

Tijuana River (TJR) National Estuarine Research Reserve Meteorological Metadata

January - December 2002

Latest Update: **April 24, 2023**

I. Data Set & Research Descriptors

1) Principal investigator(s) & contact persons

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 (nerr30.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 Tijuana Estuary Visitor's Center. The data was saved as a raw data file (TJR.dat) on the

harddrive. Following download from the CR10x the data were automatically uploaded via FTP to a SQL server at San Diego State University and are available near real time via the internet. The data are exported monthly from the SQL server into CDMO Weather Data Management Program (WDMP) to generate error logs (see section 2c for the CDMO Meteorological Data Collection Error/Anomalous Data Criteria), summary reports and to create export files to be sent to the CDMO. The WDMP program was developed in Visual Basic to interface with the NERR Meteorological Data Collection Schedule (see 2b of the Entry Verification section for the data collection schedule). 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. All error messages and anomalous data were compared to reference data obtained from a nearby (1/2 mile) weather station operated by the NAVY. Michelle Cordrey is responsible for all data QA/QC.

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 is 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)

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 (Campbell Weather Station):

The principal objective is to record long-term meteorological data for the Tijuana Estuary in order to observe any environmental changes or trends over time. Samples were taken every 5 seconds and 15 minutes over roughly one week collecting intervals.

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. A one-week sampling interval was chosen so that the CR10X datalogger would not run out of room and overwrite data, especially if the short haul modem link failed and data could not be automatically sent from the datalogger to the computer. If this were the case, the data would have to be downloaded at the storage module to a laptop or the storage module would be replaced and brought back to the lab for uploading 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 two years. There were no other analyses done on the meteorological data at present.

5) Site location and character:

The Tijuana River NERR is located on the Southern Pacific Coast, next to the California border with Mexico at a latitude of 32 deg. 34 min. N and Longitude

of 117 deg. 07 min. W. The area surrounding the 2,531 acre reserve is heavily developed by residential housing as is the watershed which drains into the estuary. Approximately 2/3 of the watershed is in Mexico and is subject to periodic raw sewage outflows. The North Eastern section of is bordered by a military helicopter training base. Vegetation in the area is dominated by common pickleweed (*Spartina virginica*) and Pacific cordgrass (*Spartina foliosa*).

The area is characterized by very dry summers with most rainfall occurring between November and March. Prevailing winds are primarily off the ocean from the west during daylight hours, lighter breezes from the land generally occur after the sun has set. During the fall "Santa Ana" winds can occur which results in sharp increases in temperature caused by winds blowing from the Mojave Dessert and decreased humidity (15% or less). Thunderstorms are not common but can occur during the winter in association with cold fronts.

Descriptions of the specific sampling station follows:

The weather station is located approximately 30m west of the TR NERR Visitor Center at a Latitude of 32deg 34min 28.32sec N and a Longitude of 117deg 07min 37.05sec W. The station is 50m north of the water quality sampling station. The vegetation surrounding the weather station are mainly upland scrub species.

The anemometer, wind direction and Licor sensors are located at the top of a 3.5 meter aluminum tower. The temperature and humidity sensors are located midway up and on the west side of the tower. The Tipping Bucket rain gauge sits on a separate 2 meter high pole located approx. a meter to the west of the main tower. It is above the ground to limit interference from the security fence surrounding the weather station. The sensors were wired to the CR10X following the NERR SWMP Meteorological SOP.

6) Data collection period:

Weather data collection began at the Tidal Linkage station in 1999.

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 Tijuana River NERR has a water quality station located at the Tidal Linkage. The principal objective of this study is to record long-term water quality data for the Tijuana Estuary in order to observe any physical changes or trends in water quality both spatially and over time. Additionally, NERR SWMP tier 1 nutrient monitoring is being conducted at the Tidal Linkage station.

