

Nov 17th, 3:15 PM - 3:40 PM

Session 4 Presentation: Wave-Current-Surge Information System (WavCIS)

Chunyan Li

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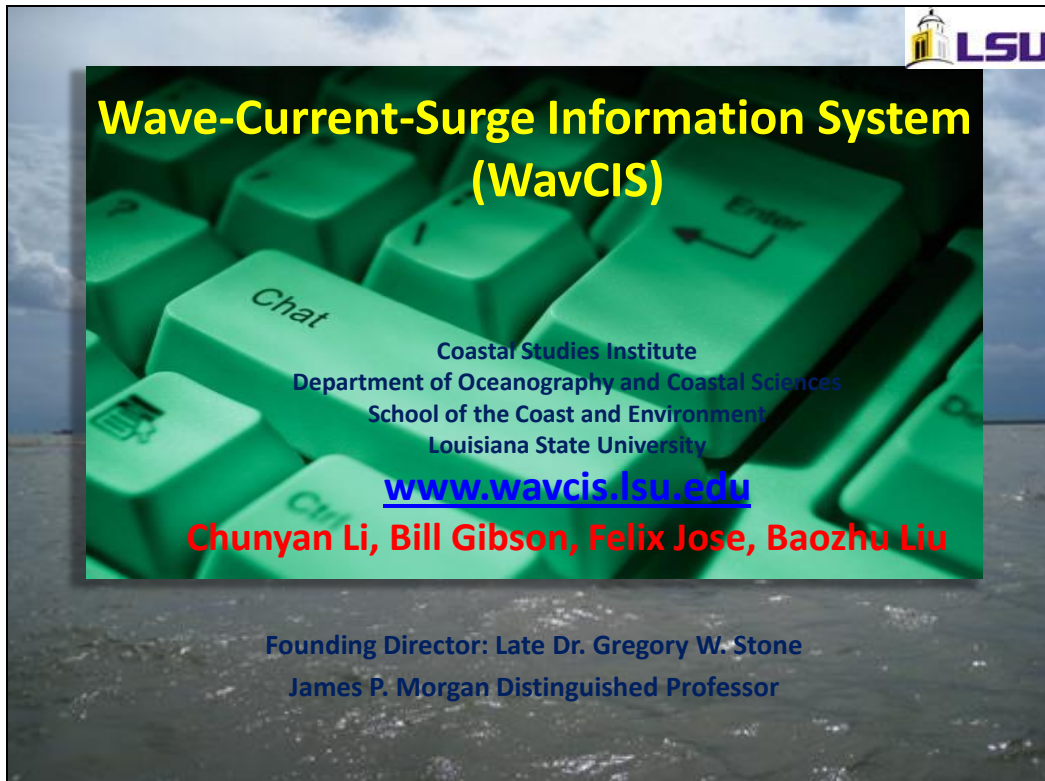
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Session IV — Accessibility of wave information for scientists, engineers, and managers.

This section describes a range of topics from wave buoy telemetry devices (e.g. Iridium, WiFi, Bluetooth) and Automatic Identification System to ocean databases and National Data Centers. Participants describe how wave data are used to assess the skill of models and to create important statistics. The following paper and extended abstracts relate to data quality control and the increasing demand for reliable information on wave conditions, particularly at coastal sites, worldwide.

Session Presentation by Dr. Chunyan Li



Wave-Current-Surge Information System (WavCIS)

Coastal Studies Institute
Department of Oceanography and Coastal Sciences
School of the Coast and Environment
Louisiana State University
www.wavcis.lsu.edu
Chunyan Li, Bill Gibson, Felix Jose, Baozhu Liu

Founding Director: Late Dr. Gregory W. Stone
James P. Morgan Distinguished Professor

Overview

- Near real time met-ocean (sea state) system
- Data dissemination via WWW to any user (fed., state, private entities, students, or just anyone)
- Inter-operability with GCOOS/IOOS/NOAA and sharing data with NDBC and other national and regional alliances by providing real-time observations, and validation data for their forecasting models.
- Wave forecast for GoM (near-real time)

