Delaware (DEL) NERR Meteorological Metadata
January - December 2002
Latest Update: **January 30, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour meteorological data were downloaded from each instrument on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (nerr303.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.

This software was located on a computer to which the data was uploaded (every 15 minutes) via a short haul modem to a computer located at St. Jones Center for Estuarine Studies. The data was saved as a raw data file (SJ_RAW.dat) onto a separate hard drive and backed up onto Delaware Coastal Programs' (DCP) server.

Once an entire month of data was 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 and Access Database. There are three main steps the WDMP performs. First, it converts the comma delimited monthly raw data file into an Access Database. Secondly, 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 Anomalous Data section. Any data corrections that were performed are noted in the Data Correction section below.

Common errors noted in the monthly error reports were wind speeds below the 0.5 m/s criteria, temperature change of greater than 3 C in a 15 minute period, and precipitation difference of greater than 5mm in 15 minutes. All errors of these types were double checked with other data that could support such "anomalous" weather changes and noted in the sections that follow. Wind speeds below the 0.5 m/s criteria are common between 1900 and 0600 hours and are not individually checked. Both raw data files and Access databases were saved to the DCP server with daily tape back-up. Both Robert Scarborough and Mike Mensinger conducted data management and QA/QC activities.

b) Data Collection Schedule

i) Data is collected in the following formats.
(1) Sample data points are collected every 15 minutes.
(2) Hourly averages are collected every 60 minutes.
(3) Every 24 hours daily averages, maximums with time, and minimums with time.

ii) 15 minute sample point parameters:
Array 150: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par), Barometric Pressure (mb), Wind Speed (m/s), Wind Direction
Array 151: Rainfall (mm)

iii) Hourly average parameters:
Array 101: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par), Barometric Pressure (mb)
Array 102: Date, Time, Wind Speed (m/s), Wind Direction, Wind Speed Maximum (m/s)

iv) Daily Averages parameters:
Array 241: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par), Barometric Pressure (mb)
Array 242: Date, Time, Wind Speed (m/s), Wind Direction, Wind Direction Standard Deviation (using Yamartino's Algorithm)

v) Daily Maximum parameters:
Array 243: Date, Time, Air Temperature (c), Time, Relative Humidity (%), Time, LiCor (par), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time

vi) Daily Minimum parameters:
Array 244: Date, Time, Air Temperature (c), Time, Relative Humidity (%), Time, LiCor

(par), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time

c) Error/Anomalous Data Criteria

Air Temp:
- 15 min sample not greater than max for the day
- 15 min sample not less than the min for the day
- 15 min sample not greater than 3.0 C from the previous 15 minutes
- Max and min temp recorded for the day
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Relative Humidity:
- Not changed by more than 25% from the previous 15 minutes
- Max and min humidity recorded for the day
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Rainfall:
- Precipitation not greater than 5 mm in 15 min
- No precipitation for the month

Wind Speed:
- Wind speed greater than 30 m/s
- Wind speed less than .5 m/s

Wind Direction:
- Wind direction not greater than 360 degrees
- Wind direction not less than 0 degrees

Pressure:
- Pressure greater than 1040 mb or less than 980 mb
- Pressure changes greater than 5 mb per hour
- Maximum and minimum values recorded for the day
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Time:
- 15-minute interval recorded

For all data:
- Duplicate interval data

3) Research objectives:

The principal objective is to record long-term meteorological data for the St. Jones Estuary in order to observe any environmental changes or trends over time. The data is also used for specific research studies relating to migrating shorebirds, horseshoe crab spawning, atmospheric deposition of nutrients and pesticides.

4) Research methods:

The Campbell Scientific weatherstation samples every 5 seconds to produce both hourly and daily averages of those measurements of air temperature, relative humidity, barometric pressure, rainfall, wind speed and wind direction. An instantaneous sample is taken every 15 minutes and that data is stored in array 150. The CR10X datalogger can store over three weeks of data before it overwrites the data, in addition there is a storage module that stores in excess of a month's data for backup. The data is sent every 15 minutes to a computer for real-time display and storage. If the short haul modem link failed and data could not be automatically sent from the datalogger to the computer the data would be downloaded from the CR10X to a laptop computer following procedures in Part D. Section 4.5 of the CDMO Operations Manual. Periodically, sensors on the Weatherstation are inspected for damage or debris. If any is found, it is repaired and/or cleaned. Sensors are removed and sent back to Campbell Scientific for calibration at minimum of every year.

