian	Array ID	TotPrep
01/14/2005	10:15	14	15	16.5
03/23/2005	12:45	82	15	5.1
04/02/2005	08:30	92	15	5.1
05/06/2005	03:00	126	15	5.6
05/17/2005	03:45	137	15	5.3
05/20/2005	18:45	140	15	5.6
05/23/2005	21:45	143	15	5.1
05/24/2005	17:30	144	15	8.1
06/02/2005	02:00	153	15	8.9
06/04/2005	01:30	155	15	6.4
06/25/2005	18:00	176	15	5.3
06/29/2005	04:15	180	15	5.8
07/13/2005	14:30	194	15	5.8
07/13/2005	15:30	194	15	5.1

07/14/2005	06:15	195	15	5.3
07/20/2005	14:30	201	15	5.1
07/20/2005	14:45	201	15	9.4
07/23/2005	00:45	204	15	8.1
07/23/2005	01:00	204	15	15.5
08/09/2005	08:00	221	15	5.1
08/09/2005	08:15	221	15	9.4
08/09/2005	08:30	221	15	6.9
08/18/2005	02:30	230	15	6.4
08/19/2005	17:30	231	15	13.7
08/19/2005	17:45	231	15	18.3
08/19/2005	18:00	231	15	9.7
08/23/2005	08:30	235	15	6.1
08/23/2005	19:15	235	15	8.6
08/23/2005	19:30	235	15	5.3
08/23/2005	19:45	235	15	13.0
08/23/2005	20:00	235	15	13.0
08/23/2005	20:15	235	15	6.6
08/27/2005	08:45	239	15	7.6
08/27/2005	09:00	239	15	6.1
09/14/2005	05:00	257	15	5.1
09/14/2005	05:15	257	15	5.1
09/14/2005	13:45	257	15	5.3
09/14/2005	14:00	257	15	8.4
09/14/2005	14:15	257	15	5.1
09/14/2005	15:30	257	15	5.3
10/05/2005	22:30	278	15	11.4
10/06/2005	16:30	279	15	7.1
10/07/2005	08:30	280	15	9.4
10/07/2005	13:00	280	15	13.0
10/07/2005	23:15	280	15	7.9
10/08/2005	03:30	281	15	7.4
10/08/2005	04:00	281	15	5.3
10/08/2005	06:00	281	15	7.1
10/08/2005	06:30	281	15	7.6
11/21/2005	08:45	325	15	5.8
11/21/2005	09:00	325	15	15.7
11/21/2005	09:15	325	15	8.4

Slightly negative values for PAR were recorded for numerous periods of time when no light was present. These values are within range of the sensor and are due to normal errors in the sensor and the CR10X Datalogger. These data were retained.

12. Deleted data:

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

When the CR10X is powered down for maintenance or other causes or the program reloaded, all temporary 5 second data for that calendar date are lost at the moment of power down. When the CR10X is powered again the 5 second data from that point on for that date are again stored in the daily temporary file for that calendar date. Consequently, the daily averages, maximums and minimums for all parameters, which are calculated for the calendar date using the 5 second data file, will be incorrect for the calendar date because only a portion of the day's data will be used for calculation. The same applies to the hourly and 15 minute averages, maximums and minimums for the time period immediately following a power down event. Current protocol is to delete the daily data for these dates as well as any hourly and 15 minute averages so affected.

All parameter data for the dates and times below were deleted for the following reasons:

Date	Time	Array	Reason
01/05/05	15:45-16:45	15	Program Reload
01/05/05	16:00, 17:00	60	Program Reload
01/05/05	24:00	144	Program Reload
02/11/05	13:00	15	Power Down
02/11/05	13:00	60	Power Down
02/11/05	16:00	60	Program Reload
02/11/05	24:00	144	Power Down/Program Reload

Inaccurate precipitation data were collected due to testing, calibration and/or cleaning of the rain gauge. Precipitation data for the following dates and times were removed or corrected:

Array ID	Date	Time
15	06/08/05	14:30-15:00
60	06/08/05	15:00
144	06/08/05	24:00
15	06/09/05	14:45-15:00
60	06/09/05	15:00
144	06/09/05	24:00
15	11/16/05	15:00
60	11/16/05	15:00
144	11/16/05	24:00

Extremely high wind speed values were recorded for the dates and times listed below due to unknown reasons. These values are most likely erroneous data that may be reported during conditions of extreme cold, freezing or heavy rain, or periods of very strong or no winds. The data were deleted due to the values being out of sensor range.

