Chesapeake Bay Virginia (CBV) NERR Meteorological Metadata
January 2006 - December 2006
Latest update: **October 19, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

Virginia Institute of Marine Science
College of William and Mary
PO Box 1346, Gloucester Point, VA 23062
Phone: (804) 684-7135

Dr. William Reay, Director
E-mail: wreay@vims.edu; (804) 684-7119
Dr. Kenneth Moore, Research Coordinator
E-mail: moore@vims.edu; (804) 684-7384

Mr. Scott Lerberg, Stewardship Coordinator
Email: lerbergs@vims.edu; (804) 684-7129
* Scott Lerberg was responsible for the QA/QC of the 2006 Weather data.

2) Entry verification

a) Data Input Procedures:

Some History: The Centralized Data Management Office converted all SWMP weather data collected with CR10X program versions prior to version 4.0. 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 (which was used in 2006) produces averages, maximums and minimums every fifteen minutes (array 15), every hour (array 60) and every day (array 144) for any sensors connected 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.

Prior to November 30th, 2006, 15-minute, 1-hour average, and 24-hour data were downloaded from each sensor on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (NERR.SCI) was loaded into the CR10X and controls the sensors and data collection schedule. The CR10X interfaced with the PC208W software supplied by Campbell Scientific. The PC208W software was located on a laptop computer to which the data were downloaded manually in the field. Data were downloaded monthly or biweekly from a storage module located within the weather station. Data were formatted in Excel using the weather macro provided by CDMO.

After switching out the Campbell Scientific CR10X Datalogger for a CR1000 instrument (on December 1, 2006) programming changes dictated only 15-minute data being downloaded from each sensor to the datalogger. The CDMO Data Logger Program (CBV_CBVTCMET_V3.0_113006.CR1) was loaded into the CR1000 which controls the sensors and data collection schedule. The CR1000 interfaced with LoggerNet Software (Version 3.2) supplied by Campbell Scientific. Data were downloaded biweekly to monthly directly from the CR1000 as the storage module was no longer

needed in this new configuration. Data were formatted in Excel using the weather macro provided by CDMO.

For data collection from January 1, 2006 to November 30th, 2006, the CR10X datalogger was programmed to collect data in the following formats:

i) 15-minute average, maximum and minimum data are averages of 5-second readings for Air Temperature (degrees C), Relative Humidity (%), Barometric Pressure (mb) and Wind Speed (m/s). 15-minute Precipitation (mm) and PAR (mmol/m^2) data are totaled from 5-second readings.

ii) Hourly average, maximum, and minimum data are averages of 5-second readings for Air Temperature (degrees C), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), and Wind Direction (degrees). Hourly totals for PAR (mmol/m^2) and Precipitation (mm) are totals of 15-minute readings.

iii) Daily average, maximum and minimum data are averages of 5-second readings for Air Temperature (degrees C), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), and Wind Direction (degrees). Daily totals for PAR (mmol/m^2) and Precipitation (mm) are totals of 15-minute readings.

Data collected from the CR10X were stored on a Campbell Scientific storage module (SM4M) and downloaded onto a laptop computer using PC208W program from Campbell Scientific. These raw data files were then exported from the PC208W program in comma-delimited format (.DAT files) and opened in Microsoft Excel using the EQWIN Format Macro developed by CDMO to reformat the header columns, insert station codes, insert a date column, correct the time column format, and format all columns to the correct number of decimal places. This formatted file was then copied into the EQWIN weather.eqi file where the data were QA/QC checked and archived in a database. Data were investigated as recommended in the CDMO NERR SWMP Data Management Manual Version 5.2, and included the use of queries, graphs, and reports. EQWIN is also used to generate customized reports and export the data in a standardized format to send to CDMO. Any anomalous data are investigated and not below in the Anomalous Data section (Section 11). Data tagged as being "anomalous" are double checked and where the data truly appear anomalous, they are compared with other regional meteorological data for verification. Any data corrections or removed data are noted in the Deleted Data section (Section 12). Any missing data is documented in the Missing Data section (Section 13).

For data collection from December 1, 2006 to December 31th, 2006, the CR1000 datalogger was programmed to collect data in the following formats:

i) 15-minute average, maximum and minimum data averaged from 5-second readings for Air Temperature (degrees C), and 15-minute average data averaged from 5-second readings for Relative Humidity (%), Barometric Pressure (mb) and Wind Speed (m/s). 15-minute Precipitation (mm) and PAR (mmol/m^2) data are totaled from 5-second readings.

