

Sapelo Island (SAP) NERR Meteorological Metadata
January – December 2007
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1) Principal investigators and contact persons:

Dorset Hurley, Research Coordinator, dhurley@darientel.net

Patrick Hagan, Research Assistant, bluewatermotion@hotmail.com

Address:

State of Georgia Natural Resources Dept.

1 Long Tabby Lane

Sapelo Island, Ga 31327

(912)-485-2251

2) Entry Verification:

Data are uploaded from the CR1000 datalogger to a Personal Computer (IBM compatible). Files are exported from PC208W or LoggerNet in a comma-delimited format and uploaded to the CDMO where they undergo automated primary QAQC and become part of the CDMO's online provisional database. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Reserve where it is opened in Microsoft Excel and processed using the CDMO's NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheets for flagged data, and graphs the data for review. It allows the user to apply QAQC flags and codes to the data, append files, and export the resulting data file to the CDMO for tertiary QAQC and assimilation into the CDMO's authoritative online database. For more information on QAQC flags and QAQC codes, see Sections 11 and 12. Patrick Hagan is responsible for all data management.

3) Research objectives:

The principal objectives are to record meteorological information for the Sapelo Island NERR's site that can be used 1) as a reference for meteorological data for research projects on the reserve, 2) to give meteorological context for our half hourly SWMP water quality data, and other long term environmental monitoring projects at the Reserve, 3) to observe and characterize important events such as storms, heat and cold waves, droughts, and heavy rainfalls, and 4) to detect trends and characterize climate variability over the long-term

3) Research methods:

Campbell Scientific data telemetry equipment was installed at the Marsh Landing station on 02/15/2007 and transmits data to the NOAA GOES satellite, NESDIS ID # 3B036592. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The “real-time” telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO’s authoritative online database. Provisional and authoritative data are available at <http://cdmo.baruch.sc.edu>.

The 15 minute Data are collected in the following formats for the **CR1000**:

Averages from 5-second data:

Air Temperature (°C), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), Wind Direction (degrees), Battery Voltage (volts)

Maximum, Minimum, and their times from 5-second data:

Air Temperature (°C), Wind Speed, (m/s), Wind Direction Standard Deviation (degrees) from 5-second data

Totals:

Precipitation(mm), PAR(millimoles/m²), and Cumulative Precipitation (mm)

5) Site location and character:

The site is located at N 31deg 25.068’, W 081deg 17.721’, about 15 feet above sea level. All sensors are mounted on a 10m-aluminum tower located in the northern corner of the Marsh Landing parking lot on the southwest corner of the island. The parking lot surface is approximately a meter above the surrounding marsh. The heights of the sensors on the tower are as follows:

temperature and relative humidity	2m
barometric pressure	1m
PAR	3m
precipitation gauge	6m
wind sensor	10m

It is bordered with salt marsh to the north and south with transition into pine forest occurring 1/2 mi to the east. On the immediate west lie the Duplin River and the ferry dock, which is also the location of our lower Duplin and marsh Landing Water Quality sampling sites. The station is well exposed to all winds and weather with practically no blockage.

This region is subject to multiple severe weather phenomena partially due to the proximity to the ocean. These phenomena include severe summer thunderstorms, which can cause drastic, localized drops in pressure, temperature, and heavy rains; powerful fall and winter frontal systems carrying prolonged

strong winds (usually NNE), drastic and sudden drops in temperature and pressure, and long, steady rains; and of course the late summer and early fall hurricanes. It must be noted that due to the remote location and proximity to the ocean our weather patterns can vary greatly from those on the mainland, particularly temperatures which tend to moderate due to our being surrounded by water. The nearest sites for comparison is the Grays Reef NOAA weather Buoy located about 20nm east of Sapelo Island and Glynco airport located approx. 30 mi to the SSE.

6) Data Collection Period:

The data collection period for 2007 ran from Jan 1, 2007 @00:00 to Dec 31, 2007 @ 23:45

7) Distribution:

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 this 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 and 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 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 comma-separated format.

8) Associated research

Sapelo Island has a long history of maintaining research. In 1953, the University of Georgia Marine Institute (UGAMI) was formed and the island became a working laboratory for many. The research continues today with SAP

NERR and UGAMI creating a unique partnership with much of the current research being done facilitated by SAP NERR and UGAMI together. Given UGAMI's long history on Sapelo, a bibliographic list of over 800 articles of current and previous research can be found on the UGAMI website:

<http://www.uga.edu/ugami> and on the Sapelo Island NERR site:
<http://www.sapelonerr.org> .