Date	Time	Julian	Array ID	WSpd
07/16/2005	04:45	197	15	446.9 (MaxWspd)
07/16/2005	05:00	197	15	298.8
07/16/2005	05:00	197	60	76.5
07/16/2005	05:15	197	15	290.9
07/16/2005	06:00	197	60	73.7
10/28/2005	08:30	301	15	446.9 (MaxWspd)
10/28/2005	08:45	301	15	244.1
10/28/2005	09:00	301	60	73.5

The value of -99999 indicating sensor error was recorded by the CR10X for wind speed and minimum wind speed periodically throughout the data set for unknown reasons. The values for the following dates and times were removed from the data set:

Date	Time	Julian	Array ID
01/01/2005	21:45	1	15
01/01/2005	22:00	1	60
01/01/2005	24:00	1	144
02/23/2005	04:00	54	15
02/23/2005	04:00	54	60
02/23/2005	24:00	54	144

The erroneous value of 447 was recorded periodically throughout the data set for wind speed maximums for unknown reasons. This value is most likely reported during conditions of extreme cold, freezing or heavy rain, or periods of very strong or no winds. These values were deleted from the data set.

Maximum wind speed:

Array	Date	Julian	Time
15	01/03/2005	3	13:45
60	01/03/2005	3	14:00
144	01/03/2005	3	24:00
15	05/06/2005	126	03:15
60	05/06/2005	126	04:00
144	05/06/2005	126	24:00
15	05/21/2005	141	11:15
60	05/21/2005	141	12:00
144	05/21/2005	141	24:00
15	05/24/2005	144	14:30
60	05/24/2005	144	15:00
144	05/24/2005	144	24:00
15	05/29/2005	149	13:00
60	05/29/2005	149	13:00
144	05/29/2005	149	24:00
15	05/31/2005	151	09:45

60	05/31/2005	151	10:00
144	05/31/2005	151	24:00
15	06/06/2005	157	17:45
60	06/06/2005	157	18:00
144	06/06/2005	157	24:00
15	06/20/2005	171	12:15
60	06/20/2005	171	13:00
144	06/20/2005	171	24:00
15	06/30/2005	181	15:30
60	06/30/2005	181	16:00
144	06/30/2005	181	24:00
15	07/03/2005	184	14:45
60	07/03/2005	184	15:00
144	07/03/2005	184	24:00
15	07/16/2005	197	04:45
15	07/16/2005	197	05:15
15	07/16/2005	197	05:00
60	07/16/2005	197	06:00
60	07/16/2005	197	05:00
144	07/16/2005	197	24:00
15	07/21/2005	202	12:15
60	07/21/2005	202	13:00
144	07/21/2005	202	24:00
15	07/26/2005	207	07:00
15	07/26/2005	207	06:30
60	07/26/2005	207	07:00
144	07/26/2005	207	24:00
15	07/28/2005	209	16:15
60	07/28/2005	209	17:00
144	07/28/2005	209	24:00
15	07/29/2005	210	11:30
60	07/29/2005	210	12:00
144	07/29/2005	210	24:00
15	07/30/2005	211	10:15
60	07/30/2005	211	11:00
144	07/30/2005	211	24:00
15	08/04/2005	216	09:00
15	08/04/2005	216	11:15
60	08/04/2005	216	09:00
60	08/04/2005	216	12:00
144	08/04/2005	216	24:00
15	08/09/2005	221	16:00
60	08/09/2005	221	16:00
144	08/09/2005	221	24:00
15	08/29/2005	241	14:45
60	08/29/2005	241	15:00
144	08/29/2005	241	24:00
15	09/01/2005	244	17:45
60	09/01/2005	244	18:00
144	09/01/2005	244	24:00

