Apalachicola NERR Meteorological Metadata

January - December 2004

Last Update: **October 11, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification:

The Data Logger program (NERR\_4.csi) controls the sampling of the sensors. Meteorological conditions are measured every 5 seconds from each sensor and stored on the CR10X. Data are output to a file in three arrays: array 15 stores 15 minute averages, max and min data; array 60 stores hourly data; max and min data; and array 144 stores daily average, max and min data. Storage modules are used to interface between the CR10X and the PC208W software supplied by Campbell Scientific. New 4M storage modules are used to store the larger output needed for the new program. EQwin now replaces the WDMP as the NERR MET primary QA/QC program.

On February 24th, 2004 the CR10X program was updated (NERR\_4\_1.csi). The midnight time stamp was changed within the program from 24:00 to 00:00 thus making the meteorological data compatible with the water quality data.

Files are exported from PC208W in a comma-delimited format (.DAT file) 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'd and archived in the database. EQWin queries, reports and graphs are used to discover data set outliers (values that 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 are investigated and noted below in the Anomalous/ Suspect Data Section. Any data corrections that were performed are noted in the Deleted Data Section below.

3) Research objectives:

Data collected from the East Bay weather station complement those data taken from the East Bay water quality station. Data are also used for the analysis of other datalogger data collected at Cat Point and Dry Bar. Positioning the weather station in East Bay allows the Reserve to monitor changes in rainfall, photosynthetically active radiation, temperature, and other weather parameters influencing the water quality of East Bay. East Bay drains the Tate's Hell Swamp area, which was altered in the late 1960's and early 1970's by timber companies. An EPA grant allowed the Northwest Florida Water Management District to begin restoration of the site in 1995 to reduce non-point source runoff. East Bay is also an important nursery area for numerous fish and invertebrate species within Apalachicola Bay.

4) Research methods:

Data Collection Schedule:

i) 15 minute data are averages/totals of 5 second sampling over the period of 15 minutes.

ii) 60 minute data are averages/totals of 5 second sampling over the period of 1 hour.

iii) 24 hour data are averages/totals of 5 second sampling over the period of 24 hours.

iv) Parameters collected during each interval include:

Date, Julian date, time, average temperature (°C), Maximum and minimum temperature, time at maximum and minimum temperature, Relative humidity, maximum and minimum relative humidity, time at maximum and minimum relative humidity, average barometric pressure, minimum and maximum barometric pressure, time at max and min barometric pressure, wind speed, wind direction, standard deviation of wind direction, maximum and minimum wind speed, time at minimum and maximum wind speed, total precipitation (for that interval), total photosynthetically active radiation (for that interval), and battery voltage.

Sensor Calibration QA/QC

Sensors are calibrated either annually or biannually according to the maintenance schedule dictated by the Weather SOPs. The sensors and their wires are inspected monthly to make sure that they are clean, moving freely, and undamaged. The arm of the wind sensor is checked monthly to assure that it is aligned to true north.

Data Storage/Interface with PC208W

Storage modules are used to interface between the CR10X and the PC208W software supplied by Campbell Scientific. 4M storage modules are used to store the larger output needed for the new NERR\_4\_1.csi program. Storage modules are exchanged monthly. At the time of the exchange, a handheld Kestrel 4000 is used to measure weather conditions and compare them to the measurements of the sensors on the weather station. The storage module is downloaded with the PC208W software.

Preprocessing and Data QA/QC

The raw .DAT file is run through the CDMO “EQWinFormat” macro in Excel. At this point the file is inspected to detect any kind of gross sensor malfunction. The file can then be imported into EQWin. Queries, Reports, and Graphs are created in EQWin to detect sensor malfunction or outliers. The following criteria are used in the EQWin program to flag potentially erroneous data:

Air Temp:

- Sample not greater than 50 degrees Celsius (C)

- Sample not less than –40 degrees Celsius (C)

- 15 min sample greater than max for the day

- 15 min sample less than the min for the day

Relative Humidity:

-Sample not greater than 100 percent humidity (%)

-Sample not less than 0 percent humidity (%)

-15 minute averages not greater than the max for the day

-15 minute averages not less than the min for the day

Barometric Pressure:

- Sample greater than 1060 millibars (mb)

- Sample not less than 900 millibars (mb)

-15 minute averages not greater than the max for the day

-15 minute averages not less than the min for the day

Wind Speed:

- Sample not greater than 30 meters per second (m/s)

- Sample not less than 0.5 meters per second (m/s) for 12 hours consecutively

Wind Direction:

- Sample not greater than 360 degrees

- Sample not less than 0 degrees

Precipitation

-15 minute total not greater than 5 millimeters

Solar Radiation

-15 minute total not greater than 5000 millimoles per meter squared (mmol/m^2)

-15 minute total not less than 0 millimoles per meter squared (mmol/m^2)

Time:

- 15-minute interval not recorded

For all data:

* Duplicate interval data

There were no other analyses, data collection intervals, or QA/QC procedures other than EQWIN expressed in Version 5.1 of the CDMO manual.