II. Physical Structure Descriptors

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

LiCor Quantum Sensor

Model # LI190SB

Stability: $<\pm 2\%$ change over 1 yr

Operating Temperature: -40 to 65°C

Sensitivity: typically 5 μA per 1000 $\mu\text{moles s}^{-1} \text{m}^{-2}$

Light spectrum wavelength: 400 to 700 nm

Date of last calibration: 04/17/01

Wind Sentry

Model # 03001 R.M Young

Range: 0-50 m/s; 360° mechanical

Date of last calibration: May 2001

Temperature and Relative Humidity

Model #: HMP35C

Operating Temperature: -35 to +50°C

Temperature Measurement Range: -35 to +50°C

Temperature Accuracy: ± 0.2 °C (0-60°C)

Relative Humidity Operating Temperature: : -20 to +60°C

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

RH Accuracy: $\pm 2\%$ RH (0-90%) and $\pm 3\%$ (90-100%)

Date of Last calibration: May 2001

Barometric Sensor

Model # CS-105

Operating Range: Pressure: 600-1060 mb

Temperature: -40 to +60C

Humidity: non-condensing

Accuracy: ± 0.5 to 6.0 mb (+20-60C)

Stability: ± 0.1 mb per year

Date of Last calibration: not known

Tipping Bucket Rain Gauge

Model #: TE 525

Range: 0.1 mm

Accuracy: 1.0% at <2 "/hr

Date of Last calibration: June 2001

10) Coded variable indicator and variable code definitions:

Site definitions: TL = Tidal Linkage

11) Data anomalies/Data corrections:

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.

January 2002

The following data appear to be correct:

Array ID	Date	Time	Error Message
150	19	315	Rel hum difference from 19 (19) 315 (57.139) to 19 (19) 330 (85.442) is greater than 25%
150	19	400	Rel hum difference from 19 (19) 400 (75.899) to 19 (19) 415 (44.103) is greater than 25%
150	19	415	Rel hum difference from 19 (19) 415 (44.103) to 19 (19) 430 (75.775) is greater than 25%
150	19	430	Rel hum difference from 19 (19) 430 (75.775) to 19 (19) 445 (50.63) is greater than 25%
150	23	2215	Rel hum difference from 23 (23) 2215 (47.177) to 23 (23) 2230 (20.564) is greater than 25%
150	23	2230	Rel hum difference from 23 (23) 2230 (20.564) to 23 (23) 2245 (48.862) is greater than 25%
150	24	230	Rel hum difference from 24 (24) 230 (33.479) to 24 (24) 245 (100) is greater than 25%

Relative humidity data were removed for the following dates and times. High humidity in the datalogger enclosure coupled with electrical problems were found to be the cause:

Date	Array(s)	Time(s)
Jan 24 2002	150	0245-0715
	101	0300-0800
	241,243,244	2400
Jan 30 2002	150	0145-0715
	101	0200-0800
	241,243,244	2400
Jan 31 2002	150	0545-0700, 2400
	101	0600-0700
	241,243,244	2400

The following data appear to be correct:

102	2	1900	Wind speed is less than 0.5 m/s from 2 (2) 1900 to 3 (3) 900
102	9	1800	Wind speed is less than 0.5 m/s from 9 (9) 1800 to 10 (10) 1000

February 2002

Higher than average air temperature and barometric pressure values and lower than average relative humidity values were recorded between February 9 and 10 and again between February 21 through 23. Sensors were functioning properly and data appears to be correct.

The following data appear to be correct:

Array ID	Date	Time	Error Message
150	36	1015	Air temp difference from 5 (36) 1015 (21.471) to 5 (36) 1030 (17.362) is greater than 3.0 degrees C
150	40	2145	Air temp difference from 9 (40) 2145 (10.177) to 9 (40) 2200 (13.644) is greater than 3.0 degrees C
150	41	100	Air temp difference from 10 (41) 100 (13.864) to 10 (41) 115 (17.561) is greater than 3.0 degrees C
150	42	345	Air temp difference from 11 (42) 345 (16.811) to 11 (42) 400 (11.744) is greater than 3.0 degrees C
150	52	1130	Air temp difference from 21 (52) 1130 (20.9) to 21 (52) 1145 (29.61) is greater than 3.0 degrees C
150	52	1200	Air temp difference from 21 (52) 1200 (30.658) to 21 (52) 1215 (26.531) is greater than 3.0 degrees C
150	52	1215	Air temp difference from 21 (52) 1215 (26.531) to 21 (52) 1230 (21.959) is greater than 3.0 degrees C
150	52	1845	Air temp difference from 21 (52) 1845 (19.147) to 21 (52) 1900 (22.887) is greater than 3.0 degrees C
150	53	645	Air temp difference from 22 (53) 645 (13.948) to 22 (53) 700 (17.723) is greater than 3.0 degrees C
150	53	1145	Air temp difference from 22 (53) 1145 (33.758) to 22 (53) 1200 (28.817) is greater than 3.0 degrees C
150	53	2200	Air temp difference from 22 (53) 2200 (14.475) to 22 (53) 2215 (10.844) is greater than 3.0 degrees C