- Following the installation of the CR1000 (and associated programs), hourly and daily data were no longer collected. In addition, these hardware and software changes resulted in a reduced parameter list which no longer included the following parameters:
    - Maximum Relative Humidity
    - Maximum Relative Humidity Time
    - Minimum Relative Humidity

- Minimum Relative Humidity Time
- Maximum Barometric Pressure
- Maximum Barometric Pressure Time
- Minimum Barometric Pressure
- Minimum Barometric Pressure Time
- Minimum Wind Speed
- Minimum Wind Speed Time

Data collected from the CR1000 Version 3 Meteorological Program were processed in a slightly different manner than the CR10X. Data were collected directly from the CR1000 and downloaded onto a laptop computer using the LoggerNET Ver. 3.2 program from Campbell Scientific. These raw data files were then exported from the LoggerNET program in comma-delimited format (.DAT files) and first run through a PERL Script conversion program (CONVERT1_GUI_BATCH_V4.exe) to convert the CR1000 raw data file to the CR10X format (with a .csv extension). This intermediate file can then be opened with the EQWIN Format Macro developed by CDMO to reformat the header columns, insert station codes, insert a date column, correct the time column format, and format all columns to the correct number of decimal places (although with a reduced parameter list – see above). The formatted file was then processed in EQWIN using the same methods described in the paragraph above for the CR10X data.

All data were checked using EQWin and the following anomalous data criteria:

Air Temp:
-Sample not greater than 40 C or less than –20 C
-15 minute averages not greater than the max for the day
-15 minute averages not greater than the min for the day

Relative Humidity:
-Sample not greater than 100% or less than 0%
-15 minute averages not greater than the max for the day
-15 minute averages not greater than the min for the day

Pressure:
-Pressure not greater than 1040 mb or less than 980 mb
-15 minute averages not greater than the max for the day
-15 minute averages not greater than the min for the day

Wind Speed:
-Wind speed not greater than 30 m/s and not less than 0
-Sample not less than 0.5 m/s for 12 hours consecutively

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

Rainfall:
- Precipitation not greater than 5 mm in 15 minutes

Photosynthetically Active Radiation (PAR):
-15 min. total not greater than 5000 mmol/m^2 or less than –2.214 mmol/m^2.
-60 min. total not greater than 20000 mmol/m^2 or less than –8.856 mmol/m^2
-24 hour total not greater than 480,000 mmol/m^2 or less than –212.544 mmol/m^2

Time:
-15 minute interval recorded

For all data:
-No duplicate data

Additional queries were performed as necessary.

3) Research objectives:

The principal objective is to record long-term meteorological data within the York River watershed in order to observe any environmental changes or trends over time. Data may also be used for watershed research. Samples were taken every 5 seconds and 15 minutes over roughly two-week collecting intervals.

4) Research methods:

The Campbell Scientific weather station samples every 5 seconds to produce 15 minute, hourly and daily averages of those measurements of air temperature, relative humidity, barometric pressure, rainfall, wind speed and wind direction. A one-month to biweekly sampling interval was chosen so that the storage module would not run out of room and overwrite data. Periodically, sensors on the weather station are inspected for damage or debris. If any is found, it is repaired and/or cleaned. Sensors are scheduled to be removed and sent back to Campbell Scientific for calibration at minimum of every two years. It should be noted that the following sensors were overdue for calibration were replaced in 2006: Temperature/RH, Barometric Pressure, LICOR, and Wind Monitor. The calibration and/or replacement dates are noted in Section 9 of this document.

5) Site location and character:

Taskinas Creek (TC) Component:

The Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERRVA) is located on the York River, a tributary of the Chesapeake Bay. CBNERRVA maintains a long-term water quality-monitoring program and stream gauge station at Taskinas Creek, a tributary of the York River that is located in the transitional zone of the York River State Park. The Taskinas Creek weather station is also located within York River State Park. The park is located on the mainstem of the York River, which is 50 km long, 38 kilometers from the mouth of the river, and 2.25 kilometer wide near the weather station. The weather station in located (37°24' 50.79850" N, 76°42' 44.51934" W) on a bluff (11m elevation) 60m from the York River in a manicured lawn area of the park. No trees or other major structures are within a 35m radius of weather station. The stream gauge is located 2km NW (288 degrees of weather station and the water quality station is located 200m (298 degrees) of weather station. The weather station has a landscape fence around it to deter park visitors from tampering with it. All the instruments are located on the approximately 3.5 m aluminum tower following the descriptions outlined in the CDMO Manual V 4.0. The Tipping Bucket Rain gauge is located within 2m of the tower. The sensors were wired to the CR10X and CR1000 following the protocols outlined in the CDMO Manual and per discussions with CDMO staff.