5) Site location and character:

The Delaware National Estuarine Research Reserve is comprised of two component sites, the St. Jones River and Blackbird Creek components. Both components are located along the Delaware Bay Coast. The St. Jones River Component is located in central Kent County Delaware, east of the State capitol city, Dover. The Blackbird Creek component is located in the unincorporated area of Southern New Castle County. The meteorological station site, is located in the St. Jones DNERR component. It is located in a tidal marsh area with a wooded fringe area 100 m to the north, 75 m to east, 75 m to the west and 1+ km to south. The wooded area is of an approximate average height of 16 m.

Position: Latitude 39 05' 20.05" N
Longitude 75 degree 26' 12.78" W

The unit is mounted on a 3-meter tower adjacent to the boardwalk that crosses the marsh. The elevations above the marsh surface are as follows; Barometric pressure - 2.2 m, temperature and relative humidity - 2.9 m , wind and PAR - 4.5 m, highest point on tower (lightning rod) - 4.9 m. The rain gauge is 2.4 m above the surface and 3 m south of the tower. The adjacent boardwalk is 1.1 m above the surface with a railing height of 1.0 m.

A vegetative cover of spartina surrounds the area with an average height of 1 m. The tower and rain gauge are both 1 m east of the boardwalk. The weatherstation is located approximately 2 km from the water quality datasonde at Scotton Landing.

6) Data collection period:

The meteorological monitoring program was started in October 1997 at the DNERR and has been continuous through the present. The data collection format has followed NERRS protocol since standardized meteorological program development in November of 1998.

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:

The NERR Water Quality Monitoring Project also has three stations located at the DNERR. The principal objective of this study is to record long-term water quality data for St. Jones and Blackbird watersheds in order to observe any physical changes or trends in water quality over time. The five sites represent a pristine site and the other four represent impacted sites. Measurements are taken every 30 minutes over roughly two-week collecting periods.

In addition atmospheric deposition of rainfall events is performed in the DNERR watersheds to monitor and characterize the nutrient input to the estuary from differing storm events and seasonally. Three samplers are positioned across the St. Jones watershed and one is in the Blackbird watershed.

II. Physical Structure Descriptors

9) Sensor specifications, operating range, accuracy, date of last calibration

LiCor Quantum Sensor
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: 8/15/2000 (installed new 12/20/2000)
12/19/02: Replaced with unit # (s/n Q22182, recalib 11/14/02)

Wind Monitor
Model # 05103
Range: 0-60 m/s; 360° mechanical
Date of last calibration: 3/5/1999 (installed new 12/20/2000)
12/19/02: Replaced with unit (s/n WM49558)

Temperature and Relative Humidity
Model #: HMP45C
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: ± 1.2% RH
Date of Last calibration: Unit 2 unknown (installed new 12/20/2000)
Unit 1 11/27/2001 (installed new 12/19/2001)

12/19/02: Replaced with unit # (s/n U1430039, recalib 10/07/02)

Barometric Sensor
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 60C)
Stability: ± 0.1 mb per year
Date of Last calibration: 9/12/00 (installed new 12/20/2000)
12/19/02: Replaced with unit (s/n R1630014, recalib 10/09/02)

Tipping Bucket Rain Gauge
Model #: TE 525
Range: 0.1 mm
Accuracy: 1.0% at <2"/hr
Date of Last calibration: field calibrated 12/20/00, 12/19/2001, 12/19/2002

10) Coded variable indicator and variable code definitions:
SJ=Saint Jones River

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 throughout the fall of 2022.

Please note: JulianD=Julian Date and CalD=Calendar Day

Wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours and occurred throughout each month.

