Apalachicola NERR Meteorological Metadata

January - December 2003

Last Update: **October 10, 2023**

I. Data Set & Research Descriptors

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2) Entry verification:

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour data were downloaded from each instrument on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (nerr\_301.csi) was loaded into the CR10X and controls the sensors and data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The CR10X then interfaced with the PC208W software supplied by Campbell Scientific.

Once an entire month of data were available, the CDMO Weather Data Management Program (WDMP) was used to convert the files to an Access database. This program was developed in Visual Basic to interface with the NERRS data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The WDMP will automatically input and convert the monthly raw data file into an Access Database. There are three main steps the WDMP performs. First, it converts the comma delimited monthly raw data file into an Access Database. Second, it checks the data against a predetermined set of error criteria (see Part C of this section). Finally, it produces error and summary reports. Any anomalous data were investigated and are noted below in the Anomalous Data section. Any data corrections that were performed are noted in the Data Correction section below. The most common error reported was the "technician changed array data...". These data changes were primarily due to sensor malfunction and wiring problems. In these instances the erroneous data were deleted by the technician and replaced with the code "55555". Other common errors were temperature changes greater than 3 ºC and precipitation differences greater than 5 mm.

As of November 3rd, 2003, the new CDMO Data Logger program (NERR\_4.csi) was loaded on the

CR10X. The Data Logger program 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 were used to store the larger output needed for the new program. EQwin now replaces the WDMP as the NERR MET primary QA/QC program.

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.

The Centralized Data Management Office converted all SWMP weather data collected with CR10X

program versions prior to version 4.0 which was distributed in October 2003. This was necessary

in order to merge the old data format (12 array output) with the new data format found in version 4.0

(3 array output). The new format produces averages, maximums and minimums every fifteen minutes

(array 15), every hour (array 60) and every day (array 144) for any sensors hooked up to the CR10X.

Specifically, the 150 and 151 fifteen minute data were converted to the new 15 array;

the hourly 101, 102, 105 and 106 data were converted to the new 60 array; and the daily 241, 242,

243, 244, 245 and 246 data were converted to the new 144 array. With the new format, the use of

55555's to code for deleted data and 11111's to code for missing data has been abandoned.

Hence, all 55555's or 11111's contained in the SWMP weather data collected prior to Version 4.0

of the CR10X program were removed and left blank.

b) Data Collection Schedule:

i) data are collected in the following formats:

1) 15 minute data are instantaneous readings except for PAR and precipitation data

that are totalized from 5-second samples sorted by date and time. (Arrays 150 and

151).

2) Hourly averages (Arrays 101 and 102) are calculated from 5 second samples sorted

by date and time except for PAR and precipitation data that are hourly totals calculated

from 15 minute totals (Arrays 105 and 106).

3) Daily average (arrays 241 and 242), maximum with time, and minimum with time

(arrays 243 and 244) are calculated from 5 second samples sorted by date and time

except for PAR and precipitation data which are 24 hour totals calculated from hourly

totals (arrays 245 and 246).

ii) 15 minute sample point parameters: Date, Time, Air Temperature (°C), Relative Humidity (%),

LiCor (PAR), Barometric Pressure (mb), Wind Speed (m/s), Wind Direction (Array 150); Rainfall

(mm) (Array 151)

iii) Hourly average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%),

Barometric Pressure (mb) (Array 101); Wind Speed (m/s), Wind Direction, Wind Speed Maximum

(Array 102)

iv) Hourly total parameters: LiCor (PAR) (Array 105); Rainfall (mm) (Array 106)

v) Daily Average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%),

Barometric Pressure (mb) (Array 241); Wind Speed (m/s), Wind Direction, Wind Direction

Standard Deviation (using Yamartino's Algorithm) (Array 242)

vi) Daily Total parameter: LiCor (PAR) (Array 245); Rainfall (mm) (Array 246)

vii) Daily Maximum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%),

Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery

Voltage, Time (Array 243)

viii) Daily Minimum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%),

Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery

Voltage, Time (Array 244)

Note: As of November 3, 2003 1000 data collected with the new CR10X program (NERR\_4.csi) are in the

following format:

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, total photosynthetically

active radiation, and battery voltage.

c) Error/Anomalous Data Criteria:

Air Temp:

- 15 min sample greater than max for the day

- 15 min sample less than the min for the day

- 15 min sample greater than 3.0 °C from the previous 15 minutes

- Max and Min values not recorded for the day

- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Relative Humidity:

- Changed by more than 25% from the previous 15 minutes

- Max and Min values not recorded for the day

- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Rainfall:

- Precipitation greater than 5 mm in 15 minutes

- No precipitation for the month

Wind Speed:

- Wind speed greater than 30 m/s

- Wind speed less than 0.5 m/s

Wind Direction:

- Wind direction greater than 360 degrees

- Wind direction less than 0 degrees

Pressure:

- Pressure greater than 1040 mb or less than 980 mb

- Pressure changes greater than 5 mb per hour

- Max and Min values not recorded for the day

- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Time:

- 15-minute interval not recorded

For all data:

- Duplicate interval data

3) Research objectives:

Data collected from the East Bay weather station complements those data taken from the East Bay water quality station. 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.

4) Research methods:

There were no other analyses, data collection intervals, or QA/QC procedures for the WDMP in Apalachicola other than those expressed in Version 4.0 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 Apalachicola 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 southern 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 6' platform. The tipping bucket rain gauge is mounted on a 4' platform approximately 15 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, 2003

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, 2003 through 0000 hrs December 31, 2003. Actual module deployment during this time period began on 12/3/2002 at 1330 hrs and ended 2/2/2004 at 1400.

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

Tamplin, M. L., et.al./ Univ. of Florida, Institute of Food and Agricultural Sciences

Association of Multiple-Antibiotic-Resistance Profiles with Point and Nonpoint Sources of Escherichia

coli in Apalachicola Bay

Iverson, R., Mortazavi, B./ Florida State University, Department of Oceanography

c-14 Primary Productivity

Nutrient Enrichment

Chanton, J./ Florida State University, Department of Oceanography

Food Web Relationships Utilizing Stable Isotope Ratios.

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., Lewis, G., Wanat, J., Levi, L., Miller, K., Stewart,J. /Apalachicola

National Estuarine Research Reserve.

Distribution and density of fishes and benthic invertebrates 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.

Determination of the distribution and volume of groundwater entering Apalachicola

Bay from St. George Island.

Putland, J. / Florida State University, Dept. of Oceanography.

Planktonic food web variations related to salinity and nutrient patterns 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.

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:

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: Time of Purchase, April 2002

In Use Dates are from 00:00 1/01/2003 through 00:00 12/31/2003

Wind Sentry: RM Young Model # 03001-5

Range: 0-50 m/s; 360° mechanical

Date of last directional calibration: At deployment, June 14, 2002

In Use Dates are from 00:00 1/01/2003 through 00:00 12/31/2003

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 1/01/2003 through 00:00 12/31/2003

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: time of purchase, April 2002

In Use Dates are from 00:00 1/01/2003 through 00:00 12/31/2003

Precipitation: Tipping Bucket Rain Gauge FIT Model #: TE 525

Range: 0.1 mm

Accuracy: 1.0% at <2"/hr

Date of Last calibration: April 4, 2002

In Use Dates are from 00:00 1/01/2003 through 00:00 12/31/2003

Storage Module (prior to November 3rd, 2003 at 0845)

Model #: SM192

Storage capacity: 192,896 bytes

Operating range: Temperature: -35° 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 (after November 3rd, 2003 at 0845)

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.

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.

January 2003

Array Day Julian Time Error

102 19 19 2100 Wind speed is less than 0.5 m/s

from 19 (19) 2100 to 20 (20) 900

The Wind Speed datum above is considered correct and unchanged.