5) Site location and character:

The Apalachicola National Estuarine Research Reserve is located in the northwestern part of Florida, generally called the panhandle. It is located adjacent to the City of Apalachicola, and encompasses most of the Apalachicola Bay system, including 52 miles of the lower Apalachicola River. Passes, both natural and manmade, connect Apalachicola Bay to the northeastern Gulf of Mexico. The sampling site is located in the upper reaches of East Bay. East Bay is separated from Apalachicola Bay by two bridges and a causeway and is located to the north of Apalachicola Bay proper. The bay is 8.2 km long, has an average depth of approximately 1.0 m MHW, and an average width of 1.8 km. The tides in East Bay are mixed and range from 0.3 m to 1.0 m (average 0.5 m).

The weather station is located at latitude 29 47.454' N and longitude 84 53.004' W. This site is less than 0.5 nautical miles west of the East Bay water quality station. The site is located near the tip of a peninsula, which separates Blount's Bay from West Bayou. The peninsula is dominated by marsh vegetation (mainly *Juncus roemerianus*). There is a cabbage palm hammock along the southeastern shoreline of the peninsula. The dominant upland habitat is primarily pineland forest to the northwest, which includes slash pine, saw palmetto, and sand pine. The weather station sensors are mounted at the top of a 3-meter tower. The tower is mounted on a 2m platform. The tipping bucket rain gauge is mounted on a 1m platform approximately 4m feet from the weather station platform. There is nothing nearby to shade the tower and the nearest wind block is the edge of the pine forest about one-half to three-quarters of a mile north to northwest of the station.

6) Data collection period: January-December, 2004

The Apalachicola weather monitoring station was erected on August 27, 1999 and began monitoring on September 3, 1999. The data submitted with this report encompasses data collected from 0015 hours January 1, 2004 through 2400 hrs December 31, 2004. Actual module deployment during this time period began on 12/31/2003 at 1300 hrs and ended 1/31/2005 at 1415.

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program, NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program 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 publications 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 Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric

Administration. The data set enclosed within this package/transmission is 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 (please see Section 1 Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please 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 format and Access data tables.

8) Associated researchers and projects:

Northwest Florida Water Management District

Tate's Hell Restoration Project

Apalachicola Bay Freshwater Needs Study

Niu, X./ Florida State University, Department of Statistics Edmiston, H.L., Bailey, G.O./ APA NERR Time

Series Models for Salinity and Other Environmental Factors in the Apalachicola

Estuarine System (1998). Estuarine, Coastal, and Shelf Science 46:549-563.

Edmiston, H.L., Wanat, J., Levi, L., Miller, K., Stewart,J. /Apalachicola

National Estuarine Research Reserve.

Distribution and density of fishes and benthic invertebrates in Apalachicola Bay.

Edmiston, H.L., Levi, L., Wanat, J., Stewart, J., Lamb, M. / Apalachicola National Estuarine Research Reserve

System-Wide Monitoring Program (SWMP) for Water Quality, Weather, Nutrients & Chlorophyll A, and Submerged Aquatic Vegetation Monitoring in Apalachicola Bay

Stewart, J., Edmiston, H.L. / Apalachicola National Estuarine Research Reserve.

Growth and spat recruitment related to environmental conditions at oyster bars in

Apalachicola Bay.

Caffrey, J. /University of West Florida

Development of an in situ instrument for measuring nitrogen in natural waters.

Childs, C./Florida State University, Dept. of Oceanography.

A spatial and temporal assessment of factors affecting denitrification in Apalachicola

Bay.

Wilber, P., et.al./NOAA Coastal Services Center & Edmiston, L., et al./Apalachicola

National Estuarine Research Reserve

Benthic habitat mapping in Apalachicola Bay

Donatto Surratt / Florida A&M University

Compare and contrast the historic and current trophic status of Apalachicola Bay using

stable isotopes in sediments.