The following data appear to be correct:

150	33	1000	Rel hum difference from 2 (33) 1000 (29.143) to 2 (33) 1015 (62.24) is greater than 25%
150	37	130	Rel hum difference from 6 (37) 130 (56.259) to 6 (37) 145

(84.019) is greater than 25%

150 40 915 Rel hum difference from 9 (40) 915 (68.101) to 9 (40) 930

(38.745) is greater than 25%

150 40 1015 Rel hum difference from 9 (40) 1015 (40.608) to 9 (40)

1030 (14.295) is greater than 25%

150 52 1130 Rel hum difference from 21 (52) 1130 (58.176) to 21 (52)

1145 (17.712) is greater than 25%

150 52 1200 Rel hum difference from 21 (52) 1200 (15.832) to 21 (52)

1215 (41.452) is greater than 25%

150 54 800 Rel hum difference from 23 (54) 800 (23.777) to 23 (54)

815 (64.14) is greater than 25%

The following data appear to be correct:

102 38 2000 Wind speed is less than 0.5 m/s from 7 (38) 2000 to 8 (39) 1000

102 43 1900 Wind speed is less than 0.5 m/s from 12 (43) 1900 to 13 (44) 900

102 45 1900 Wind speed is less than 0.5 m/s from 14 (45) 1900 to 15 (46) 900

102 46 1900 Wind speed is less than 0.5 m/s from 15 (46) 1900 to 16 (47) 900

102 55 1900 Wind speed is less than 0.5 m/s from 24 (55) 1900 to 25 (56) 900

102 57 2000 Wind speed is less than 0.5 m/s from 26 (57) 2000 to 27 (58) 800

102 58 1800 Wind speed is less than 0.5 m/s from 27 (58) 1800 to 28 (59) 700

Relative humidity data were removed for the following dates and times. High humidity
in the datalogger enclosure coupled with electrical problems were found to be the cause:

Feb 1 2002 150 0015-0715

101 0100-0800

241,243,244 2400

Feb 3 2002	150	0300-0715
	101	0300-0800
	241,243,244	2400
Feb 4 2002	150	0445 - 0630
	101	0500 - 0700
	241,243,244	2400
Feb 5 2002	150,	0445 - 0645
	101,	0500 - 0700
	241,243,244	2400
Feb 6 2002	150	0445 - 0630
	101	0500 - 0700
	241,243,244	2400
Feb 7 2002	150	0545 - 0700
	101	0600 - 0700
	241,243,244	2400

March 2002

Higher than average air temperature and barometric pressure values and lower than average relative humidity values were recorded between March 2 and 4. Sensors were functioning properly and data appears to be correct.

The following data appear to be correct:

Array ID	Date	Time	Error Message
150 69	930	Air temp difference from 10 (69) 930 (19.888) to 10 (69)	

945 (16.691) is greater than 3.0 degrees C

150 80 930 Air temp difference from 21 (80) 930 (21.652) to 21 (80)

945 (18.105) is greater than 3.0 degrees C

The following data appear to be correct:

150 61 1545 Rel hum difference from 2 (61) 1545 (15.836) to 2 (61)

1600 (40.865) is greater than 25%

150 61 1630 Rel hum difference from 2 (61) 1630 (12.146) to 2 (61)

1645 (46.569) is greater than 25%

150 61 1645 Rel hum difference from 2 (61) 1645 (46.569) to 2 (61)

1700 (11.877) is greater than 25%

150 69 930 Rel hum difference from 10 (69) 930 (38.26) to 10 (69)

945 (65.439) is greater than 25%

The following data appear to be correct:

102 60 1900 Wind speed is less than 0.5 m/s from 1 (60) 1900 to 2 (61) 900

102 84 1900 Wind speed is less than 0.5 m/s from 25 (84) 1900 to 26 (85) 700

102 85 1900 Wind speed is less than 0.5 m/s from 26 (85) 1900 to 27 (86) 800

The following data appear to be correct:

101 62 1900 Relative humidity average in 1 hour data (10.697) is greater
than 15 minute maximum (9.4638) by at least 10%

Relative humidity data were removed for the following dates and times. High humidity
in the datalogger enclosure coupled with electrical problems were found to be the cause:

Mar 3 2002 150 0530 - 0630

101 0600 - 0700

241,243,244 2400

Mar 4 2002	150	0400 - 0430
	101	0500
	241,243,244	2400

April 2002

None

May 2002

The following data appear to be correct:

Array ID	Date	Time	Error Message
102 132	1900	Wind speed is less than 0.5 m/s from 12 (132) 1900 to 13 (133) 700	

June 2002

None

July 2002

The following data appear to be correct:

Array ID	Date	Time	Error Message
102 195	1900	Wind speed is less than 0.5 m/s from 14 (195) 1900 to 15 (196) 800	
102 197	1900	Wind speed is less than 0.5 m/s from 16 (197) 1900 to 17 (198) 800	
102 198	1900	Wind speed is less than 0.5 m/s from 17 (198) 1900 to 18 (199) 800	

August 2002

The malfunction in the wind sensor was caused by a short in the cable that resulted in wind direction values that ranged from 0 to 45 degrees only. The

sensor cable was replaced on 8/23/2002 at about 2pm. All wind direction values prior to the installation of the new cable were deleted and replaced with 55555.

Array ID	Date	Time	Error Message
150	213	15	Technician changed 150 Array data from 1 (213) 15 to 23 (235) 1400
102	213	100	Technician changed 102 Array from 1 (213) 100 to 23 (235) 1400
242	213	2400	Technician changed 242 Array from 1 (213) 2400 to 23 (235) 2400

The following data appear to be correct:

Array ID	Date	Time	Error Message
102	215	2000	Wind speed is less than 0.5 m/s from 3 (215) 2000 to 4 (216) 900
102	216	2000	Wind speed is less than 0.5 m/s from 4 (216) 2000 to 5 (217) 1000
102	217	1800	Wind speed is less than 0.5 m/s from 5 (217) 1800 to 6 (218) 800
102	218	1700	Wind speed is less than 0.5 m/s from 6 (218) 1700 to 7 (219) 900
102	219	1900	Wind speed is less than 0.5 m/s from 7 (219) 1900 to 8 (220) 900
102	220	1800	Wind speed is less than 0.5 m/s from 8 (220) 1800 to 9 (221) 800
102	221	2000	Wind speed is less than 0.5 m/s from 9 (221) 2000 to 10 (222) 1000
102	222	2000	Wind speed is less than 0.5 m/s from 10 (222) 2000 to 11 (223) 800
102	223	1900	Wind speed is less than 0.5 m/s from 11 (223) 1900 to 12 (224) 800
102	225	2000	Wind speed is less than 0.5 m/s from 13 (225) 2000 to 14 (226) 800
102	226	1900	Wind speed is less than 0.5 m/s from 14 (226) 1900 to 15 (227) 800
102	228	2000	Wind speed is less than 0.5 m/s from 16 (228) 2000 to 17 (229) 800
102	231	1900	Wind speed is less than 0.5 m/s from 19 (231) 1900 to 20 (232) 900
102	232	2000	Wind speed is less than 0.5 m/s from 20 (232) 2000 to 21 (233) 800
102	234	2000	Wind speed is less than 0.5 m/s from 22 (234) 2000 to 23 (235) 800
102	235	2000	Wind speed is less than 0.5 m/s from 23 (235) 2000 to 24 (236) 900
102	236	2000	Wind speed is less than 0.5 m/s from 24 (236) 2000 to 25 (237) 900

102	237	1900	Wind speed is less than 0.5 m/s from 25 (237) 1900 to 26 (238) 1000
102	238	1900	Wind speed is less than 0.5 m/s from 26 (238) 1900 to 27 (239) 800
102	240	2000	Wind speed is less than 0.5 m/s from 28 (240) 2000 to 29 (241) 800
102	241	2000	Wind speed is less than 0.5 m/s from 29 (241) 2000 to 30 (242) 800
102	242	1900	Wind speed is less than 0.5 m/s from 30 (242) 1900 to 31 (243) 800

