Delaware (DEL) NERR Meteorological Metadata
January - December 2001
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: D
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, an 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 degree 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 Scotten Landing.

6) Data collection period:

The meteorological monitoring program was started in October 1997 at the DNERR and has been continuos 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 three sites represent a pristine site and the other two to 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)

Wind Monitor
Model # 05103
Range: 0-60 m/s; 360° mechanical
Date of last calibration: 4/5/1999 (installed new 12/20/2000)

Temperature and Relative Humidity
Model #: HMP45C
Operating Temperature: -40-+60°C
Temperature Measurement Range: -40-+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)

Barometric Sensor
Model # CS-105
Operating Range: Pressure - 600-1060 mb
Temperature: -40-+60C
Humidity: non-condensing
Accuracy: ±0.5 to 6.0 mb (+20-60C)
Stability: ± 0.1 mb per year
Date of Last calibration: 9/12/00 (installed new 12/20/2000)

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

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 2001

The following data appear to be correct:

ArrayID	JulianD	CalD	Time	Error Message
150	11	11	745	Air temp difference from 11 (11) 745 (.40335) to 11 (11) 800 (3.6975) is greater than 3.0 degrees C
150	30	30	745	Air temp difference from 30 (30) 745 (3.728) to 30 (30) 800 (7.2208) is greater than 3.0 degrees C

150 30 30 1415 Air temp difference from 30 (30) 1415 (15.945) to 30 (30) 1430 (12.256) 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	JulianD	CalD	Time	Error Message
102	28	28	1900	Windspeed is less than 0.5 m/s from 28 (28) 1900 to 29 (29) 700

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

ArrayID	JulianD	CalD	Time	Error Message
150	8	8	745	Wind direction is greater than 360 or less than 0 on 8 (8) 745 (-.0954)
150	8	8	1045	Wind direction is greater than 360 or less than 0 on 8 (8) 1045 (-.0954)
150	12	12	600	Wind direction is greater than 360 or less than 0 on 12 (12) 600 (-.09543)
150	12	12	1530	Wind direction is greater than 360 or less than 0 on 12 (12) 1530 (-.09537)
150	16	16	215	Wind direction is greater than 360 or less than 0 on 16 (16) 215 (-.0954)
150	20	20	1715	Wind direction is greater than 360 or less than 0 on 20 (20) 1715 (-.0954)

February 2001

The following data appear correct, associated with an ~180 wind shift at 1345 and again at 1615

ArrayID	JulianD	CalD	Time	Error Message
150	51	20	1345	Air temp difference from 20 (51) 1345 (18.081) to 20 (51) 1400 (14.056) is greater than 3.0 degrees C
150	51	20	1615	Air temp difference from 20 (51) 1615 (10.313) to 20 (51) 1630 (14.818) is greater than 3.0 degrees C
150	51	20	1615	Rel hum difference from 20 (51) 1615 (0) to 20 (51) 1630 (0) 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	JulianD	CalD	Time	Error Message
102	34	3	1900	Windspeed is less than 0.5 m/s from 28 (28) 1900 to 29 (29) 700

March 2001

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message

150 20 79 645 Air temp difference from 20 (79) 645 (1.129) to 20 (79) 700 (4.5564) is greater than 3.0 degrees C
150 30 89 1015 Air temp difference from 30 (89) 1015 (14.872) to 30 (89) 1030 (11.652) is greater than 3.0 degrees C

The following data appear correct, associated with an onshore wind shift:

ArrayID	CalD	JulianD	Time	Error Message
150	28	87	1800	Rel hum difference from 28 (87) 1800 (0) to 28 (87) 1815 (0) is greater than 25%

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

ArrayID	CalD	JulianD	Time	Error Message
150	6	65	1530	Wind direction is greater than 360 or less than 0 on 6 (65) 745 (-.09541)
150	15	74	2045	Wind direction is greater than 360 or less than 0 on 15(74) 1045 (-.09537)
150	18	77	2245	Wind direction is greater than 360 or less than 0 on 18 (77) 600 (-.09539)
150	19	78	845	Wind direction is greater than 360 or less than 0 on 19 (78) 845 (-.09539)
150	26	85	700	Wind direction is greater than 360 or less than 0 on 26 (85) 700 (-.09542)