February 2003

Array Day Julian Time Error

151 6 37 2215

Precip difference from 6 (37) 2215 (3.048) to 6 (37) 2230 (11.684) is greater than 5 mm

151 6 37 2230

Precip difference from 6 (37) 2230 (11.684) to 6 (37) 2245 (3.556) is greater than 5 mm

151 6 37 2315

Precip difference from 6 (37) 2315 (5.588) to 6 (37) 2330 (.508) is greater than 5 mm

151 16 47 615

Precip difference from 16 (47) 615 (.254) to 16 (47) 630 (13.97) is greater than 5 mm

151 16 47 630

Precip difference from 16 (47) 630 (13.97) to 16 (47) 645 (7.62) is greater than 5 mm

151 22 53 830

Precip difference from 22 (53) 830 (1.016) to 22 (53) 845 (6.096) is greater than 5 mm

151 27 58 500

Precip difference from 27 (58) 500 (4.064) to 27 (58) 515 (11.43) is greater than 5 mm

151 27 58 530

Precip difference from 27 (58) 530 (12.7) to 27 (58) 545 (5.334) is greater than 5 mm

The above precipitation data are considered correct and remains unchanged.

March 2003

Array Day Julian Time Error

151 1 60 445

Precip difference from 1 (60) 445 (3.556) to 1 (60) 500 (9.144) is greater than 5 mm

151 1 60 530

Precip difference from 1 (60) 530 (9.652) to 1 (60) 545 (1.016) is greater than 5 mm

151 1 60 1615

Precip difference from 1 (60) 1615 (1.016) to 1 (60) 1630 (7.62) is greater than 5 mm

151 1 60 1645

Precip difference from 1 (0) 1645 (11.938) to 1 (60) 1700 (6.096) is greater than 5 mm

151 7 66 1030

Precip difference from 7 (66) 1030 (3.556) to 7 (66) 1045 (9.398) is greater than 5 mm

151 7 66 1045

Precip difference from 7 (66) 1045 (9.398) to 7 (66) 1100 (2.286) is greater than 5 mm

151 9 68 600

Precip difference from 9 (68) 600 (23.876) to 9 (68) 615 (4.826) is greater than 5 mm

The above precipitation data are considered correct and remains unchanged

102 9 68 600

Max hourly wind speed is greater than 30 m/s on 9 (68) 600 (0)

The above wind speed datum is considered correct and remains unchanged

April 2003

Array Day Julian Time Error

150 24 114 700

Air temp difference from 24 (114) 700 (16.684) to 24 (114) 715 (20.027) is greater than 3.0 degrees C

150 25 115 1015

Air temp difference from 25 (115) 1015 (21.789) to 25 (115) 1030 (18.449) is greater than 3.0 degrees C

The temperature data above are considered correct when compared with precipitation and wind data for

those days. They remain unchanged.

May 2003

Array Day Julian Time Error

151 22 142 1100

Precip difference from 22 (142) 1100 (.508) to 22 (142) 1115 (7.62) is greater than 5 mm

The above Precipitation datum is considered correct and remains unchanged.

June 2003

Array Day Julian Time Error

150 3 154 1015

Air temp difference from 3 (154) 1015 (26.778) to 3 (154) 1030 (22.437) is greater than 3.0 degrees C

150 6 157 2300

Air temp difference from 6 (157) 2300 (26.043) to 6 (157) 2315 (22.905) is greater than 3.0 degrees C

150 20 171 1715

Air temp difference from 20 (171) 1715 (25.107) to 20 (171) 1730 (21.968) is greater than 3.0 degrees C

150 22 173 1300

Air temp difference from 22 (173) 1300 (26.353) to 22 (173) 1315 (23.285) is greater than 3.0 degrees C

150 26 177 1045

Air temp difference from 26 (177) 1045 (28.026) to 26 (177) 1100 (24.889) is greater than 3.0 degrees C

150 29 180 845

Air temp difference from 29 (180) 845 (26.776) to 29 (180) 900 (22.903) is greater than 3.0 degrees C

150 30 181 1615

Air temp difference from 30 (181) 1615 (28.101) to 30 (181) 1630 (24.964) is greater than 3.0 degrees C

The above Temperature data are considered correct and remain unchanged

151 6 157 2315

Precip difference from 6 (157) 2315 (2.286) to 6 (157) 2330 (9.398) is greater than 5 mm

151 6 157 2330

Precip difference from 6 (157) 2330 (9.398) to 6 (157) 2345 (2.794) is greater than 5 mm

