Climate Data with Water Parameters from North Inlet Meteorological Station, North Inlet Estuary, Georgetown, South Carolina: 1982-1996.

Year Released to Public	2002		
Distribution URL for file	http://links.baruch.sc.edu/data/accessfiles/Meteorological_with_water_parameters__LTERMET__61982_41996.zip		
DATASET TITLE:	Long-Term Ecological Research (LTER) Climate Data with Water Parameters from North Inlet Meteorological Station, North Inlet Estuary, Georgetown, South Carolina: 1982-1996.		
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DATA FILE INFORMATION:

This condensed metadata is from the original, more extensive metadata created on 3/10/2004 by Ginger Ogburn-Matthews.

If needed, the original may be accessed at: **http://links.baruch.sc.edu/Data/LTERMET/metadata/LTERMET.Metadata.pdf**

Links and email addresses in the original have not been updated as those locations and people may no longer be available.

The data manager identified on this page should be contacted for any questions about the data.

Data File Name	Meteorological_with_water_parameters__LTERMET__61982_41996.zip
Beginning Date	03-Jun-1982
End Date	29-Apr-1996
RESEARCH LOCATION:	Oyster Landing
Geographic Description	Oyster Landing pier in Crab Haul Creek: 33.21'2" Lat., 79.11'27" Lon. This tidal marsh creek resides in the North Inlet Estuary. The North Inlet Estuary lies east of the uplands of Hobcaw Barony (also known as the Belle W. Baruch Property). To the north of the Estuary is the Debordieu Colony Property. The Estuary is located in Georgetown County, South Carolina.
Location Bounding Box	
West Bounding Coordinate	-79.192
East Bounding Coordinate	-79.167
North Bounding Coordinate	33.35
South Bounding Coordinate	33.327
OR if single point location	
Latitude	
Longitude	
Elevation	
TAXONOMIC COVERAGE:	
Taxonomic Protocols	
Organisms studied	

KEYWORD INFORMATION

KEYWORDS: weather, meteorological, water temperature, coastal, water level, air temperature, wind velocity, barometric pressure, estuary, ecosystem, conductivity, LTER, Long-term ecological research, long-term, solar radiation, tide, tidal creek, marsh, wind direction, salinity, salt marsh, tidal elevation, tide, climate, water quality, north inlet, north inlet, south carolina, atlantic coast, oyster landing, crab haul, east coast, southeast coast, coastal, georgetown county, usa

ABSTRACT:

Abstract:
Meteorological data with water parameters were collected on an hourly basis from June 3, 1982 through April 29, 1996 in the North Inlet Estuary, Georgetown County, SC. Readings were taken 24 hours a day, every day of the year, except when individual probes or the entire meteorological station were down. Most sensors were scanned once per second (3600 times per hour), and hourly averages for the previous hour were generated and recorded. Three different meteorological systems were used during this period (see Supplemental Information). The first and last systems were designed to measure and transmit wind speed, wind direction, air temperature, barometric pressure, solar radiation, precipitation, water level, water temperature, and conductivity data. The temporary system, deployed from October 1989 to December 1990, was substituted for the meteorological station destroyed by Hurricane Hugo in September of 1989. It measured all of the parameters detailed above plus relative humidity, but did not measure water level, water temperature, and conductivity. NO PRECIPITATION DATA ARE CONTAINED IN THE FINAL 1982-1996 DATABASE. Data from this sensor were removed because of problems with the recording device. Rain data does exist in another database called RAINDAZE. The water level and conductivity data should be used with CAUTION!! Twenty-four hour minimum and maximum values for the meteorological data occur in the 15 ancillary data files: LTER.MET1982.24HRMAXMIN.FINAL.CSV to LTER.MET1996.24HRMAXMIN.FINAL.CSV. An additional database contains daily maximum and minimum relative humidity values recorded by the National Weather Service observing station, located near the meteorological station. See the Supplemental Information.

Purpose:
To monitor and archive weather data for the North Inlet Estuary LTER site for short- and long-term studies at North Inlet and for comparisons to other LTER sites and other estuarine sites in the nation and world.

METHODS:

Field Collection Procedures and Protocols
Meteorological data with water parameters were collected on an hourly (value is an average of the 3600 instantaneous secondly readings before the hour of record) basis from June 3, 1982 through April 29, 1996, at Oyster Landing at the end of an 800 foot boardwalk ending in Crab Haul Creek. "Standardized Meteorological Measurements for Long Term Ecological Research Sites," published in 1986, was used as a guideline for assembling meteorological data. Readings were taken 24 hours a day, every day of the year, except when individual probes or the entire meteorological station were down. Three different meteorological systems were used during this period.