9) Sensor specifications:

Parameter: temperature

Units: Celsius

Sensor type: Platinum resistance temperature detector (PRT)

Model #: HMP45C temperature and relative humidity probe

Operating temperature: -40 to +60 deg C

Range Units: -40 to +60 deg C

Accuracy: +/- .2deg C @20deg C

Last calibration: April 2005

Parameter: relative humidity

Units: percent

Sensor type: Vaisala HUMICAP 180 capacitive relative humidity sensor

Model #: HMP45C temperature and relative humidity probe

Range: 0-100% non-condensing

Accuracy @20deg C: +/- 2% RH (0-90%) and +/- 3% (90-100%)

Temperature dependence of RH measurement: +/-0.05% RH/deg C

Last calibration: April 2005

Parameter: barometric sensor

Units: millibars (mb)

Sensor type: Vaisala Barocap silicon capacitive pressure sensor

Model #: CS-105

Operating range: 600-1061mb @-20 to +60deg C

Humidity: non condensing

Accuracy: +/- .5mb @20degC; +/- 2 mb @ 0-40deg C; +/- 4mb @-20 to 45deg C;
+/-6mb @ 40-60deg C

Stability: +/- .1mb/ year

Last calibration: March 2005

Parameter: wind speed

Units: Meters/second (m/s)

Sensor type: 12cm dia cup wheel assembly, 40 mm dia hemispherical cups

Model #: R.M. Young 03110-5 Wind Sentry

Range: 0-50m/s (112mph) gust survival; 60m/s (134mph)

Accuracy: +/-2%

Last service: March 2005

Parameter: wind direction

Units: degrees
Sensor type: balanced vane 16cm turning radius
Model #: R.M. Young 03110-5 Wind Sentry
Range: 360deg
Accuracy: +/- 5%
Last service: March 2005

Parameter: LI-COR quantum sensor
Units: mmol m⁻² (total flux)
Sensor type: high stability silicone photovoltaic detector (blue enhanced)
Model #: LI190SB
Light spectrum waveband: 400-700nm
Temperature dependence: 0.15% per deg C max
Stability: <2% change/year
Operating temperature: -40 to 65deg C; 0-100% humidity
Accuracy: typically 5 uA per 1000umol s⁻¹ m⁻²
Last calibration: Mar 2002

Parameter: precipitation
Units: millimeters (mm)
Sensor type: Tipping bucket rain gauge
Model#: TE525
Rainfall per tip: 0.01inch
Operating range: 32-50degC; 0-100% humidity
Accuracy: +/-1% up to 1in/hr; +0, -3% from 1-2in/hr, +0, -5% from 2-3in/hr
Last calibration: Nov 2001

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.
Date CR1000 Installed: June 26, 2006

10) Coded Variable Definitions:

Sampling station: Marsh Landing
Sampling site code: ML
Station code: sapmlmet

11) QAQC flag definitions

QAQC flags provide documentation of the data and are applied to individual data points by insertion into the parameter's associated flag column (header preceded

by an F_). During primary automated QAQC (performed by the CDMO), -5, -4, and -2 are applied automatically to indicate data that is above or below sensor range or missing. All remaining data are then flagged 0, as passing initial QAQC checks. During secondary and tertiary QAQC 1, -3, and 5 flags may be used to note data as suspect, rejected due to QAQC, or corrected.

- 5 Outside High Sensor Range
- 4 Outside Low Sensor Range
- 3 Data Rejected due to QAQC
- 2 Missing Data
- 1 Optional SWMP supported parameter
- 0 Passed Initial QAQC Checks
- 1 Suspect Data
- 2 *Open - reserved for later flag*
- 3 *Open - reserved for later flag*
- 4 Historical Data: Pre-Auto QAQC
- 5 Corrected Data

12) QAQC code definitions

QAQC codes are used in conjunction with QAQC flags to provide further documentation of the data and are also applied by insertion into the associated flag column. There are three (3) different code categories, general, sensor, and comment. General errors document general problems with the deployment or YSI datasonde, sensor errors are sensor specific, and comment codes are used to further document conditions or a problem with the data. Only one general or sensor error and one comment code can be applied to a particular data point.

General Errors

- GIM Instrument Malfunction
- GMT Instrument Maintenance
- GPF Power Failure / Low Battery
- GQR Data Rejected Due to QA/QC Checks
- GPR Program Reload
- GPD Power Down

Sensor Errors

- SIC Incorrect Calibration Constant, Multiplier or Offset
- SSN Not a Number / Unknown Value
- SNV Negative Value
- SOC Out of Calibration
- SSM Sensor Malfunction
- SSR Sensor Removed

Comments

- CAF Acceptable Calibration/Accuracy Error of Sensor

CDF Data Appear to Fit Conditions
CRE Significant Rain Event
CSM See Metadata

13) Other remarks/notes

Data are missing due to equipment or associated specific sensors not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. Any NaNs in the dataset stand for “not a number” and are the result of low power, disconnected wires, or out of range readings. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

Small negative PAR values are within range of the sensor and are due to normal errors in the sensor and the CR1000 Datalogger. The Maximum signal noise error for the Licor sensor is +/- 2.214 mmol/m² over a 15 minute interval.

Relative Humidity data greater than 100 are within range of the sensor accuracy of +/-3%.

CDMO UPDATE 10/6/2014: All PAR data for 2007 are considered suspect (unless flagged as rejected or missing). After reviewing several years of data (2007-2011), we believe an incorrect PAR multiplier was used during 2007 (through March 2009). Since this cannot be verified, the data were not rejected and were instead marked as suspect.

The recommended calibration frequency for the PAR sensor is every 2 years. As of 2007, the installed PAR sensor had not been calibrated since March 2002. The precipitation gauge should be calibrated annually. As of 2007, the installed precipitation gauge had not been calibrated since November 2001.

On 03/05/07 @ 15:00 our rain gauge registered 6.1 and was flagged with a <1> (CSM). Due to surrounding data (lack of temp, wind, and pressure shifts during this time is suspected that the gauge was clogged and holding water up to this point during which the clog worked loose and the water was all dumped at once.