151 7 158 1615

Precip difference from 7 (158) 1615 (.762) to 7 (158) 1630 (7.112) is greater than 5 mm

151 7 158 1630

Precip difference from 7 (158) 1630 (7.112) to 7 (158) 1645 (1.27) is greater than 5 mm

151 20 171 930

Precip difference from 20 (171) 930 (2.032) to 20 (171) 945 (10.668) is greater than 5 mm

151 20 171 1030

Precip difference from 20 (171) 1030 (1.27) to 20 (171) 1045 (11.684) is greater than 5 mm

151 20 171 1115

Precip difference from 20 (171) 1115 (11.176) to 20 (171) 1130 (16.256) is greater than 5 mm

151 20 171 1130

Precip difference from 20 (171) 1130 (16.256) to 20 (171) 1145 (3.048) is greater than 5 mm

151 20 171 1730

Precip difference from 20 (171) 1730 (10.414) to 20 (171) 1745 (3.556) is greater than 5 mm

151 22 173 1300

Precip difference from 22 (173) 1300 (4.064) to 22 (173) 1315 (18.796) is greater than 5 mm

151 22 173 1315

Precip difference from 22 (173) 1315 (18.796) to 22 (173) 1330 (4.318) is greater than 5 mm

151 29 180 915

Precip difference from 29 (180) 915 (10.922) to 29 (180) 930 (1.27) is greater than 5 mm

The above precipitation data are considered correct and remain unchanged.

July 2003

Array Day Julian Time Error

150 1 182 1930

Air temp difference from 1 (182) 1930 (28.102) to 1 (182) 1945 (24.563) is greater than 3.0 degrees C

150 2 183 845

Air temp difference from 2 (183) 845 (26.977) to 2 (183) 900 (23.972) is greater than 3.0 degrees C

150 11 192 1015

Air temp difference from 11 (192) 1015 (30.017) to 11 (192) 1030 (26.945) is greater than 3.0 degrees C

150 15 196 1145

Air temp difference from 15 (196) 1145 (27.89) to 15 (196) 1200 (23.552) is greater than 3.0 degrees C

150 19 200 1000

Air temp difference from 19 (200) 1000 (29.692) to 19 (200) 1015 (26.288) is greater than 3.0 degrees C

150 19 200 1130

Air temp difference from 19 (200) 1130 (29.821) to 19 (200) 1145 (24.745) is greater than 3.0 degrees C

150 24 205 1145

Air temp difference from 24 (205) 1145 (29.283) to 24 (205) 1200 (25.477) is greater than 3.0 degrees C

150 24 205 1545

Air temp difference from 24 (205) 1545 (26.897) to 24 (205) 1600 (22.358) is greater than 3.0 degrees C

150 25 206 1400

Air temp difference from 25 (206) 1400 (29.358) to 25 (206) 1415 (25.017) is greater than 3.0 degrees C

150 27 208 1145

Air temp difference from 27 (208) 1145 (30.213) to 27 (208) 1200 (26.209) is greater than 3.0 degrees C

150 29 210 1045

Air temp difference from (29 210) 1045 (28.414) to 29 (210) 1100 (24.142) is greater than 3.0 degrees C

150 30 211 945

Air temp difference from 30 (211) 945 (27.224) to 30 (211) 1000 (24.086) is greater than 3.0 degrees C

150 31 212 1045

Air temp difference from 31 (212) 1045 (29.217) to 31 (212) 1100 (26.211) is greater than 3.0 degrees C

The above temperature data are considered correct and remain unchanged.

151 1 182 1945

Precip difference from 1 (182) 1945 (2.54) to 1 (182) 2000 (12.446) is greater than 5 mm

151 2 183 45

Precip difference from 2 (183) 45 (5.842) to 2 (183) 100 (.254) is greater than 5 mm

151 2 183 900

Precip difference from 2 (183) 900 (1.016) to 2 (183) 915 (6.096) is greater than 5 mm

151 2 183 915

Precip difference from 2 (183) 915 (6.096) to 2 (183) 930 (11.176) is greater than 5 mm

151 2 183 930

Precip difference from 2 (183) 930 (11.176) to 2 (183) 945 (1.016) is greater than 5 mm