Dulaiova, H. / Florida State University, Dept. of Oceanography.

NOAA Graduate Research Fellowship

Determination of the distribution and volume of groundwater entering Apalachicola

Bay from St. George Island.

Jennifer Putland / Florida State University Department of Oceanography

NOAA Graduate Research Fellowship

"Planktonic food web variations related to salinity and nutrient patterns in Apalachicola Bay."

II. Physical Structure Descriptors

9) Sensor Specifications:

Parameter: Photosynthetically Active Radiation (PAR)

LiCor Quantum Pyranometer

Model # LI190SB

Stability: <±2% change over 1 yr

Operating Temperature: -40 to 65°C

Sensitivity: typically 5 µA per 1000µmoles s-1 m-2

Light spectrum wavelength: 400 to 700 nm

Date of last calibration: April 2002

In Use Dates are from 00:00 1/01/2004 to 10:15 4/28/04

Parameter: Photosynthetically Active Radiation (PAR)

LiCor Quantum Pyranometer

Model # LI190SB

Stability: <±2% change over 1 yr

Operating Temperature: -40 to 65°C

Sensitivity: typically 5 µA per 1000µmoles s-1 m-2

Light spectrum wavelength: 400 to 700 nm

Date of last calibration: 3/23/04

In Use Dates are from 11:45 4/28/04 to 24:00 12/31/2004

Parameter: Wind Speed/Wind Direction

Wind Sentry: RM Young Model # 03001-5

Range: 0-50 m/s; 360° mechanical

Date of last calibration: 6/14/2002

In Use Dates are from 00:00 1/01/2004 through 10:15 4/28/2004

\*\*Note\*\* The arm of the wind sensor is checked monthly to ensure that it remains aligned to true north.

Parameter: Wind Speed/Wind Direction

Wind Sentry: RM Young Model # 03001-5

Range: 0-50 m/s; 360° mechanical

Date of last calibration: 2/16/2004

In Use Dates are from 11:45 4/28/04 through 24:00 12/31/2004

Parameter: Temperature and Relative Humidity

Vaisala Model #: HMP45AC

Operating Temperature: -40 to 60°C

Temperature Measurement Range: -40 to 60°C

Temperature Accuracy: ± 0.2 °C @ 20°C

Relative Humidity Measurement Range: 0-100% non-condensing

RH Accuracy: +/-2% RH (0-90%) and +/-3% (90-100%)

Uncertainty of calibration: ± 0.6% RH

Date of Last calibration: 1/31/2002

In Use Dates are from 00:00 1/01/2004 to 1015 4/28/2004

Parameter: Temperature and Relative Humidity

Vaisala Model #: HMP35C

Operating Temperature: -20 to 60°C

Temperature Measurement Range: -35 to 50°C

Temperature Accuracy: ± 0.2 °C @ 20°C

Relative Humidity Measurement Range: 0-100% non-condensing

RH Accuracy: +/-2% RH (0-90%) and +/-3% (90-100%)

Uncertainty of calibration: ± 0.6% RH

Date of Last calibration: 2/27/2004

In Use Dates are from 1145 4/28/2004 to 0850 11/24/2004

Parameter: Temperature and Relative Humidity

Vaisala Model #: HMP45AC

Operating Temperature: -40 to 60°C

Temperature Measurement Range: -40 to 60°C

Temperature Accuracy: ± 0.2 °C @ 20°C

Relative Humidity Measurement Range: 0-100% non-condensing

RH Accuracy: +/-2% RH (0-90%) and +/-3% (90-100%)

Uncertainty of calibration: ± 0.6% RH

Date of Last calibration: 8/3/2004

In Use Dates are from 0915 11/24/2004 to 24:00 12/31/2004

Parameter: Barometric Pressure

Barometric Sensor: Vaisala model CS-105

Operating Range:

Pressure: 600 to 1060 mb

Temperature: -40 to 60C

Humidity: non-condensing

Accuracy: ±0.5 to 6.0 mb (20 to 60°C)

Stability: ± 0.1 mb per year

Date of Last calibration: April 2002

In Use Dates are from 00:00 1/01/2004 through 1015 4/28/04

Parameter: Barometric Pressure

Barometric Sensor: Vaisala model CS-105

Operating Range:

Pressure: 600 to 1060 mb

Temperature: -40 to 60C

Humidity: non-condensing

Accuracy: ±0.5 to 6.0 mb (20 to 60°C)

Stability: ± 0.1 mb per year

Date of Last calibration: 2/18/2004

In Use Dates are from 1145 4/28/2004 through 12/31/2004

Parameter: Precipitation

Tipping Bucket Rain Gauge FIT Model #: TE 525

Range: 0.1 mm

Accuracy: 1.0% at <2"/hr

Date of Last calibration: 1/14/2004

In Use Dates are from 00:00 1/01/2004 through 00:00 12/31/2004

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: 64KB, flash memory based, user downloadable

Operating range: Temperature: -35° 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 indicator and variable code definitions:

Site Definitions: The weather data master table files for the Apalachicola NERR are coded **apaebmet**, indicating the location of the weather station (**East Bay**) within the greater Apalachicola Bay system.

Station Code= apaebmet

Sampling Station Code=EB

Sampling Station=East Bay

11) Data anomalies:

**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](http://www.nerrsdata.org/get/landing.cfm) throughout the fall of 2022.

Photosynthetically Active Radiation (PAR) measurements throughout the year are periodically negative. The values are within the error range of the sensor and should be rounded to zero. The values are not changed in the dataset.

January

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 01/17/2004 17 23:45 15 14.0

apaebmet 01/18/2004 18 00:15 15 06.9

February

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 02/06/2004 37 16:15 15 06.6

apaebmet 02/06/2004 37 16:30 15 07.9

apaebmet 02/14/2004 45 07:30 15 07.1

apaebmet 02/23/2004 54 17:45 15 09.4

apaebmet 02/23/2004 54 18:15 15 05.3

March

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 03/30/2004 90 12:45 15 5.8

April – November

The Relative Humidity sensor periodically spiked to the range of the sensor (min = 0 and max = 110). This coincided with the installation of the old HMP35C Temp/RH sensor on April 28th, 2004 at 1136. Between the spikes, the sensor appeared to be operating correctly. It was concluded that the spikes were a representation of some kind of wiring problem. In the data set, where the RH spiked to the max of the sensor (>103%) and to the minimum (= 0%), the data were deleted. All other data should be considered anomalous. The sensor was replaced on November 24th, 2004 at 08:50.

June

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 06/01/2004 153 19:00 15 14.2

apaebmet 06/01/2004 153 19:15 15 5.6

apaebmet 06/07/2004 159 14:45 15 10.4

apaebmet 06/07/2004 159 15:00 15 13

apaebmet 06/07/2004 159 15:15 15 8.1

apaebmet 06/15/2004 167 15:15 15 8.4

apaebmet 06/29/2004 181 09:30 15 15.5

apaebmet 06/29/2004 181 09:45 15 8.9

July

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 07/02/2004 184 11:00 15 14.5

apaebmet 07/02/2004 184 11:15 15 5.1

apaebmet 07/04/2004 186 12:30 15 5.3

apaebmet 07/08/2004 190 03:00 15 7.1

apaebmet 07/08/2004 190 03:15 15 10.4

apaebmet 07/08/2004 190 03:30 15 7.9

apaebmet 07/08/2004 190 04:00 15 5.8

apaebmet 07/27/2004 209 11:00 15 8.4

July/August

During the period of deployment the wind sensor arm became oriented 60 degrees east of true north. We were unable to determine when the rotation occurred so for the period of the deployment, the wind direction data should be considered suspect. The period of the deployment was 7/23/04 @ 1215 through 8/31/04 @ 1045.

August

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 08/06/2004 219 20:15 15 9.9

apaebmet 08/09/2004 222 06:15 15 10.7

apaebmet 08/10/2004 223 16:45 15 5.6

apaebmet 08/11/2004 224 08:00 15 9.7

apaebmet 08/21/2004 234 14:15 15 5.8

apaebmet 08/21/2004 234 16:15 15 5.1

apaebmet 08/22/2004 235 14:30 15 7.1

apaebmet 08/24/2004 237 19:15 15 12.7

apaebmet 08/24/2004 237 19:30 15 5.1

apaebmet 08/28/2004 241 14:15 15 19.8

apaebmet 08/28/2004 241 14:30 15 20.6

The following Relative Humidity measurement falls within the error range of the sensor (+/- 3 % at 90 to 100%) and can be attributed to a super-saturation event. The sample value has not been changed in the data set.