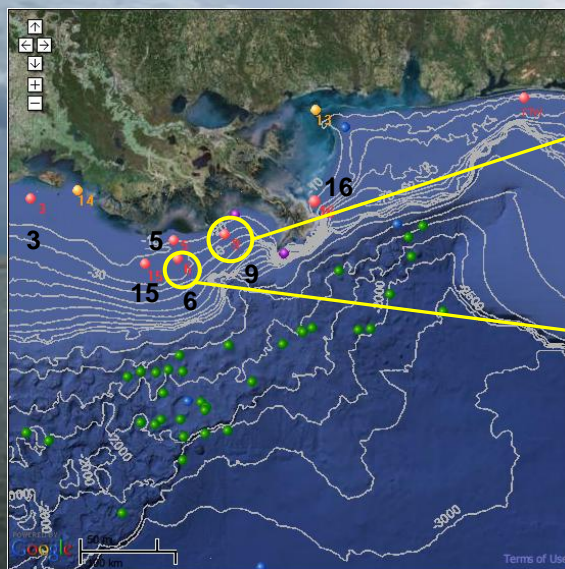
Overview (cont.)

- Collaboration with NASA AERONET Program and US Navy/NRL (CSI-6) for implementing cutting edge research in marine optics, particularly for coastal waters, and the additional meteorological sensor for Sonoma Technologies
- CSI-6 and CSI-9 also support the Hypoxia program for LUMCON, NGOMEX/NOAA (w/ water quality data at 3 vertical levels).

Overview (cont.)

- Response of shallow shoals to wave and current fields during high energy events: BOEMRE
- Morphodynamic responses of barrier islands to tropical storms and cold fronts, and the replenishment and protection of detached breakwaters: National Park Service, Raccoon Island/LDNR (OCPR)

Station Information



- Deployed: 1998 - 2009
- Fully operational stations: CSI03, CSI05, CSI06, CSI09, CSI15, and CSI16

Ocean_Wave_NOV_2011a - Microsoft PowerPoint

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http://www.ndbc.noaa.gov/station_page.php?station=mrs1l

NDBC - Station MRSL1

WAVCIS, Coastal Studies

National Oceanic and Atmospheric Administration's
National Data Buoy Center
Center of Excellence in Marine Technology

Home News Organization Search NDBC Web Site

Station ID Search
Station List

Observations
Mobile Access
Obs via Google Maps
Classic Maps
Recent
Historical
DART@
MMS ADCP
Obs Search
Ship Obs Report
Gliders
APEX
TAO
DODS
HF Radar
OSMC
Dial-A-Buoy
RSS Feeds
Obs Web Widget
Email Access

Station Status
NDBC Maintenance
NDBC Platforms
Partner Platforms

Program Info
NDBC on Facebook
About NDBC
Met/Ocean
Moored Buoy


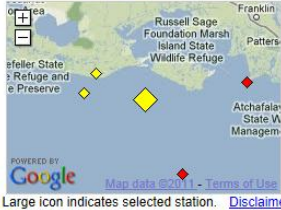
Follow the [National Data Buoy Center on Facebook](#).

Station MRSL1 - Marsh Island, LA / CSI03

Owned and maintained by [Coastal Studies Institute, Louisiana State University](#)
Shorebased Tower
29.440 N 92.061 W (29°26'25" N 92°3'41" W)

Site elevation: sea level
Anemometer height: 23.4 m above site elevation

[Latest NWS Marine Forecast](#)
[Search And Rescue \(SAR\) Data](#)
[Meteorological Observations from Nearby Stations and Ships](#)

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♦ Stations with recent data

CSI 3

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http://www.ndbc.noaa.gov/station_page.php?station=ildl1

NDBC - Station ILDL1

WAVCIS, Coastal Studies

National Oceanic and Atmospheric Administration's
National Data Buoy Center
Center of Excellence in Marine Technology

Home News Organization Search NDBC Web Site

Station ID Search
Station List

Observations
Mobile Access
Obs via Google Maps
Classic Maps
Recent
Historical
DART@
MMS ADCP
Obs Search
Ship Obs Report
Gliders
APEX
TAO
DODS
HF Radar
OSMC
Dial-A-Buoy
RSS Feeds
Obs Web Widget
Email Access

Station Status
NDBC Maintenance
NDBC Platforms
Partner Platforms

Program Info
NDBC on Facebook
About NDBC
Met/Ocean
Moored Buoy

Follow the [National Data Buoy Center on Facebook](#).