System 1
During the phase preceding September 21, 1989, the Climatronics Corporation of Bohemia, NY, designed the system in use. It consisted of a remote meteorological system with telemetry and an IMP 803 cassette data acquisition system. The system was designed to measure and transmit wind speed, wind direction, air temperature, barometric pressure, solar radiation, precipitation (see Supplemental Information), water level, water temperature, and conductivity data. This system consisted of the following components:

Remote Site:
1. Wind Speed and Direction sensors with cross arm Climatronics Wind Mark III
2. Naturally Aspirated Temperature Shield w/ YSI 703 - Dual Element Air Temperature Thermistor
3. Solar Radiation sensor with mount, Eppley 8-48 radiometer
4. Barometric Pressure sensor, YSI 2014 transducer
5. Precipitation Gauge, Belfort Instruments tipping bucket gauge
6. Water Depth, Enviro-Labs Water Level Sensor
7. Water Temperature, YSI 701 Water Temperature Thermistor
8. Conductivity Meter, YSI Conductivity Sensor, glass conductivity cell and temperature compensator
9. Remote Meteorological System mainframe in a NEMA environmental enclosure (with mounting hardware), housing the following equipment:
    a. signal conditioning electronics
    b. modem transmitter
    c. conductivity meter
    d. line protectors
10. Ten meter aluminum tower with guying kit
11. Cables, connectors and a sensor mounting boom

The wind cross arm was mounted to the 4 foot extension mast located at the top of the tower. The temperature shield and solar radiation sensor were mounted on a tower boom near the top of the tower. The precipitation gauge was mounted on a level surface approximately 20 meters from the tower base. The barometric pressure sensor was mounted inside of the NEMA enclosure. The water temperature, water level and conductivity cables were placed in a rigid PVC well in the water.

All of the sensor cables were wired through the signal line protector except the conductivity cell. The remote meteorological site's NEMA enclosure housed the signal conditioning electronics, the conductivity meter, an AC/DC converter, and a battery back-up pack.

Base Site:
1. Pre-wired Instrument Cabinet containing a mainframe with a power supply and Modem Receiver, a multiplexing (MUX) recorder, and an IMP 803 Microprocessor based Cassette Data Acquisition System.

2. 2,500 feet of telemetry cable.

All sensors were scanned once per second (3600 times per hour) except wind direction, water level, and precipitation. Wind direction hourly data is based on a mean of 120 scans per hour. Final hourly data values are an average of the number of scans for the previous hour. Water level and precipitation (cumulative) values are instantaneous readings recorded at the time indicated.

System 2
Hurricane Hugo destroyed the original meteorological station on September 21, 1989. From October 14, 1989 through December 31, 1990, the meteorological system utilized was borrowed from the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. The signal was scanned every second and a 5 minute mean was transmitted every 15 minutes to a satellite, which in turn sent the signal to a computer in Boulder, CO. NCAR designed and built the system to measure, transmit, and store wind speed, wind direction, maximum wind velocity, dry air temperature, wet air temperature, barometric pressure, solar radiation, precipitation, dew point, and relative humidity. This data set was modified in the final form to only include the wind speed, wind direction, air temperature, barometric pressure, and solar radiation data in order for it to be compatible with the previous long-term climate data. The water temperature, water level, and conductivity parameters measured previously are absent from this portion of the data set.

The NCAR system consisted of the following components:
1. Anemometer is mounted to the top of the 8 meter mast
2. The temperature sensors are located near the shield within a cylinder.
3. The solar radiation sensor is mounted on a separate post approx 5 m away from the tower.
4. Precipitation gauge is mounted on a level surface approx 5 m from the tower base.
5. Barometric pressure sensor is mounted inside the NEMA enclosure.

All sensors were scanned 3600 times per hour (including wind direction with this frequency), except for precipitation which was a cumulative value for the hour.

System 3
On December 31, 1990, a new Campbell Scientific CR10 measurement and control module meteorological system was installed. The system was designed by Climatronics Corporation to measure and transmit wind speed, wind direction, air temperature, barometric pressure, solar radiation, precipitation (see Supplemental Information), water level, water temperature, and conductivity data. This system is still in use to date, however, this data set concludes on April 29, of 1996 because of electrical problems. The entire system was rebuilt and calibrated and back online in July 1997 as part of the National Estuarine Research Reserve (NERR) Program.