6) Data collection period:

Weather data has been collected from the current weather station at the Taskinas Creek since 1996. Data was collected (by field downloads onto the laptop computer) for the calendar year 2006 on the following dates:

- January 4, 2006 (from 01/01/2006 at 0:15 to 01/04/2006 at 14:00)

- January 17, 2006 (from 01/01/2006 at 5:45 to 01/17/2006 at 10:00)
  - Missing data (from 01/04/2006 at 14:15 to 01/07/2006 at 05:30)
- January 31, 2006 (from 01/21/2006 at 07:45 to 01/31/2006 at 12:00)
  - Missing data (from 01/17/2006 at 10:15 to 01/21/2006 at 07:30)
- February 7, 2006 (from 01/28/2006 at 20:30 to 02/07/2006 at 16:45)
  - Overlap in data from 01/28/2006 at 20:30 to 01/31/2006 at 12:00
- February 14, 2006 (no data collected during this period)
- March 2, 2006 (from 02/07/2006 at 17:00 to 03/02/2006 at 10:00)
- March 21, 2006 (from 02/07/2006 at 17:00 to 03/21/2006 at 09:30)
  - Overlap in data from 02/07/2006 at 1700 to 03/02/2006 at 10:00)
- April 5, 2006 (from 03/21/2006 at 09:45 to 04/05/2006 at 08:15)
- April 18, 2006 (from 04/05/2006 at 08:30 to 04/18/2006 at 08:00)
- May 4, 2006 (from 04/18/2006 at 08:15 to 05/04/2006 at 09:30)
- May 16, 2006 (from 05/04/2006 at 09:45 to 05/16/2006 at 08:15)
- May 30, 2006 (from 05/16/2006 at 08:30 to 05/30/2006 at 08:45)
- June 12, 2006 (from 05/30/2006 at 09:15 to 06/12/2006 at 08:30)
  - Missing data – on 05/30/2006 at 09:00
- June 27, 2006 (from 06/12/2006 at 08:45 to 06/27/2006 at 08:15)
- July 10, 2006 (from 06/27/2006 at 08:30 to 07/10/2006 at 08:15)
- July 25, 2006 (from 07/10/2006 at 08:30 to 07/25/2006 at 08:30)
- August 8, 2006 (from 07/25/2006 at 08:45 to 08/08/2006 at 10:15)
- August 22, 2006 (from 08/08/2006 at 10:30 to 08/22/2006 at 08:15)
- September 5, 2006 (from 08/22/2006 at 08:30 to 09/05/2006 at 10:00)
- September 20, 2006 (from 09/05/2006 at 10:30 to 09/20/2006 at 08:45)
  - Missing data – on 09/05/2006 at 10:15
- October 3, 2006 (from 09/20/2006 at 09:00 to 10/03/2006 at 08:15)
- October 16, 2006 (from 10/03/2006 at 08:30 to 10/16/2006 at 09:30)
- October 31, 2006 (from 10/16/2006 at 09:45 to 10/31/2006 at 09:15)
- November 15, 2006 (from 10/31/2006 at 09:30 to 11/15/2006 at 10:30)
- November 29, 2006 (from 11/15/2006 at 10:45 to 11/29/2006 at 09:15)
- November 30, 2006 (from 11/29/2006 at 09:30 to 11/30/2006 at 09:15)
- December 1, 2006 (from 12/1/2006 at 10:30 to 12/1/2006 at 11:15)
  - Missing data from 11/30/2006 (0930) to 12/01/2006 (10:15)
- December 13, 2006 (from 12/01/2006 at 11:30 to 12/13/2006 at 10:00)
  - Missing data from 12/1/2006 (12:15) to 12/01/2006 (13:00)
- December 31,2006 (from 12/13/2006 at 10:15 to 12/31/2006 at 23:45
  - This dataset was clipped from the download on January 3, 2007

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 currently available in text format.

8) Associated researchers and projects:

The Taskinas Creek watershed is a site of limited impact due to development or recreational use. There is a water quality station and a stream gauge station at this site. This site is being developed as a control site for watershed work in the area.