151 3 184 245

Precip difference from 3 (184) 245 (2.794) to 3 (184) 300 (9.398) is greater than 5 mm

151 3 184 300

Precip difference from 3 (184) 300 (9.398) to 3 (184) 315 (2.794) is greater than 5 mm

151 4 185 1000

Precip difference from 4 (185) 1000 (7.366) to 4 (185) 1015 (.508) is greater than 5 mm

151 12 193 1300

Precip difference from 12 (193) 1300 (.762) to 12 (193) 1315 (8.382) is greater than 5 mm

151 12 193 1315

Precip difference from 12 (193) 1315 (8.382) to 12 (193) 1330 (.508) is greater than 5 mm

151 22 203 930

Precip difference from 22 (203) 930 (2.54) to 22 (203) 945 (15.24) is greater than 5 mm

151 22 203 945

Precip difference from 22 (203) 945 (15.24) to 22 (203) 1000 (8.636) is greater than 5 mm

151 24 205 1600

Precip difference from 24 (205) 1600 (14.732) to 24 (205) 1615 (4.572) is greater than 5 mm

151 31 212 1100

Precip difference from 31 (212) 1100 (7.112) to 31 (212) 1115 (1.524) is greater than 5 mm

The above precipitation data are considered correct and remain unchanged.

August 2003

Array Day Julian Time Error

150 4 216 1030

Air temp difference from 4 (216) 1030 (28.625) to 4 (216) 1045 (24.085) is greater than 3.0 degrees C

150 4 216 1400

Air temp difference from 4 (216) 1400 (29.815) to 4 (216) 1415 (25.744) is greater than 3.0 degrees C

150 7 219 845

Air temp difference from 7 (219) 845 (28.369) to 7 (219) 900 (23.893) is greater than 3.0 degrees C

150 12 224 2145

Air temp difference from 12 (224) 2145 (25.977) to 12 (224) 2200 (22.704) is greater than 3.0 degrees C

150 18 230 1345

Air temp difference from 18 (230) 1345 (30.761) to 18 (230) 1400 (26.822) is greater than 3.0 degrees C

The above temperature data are considered correct and remain unchanged.

151 5 217 1130

Precip difference from 5 (217) 1130 (6.858) to 5 (217) 1145 (1.27) is greater than 5 mm

151 7 219 900

Precip difference from 7 (219) 900 (10.414) to 7 (219) 915 (2.032) is greater than 5 mm

151 8 220 230

Precip difference from 8 (220) 230 (5.842) to 8 (220) 245 (13.716) is greater than 5 mm

151 8 220 245

Precip difference from 8 (220) 245 (13.716) to 8 (220) 300 (2.032) is greater than 5 mm

151 12 224 2145

Precip difference from 12 (224) 2145 (1.524) to 12 (224) 2200 (21.082) is greater than 5 mm

151 12 224 2200

Precip difference from 12 (224) 2200 (21.082) to 12 (224) 2215 (9.398) is greater than 5 mm

151 12 224 2215

Precip difference from 12 (224) 2215 (9.398) to 12 (224) 2230 (.254) is greater than 5 mm

151 21 233 845

Precip difference from 21 (233) 845 (13.208) to 21 (233) 900 (5.08) is greater than 5 mm

The above precipitation data are considered correct and remain unchanged.

September 2003

Array Day Julian Time Error

150 14 257 1315

Air temp difference from 14 (257) 1315 (29.214) to 14 (257) 1330 (25.548) is greater than 3.0 degrees C

151 4 247 615

Precip difference from 4 (247) 615 (9.398) to 4 (247) 630 (2.54) is greater than 5 mm

151 5 248 415

Precip difference from 5 (248) 415 (.254) to 5 (248) 430 (7.366) is greater than 5 mm

151 5 248 445

recip difference from 5 (248) 445 (7.62) to 5 (248) 500 (2.286) is greater than 5 mm

151 25 268 1700

Precip difference from 25 (268) 1700 (.762) to 25 (268) 1715 (8.636) is greater than 5 mm

The above temperature and precipitation data are considered correct and remain unchanged.