Station ILDL1 - Isle Dernieres, LA / CSI05

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Shorebased Tower
29.053 N 90.533 W (29°3'12" N 90°32'0" W)

Site elevation: sea level
Anemometer height: 19.2 m above site elevation

[Latest NWS Marine Forecast](#)
[Search And Rescue \(SAR\) Data](#)
[Meteorological Observations from Nearby Stations and Ships](#)




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♦ Stations with recent data
♦ Stations with no data in last 8 hours (24 hours for tsunami stations)

CSI 5

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From Beginning

Slides

1

2

3

4

5

6

http://www.ndbc.noaa.gov/station_page.php?station=spll1

NDBC - Station SPL11

WAVCIS, Coastal Studies

National Oceanic and Atmospheric Administration's
National Data Buoy Center
Center of Excellence in Marine Technology

Home News Organization Search NDBC Web Site

Station ID Search
Station List

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Program Info
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Met/Ocean
Moored Buoy
C-MAN

Follow the [National Data Buoy Center on Facebook](#).

Station SPL11 - South Timbalier Block 52, LA / CSI06

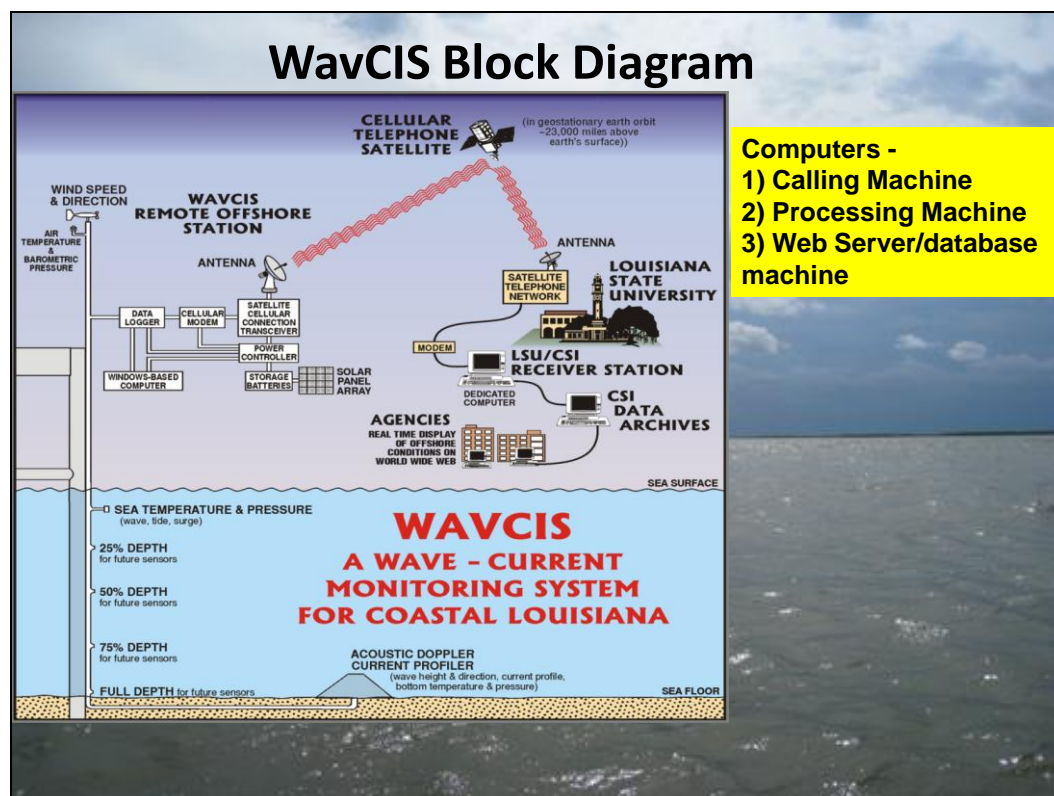
Owned and maintained by [Coastal Studies Institute, Louisiana State University](#)
Shorebased Tower
28.867 N 90.483 W (28°52'0" N 90°29'0" W)
Site elevation: sea level
Anemometer height: 40.4 m above site elevation
[Latest NWS Marine Forecast](#)
[Search And Rescue \(SAR\) Data](#)
[Meteorological Observations from Nearby Stations and Ships](#)