II. Physical Structure Descriptors

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

CSI LiCor Quantum Sensor
Model # LI190SZ
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
Multiplier: 1.346
Date of previous calibration: 4/1/2005. Date Installed 7/13/2005.
Date of last calibration: 6/13/2006. Date Installed 11/30/2006.

R.M. Young Wind Monitor
Model # 05103-5
WIND SPEED SUMMARY:
Range: 0-60 m/s; gust survival 100 m/s
WIND DIRECTION (AZIMUTH) SUMMARY:
Range: 360° mechanical, 355° electrical
Date of previous calibration 3/2004. Date Installed 6/23/2004.
Date of last calibration 9/7/2006. Date Installed 11/30/2006.

CSI Temperature and Relative Humidity
Model #: HM45C
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 previous calibration: 10/1/2004. Date Installed 7/13/2005.
Date of last calibration: 9/25/2006. Date Installed 11/30/2006.

CSI Barometric Sensor
Model #PTB101B
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: 3/2/2005. Date Installed 7/14/2005.
Date of last calibration: 7/10/2006. Date Installed 11/30/2006.

Fluid Isolation Technology Tipping Bucket Rain Gauge
Model #: RG-2000-C
Range: 0.1 mm
Accuracy: 1.0% at <14"/hr
Date of Last calibration: 2/22/2005

The Campbell Scientific CR10X Wiring Panel has 128K of flash memory (EEPROM) in which it stores the operating system and its program (that it uses to run the weather station). Additionally, there are 128K of SRAM, which it uses to run the program and store its measurements and for final data storage.

The CR1000 has two MB Flash EEPROM that is used to store the Operating System. Another 128 K Flash is used to store configuration settings. A minimum of 2 MB SRAM is (4 MB optional) is available for program storage (16K), operating system use, and data storage. Additional storage is available by using a compact flash card in the optional CFM100 Compact Flash Module.

10) Coded variable indicator and variable code definitions:

Sampling station:	Sampling site code:	Station code:
Taskinas Creek	TC	cbvtcmet

11) Data anomalies/Data corrections: The following are records which have been identified as being "suspect" as they fall outside of the range of measurement specifications for the sensors (the ranges were identified in Section 2) within the 2006 Taskinas Creek Weather Station Dataset. This data has not been deleted, but should be "flagged" as being suspect and should be treated with caution.

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.

- For Total Precipitation – there were a few records where the total precipitation during a 15 minute sampling period exceeded 5 millimeters (the threshold defined by CDMO). All of these events were cross-checked with precipitation records for nearby weather monitoring stations during those same dates and times. It has been determined that although these values appear high, there were also rain events at those other stations

during this time, and thus this data most likely reflects real rain events. Three exceptions are the rain events on 07/15/06, 07/21/06, and 08/18/06 in which cross checks with stations at Williamsburg and VIMS showed no rainfall totals. However, 15 minute sample rain fall amount differences of over 5 mm in 15 minutes can occur be very localized in frontal passages and increases in relative humidity were observed during these times. The date, time, and measured values for these "suspect" events are as follows:

  - 01/31/2006 at 0530 (6.1)
  - 04/22/2006 at 1215 (5.1)
  - 04/22/2006 at 1230 (5.8)
  - 04/22/2006 at 1345 (6.9)
  - 04/22/2006 at 1430 (8.1)
  - 05/11/2006 at 1845 (7.1)
  - 05/11/2006 at 1900 (5.8)
  - 06/07/2006 at 1915 (6.6)
  - 06/23/2006 at 1530 (9.4)
  - 07/05/2006 at 2130 (7.1)
  - 07/15/2006 at 1530 (6.9)
  - 07/21/2006 at 2315 (5.8)
  - 08/18/2006 at 1200 (9.4)
  - 09/01/2006 at 1200 (5.1)
  - 09/01/2006 at 1345 (6.1)
  - 09/01/2006 at 1400 (5.3)
  - 09/01/2006 at 1415 (5.3)
  - 09/24/2006 at 2245 (7.6)
  - 10/06/2006 at 0700 (5.1)
  - 10/07/2006 at 1230 (9.4)
  - 10/07/2006 at 1245 (8.9)
  - 10/07/2006 at 1300 (7.1)
  - 11/16/2006 at 1530 (7.1)
  - 12/01/2006 at 1115 (5.6)

- For Wind Speed – there was five periods of time where the wind speed was less than or around 0.5 meters per second for a large majority of a 12 hour period. This low wind conditions occurred during the following time periods although these could be indicative of usually calm conditions and so no data has been deleted.
  - 7/9/2006 to 7/10/2006
  - 9/4/2006 (from 13:00 to 24:00)
  - 9/10/2006 to 9/11/2006
  - 10/11/2006
  - 11/28/2006 to 11/29/2006

- The daily data (144) for 05/30/2006 were not deleted but should be treated with caution (i.e. as suspect) because of the missing 15 and 60 minute records at 09:00.