April 2001

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	7	97	900	Air temp difference from 7 (97) 900 (15.811) to 7 (97) 915 (11.048) is greater than 3.0 degrees C
150	9	99	1915	Air temp difference from 9 (99) 1915 (16.202) to 9 (99) 1930 (19.357) is greater than 3.0 degrees C
150	9	99	1930	Air temp difference from 9 (99) 1930 (19.357) to 9 (99) 1945 (22.779) is greater than 3.0 degrees C
150	9	99	2015	Air temp difference from 9 (99) 2015 (22.907) to 9 (99) 2030 (18.275) is greater than 3.0 degrees C
150	23	113	1430	Air temp difference from 23 (113) 1430 (25.731) to 23 (113) 1445 (30.488) is greater than 3.0 degrees C
150	24	114	1545	Air temp difference from 24 (114) 1545 (28.274) to 24 (114) 1600 (24.187) is greater than 3.0 degrees C
150	24	114	1745	Air temp difference from 24 (114) 1745 (19.995) to 24 (114) 1800 (15.844) is greater than 3.0 degrees C
150	4	94	1630	Relative humidity difference from 4 (94) 1630 (32.199) to 4 (94) 1645 (57.555) is greater than 25%

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

ArrayID	CalD	JulianD	Time	Error Message
150	1	91	2245	Wind direction is greater than 360 or less than 0 on 1 (91) 2245 (-.09537)
150	25	115	1645	Wind direction is greater than 360 or less than 0 on 25(115) 1645 (-.09529)
150	26	116	545	Wind direction is greater than 360 or less than 0 on 26 (116) 545 (-.09541)

May 2001

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	4	124	1345	Air temp difference from 4 (124) 1345 (30.339) to 4 (124) 1400 (27.122) is greater than 3.0 degrees C
150	16	136	430	Air temp difference from 16 (136) 430 (9.286) to 16 (136) 445 (12.509) is greater than 3.0 degrees C
150	27	147	1630	Air temp difference from 27 (147) 1630 (22.938) to 27 (147) 1645 (18.916) 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	6	126	130	Wind direction is greater than 360 or less than 0 on 6 (126) 130 (-.09532)
150	14	134	100	Wind direction is greater than 360 or less than 0 on 14(134) 100 (-.095532)
150	14	134	2200	Wind direction is greater than 360 or less than 0 on 14(134) 2200 (-.0953)

June 2001

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

ArrayID	JulianD	CalD	Time	Error Message
150	174	23	1200	Air temp difference from 23 (174) 1200 (25.003) to 23 (174) 1215 (21.652) is greater than 3.0 degrees C
151	174	23	1200	Precipitation difference from 23 (174) 1200 (.254) to 23 (174) 1215 (5.842)is greater than 5 mm
151	174	23	1215	Precipitation difference from 23 (174) 1215 (5.842) to 23 (174) 1230 (15.494)is greater than 5 mm
151	174	23	1230	Precipitation difference from 23 (174) 1230 (15.494) to 23 (174) 1245 (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	28	179	1900	Wind speed is less than 0.5 m/s from 28 (179) 1900 to 29 (180) 700

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

ArrayID	CalD	JulianD	Time	Error Message
150	24	175	1815	Wind direction is greater than 360 or less than 0 on 24(175) 1815 (-.09519)
150	24	175	2015	Wind direction is greater than 360 or less than 0 on 24(175) 2015 (-.09522)

July 2001

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

ArrayID	CalD	JulianD	Time	Error Message
150	1	182	1700	Air temp difference from 1 (182) 1700 (26.474) to 1 (182) 1715 (21.718) is greater than 3.0 degrees C
150	10	191	1700	Air temp difference from 10 (191) 1700 (29.067) to 10 (191) 1715 (25.588) is greater than 3.0 degrees C
150	11	192	1400	Air temp difference from 1 (182) 1700 (26.474) to 1 (182) 1715 (21.718) is greater than 3.0 degrees C
150	11	192	1400	Relative hum difference from 11 (192) 1400 (46.695) to 11 (192) 1415 (85.354) is greater than 25%
151	26	207	1430	Precipitation difference from 26 (207) 1430 (1.778) to 26 (207) 1445 (27.94) is greater than 5 mm
151	26	207	1445	Precipitation difference from 26 (207) 1445 (27.94) to 26 (207) 1500 (8.89) is greater than 5 mm
151	26	207	1500	Precipitation difference from 26 (207) 1500 (8.89) to 26 (207) 1515 (1.016) is greater than 5 mm