The system consists of the following components:
1. Wind speed and direction sensors with cross arm Climatronics Wind Mark III
2. Naturally Aspirated Temperature Shield w/ YSI 703 - Dual Element Air Temperature Thermistor
3. Solar radiation sensor with mount, Eppley 8-48 radiometer
4. Barometric pressure sensor, YSI 2014 transducer
5. Precipitation gauge, Sierra-Misco 2500-8 Tipping Bucket Precipitation Gauge
6. Water depth, Keller PSI PT108V-50-15PSI Water Level Sensor
7. Water temperature, YSI 070/44018/NA/RN/300 - Water Temperature Thermistor
8. Conductivity Meter, Rosemount 1181T-00-02-99 Water Conductivity Probe
9. Remote Meteorological System mainframe in a NEMA environmental enclosure (with mounting hardware), housing the following equipment:
a. signal conditioning electronics
b. modem transmitter
c. conductivity meter
d. line protectors
e. CR10 data logger
10. Ten meter aluminum tower with guying kit
11. Cables, connectors, and a sensor mounting boom
12. Solar radiation sensor, Licor LI190SB Quantum Sensor (added in 1994)

The wind cross arm is mounted to the 4 foot extension mast located at the top of the tower. The temperature shield and solar radiation sensor are mounted on the tower boom near the top of the tower. The barometric pressure sensor is mounted outside of the NEMA enclosure. The water temperature, water level and conductivity cables are placed in a rigid

PVC well in the water. All of the sensor cables are wired through the signal line protector. The remote meteorological site's NEMA enclosure houses the Campbell control module, the storage module, the Rosemont conductivity transmitter, and a backup 12-volt battery. The primary power source is a solar panel.

All sensors were scanned once per second (3600 times per hour) and hourly means (from the previous 3600 seconds) were generated on the hour. The only exception was the water level parameter, which recorded an instantaneous value every six minutes. An instantaneous water level value was also recorded on the hour.

Once a week the storage module that records data was retrieved from the field, and the data were downloaded to a PC in Baruch's data management office using a program called SMCOM, written by Campbell Scientific. This was done because the field laboratory was not completely reconstructed after Hurricane Hugo and the remote phone line to the MET station tower was not yet installed. The data were reformatted and appended to the yearly data set. The data were archived in six month blocks.

As of July 1993:
The dedicated phone line was installed and the weather module data was accessed by phone line. The remote station was called up through the program called "TELCOM". This program downloads all data that have not already been retrieved. Another program called "TERM", displays a form screen which displays the realtime data as it is happening, but the program does not record any data to the computer file.

As of 10/5/94:
The Licor LI-190SB solar radiation sensor was added. This sensor uses a unique multiplier for each individual sensor that is based on a calibration constant obtained during the calibration process. The calibration constants and multipliers for this data set (94-96) were not documented, but were simply part of the datalogger program.

VARIABLE DESCRIPTIONS:

Variable Name	Variable Description	Units	Measurement Scale	Code Information	Number Type
Date	month/day/year (mm/dd/yyyy) that the reading was taken (not necessarily processed).	1-12, 1-31, 1982-1996	datetime		
Jday	Julian day that the reading was taken	1-366	nominal		integer
Hour	Time on the 24 hour clock that the reading was taken; reading represents the data from the previous hour.	0000-2400	datetime		
Date/Time	the combination of the month/day/year column with the hour column; the hour 2400 was modified to 2359 in order for the graphics software to graph the data correctly.	1-12, 1-31, 1982-1996, 0:00-23:59	datetime		
Wind Velocity	The mean wind velocity of 3600 observations taken over the preceding hour.	0.0-50.0 Meters per second	ratio		real
Max Wind Velocity	The maximum wind velocity over the preceding hour.	0.0-50.0 Meters per second	ratio		real
Wind Direction	The mean wind direction (the wind is coming from) of 120 observations taken over the preceding hour (no correction for magnetic declination).	0-540 Degrees	ratio		real
Air Temperature	The mean air temperature of 3600 observations taken over the preceding hour.	-20.0-50.0 Degrees C	ratio		real
Water Temperature	The mean water temperature of 3600 observations taken over the preceding hour.	0.0-50.0 Degrees C	ratio		real
Solar Radiation (Eppley)	The mean solar radiation of 3600 observations taken over the preceding hour, as measured by the Eppley pyranometer. Note: the sensor does NOT subtract out whatever is reflected from the ground.	0.0 -2.0 to 0.000-2.000 Langleys/minute,@280-2800nm	ratio		real
Water Level	The instantaneous water level at the time indicated.	0.0-300.0 centimeters	ratio		real
Conductivity	The mean conductivity of 3600 observations taken over the preceding hour	0.0-70.0 (80?)* millivolts/centimeter	ratio		real

Barometric Pressure	The mean barometric pressure of 3600 observations taken over the preceding hour.	940-1040 Millibars	ratio		real	
Solar Radiation (Licor)	The mean solar radiation of 3600 observations taken over the preceding hour, as measured by the Licor Quantum Sensor.	0.0~2000 microEinsteins/M2/Sec or micromoles/M2/Sec	ratio		real	