January 2002

The following data appear to be correct:

ArrayID CalD JulianD Time Error Message

150 24 24 1145 Air temp difference from 24 (24) 1145 (9.5433) to 24 (24) 1200 (13.035) is greater than 3.0 degrees C

The following data appear correct, associated with a convective storm:

ArrayID CalD JulianD Time Error Message
151 6 6 1715 Precip difference from 6 (6) 1715 (2.286) to 6 (6) 1730 (7.366) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID CalD JulianD Time Error Message
102 17 17 2100 Wind speed is less than 0.5 m/s from 17 (17) 2100 to 18 (18) 900

The following data appear to be correct; % changes in this range with low temperatures are insignificant:

ArrayID CalD JulianD Time Error Message
101 18 18 400 Air temp average in 1 hour data (.74581) is greater than 15 minute maximum (.66543) by at least 10%
101 19 19 1300 Air temp average in 1 hour data (.06699) is greater than 15 minute maximum (.04702) by at least 10%
101 21 21 2100 Air temp average in 1 hour data (.24766) is greater than 15 minute maximum (.1814) by at least 10%

February 2002

The following data appear to be correct:

ArrayID CalD JulianD Time Error Message
150 1 32 1600 Air temp difference from 1 (32) 1600 (23.091) to 1 (32) 1615 (18.398) is greater than 3.0 degrees C
150 4 35 1400 Air temp difference from 4 (35) 1400 (6.0634) to 4 (35) 1415 (2.5718) is greater than 3.0 degrees C
150 4 35 1415 Air temp difference from 4 (35) 1415 (2.5718) to 4 (35) 1430(-.44991) is greater than 3.0 degrees C
150 10 41 1500 Air temp difference from 10 (41) 1500 (12.934) to 10 (41) 1515 (17.094) is greater than 3.0 degrees C

The following data appear to be correct:

ArrayID CalD JulianD Time Error Message

150 4 35 1400 Rel hum difference from 4 (35) 1400 (43.982) to 4 (35) 1415 (73.258) is greater than 25%
150 4 35 1415 Rel hum difference from 4 (35) 1415 (73.258) to 4 (35) 1430 (100) is greater than 25%
150 25 56 1215 Rel hum difference from 25 (56) 1215 (35.833) to 25 (56) 1230 (64.751) is greater than 25%
150 25 56 1645 Rel hum difference from 25 (56) 1645 (71.532) to 25 (56) 1700 (41.607) is greater than 25%
150 25 56 1745 Rel hum difference from 25 (56) 1745 (35.302) to 25 (56) 1800 (71.618) is greater than 25%

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	2	33	1900	Wind speed is less than 0.5 m/s from 2 (33) 1900 to 3 (34) 700
102	18	49	1900	Wind speed is less than 0.5 m/s from 18 (49) 1900 to 19 (50) 800
102	21	52	1900	Wind speed is less than 0.5 m/s from 21 (52) 1900 to 22 (53) 800

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	9	40	730	Wind direction is greater than 360 or less than 0 on 9 (40) 730 (-.09541)

March 2002

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	7	66	1700	Air temp difference from 7 (66) 1700 (18.272) to 7 (66) 1715(15.257) is greater than 3.0 degrees C
150	10	69	245	Air temp difference from 10 (69) 245 (15.198) to 10 (69) 300 (12.113)is greater than 3.0 degrees C
150	24	83	1515	Air temp difference from 24 (83) 1515 (15.869) to 24 (83) 1530 (12.247) is greater than 3.0 degrees C
150	26	85	2115	Air temp difference from 26 (85) 2115 (16.696) to 26 (85) 2130 (11.729) is greater than 3.0 degrees C

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	8	67	630	Wind direction is greater than 360 or less than 0 on 8 (67) 630

(-.09543)
150 11 70 515 Wind direction is greater than 360 or less than 0 on 11 (70) 515 (-.09553)

April 2002

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	3	93	1515	Air temp difference from 3 (93) 1515 (20.11) to 3 (93) 1530 (15.556) is greater than 3.0 degrees C
150	10	100	1730	Air temp difference from 10 (100) 1730 (17.532) to 10 (100) 1745 (13.912) is greater than 3.0 degrees C
150	14	104	1530	Air temp difference from 14 (104) 1530 (20) to 14 (104) 1545 (26.638) is greater than 3.0 degrees C
150	24	114	300	Air temp difference from 24 (114) 300 (3.8098) to 24 (114) 315 (7.1695) is greater than 3.0 degrees C

The following data appear to be correct, wind shifted from west to east bringing humid air from the bay:

ArrayID	CalD	JulianD	Time	Error Message
150	10	100	1730	Rel hum difference from 10 (100) 1730 (40.701) to 10 (100) 1745 (67.055) is greater than 25%