15	09/14/2005	257	21:00
15	09/14/2005	257	12:15
15	09/14/2005	257	07:45
15	09/14/2005	257	10:15
15	09/14/2005	257	07:30
15	09/14/2005	257	07:15
60	09/14/2005	257	21:00
60	09/14/2005	257	13:00
60	09/14/2005	257	11:00
60	09/14/2005	257	08:00
144	09/14/2005	257	24:00
15	09/15/2005	258	13:15
15	09/15/2005	258	15:45
60	09/15/2005	258	14:00
60	09/15/2005	258	16:00
144	09/15/2005	258	24:00
15	10/02/2005	275	10:15
60	10/02/2005	275	11:00
144	10/02/2005	275	24:00
15	10/23/2005	296	13:00
60	10/23/2005	296	13:00
144	10/23/2005	296	24:00
15	10/28/2005	301	08:30
15	10/28/2005	301	08:45
60	10/28/2005	301	09:00
144	10/28/2005	301	24:00
15	11/17/2005	321	10:45
60	11/17/2005	321	11:00
144	11/17/2005	321	24:00
15	12/09/2005	343	11:30
15	12/09/2005	343	11:00
60	12/09/2005	343	12:00
60	12/09/2005	343	11:00
144	12/09/2005	343	24:00

There were large spikes in relative humidity, maximum relative humidity, and minimum relative humidity on 15 September 2005 most likely due to saturation from Hurricane Ophelia that passed over the area on 14 September 2005. The values were deleted for the following dates and times:

Relative Humidity:

ArrayId	Date	Julian	Time	RH
15	09/15/2005	258	05:30	105
15	09/15/2005	258	05:45	106
15	09/15/2005	258	06:00	107
60	09/15/2005	258	06:00	105
15	09/15/2005	258	06:15	108
15	09/15/2005	258	06:30	108
15	09/15/2005	258	06:45	109
15	09/15/2005	258	07:00	109
60	09/15/2005	258	07:00	108

15	09/15/2005	258	07:15	110
15	09/15/2005	258	07:30	112
15	09/15/2005	258	07:45	112
15	09/15/2005	258	08:00	117
60	09/15/2005	258	08:00	113
15	09/15/2005	258	08:15	124
15	09/15/2005	258	08:30	145
15	09/15/2005	258	08:45	154
15	09/15/2005	258	09:00	156
60	09/15/2005	258	09:00	145
15	09/15/2005	258	09:15	161
15	09/15/2005	258	09:30	165
15	09/15/2005	258	09:45	171
15	09/15/2005	258	10:00	174
60	09/15/2005	258	10:00	168
15	09/15/2005	258	10:15	175
15	09/15/2005	258	10:30	178
15	09/15/2005	258	10:45	174
15	09/15/2005	258	11:00	170
60	09/15/2005	258	11:00	174
15	09/15/2005	258	11:15	167
15	09/15/2005	258	11:30	165
15	09/15/2005	258	11:45	163
15	09/15/2005	258	12:00	155
60	09/15/2005	258	12:00	162
15	09/15/2005	258	12:15	144
15	09/15/2005	258	12:30	137
15	09/15/2005	258	12:45	130
15	09/15/2005	258	13:00	121
60	09/15/2005	258	13:00	133
15	09/15/2005	258	13:15	118
15	09/15/2005	258	13:30	115
15	09/15/2005	258	13:45	114
15	09/15/2005	258	14:00	113
60	09/15/2005	258	14:00	115
15	09/15/2005	258	14:15	105
60	09/15/2005	258	15:00	94

Maximum Relative Humidity:

ArrayId	Date	Julian	Time	MaxRH
15	09/15/2005	258	05:15	104
15	09/15/2005	258	05:30	106
15	09/15/2005	258	05:45	106
15	09/15/2005	258	06:00	107
60	09/15/2005	258	06:00	107
15	09/15/2005	258	06:15	109
15	09/15/2005	258	06:30	109
15	09/15/2005	258	06:45	110
15	09/15/2005	258	07:00	109
60	09/15/2005	258	07:00	110

15	09/15/2005	258	07:15	111
15	09/15/2005	258	07:30	113
15	09/15/2005	258	07:45	113
15	09/15/2005	258	08:00	122
60	09/15/2005	258	08:00	122
15	09/15/2005	258	08:15	132
15	09/15/2005	258	08:30	154
15	09/15/2005	258	08:45	155
15	09/15/2005	258	09:00	158
60	09/15/2005	258	09:00	158
15	09/15/2005	258	09:15	166
15	09/15/2005	258	09:30	178
15	09/15/2005	258	09:45	179
15	09/15/2005	258	10:00	181
60	09/15/2005	258	10:00	181
15	09/15/2005	258	10:15	185
15	09/15/2005	258	10:30	185
15	09/15/2005	258	10:45	183
15	09/15/2005	258	11:00	182
60	09/15/2005	258	11:00	185
15	09/15/2005	258	11:15	180
15	09/15/2005	258	11:30	175
15	09/15/2005	258	11:45	176
15	09/15/2005	258	12:00	168
60	09/15/2005	258	12:00	180
15	09/15/2005	258	12:15	154
15	09/15/2005	258	12:30	141
15	09/15/2005	258	12:45	132
15	09/15/2005	258	13:00	127
60	09/15/2005	258	13:00	154
15	09/15/2005	258	13:15	120
15	09/15/2005	258	13:30	116
15	09/15/2005	258	13:45	116
15	09/15/2005	258	14:00	116
60	09/15/2005	258	14:00	120
15	09/15/2005	258	14:15	109
60	09/15/2005	258	15:00	109
144	09/15/2005	258	24:00	185