October 2003

Array Day Julian Time Error

151 8 281 1630

Precip difference from 8 (281) 1630 (8.128) to 8 (281) 1645 (.254) is greater than 5 mm

151 28 301 900

Precip difference from 28 (301) 900 (2.286) to 28 (301) 915 (7.874) is greater than 5 mm

151 28 301 915

Precip difference from 28 (301) 915 (7.874) to 28 (301) 930 (1.016) is greater than 5 mm

The above precipitation data are considered correct and remain unchanged.

102 5 278 1900

Wind speed is less than 0.5 m/s from 5 (278) 1900 to 6 (279) 800

102 6 279 2000

Wind speed is less than 0.5 m/s from 6 (279) 2000 to 7 (280) 800

102 23 296 2200

Wind speed is less than 0.5 m/s from 23 (296) 2200 to 24 (297) 1000

The above wind speed data are considered correct and remain unchanged.

November 2003

The following rainfall data are correct and were not deleted.

15 minute Precip on 11/5/03 @ 01:15

15 minute Precip on 11/5/03 @ 01:30

15 minute Precip on 11/5/03 @ 01:45

15 minute Precip on 11/5/03 @ 02:00

15 minute Precip on 11/5/03 @ 02:15

15 minute Precip on 11/5/03 @ 02:30

15 minute Precip on 11/18/03 @ 23:00

15 minute Precip on 11/18/03 @ 23:30

15 minute Precip on 11/18/03 @ 23:45

15 minute Precip on 11/19/03 @ 02:45

15 minute Precip on 11/24/03 @ 09:15

15 minute Precip on 11/24/03 @ 09:30

December 2003

There were no anomalous data recorded.

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.

January 2003

Array Day Julian Time Error

101 1 1 100 Technician changed 101 Array data at 1 (1) 100 to 31 (31) 2400

150 1 1 15 Technician changed 150 Array data at 1 (1) 15 to 31 (31) 2400

241 1 1 2400 Technician changed 241 Array data at 1 (1) 2400 to 31 (31) 2400

243 1 1 2400 Technician changed 243 Array data at 1 (1) 2400 to 31 (31) 2400

244 1 1 2400 Technician changed 244 Array data at 1 (1) 2400 to 31 (31) 2400

The above errors are associated with a malfunctioning temperature and relative humidity sensor.

Temperature and relative humidity data for the above arrays and time periods were considered incorrect and

were deleted (All temperature and relative humidity data for entire month of January have been deleted).

February 2003

Array Day Julian Time Error

101 1 32 100 Technician changed 101 Array data at 1 (32) 100 to 28 (59) 2400

150 1 32 15 Technician changed 150 Array data at 1 (32) 15 to 28 (59) 2400

241 1 32 2400 Technician changed 241 Array data at 1 (32) 2400 to 28 (59) 2400

243 1 32 2400 Technician changed 243 Array data at 1 (32) 2400 to 28 (59) 2400

244 1 32 2400 Technician changed 244 Array data at 1 (32) 2400 to 28 (59) 2400

The errors above are associated with a malfunctioning temperature and relative humidity sensor.

Temperature and relative humidity data for the above arrays and time periods were considered incorrect and

were deleted (All temperature and relative humidity data for entire month of February have been deleted).

March 2003

Array Day Julian Time Error

101 1 60 100 Technician changed 101 Array data from 1 (60) 100 to 10 (69) 900

150 1 60 15 Technician changed 150 Array data from 1 (60) 15 to 10 (69) 830

241 1 60 2400 Technician changed 241 Array from 1 (60) 2400 to 10 (69) 2400

243 1 60 2400 Technician changed 243 Array data from 1 (60) 2400 to 10 (69) 2400

244 1 60 2400 Technician changed 244 Array data from 1 (60) 2400 to 10 (69) 2400

The above errors are associated with malfunctioning temperature and relative humidity sensor. Temperature

and relative humidity data for the above arrays and time periods were considered incorrect and deleted.

150 21 80 2345 Technician changed 150 Array data from 21 (80) 2345 to 21 (80) 2345

Array was deleted due to all sensors recording values out of range. This event coincides with the beginning

of the powering-down event that occurred between 2345 on March 21st and 530 on March 22nd.