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

ArrayID	CalD	JulianD	Time	Error Message
6	6	187	1800	Wind direction is greater than 360 or less than 0 on 6 (187) 1800 (-.09516)
10	10	191	800	Wind direction is greater than 360 or less than 0 on 10 (191) 800 (-.09518)
16	16	197	1445	Wind direction is greater than 360 or less than 0 on 16 (197) 1445 (-.09513)
21	21	202	915	Wind direction is greater than 360 or less than 0 on 21 (202) 915 (-.0952)

August 2001

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

ArrayID	CalD	JulianD	Time	Error Message
150	10	222	1630	Air temp difference from 10 (222) 1630 (32.213) to 10 (222) 1645 (27.325) is greater than 3.0 degrees C

150 14 226 1600 Air temp difference from 14 (226) 1600 (27.329) to 14 (226) 1615 (23.78) is greater than 3.0 degrees C
150 14 226 1615 Air temp difference from 14 (226) 1615 (23.78) to 14 (226) 1630 (20.642) is greater than 3.0 degrees C
151 19 231 1815 Precipitation difference from 19 (231) 1815 (3.302) to 19 (231) 1830 (10.16) is greater than 5 mm
151 19 231 1830 Precipitation difference from 19 (231) 1830 (10.16) to 19 (231) 1845 (5.08) 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	21	233	1900	Wind speed is less than 0.5 m/s from 21 (233) 1900 to 22 (234) 700

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

ArrayID	CalD	JulianD	Time	Error Message
150	1	213	900	Wind direction is greater than 360 or less than 0 on 1 (213) 900 (-.09522)
150	22	234	1100	Wind direction is greater than 360 or less than 0 on 22 (234) 1100 (-.09515)
150	26	238	815	Wind direction is greater than 360 or less than 0 on 26 (238) 815 (-.09524)

September 2001

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

ArrayID	CalD	JulianD	Time	Error Message
151	4	247	1930	Precipitation difference from 4 (247) 1930 (.254) to 4 (247) 1945 (5.334) is greater than 5 mm

The following data appear 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	260	1900	Wind speed is less than 0.5 m/s from 17 (260) 1900 to 18 (261) 700

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

ArrayID	CalD	JulianD	Time	Error Message
150	5	248	845	Wind direction is greater than 360 or less than 0 on 5 (248) 845 (-.09523)
150	5	248	1715	Wind direction is greater than 360 or less than 0 on 5 (248) 1715 (-.09517)
150	9	252	330	Wind direction is greater than 360 or less than 0 on 9 (252) 330 (-.09527)
150	14	257	400	Wind direction is greater than 360 or less than 0 on 14 (257) 400 (-.09527)
150	14	257	630	Wind direction is greater than 360 or less than 0 on 14 (257) 630 (-.09527)

150	15	258	1730	Wind direction is greater than 360 or less than 0 on 15 (258) 1730 (-.09521)
150	29	272	2200	Wind direction is greater than 360 or less than 0 on 29 (272) 2200 (-.09527)
150	30	273	45	Wind direction is greater than 360 or less than 0 on 30 (273) 45 (-.0953)

October 2001

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	275	1800	Wind speed is less than 0.5 m/s from 2 (275) 1800 to 3 (276) 700

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

ArrayID	CalD	JulianD	Time	Error Message
150	15	288	15	Wind direction is greater than 360 or less than 0 on 15 (288) 15 (-.09524)
150	22	295	1015	Wind direction is greater than 360 or less than 0 on 22 (295) 1015 (-.09524)