The following data appear to be correct, wind shifted from the east (humid air) to the west (less humid air):

ArrayID	CalD	JulianD	Time	Error Message
150	14	104	1530	Rel hum difference from 14 (104) 1530 (77.296) to 14 (104) 1545 (45.118) is greater than 25%

The following data appear correct, associated with a convective storm:

ArrayID	CalD	JulianD	Time	Error Message
151	28	118	1930	Precip difference from 28 (118) 1930 (.254) to 28 (118) 1945 (5.334) is greater than 5 mm

May 2002

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	12	132	1730	Air temp difference from 12 (132) 1730 (26.543) to 12 (132) 1745 (23.461) is greater than 3.0 degrees C
150	12	132	1915	Air temp difference from 12 (132) 1915 (22.145) to 12 (132) 1930 (18.126) is greater than 3.0 degrees C
150	18	138	700	Air temp difference from 18 (138) 700 (16.622) to 18 (138) 715 (20.045) is greater than 3.0 degrees C
150	18	138	715	Air temp difference from 18 (138) 715 (20.045) to 18 (138) 730 (13.266) is greater than 3.0 degrees C

The following data appear correct, associated with a convective storm:

ArrayID	CalD	JulianD	Time	Error Message
151	2	122	715	Precip difference from 2 (122) 715 (.254) to 2 (122) 730 (5.842) is greater than 5 mm
151	2	122	800	Precip difference from 2 (122) 800 (7.366) to 2 (122) 815 (.762) is greater than 5 mm
151	12	132	1930	Precip difference from 12 (132) 1930 (17.272) to 12 (132) 1945 (4.572) is greater than 5 mm
151	18	138	415	Precip difference from 18 (138) 415 (.254) to 18 (138) 430 (5.334) is greater than 5 mm

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	4	124	100	Wind direction is greater than 360 or less than 0 on 4 (124) 100 (-.09538)

June 2002

The following data appear correct, associated with convective storms:

ArrayID	CalD	JulianD	Time	Error Message
150	5	156	2115	Air temp difference from 5 (156) 2115 (25.09) to 5 (156) 2130 (21.672) is greater than 3.0 degrees C
150	27	178	2000	Air temp difference from 27 (178) 2000 (28.554) to 27 (178) 2015 (25.338) is greater than 3.0 degrees C
151	5	156	2130	Precip difference from 5 (156) 2130 (7.366) to 5 (156) 2145 (2.286) is greater than 5 mm
151	6	157	1700	Precip difference from 6 (157) 1700 (3.556) to 6 (157) 1715 (10.16) is greater than 5 mm
151	6	157	1715	Precip difference from 6 (157) 1715 (10.16) to 6 (157) 1730 (1.27) is greater than 5 mm

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	2	153	1100	Wind direction is greater than 360 or less than 0 on 2(153) 1100 (-.09513)
150	22	173	1030	Wind direction is greater than 360 or less than 0 on 22(173) 1030 (-.09518)
150	29	180	1100	Wind direction is greater than 360 or less than 0 on 29 (180) 1100 (-.09516)

July 2002

The following data appear correct, associated with a convective storm event:

ArrayID	CalD	JulianD	Time	Error Message
151	23	204	2015	Precip difference from 23 (204) 2015 (4.826) to 23 (204) 2030 (12.954) is greater than 5 mm
151	23	204	2045	Precip difference from 23 (204) 2045 (8.636) to 23 (204) 2100 (3.556) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	18	199	1900	Wind speed is less than 0.5 m/s from 18 (199) 1900 to 19 (200) 700

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	5	186	645	Wind direction is greater than 360 or less than 0 on 5 (186) 645 (-.09518)
150	16	197	1915	Wind direction is greater than 360 or less than 0 on 16 (197) 1915 (-.09515)
150	19	200	2030	Wind direction is greater than 360 or less than 0 on 19 (200) 2030 (-.09518)
150	29	210	1030	Wind direction is greater than 360 or less than 0 on 29 (210) 1030 (-.09513)
150	31	212	315	Wind direction is greater than 360 or less than 0 on 31 (212) 315 (-.09522)

August 2002

The following data appear correct:

ArrayID	CalD	JulianD	Time	Error Message
150	20	232	1600	Air temp difference from 20 (232) 1600 (31.68) to 20 (232) 1615 (28.598) is greater than 3.0 degrees C