Station Code Date Julian Time Array MaxRH

apaebmet 08/29/2004 242 06:15 15 101

September

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

The following rain event was associated with Hurricane Francis:

Station Code Date Julian Time Array TotPrcp

apaebmet 09/05/2004 249 16:15 15 7.6

The following rain events were associated with Hurricane Ivan:

Station Code Date Julian Time Array TotPrcp

apaebmet 09/15/2004 259 18:00 15 5.6

apaebmet 09/15/2004 259 18:30 15 7.4

apaebmet 09/15/2004 259 19:45 15 6.9

apaebmet 09/15/2004 259 20:00 15 13.5

The following rain events were associated with Hurricane Jeanne:

Station Code Date Julian Time Array TotPrcp

apaebmet 09/27/2004 271 02:15 15 6.6

apaebmet 09/27/2004 271 02:30 15 5.1

apaebmet 09/27/2004 271 03:15 15 6.4

October

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 10/04/2004 278 17:00 15 7.4

apaebmet 10/04/2004 278 17:15 15 10.4

apaebmet 10/15/2004 289 02:00 15 6.1

apaebmet 10/15/2004 289 02:15 15 10.4

apaebmet 10/15/2004 289 02:30 15 5.8

November

The following Precipitation amounts are related to rainfall events over Apalachicola Bay. The high values coincide with values measured at the nearby NWS weather station in Apalachicola and are considered to be correct. They remain unchanged in the dataset.

Station Code Date Julian Time Array TotPrcp

apaebmet 11/12/2004 317 04:45 15 9.4

apaebmet 11/24/2004 329 13:45 15 6.6

apaebmet 11/24/2004 329 14:15 15 12.2

apaebmet 11/27/2004 332 15:45 15 7.6

apaebmet 11/27/2004 332 16:00 15 7.1

apaebmet 11/27/2004 332 16:15 15 7.1

The following Relative Humidity measurements fall within the error range of the sensor (+/- 3 % at 90 to 100%) and can be attributed to a super-saturation event. The sample values have not been changed in the data set.

Station Code Date Julian Time Array MaxRH

apaebmet 11/28/2004 333 04:30 15 101

apaebmet 11/28/2004 333 04:45 15 101

apaebmet 11/28/2004 333 05:00 15 101

apaebmet 11/28/2004 333 05:00 60 101

apaebmet 11/28/2004 333 05:15 15 101

apaebmet 11/28/2004 333 05:30 15 101

apaebmet 11/28/2004 333 05:45 15 101

apaebmet 11/28/2004 333 06:00 15 101

apaebmet 11/28/2004 333 06:00 60 101

apaebmet 11/28/2004 333 06:15 15 101

apaebmet 11/28/2004 333 06:30 15 101

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](http://www.nerrsdata.org/get/landing.cfm) throughout the fall of 2022.

February

The CR10X was turned off to install the new NERR\_4\_1.csi program onto the datalogger. The following samples were deleted:

Date Julian Time Array Data Type

2/2/2004 33 14:00 15 All data

2/2/2004 33 14:00 60 All data

2/3/2004 34 00:00 144 All data

April

The Temperature/Relative Humidity sensor failed during the deployment. All Temperature/Relative Humidity data, all maximum/minimum Temperature/RH data, and associated times of sampling were deleted. The time period of the sensor failure was 10:00 4/6/04 through 09:00 4/28/04.

The CR10X was turned off at 0915 on 4/28/04 to replace all of the sensors except the rain gauge. The CR10X was turned back on at 1036. The following samples were deleted from the database:

Date Julian Time Array Data Type

4/28/2004 119 10:45 15 All data

4/28/2004 119 11:00 60 All data

4/28/2004 120 24:00 144 All data

April – November

The Relative Humidity sensor periodically spiked to the range of the sensor (min = 0 and max = 110). This coincided with the installation of the old HMP35C Temp/RH sensor on April 28th, 2004 at 1136. Between the spikes, the sensor appeared to be operating correctly. It was concluded that the spikes were a representation of some kind of wiring problem. In the data set, where the RH spiked to the max of the sensor (>103%) and to the minimum (= 0%), the data were deleted. All other data should be considered anomalous. The sensor was replaced on November 24th, 2004 at 08:50.