101 22 81 600 Technician changed 101 Array data from 22 (81) 600 to 22 (81) 600

102 22 81 600 Technician changed 102 Array from 22 (81) 600 to 22 (81) 600

Hourly arrays were deleted due to missing data during the beginning of the hour. This event coincided with

the end of the powering-down event.

241 22 81 2400 Technician changed 241 Array from 22 (81) 2400 to 22 (81) 2400

242 22 81 2400 Technician changed 242 Array from 22 (81) 2400 to 22 (81) 2400

243 22 81 2400 Technician changed 243 Array data from 22 (81) 2400 to 22 (81) 2400

244 22 81 2400 Technician changed 244 Array data from 22 (81) 2400 to 22 (81) 2400

Twenty-four hour data were deleted for March 22, 2003 due to a powering down event by the CR10X

datalogger for 6 hours in the morning.

April 2003 through December 2003

There were no data deleted during this time period.

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.

January 2003 and February 2003

There were no missing data within these months

March 2003

Array Day Julian Time Error

150 21 80 2345 Missing 150 Array data (15 minute data) from 21 (80) 2345 to 22 (81) 515

101 21 80 2400 Missing 101 Array data (Hourly Averages) from 21 (80) 2400 to 22 (81) 600

102 21 80 2400 Missing 102 Array data (Hourly Average Wind Parameters) from 21 (80) 2400

to 22 (81) 500

241 21 80 2400 Missing 241 Array (Daily Averages)

242 21 80 2400 Missing 242 Array (Daily Average Wind Parameters)

243 21 80 2400 Missing 243 Array (Daily Max/Time Values)

244 21 80 2400 Missing 244 Array (Daily Min/Time Values)

The CR10X datalogger did not collect data for the above missing data period due to a powering-down event.

April 2003 through December 2003

There were no missing data during these months.

14) Other Remarks/notes

**On 10/10/2023 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 tobe 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.

A new temperature/RH sensor was installed on July 25, 2002 at 0745. All temperature/RH data collected

from the installation date through March 10, 2003 at 0830 were incorrect due to a faulty sensor. After

discussions with Bob Scarborough and Campbell Scientific, as well as rewiring the sensor, it was finally

decided that the new sensor was faulty. The temperature/RH sensor was repaired in February of 2003,

installed on March 10, 2003 at 0845 and is now functioning correctly.

Tropical Storm Bill passed over the Apalachicola Bay area on June 30, 2003

The wires to two of the sensors had been chewed when the Weather Station was serviced on November 3rd. The actual wiring appeared to have not been damaged, so the places that had been stripped were repaired with electrical tape. The data file appears to have not been corrupted by this event.

When the new CR10X program was loaded on the CR10X, it was discovered that the time stamp was a year behind. The year was adjusted on November 17th, 2003. Two raw files have incorrect year values:

data069.dat and data070.dat. The year was corrected after the file was run through the Eqwinformat.xls

macro and before entry into EQWin.

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.

Rain Events: All measurements in mm.