The following data appear correct and associated with storm event:

ArrayID	CalD	JulianD	Time	Error Message
150	28	240	100	Rel hum difference from 28 (240) 100 (71.545) to 28 (240) 115 (42.914) is greater than 25%
151	29	241	115	Precip difference from 29 (241) 115 (1.778) to 29 (241) 130 (7.366) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	25	237	2100	Wind speed is less than 0.5 m/s from 25 (237) 2100 to 26 (238) 900

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	6	218	845	Wind direction is greater than 360 or less than 0 on 6 (218) 845 (-.09519)
150	7	219	1615	Wind direction is greater than 360 or less than 0 on 7 (219) 1615 (-.09516)
150	8	220	1000	Wind direction is greater than 360 or less than 0 on 8 (220) 1000 (-.09519)

September 2002

The following data appear correct:

ArrayID	CalD	JulianD	Time	Error Message
150	28	271	15	Air temp difference from 28 (271) 15 (26.356) to 28 (271) 30 (22.736) is greater than 3.0 degrees C

The following data appear to be correct, associated with a convective storm:

ArrayID	CalD	JulianD	Time	Error Message
151	16	259	600	Precip difference from 16 (259) 600 (.508) to 16 (259) 615 (5.588) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	12	255	1900	Wind speed is less than 0.5 m/s from 12 (255) 1900 to 13 (256) 700

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	1	244	15	Wind direction is greater than 360 or less than 0 on 1 (244) 15 (-.09524)
150	5	248	1415	Wind direction is greater than 360 or less than 0 on 5 (248) 1415 (-.09516)
150	11	254	1700	Wind direction is greater than 360 or less than 0 on 11 (254) 1700 (-.09519)

October 2002

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common during the evening.

ArrayID	CalD	JulianD	Time	Error Message
102	22	295	1700	Wind speed is less than 0.5 m/s from 22 (295) 1700 to 23 (296) 600

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	29	302	2400	Wind direction is greater than 360 or less than 0 on 29 (302) 2400 (-.09538)

November 2002

The following data appear to be correct, associated with a convective storm:

ArrayID	CalD	JulianD	Time	Error Message
150	22	326	1315	Air temp difference from 22 (326) 1315 (13.069) to 22 (326)

1330 (9.1781) is greater than 3.0 degrees C

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	20	324	1900	Wind speed is less than 0.5 m/s from 20 (324) 1900 to 21 (325) 900

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	18	322	2000	Wind direction is greater than 360 or less than 0 on 18 (322) 2000 (-.09541)
150	20	324	300	Wind direction is greater than 360 or less than 0 on 20 (324) 300 (-.09541)
150	27	331	2045	Wind direction is greater than 360 or less than 0 on 27 (331) 2045 (-.09544)

December 2002

The following hourly licor data was replaced with 55555, as it was missing the (1100) 15 minute reading used for the hourly calculation:

ArrayID	CalD	JulianD	Time
105	19	353	1100

The 15 minute licor value for the following was (0), it was replaced with 55555 as reading was incorrect and associated with the licor sensor change:

ArrayID	CalD	JulianD	Time
150	19	353	1200
150	19	353	1215
150	19	353	1230
150	19	353	1245
150	19	353	1300

The following arrays were removed and replaced with 55555, the 15 minute readings used to generate the hourly totals were not available due to sensor replacement:

ArrayID	CalD	JulianD	Time
101	19	353	1200
102	19	353	1200

105	19	353	1200
105	19	353	1300

The following arrays were removed and replaced with 55555, the daily totals were incorrect due to missing data associated with sensor replacement:

ArrayID	CalD	JulianD	Time
241	19	353	2400
242	19	353	2400

The following data were removed and replaced with 55555, as they are incorrect due to missing data from sensor replacement:

ArrayID	CalD	JulianD	Time	
243	19	353	2400	Daily maximum relative humidity/time
243	19	353	2400	Daily maximum licor/time
243	19	353	2400	Daily maximum barometric pressure/time
244	19	353	2400	Daily minimum temperature/time
244	19	353	2400	Daily minimum licor time ONLY
244	19	353	2400	Daily minimum wind speed time ONLY
245	19	353	2400	Daily total licor

The following data appear to be correct and associated with a heavy precipitation event:

ArrayID	CalD	JulianD	Time	
151	20	354	1145	Precip difference from 20 (354) 1145 (2.032) to 20 (354) 1200 (7.112) is greater than 5 mm
151	20	354	1200	Precip difference from 20 (354) 1200 (7.112) to 20 (354) 1215 (.762) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	6	340	1800	Wind speed is less than 0.5 m/s from 6 (340) 1800 to 7 (341) 800

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	5	339	1930	Wind direction is greater than 360 or less than 0 on 5 (339) 1930 (-.09541)
150	9	343	2315	Wind direction is greater than 360 or less than 0 on 9 (343) 2315 (-.09553)

150 17 351 1900 Wind direction is greater than 360 or less than 0 on 17 (351) 1900 (-.09548)
150 18 352 430 Wind direction is greater than 360 or less than 0 on 18 (352) 430 (-.09546)
150 18 352 600 Wind direction is greater than 360 or less than 0 on 18 (352) 600 (-.09548)
150 24 358 1500 Wind direction is greater than 360 or less than 0 on 24 (358) 1500 (-.09538)

For the following data, the values are so small that the greater than 10% flag is not a cause for suspicion:

ArrayID CalD JulianD Time Error Message
101 5 339 1200 Air temp average in 1 hour data (-.13113) is greater than 15 minute maximum (-.15456) by at least 10%
101 5 339 1800 Air temp average in 1 hour data (-.1917) is greater than 15 minute maximum (-.22175) by at least 10%
101 10 344 1200 Air temp average in 1 hour data (.00041) is less than 15 minute minimum (.04704) by at least 10%
101 31 365 700 Air temp average in 1 hour data (1.2433) is greater than 15 minute maximum (1.0549) by at least 10%

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

The following missing data loss for all parameters occurred at the time of sensor changes on December 19, 2002, missing data denoted by 11111 in database:

ArrayID CalD JulianD Time Error Message
150 19 353 1100 Missing 150 Array data (15 min. data) from 19 (353) 1100 to 19 (353) 1145
101 19 353 1100 Missing 101 ARRAY (Hourly Averages)
102 19 353 1100 Missing 102 Array (Hourly Average Wind Parameters)

13) Other Remarks/notes

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.

January	Rainamount (mm)
6	26.416
7	.762
11	10.922
19	13.716
20	4.826
21	2.032
23	1.016
24	3.048
25	3.048
31	1.016

February	Rainamount (mm)
1	1.016
7	9.652
10	2.286
11	.254

March	Rainamount (mm)
2	11.938
3	5.080

10	.762
12	1.778
13	10.922
16	.508
17	4.318
18	18.288
20	23.622
26	17.526
27	6.604
31	17.272

April Rainamount (mm)

1	2.540
3	4.318
9	12.954
10	6.096
12	7.620
16	4.064
20	.508
21	.508
22	5.588
25	4.318
26	.508
27	2.794
28	57.912

May Rainamount (mm)

2	26.670
4	3.556
5	1.016
7	.254
12	34.798
13	8.128
14	.508
17	1.524
18	22.606

June Rainamount (mm)

4	.254
5	12.446
6	22.352
7	1.778
13	3.048
14	4.826
15	.254
18	.508
19	.762
27	.762

28 .254

July Rainamount (mm)
9 .762
10 4.318
14 2.286
15 .254
23 37.084
24 .762
25 7.366
27 7.620
28 1.016

August Rainamount (mm)
6 1.270
24 13.462
28 24.384
29 41.656
31 .254

September Rainamount (mm)
1 102.362
2 2.286
8 .254
9 .254
15 4.064
16 12.954
23 .254
26 20.574
27 4.826
28 3.048

October Rainamount (mm)

9 .762
10 63.500
11 29.464
12 1.016
13 2.794
15 2.794
16 37.084
17 1.270
18 .254
20 .254
23 .254
25 14.224
26 16.002

28	.508
29	23.876
30	10.160
31	1.270

November Rainamount (mm)

5	14.986
6	10.160
11	8.636
12	26.670
13	6.604
16	57.658
17	20.320
19	.254
21	7.366
22	4.826
27	3.302
30	1.270

December Rainamount (mm)

5	1.270
6	2.286
7	3.810
8	2.794
11	36.830
13	18.288
20	16.256
22	.254
24	.762
25	19.558
30	.254