July

On July 23rd, when the weather station was service, we found the funnel and screen had been removed from the rain gauge. The daily rainfall and total rainfall on July 8th looks correct, but afterwards the data doesn’t appear normal. No rain was recorded after the 8th and there is no indication as to when the funnel was removed, so all data were deleted through the end of the deployment period. The period of the deleted data is 7/9/04 @ 00:15 (array 15) through 7/23/04 @ 1100 (array 60).

November

The CR10X was turned off at 08:50 and powered up at 09:09 on November 24th to install the new Temp/RH HMP45AC sensor and program with the associated sensor change. The following samples were deleted from the database:

Date Julian Time Array Data Type

11/24/2004 329 09:15 15 All data

11/24/2004 329 10:00 60 All data

11/24/2004 329 24:00 144 All data

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](http://www.nerrsdata.org/get/landing.cfm) throughout the fall of 2022.

Missing data are denoted by a blank in the data set. Data are missing due to equipment failure or power loss, where no sensors were deployed, for maintenance or calibration of equipment elimination of obvious outliers or elimination of data due to calibration problems. For more details on deleted data, see the Anomalous Data/Suspect Data section. To find out more details about missing data, contact the Research Coordinator at the site submitting the data.

April 2004

The CR10X was turned off at 0915 to replace all of the sensors except the rain gauge. The CR10X was then turned back on at 1036. The following samples are missing from the database:

Date Julian Time Array Data Type

4/28/2004 119 09:15 15 All data

4/28/2004 119 09:30 15 All data

4/28/2004 119 09:45 15 All data

4/28/2004 119 10:00 15 All data

4/28/2004 119 10:00 60 All data

4/28/2004 119 10:15 15 All data

4/28/2004 119 10:30 15 All data

November 2004

The CR10X was turned off at 08:50 and powered up at 09:09 on November 24th to install the new Temp/RH HMP45AC sensor and program with the associated sensor change. The following data are missing from the database:

Date Julian Time Array Data Type

11/24/2004 329 09:00 15 All data

11/24/2004 329 09:00 60 All data

14) Other Remarks/notes

**On 10/11/2023 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](http://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](http://www.nerrsdata.org/get/landing.cfm) throughout early 2023.

LiCor:

Prior to the installation of the new NERR\_4.CSI program, 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, 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.

January 2004

On 1/14/2004 the rain gauge was calibrated while the CR10X was recording. The following data values were changed to 00.0:

Date Julian Time Array Data Type

1/14/2004 14 14:00 60 Precipitation

1/14/2004 14 14:00 15 Precipitation

1/14/2004 14 14:15 15 Precipitation

1/14/2004 14 14:30 15 Precipitation

1/14/2004 14 14:45 15 Precipitation

1/14/2004 14 15:00 60 Precipitation

1/15/2004 15 00:00 144 Precipitation

April 2004

During the installation of the new sensors, the arm with the wind sensors was rotated to tighten it down. The sensors ended up being oriented 180 degrees from true north. The data were edited by subtracting 180 degrees from the values recorded. The period of the erroneous wind direction was from 4/28/2004 @ 10:36 through 4/29/2004 @ 08:55.

Hurricanes and Tropical Storms

Tropical Storm Bonnie impacted the Apalachicola Bay area on August 12th, 2004.

Hurricane Frances impacted the Apalachicola Bay area on September 5th and 6th, 2004.

Hurricane Ivan impacted the Apalachicola Bay area on September 15th and 16th, 2004.

Hurricane Jeanne impacted the Apalachicola Bay area on September 26th and 27th, 2004.

Rain Events (All measurements in mm)