November 2001

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	16	320	2300	Air temp difference from 16 (320) 2300 (8.145) to 16 (320) 2315 (13.584) is greater than 3.0 degrees C
150	23	327	800	Air temp difference from 23 (327) 800 (4.8328) to 23 (327) 815 (7.9874) 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	9	313	1800	Wind speed is less than 0.5 m/s from 9 (313) 1800 to 10 (314) 600
102	11	315	2000	Wind speed is less than 0.5 m/s from 11 (315) 2000 to 12 (316) 800
102	12	316	1800	Wind speed is less than 0.5 m/s from 12 (316) 1800 to 13 (317) 900

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

ArrayID	CalD	JulianD	Time	Error Message
150	12	316	30	Wind direction is greater than 360 or less than 0 on 12 (316) 30 (-.09548)

December 2001

ArrayID	CalD	JulianD	Time	Error Message
150	1	335	1615	Air temp difference from 1 (335) 1615 (21.005) to 1 (335) 1630 (17.857) is greater than 3.0 degrees C
150	14	348	1645	Air temp difference from 14 (348) 1645 (13.069) to 14 (348) 1700 (16.759) is greater than 3.0 degrees C
150	24	358	130	Air temp difference from 24 (358) 130 (12.634) to 24 (358) 145 (9.2097) is greater than 3.0 degrees C

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 www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

The following data are missing (-99999) due to replacement work on temperature sensor:

ArrayID	CalD	JulianD	Time	Error Message
150	19	353	1030	15 minute air temperature and humidity

The following data were removed (55555), approximately 15 minutes of the one hour sampling period were missing due to sensor replacement.

ArrayID	CalD	JulianD	Time	Error Message
101	19	353	1100	hourly average air temp and average relative humidity

The following data are retained but may be inaccurate due to daily average temperature and daily average relative humidity calculations are based on all 5 seconds samples with the exception of approximately 15 minute interval while sensor was being replaced around 1030.

ArrayID	CalD	JulianD	Time	Error Message
241	19	353	2400	daily average air temp and average relative humidity

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)
5	.254
6	.254
8	6.096
14	2.286
15	1.016
16	.762
18	.762
19	29.464
20	21.082
21	.508
22	.254
30	6.604

February	Rainamount (mm)
2	.254
5	31.242
9	.254
10	1.524
12	3.302
13	2.032

14	.254
15	1.524
16	17.780
17	4.064
23	5.334
25	3.556

March Rainamount (mm)

4	16.256
5	4.318
9	3.810
12	5.588
13	9.652
15	8.636
16	1.524
17	.508
20	2.540
21	41.910
24	.508
26	3.556
29	18.034
30	11.176

April Rainamount (mm)

2	.254
6	.254
7	.254
8	1.016
9	5.334
11	11.176
12	.254
13	.508
15	6.350
16	2.794
17	2.540
18	.254
24	2.286

May Rainamount (mm)

17	.254
19	.508
20	1.778
21	20.828
22	8.128

23	.254
25	.762
26	44.450
27	13.462
28	.254
30	.508

June Rainamount (mm)

1	3.810
2	4.064
3	.254
5	5.080
7	18.034
15	.508
16	21.590
17	55.880
21	.254
23	37.846

July Rainamount (mm)

1	10.160
4	6.096
5	14.224
8	.508
9	.508
10	.254
11	1.778
18	13.716
23	.254
26	52.832
29	13.208

August Rainamount (mm)

10	3.810
11	21.082
12	3.810
13	2.794
14	3.810
19	23.622
20	.254
23	16.510
27	.508
28	1.016
31	1.778

September Rainamount (mm)

4	11.684
14	3.048
17	.254
20	4.572
21	1.778
24	4.826
25	3.302
26	.254
27	1.270
28	.508
30	12.446

October Rainamount (mm)

1	8.636
6	4.064
14	4.826
15	.762
16	2.032

November Rainamount (mm)

3	1.016
19	.508
20	.762
24	.508
25	13.462
26	.254

December Rainamount (mm)

7	.254
8	13.970
9	1.016
11	6.858
12	2.032
13	.508
14	.508
15	.254
17	3.556
18	4.572
19	8.128
23	1.270
24	9.906