144 1/2/2003 2 01.5

144 1/11/2003 11 02.8

144 1/13/2003 13 00.5

144 1/14/2003 14 00.8

144 1/23/2003 23 00.3

144 2/4/2003 35 04.8

144 2/5/2003 36 04.3

144 2/7/2003 38 35.1

144 2/10/2003 41 02.3

144 2/11/2003 42 00.8

144 2/17/2003 48 42.4

144 2/23/2003 54 22.4

144 2/25/2003 56 00.3

144 2/27/2003 58 08.9

144 2/28/2003 59 43.2

144 3/1/2003 60 00.3

144 3/2/2003 61 96.5

144 3/4/2003 63 17.8

144 3/5/2003 64 03.8

144 3/6/2003 65 00.3

144 3/7/2003 66 03.8

144 3/8/2003 67 21.1

144 3/10/2003 69 50.8

144 3/11/2003 70 00.3

144 3/17/2003 76 06.9

144 3/18/2003 77 09.1

144 3/19/2003 78 00.5

144 3/30/2003 89 01.3

144 3/31/2003 90 11.7

144 4/5/2003 95 00.3

144 4/6/2003 96 00.3

144 4/9/2003 99 31.5

144 4/10/2003 100 04.1

144 4/18/2003 108 00.3

144 4/26/2003 116 11.9

144 5/20/2003 140 03.6

144 5/21/2003 141 05.8

144 5/22/2003 142 05.6

144 5/23/2003 143 45.2

144 6/3/2003 154 00.5

144 6/4/2003 155 10.4

144 6/5/2003 156 00.5

144 6/6/2003 157 00.8

144 6/7/2003 158 27.4

144 6/8/2003 159 92.5

144 6/14/2003 165 03.8

144 6/18/2003 169 05.8

144 6/19/2003 170 16.8

144 6/20/2003 171 03.0

144 6/21/2003 172 106.7

144 6/22/2003 173 06.1

144 6/23/2003 174 36.6

144 6/24/2003 175 00.3

144 6/25/2003 176 00.3

144 6/27/2003 178 02.3

144 6/29/2003 180 02.3

144 6/30/2003 181 27.4

144 7/1/2003 182 02.0

144 7/2/2003 183 18.5

144 7/3/2003 184 42.2

144 7/4/2003 185 46.0

144 7/5/2003 186 23.6

144 7/7/2003 188 04.6

144 7/12/2003 193 01.8

144 7/13/2003 194 10.2

144 7/16/2003 197 15.7

144 7/17/2003 198 01.3

144 7/18/2003 199 00.3

144 7/20/2003 201 08.1

144 7/21/2003 202 05.3

144 7/23/2003 204 40.9

144 7/24/2003 205 06.1

144 7/25/2003 206 20.3

144 7/26/2003 207 14.5

144 7/28/2003 209 00.3

144 7/30/2003 211 02.8

144 7/31/2003 212 01.8

144 8/1/2003 213 09.1

144 8/2/2003 214 00.8

144 8/3/2003 215 00.8

144 8/5/2003 217 25.9

144 8/6/2003 218 08.1

144 8/7/2003 219 02.8

144 8/8/2003 220 24.6

144 8/9/2003 221 24.9

144 8/10/2003 222 00.5

144 8/13/2003 225 34.8

144 8/14/2003 226 00.3

144 8/16/2003 228 00.8

144 8/17/2003 229 04.1

144 8/19/2003 231 07.4

144 8/20/2003 232 00.8

144 8/22/2003 234 30.5

144 8/23/2003 235 09.7

144 8/24/2003 236 06.6

144 8/28/2003 240 02.5

144 8/29/2003 241 00.8

144 9/1/2003 244 06.1

144 9/4/2003 247 14.0

144 9/5/2003 248 16.5

144 9/6/2003 249 37.3

144 9/7/2003 250 08.6

144 9/8/2003 251 01.3

144 9/15/2003 258 01.5

144 9/23/2003 266 23.4

144 9/24/2003 267 00.5

144 9/26/2003 269 16.5

144 9/28/2003 271 00.8

144 10/2/2003 275 08.4

144 10/9/2003 282 21.3

144 10/11/2003 284 14.5

144 10/12/2003 285 73.2

144 10/15/2003 288 00.3

144 10/18/2003 291 00.3

144 10/26/2003 299 00.3

144 10/27/2003 300 03.8

144 10/28/2003 301 03.0

144 10/29/2003 302 39.9

144 10/31/2003 304 00.3

144 11/4/2003 308 01.0

144 11/5/2003 309 00.3

144 11/6/2003 310 61.0

144 11/14/2003 318 00.3

144 11/18/2003 322 00.3

144 11/19/2003 323 32.5

144 11/20/2003 324 11.9

144 11/23/2003 327 00.3

144 11/24/2003 328 00.3

144 11/25/2003 329 19.8

144 11/29/2003 333 16.3

144 12/5/2003 339 10.7

144 12/11/2003 345 06.6

144 12/14/2003 348 11.9

144 12/15/2003 349 08.1

144 12/17/2003 351 00.3

144 12/18/2003 352 11.2

144 12/24/2003 358 10.7

144 12/25/2003 359 03.0

144 12/31/2003 365 01.5