Grand Isle

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Large icon indicates selected station. [Disclaimer](#)
♦ Stations with recent data
♦ Stations with no data in last 8 hours (24 hours for tsunami stations)

CSI 6



Instrumentation

Meteorological Sensors:

- R.M. Young wind monitor
- Rotronic/Vaisala Humidity Probe
- **Belfort visibility sensor**
- Vaisala barometric pressure sensor

Oceanographic Sensors:

- Paroscientific Pressure Transducer
- Rotronic temperature probe
- **RD instrument ADCP (Acoustic Doppler Current Profiler)**
- Nortek Aquadopp
- **YSI 6600V2 Sonde (Hypoxia Program, CSI 6 & CSI 9)**
- SBE-37 Conductivity/Temperature/Salinity Sensor (CSI 16)
- SBE-19 SeaCat CTD Probe (used for calibration)



Additional Instruments at CSI-6

Instrument	Main Parameters	Height Coverage
Mini-sonde	Wind profiles	15 – 200 (m apl)
Ceilometer	Mixing heights and clouds	~0 – 4,000 (m apl)
Microwave radiometer	Temperature and humidity profiles	~0 – 10,000 (m apl)
Two ultrasonic anemometers and fast-response humidity and CO₂ sensors	Latent, sensible, and momentum flux, and turbulence (plus temperature and winds)	~7 (m msl)
Surface meteorology	Wind speed and direction, temperature, humidity and pressure	~10 (m apl) for wind speed/direction ~2 (m apl) for remaining parameters
Wave sensor via LSU	Wave height, spectra, and period	0 (m msl)
Underwater temperature float	Water temperature	~.02 (m below sea level)
Pyranometer	Downwelling radiation	~3 (m apl)
Infrared temperature sensor	Sea skin temperature	0.0 sea level



WavCIS Provides a Framework for Offshore Measurements (1 of 2)

Use of instruments in offshore areas

- **Flux**
 - Unattended
 - Long-term
 - Two instruments
 - Upside down
- **Sondar**
 - New clutter removal techniques
 - Electronic
 - Physical
 - Noise reduction for crew
- **Radiometer**
 - Beta software for off-zenith measurements (key for boundary layer data)

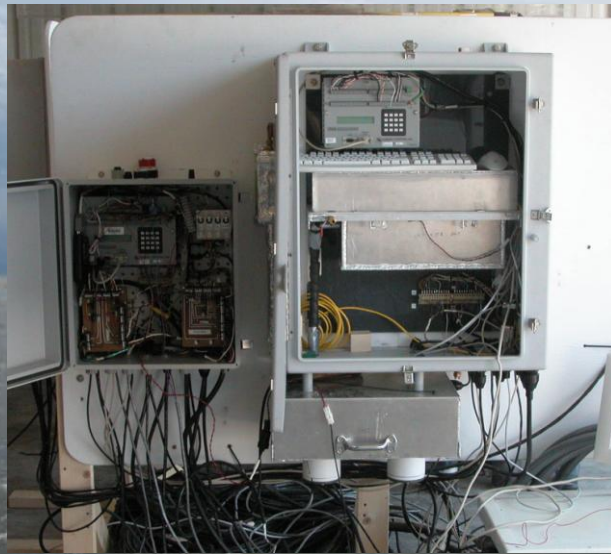


WavCIS Provides a Framework for Offshore Measurements (2 of 2)

- **Ceilometer**
 - Mixing height algorithms are being tested
- **Radiometer for skin temperature measurements**
 - Redesign of instrument for improved sky correction
- **New system for near-surface temperature measurements**
- **Computer**
 - One computer
 - Water-cooled shelter
- **Communications and data storage**
 - Large amount of data
- **Infrastructure**
 - Special mounts for all instruments