- The daily data (144) for 09/05/06 were not deleted but should be treated with caution (i.e. as suspect)because of the missing 15 minute record at 10:15.

12) Deleted Data:

Arrays:
During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

- For PAR – there were two records which were deleted due to readings of "NAN" on 12/1/06 at 10:30 and 10:45. These errors in measurement were most likely due to "glitches" which resulted during the installation of the new CR1000 datalogger (replacing the old CR10X).

- For Wind Speed – every day at 12:15 (starting on 12/01/2006) the wind speed measures "NAN". According to Jay Poucher in the Central Data Management Office (CDMO) there is a glitch in the CR1000 that causes this problem and it may have to do with a problem with the GPS Clock Sync. Until this problem is resolved, these values will be deleted from the dataset.

- Due to the missing 15 minute data at 05:15 and 5:30 (on 01/07/06), the 60 minute data at 06:00 and the daily data (144) for 01/07/06 were also deleted.

- Due to the missing 15 minute data at 07:15 and 07:30, the 60 minute data at 08:00 and the daily data (144) for 01/21/06 were also deleted.

- Due to the missing 15 minute data at 10:15 on 09/05/06, the 60 minute data at 11:00 were also deleted.

- Due to missing data that occurred as a result of program uploads, data at 10:30 and 13:15 on 12/01/06 were deleted.

13) Missing data:

Arrays:
During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

- 01/04/2006 (14:15) to 01/07/2006 (05:30). These data gaps were most likely due to download issues during a time when the SM4M storage module was removed and some software/hardware issues occurred during this time (see "Other Remarks" Section below).

- 01/17/2006 (10:15) to 01/21/2006 (07:30). These data gaps were most likely due to download issues during a time when the SM4M storage module was removed and some software/hardware issues occurred during this time (see "Other Remarks" Section below).

- 05/30/2006 at 09:00. This was during a time when a regular download was being conducted on the weather station causing loss of those records. Both the 15 minute and 60 minute data are missing for this time record.

- 09/05/2006 at 10:15. This was during a time when a regular download was being conducted on the weather station causing loss of those records.

- 11/30/2006 (09:30) to 12/01/2006 (10:15). This was during a time where all the sensor were replaced (and the CR10X was replaced by a CR1000) and software issues associated with the installation of the CR1000 resulted in staff leaving the weather station essentially shut down during this time period. The software issues were resolved and the station was back up and running the following data (12/01/2006). With the conversion to the CR1000, there is no longer hourly or daily data recorded, so there was no need to delete hourly or daily data on 12/01/06.

- 12/01/2006 (from 12:15 to 13:00). There records were lost due to maintenance being done on the station in conjunction with the replacement of the CR10X datalogger with the CR1000 datalogger. Again, with the conversion to the CR1000, there is no longer hourly or daily data recorded, so there was no need to delete hourly or daily data on 12/01/06.

14) Other Remarks/notes

On 10/19/2023 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2007, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

Arrays:
During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through

the various data applications at www.nerrsdata.org/get/landing.cfm 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.

As part of the NERR's Telemetry Pilot Program a Campbell Scientific TX312 Satellite transmitter was installed in November of 2005. At that time the SM4M Storage Module was removed because it was believed it would interfere with the transmitter and patches were installed during November 2005 – February 2006. On February 7th, 2006, the TX312 firmware was updated and the SM4M storage module was re-attached at this time. Due to some hardware/software issues during these months, there are some data gaps during this time and these are noted in the "missing data" section above.

Campbell Scientific data telemetry equipment is used at this station to transmit to the NOAA GOES satellite, NESDIS ID #3B009218. The transmissions are scheduled hourly and contain four (4) datasets reflecting the fifteen min data sampling interval. The telemetry is "Provisional" data and not the "Authentic" Dataset used for long term monitoring and study. The telemetry equipment was installed and began transmitting on December 1, 2006. This data can be viewed by going to http://cdmo.baruch.sc.edu.