September 2002

Array ID	Date	Time	Error Message
102	245	2100	Wind speed is less than 0.5 m/s from 2 (245) 2100 to 3 (246) 900
102	246	1900	Wind speed is less than 0.5 m/s from 3 (246) 1900 to 4 (247) 1300
102	247	1600	Wind speed is less than 0.5 m/s from 4 (247) 1600 to 6 (249) 900
102	250	1800	Wind speed is less than 0.5 m/s from 7 (250) 1800 to 8 (251) 1000
102	251	1400	Wind speed is less than 0.5 m/s from 8 (251) 1400 to 12 (255) 1000
102	255	1900	Wind speed is less than 0.5 m/s from 12 (255) 1900 to 13 (256) 1100
102	256	1700	Wind speed is less than 0.5 m/s from 13 (256) 1700 to 14 (257) 1100
102	257	1600	Wind speed is less than 0.5 m/s from 14 (257) 1600 to 15 (258) 1100
102	258	1900	Wind speed is less than 0.5 m/s from 15 (258) 1900 to 16 (259) 1100
102	259	1300	Wind speed is less than 0.5 m/s from 16 (259) 1300 to 17 (260) 900
102	261	1900	Wind speed is less than 0.5 m/s from 18 (261) 1900 to 19 (262) 700
102	262	1900	Wind speed is less than 0.5 m/s from 19 (262) 1900 to 20 (263) 1000
102	263	2000	Wind speed is less than 0.5 m/s from 20 (263) 2000 to 21 (264) 800
102	264	1800	Wind speed is less than 0.5 m/s from 21 (264) 1800 to 22 (265) 800
102	265	1800	Wind speed is less than 0.5 m/s from 22 (265) 1800 to 23 (266) 800
102	267	1100	Wind speed is less than 0.5 m/s from 24 (267) 1100 to 26 (269) 1100

October 2002

The following data appear to be correct:

Array ID	Date	Time	Error Message
102	302	2000	Wind speed is less than 0.5 m/s from 29 (302) 2000 to 30 (303) 800

November 2002

The following data appear to be correct:

Array ID	Date	Time	Error Message
150	319	1100	Air temp difference from 15 (319) 1100 (21.595) to 15 (319) 1115 (28.077) is greater than 3.0 degrees C
150	319	1145	Air temp difference from 15 (319) 1145 (30.738) to 15 (319) 1200 (24.971) is greater than 3.0 degrees C
150	320	1745	Air temp difference from 16 (320) 1745 (18.784) to 16 (320) 1800 (15.456) is greater than 3.0 degrees C
150	324	1030	Air temp difference from 20 (324) 1030 (27.554) to 20 (324) 1045 (22.758) is greater than 3.0 degrees C
150	324	2230	Air temp difference from 20 (324) 2230 (22.815) to 20 (324) 2245 (19.509) is greater than 3.0 degrees C
150	324	2315	Air temp difference from 20 (324) 2315 (22.072) to 20 (324) 2330 (19.027) is greater than 3.0 degrees C
150	325	515	Air temp difference from 21 (325) 515 (24) to 21 (325) 530 (20.486) is greater than 3.0 degrees C
150	325	530	Air temp difference from 21 (325) 530 (20.486) to 21 (325) 545 (17.223) is greater than 3.0 degrees C
150	325	915	Air temp difference from 21 (325) 915 (26.074) to 21 (325) 930 (22.515) is greater than 3.0 degrees C
150	331	630	Air temp difference from 27 (331) 630 (13.201) to 27 (331) 645 (16.603) is greater than 3.0 degrees C
150	332	800	Air temp difference from 28 (332) 800 (16.464) to 28 (332) 815 (19.644) is greater than 3.0 degrees C

The following data appear to be correct:

150 319 1100 Rel hum difference from 15 (319) 1100 (56.961) to 15 (319) 1115 (14.29) is greater than 25%

150 319 1145 Rel hum difference from 15 (319) 1145 (9.1231) to 15 (319) 1200 (35.277) is greater than 25%

150 325 515 Rel hum difference from 21 (325) 515 (17.849) to 21 (325) 530 (45.16) is greater than 25%