Minimum Relative Humidity:

ArrayId	Date	Julian	Time	MinRH
15	09/15/2005	258	05:30	104
15	09/15/2005	258	05:45	105
15	09/15/2005	258	06:00	106
15	09/15/2005	258	06:15	107
15	09/15/2005	258	06:30	107
15	09/15/2005	258	06:45	108
15	09/15/2005	258	07:00	108
60	09/15/2005	258	07:00	107
15	09/15/2005	258	07:15	109

15	09/15/2005	258	07:30	110
15	09/15/2005	258	07:45	111
15	09/15/2005	258	08:00	113
60	09/15/2005	258	08:00	109
15	09/15/2005	258	08:15	121
15	09/15/2005	258	08:30	132
15	09/15/2005	258	08:45	152
15	09/15/2005	258	09:00	153
60	09/15/2005	258	09:00	121
15	09/15/2005	258	09:15	156
15	09/15/2005	258	09:30	159
15	09/15/2005	258	09:45	165
15	09/15/2005	258	10:00	166
60	09/15/2005	258	10:00	156
15	09/15/2005	258	10:15	169
15	09/15/2005	258	10:30	170
15	09/15/2005	258	10:45	168
15	09/15/2005	258	11:00	166
60	09/15/2005	258	11:00	166
15	09/15/2005	258	11:15	159
15	09/15/2005	258	11:30	160
15	09/15/2005	258	11:45	158
15	09/15/2005	258	12:00	147
60	09/15/2005	258	12:00	147
15	09/15/2005	258	12:15	136
15	09/15/2005	258	12:30	132
15	09/15/2005	258	12:45	126
15	09/15/2005	258	13:00	116
60	09/15/2005	258	13:00	116
15	09/15/2005	258	13:15	116
15	09/15/2005	258	13:30	114
15	09/15/2005	258	13:45	112
15	09/15/2005	258	14:00	109
60	09/15/2005	258	14:00	109

13. Missing data

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. For more details on deleted data, see the Deleted Data Section (12). If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

Specifically, all parameter data for the dates and times below are missing for the following reasons:

Date	Time	Reason
01/05/05	15:00-15:30	Power Down
02/11/05	15:30	Program Reload
12/23/05 – 12/28/05	01:30-19:15	Unknown; possible telemetry failure

14. Other remarks/notes

On 10/17/2023 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2007, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Precipitation:

During the initial years of NERRS SWMP weather data collection the CR10X programming was inconsistent in how precipitation values were recorded. For most reserves, zeros were not recorded when rainfall had not occurred between 2001-2003, instead no rainfall was represented by a blank cell. The CDMO verified which datasets were impacted by this issue for the 2001-2006 datasets and inserted zeros when the metadata indicated that no precipitation occurred and data were not missing for other reasons. In some cases, zero values for precipitation data were evaluated and removed

where the metadata confirmed that no rainfall should have been in the dataset. The pre-2007 data did not go through a thorough QAQC process again at that time (in addition to previous QAQC); however, if discrepancies were noticed between what was documented in the metadata and what was in the dataset, additional updates may have been made. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout early 2023.

LiCor:

Prior to the installation of the new NERR_4.CSI program in November 2003, all values less than 0 were altered in the raw data to read 0. These values may indicate an incorrect multiplier, calibration problems, or a sensor malfunction. Because these values are changed in the raw data, we cannot confirm that they are all valid data points.

Relative Humidity:

Prior to the installation of the new NERR_4.CSI program in November 2003, all values over 100% were altered in the raw data to read 100%. These values may indicate super saturated air, calibration problems, or a sensor malfunction. Because these values are changed in the raw data, we cannot confirm that they are all valid data points.

Hurricane Ophelia passed over the area on 14 September 2005.