STNCODE SMPLDATE TotPrcp

apaebmet 01/04/2004 00.3

apaebmet 01/06/2004 01.8

apaebmet 01/07/2004 00.3

apaebmet 01/09/2004 01.5

apaebmet 01/10/2004 02.3

apaebmet 01/13/2004 00.3

STNCODE SMPLDATE TotPrcp

apaebmet 01/18/2004 17.5

apaebmet 01/19/2004 17.5

apaebmet 01/20/2004 03.3

apaebmet 01/27/2004 00.5

apaebmet 01/31/2004 00.3

apaebmet 02/01/2004 00.5

apaebmet 02/02/2004 03.3

apaebmet 02/07/2004 20.6

apaebmet 02/10/2004 00.5

apaebmet 02/11/2004 21.1

apaebmet 02/12/2004 11.2

apaebmet 02/14/2004 30.2

apaebmet 02/15/2004 39.1

apaebmet 02/16/2004 00.3

apaebmet 02/22/2004 00.3

apaebmet 02/24/2004 35.3

apaebmet 02/25/2004 27.7

apaebmet 02/26/2004 05.3

apaebmet 03/07/2004 1.5

apaebmet 03/08/2004 0.3

apaebmet 03/17/2004 2.5

apaebmet 03/19/2004 0.3

apaebmet 03/21/2004 0.3

apaebmet 03/31/2004 7.9

apaebmet 04/01/2004 0.3

apaebmet 04/08/2004 2

apaebmet 04/09/2004 0.5

apaebmet 04/12/2004 4.3

apaebmet 04/13/2004 15.7

apaebmet 04/14/2004 9.9

apaebmet 04/20/2004 0.3

apaebmet 04/25/2004 0.3

apaebmet 04/27/2004 0.8

apaebmet 05/01/2004 0.3

apaebmet 05/03/2004 6.1

apaebmet 05/04/2004 0.8

apaebmet 06/02/2004 22.1

apaebmet 06/07/2004 5.8

apaebmet 06/08/2004 33.3

apaebmet 06/10/2004 2.5

apaebmet 06/15/2004 7.9

apaebmet 06/16/2004 17

apaebmet 06/18/2004 0.5

apaebmet 06/19/2004 3.6

apaebmet 06/21/2004 5.1

STNCODE SMPLDATE TotPrcp

apaebmet 06/22/2004 4.6

apaebmet 06/26/2004 3

apaebmet 06/27/2004 0.8

apaebmet 06/28/2004 0.3

apaebmet 06/30/2004 31.5

apaebmet 07/03/2004 25.9

apaebmet 07/04/2004 2

apaebmet 07/05/2004 10.2

apaebmet 07/08/2004 2.5

apaebmet 07/09/2004 34.5

apaebmet 07/25/2004 7.1

apaebmet 07/28/2004 15.7

apaebmet 07/29/2004 3.6

apaebmet 07/31/2004 2.8

apaebmet 08/01/2004 6.1

apaebmet 08/05/2004 0.3

apaebmet 08/07/2004 16.8

apaebmet 08/09/2004 5.8

apaebmet 08/10/2004 20.6

apaebmet 08/11/2004 21.6

apaebmet 08/12/2004 18.5

apaebmet 08/13/2004 13.5

apaebmet 08/14/2004 9.1

apaebmet 08/15/2004 0.3

apaebmet 08/17/2004 4.3

apaebmet 08/18/2004 0.3

apaebmet 08/22/2004 29

apaebmet 08/23/2004 10.4

apaebmet 08/25/2004 18.5

apaebmet 08/28/2004 4.6

apaebmet 08/29/2004 44.2

apaebmet 08/31/2004 1.8

apaebmet 09/03/2004 2

apaebmet 09/06/2004 15.5

apaebmet 09/07/2004 15.5

apaebmet 09/08/2004 0.5

apaebmet 09/11/2004 4.3

apaebmet 09/12/2004 22.9

apaebmet 09/13/2004 0.3

apaebmet 09/14/2004 4.8

apaebmet 09/16/2004 67.1

apaebmet 09/17/2004 4.8

apaebmet 09/27/2004 3.6

apaebmet 09/28/2004 40.6

apaebmet 10/05/2004 25.4

STNCODE SMPLDATE TotPrcp

apaebmet 10/11/2004 8.6

apaebmet 10/12/2004 12.7

apaebmet 10/15/2004 6.6

apaebmet 10/16/2004 26.2

apaebmet 10/17/2004 0.3

apaebmet 10/21/2004 7.6

apaebmet 10/23/2004 0.3

apaebmet 11/05/2004 4.1

apaebmet 11/13/2004 21.1

apaebmet 11/20/2004 2

apaebmet 11/21/2004 13

apaebmet 11/23/2004 0.3

apaebmet 11/25/2004 32.5

apaebmet 11/28/2004 41.9

apaebmet 11/29/2004 0.3

apaebmet 11/30/2004 0.3

apaebmet 12/05/2004 2.3

apaebmet 12/09/2004 0.3

apaebmet 12/10/2004 0.3

apaebmet 12/14/2004 0.3

apaebmet 12/23/2004 0.5

apaebmet 12/24/2004 8.9

apaebmet 12/25/2004 3.3

apaebmet 12/26/2004 43.2

apaebmet 12/27/2004 25.9

apaebmet 12/31/2004 0.3