150 326 900 Rel hum difference from 22 (326) 900 (32.822) to 22 (326) 915 (60.136) is greater than 25%

150 331 2015 Rel hum difference from 27 (331) 2015 (48.002) to 27 (331) 2030 (74.588) is greater than 25%

The following data appear to be correct:

102 306 2000 Wind speed is less than 0.5 m/s from 2 (306) 2000 to 3 (307) 900

102 317 1800 Wind speed is less than 0.5 m/s from 13 (317) 1800 to 14 (318) 900

Negative wind directions of -0.09534 were recorded during the month. These slight negative values are actually the sensor offset which is output when the wind blows in the 355-360 degree direction. Values have been converted to zero:

Nov 3 2002	150	0500
Nov 5 2002	150	115
Nov 15 2002	150	145
Nov 24 2002	150	1800
Nov 24 2002	150	2330

Nov 26 2002 150 2330

Nov 28 2002 150 0600

Higher than average air temperature and barometric pressure values and lower than average relative humidity values were recorded between November 15 and 17 and again on November 20 through 22. Sensors were functioning properly and data appears to be correct.

December 2002

Higher than average air temperature and barometric pressure values and lower than average relative humidity values were recorded on December 19 and 25. Sensors were functioning properly and data appears to be correct.

The following data appear to be correct:

Array ID	Date	Time	Error Message
150 361	645	Rel hum difference from 27 (361) 645 (100) to 27 (361) 700 (73.735) is greater than 25%	

The following data appear to be correct:

150 344	1845	Wind direction is greater than 360 or less than 0 on 10 (344) 1845 (-.09534)
150 349	315	Wind direction is greater than 360 or less than 0 on 15 (349) 315 (-.09539)
150 360	1745	Wind direction is greater than 360 or less than 0 on 26 (360) 1745 (-.09534)

Relative humidity data were removed for the following dates and times. High humidity in the datalogger enclosure coupled with electrical problems were found to be the cause:

Dec 19 2002	150	0300 - 0700
	101	0400 - 0700
	241,243,244	2400

Dec 25 2002	150	0315 - 0630
	101	0400 - 0700
	241,243,244	2400

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.

January 2002

Data are missing for the following dates and times due to memory overwrite:

Array ID	Date	Time	Error Message
150	10	1415	Missing 150 Array data (15 minute data) from 10 (10) 1415 to 18 (18) 715
101	10	1500	Missing 101 Array data (Hourly Averages) from 10 (10) 1500 to 18 (18) 700
102	10	1500	Missing 102 Array data (Hourly Average Wind Parameters) from 10 (10) 1500 to 18 (18) 700
241	10	2400	Missing 241 data (Daily Averages) from 10 (10) 2400 to 17 (17) 2400

242	10	2400	Missing 242 data (Daily Average Wind Parameters)
from 10 (10) 2400 to 17 (17) 2400			
243	10	2400	Missing 243 data (Daily Max/Time Values) from 10 (10)
2400 to 17 (17) 2400			
244	10	2400	Missing 244 data (Daily Min/Time Values) from 10 (10)
2400 to 17 (17) 2400			

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

102	1	100	Technician changed 102 Array data at 1 (1) 100 to 31 (31) 2400
150	1	15	Technician changed 150 Array data at 1 (1) 15 to 31 (31) 2400
242	1	2400	Technician changed 242 Array data at 1 (1) 2400 to 31 (31) 2400

February 2002

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102	32	100	Technician changed 102 Array data at 1 (32) 100 to 28 (59) 2400
150	32	15	Technician changed 150 Array data at 1 (32) 15 to 28 (59) 2400
242	32	2400	Technician changed 242 Array data at 1 (32) 2400 to 28 (59) 2400

March 2002

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102	60	100	Technician changed 102 Array data at 1 (60) 100 to 31 (90) 2400

150	60	15	Technician changed 150 Array data at 1 (60) 15 to 31 (90) 2400
242	60	2400	Technician changed 242 Array data at 1 (60) 2400 to 31 (90) 2400

April 2002

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102	91	100	Technician changed 102 Array data at 1 (91) 100 to 30 (120) 2400
150	91	15	Technician changed 150 Array data at 1 (91) 15 to 30 (120) 2400
242	91	2400	Technician changed 242 Array data at 1 (91) 2400 to 30 (120) 2400

May 2002

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102	121	100	Technician changed 102 Array data at 1 (121) 100 to 31 (151) 2400
150	121	15	Technician changed 150 Array data at 1 (121) 15 to 31 (151) 2400
242	121	2400	Technician changed 242 Array data at 1 (121) 2400 to 31 (151) 2400

June 2002

Data missing on the following date and time, communication error with CR10x believed to be cause:

Array ID	Date	Time	Error Message
150	156	1130	Missing 150 Array data (15 min data) on 5 (156) 1130

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102 152	100		Technician changed 102 Array data at 1 (152) 100 to 30 (181) 2400
150 152	15		Technician changed 150 Array data at 1 (152) 15 to 30 (181) 2400
242 152	2400		Technician changed 242 Array data at 1 (152) 2400 to 30 (181) 2400

July 2002

Data were removed for the following dates and times due to malfunctioning wind direction sensor:

Array ID	Date	Time	Error Message
102 182	100		Technician changed 102 Array data at 1 (182) 100 to 31 (212) 2400
150 182	15		Technician changed 150 Array data at 1 (182) 15 to 31 (212) 2400
242 182	2400		Technician changed 242 Array data at 1 (182) 2400 to 31 (212) 2400

August 2002

102 1	213	100	Technician changed 102 Array from 1 (213) 100 to 23 (235) 1400
150 1	213	15	Technician changed 150 Array data from 1 (213) 15 to 23 (235) 1400
242 1	213	2400	Technician changed 242 Array from 1 (213) 2400 to 23 (235) 2400

September 2002

None

October 2002

None

November 2002

None

December 2002

None

13) Other remarks:

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.

During 2023 precipitation edits mentioned above it was noted that all hourly readings for 2002 were missing with no explanation in the metadata. Those data were found in archived monthly files and added back to the dataset.

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.

The malfunction in the wind sensor was caused by a short in the cable that resulted in wind direction values that ranged from 0 to 45 deg. only. The sensor cable was replaced on 8/23/2002 at about 2pm.

Rain Events:

January

Date	RainAmount (mm)
------	-----------------

"Calendar Day"	"Daily Precipitation Totals (mm)"
----------------	-----------------------------------

3	5.334
---	-------

28	9.652
----	-------

29	5.588
----	-------

"Monthly Total"	20.6
-----------------	------

February

Date	RainAmount (mm)
------	-----------------

"Calendar Day"	"Daily Precipitation Totals (mm)"
----------------	-----------------------------------

17	6.096
----	-------

27	.254
----	------

"Monthly Total"6.4

March

Date	RainAmount (mm)
------	-----------------

"Calendar Day" "Daily Precipitation Totals (mm)"

7	1.270
---	-------

16	.762
----	------

17	2.032
----	-------

18	2.032
----	-------

23	1.016
----	-------

24	.508
----	------

"Monthly Total"7.6

April

Date	RainAmount (mm)
------	-----------------

"Calendar Day" "Daily Precipitation Totals (mm)"

6	3.048
---	-------

15	1.016
24	6.096
26	4.064

"Monthly Total"14.2

May

Date	RainAmount (mm)
------	-----------------

June

Date	RainAmount (mm)
------	-----------------

July

Date	RainAmount (mm)
------	-----------------

August

Date	Rainamount (mm)
------	-----------------

September

Date	RainAmount (mm)
------	-----------------

"Calendar Day" "Daily Precipitation Totals (mm)"

6	1.524
7	11.176
23	.508
24	.254
25	.254
29	1.524

"Monthly Total"15.2

October

Date Rainamount (mm)

"Calendar Day" "Daily Precipitation Totals (mm)"

1	.254
8	.254
25	.254

"Monthly Total".8

November

Date Rainamount (mm)

"Calendar Day" "Daily Precipitation Totals (mm)"

8	2.540
9	3.810
28	.508
29	.508

"Monthly Total"7.4

December

Date	RainAmount (mm)
------	-----------------

"Calendar Day"	"Daily Precipitation Totals (mm)"
----------------	-----------------------------------

16	12.700
17	3.810
20	9.906
22	1.524
29	6.604

"Monthly Total"34.5