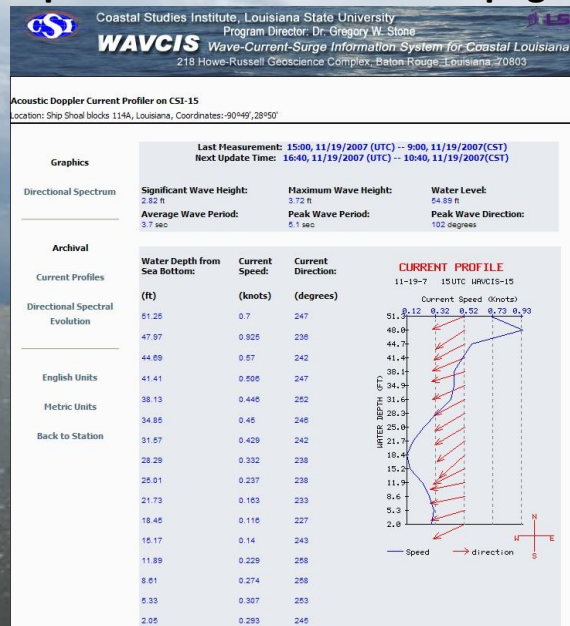
CR23X Micro-Datalogger and Computer for a Typical Site



Real-time Data Products

- Wave (heights, direction, period, directional spectra)
- Current profile
- Water T, S, turbidity,
- Air T, RH, wind, visibility, etc.
- CSI-6 and CSI-9 also provides 3-levels of T, S, DO, turbidity and chlorophyll (LUMCON).
- CSI-6 via the NASA AERONET site the aerosol and water color content (for satellite data validation).
- CSI-16 also provides T & S.

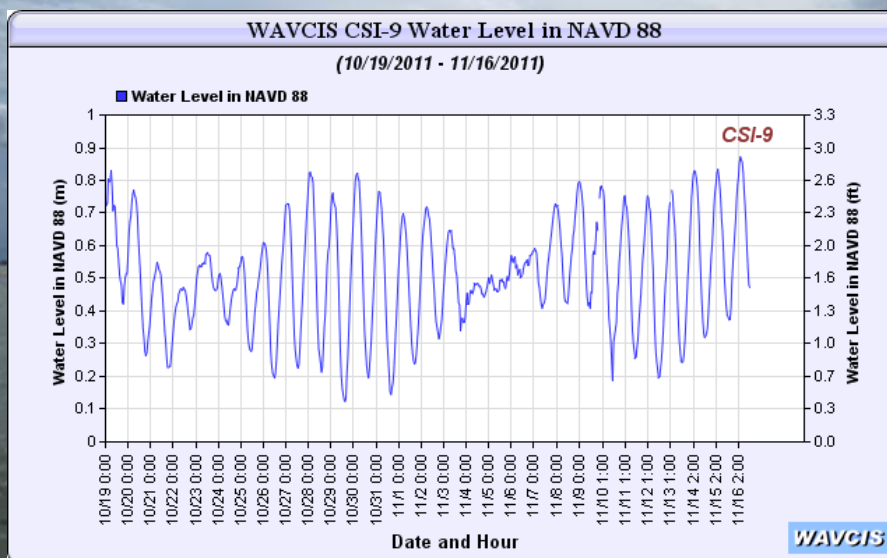
Real Time Data And Current Profiles provided on WAVCIS web pages



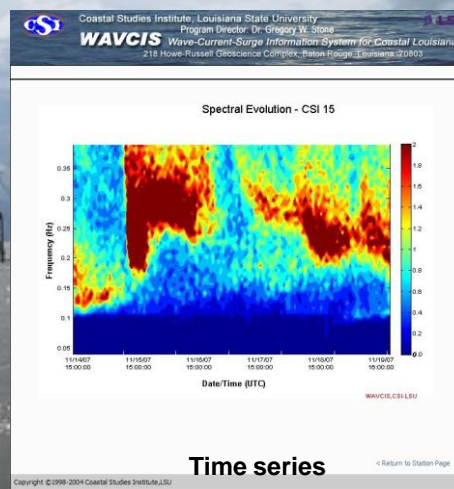
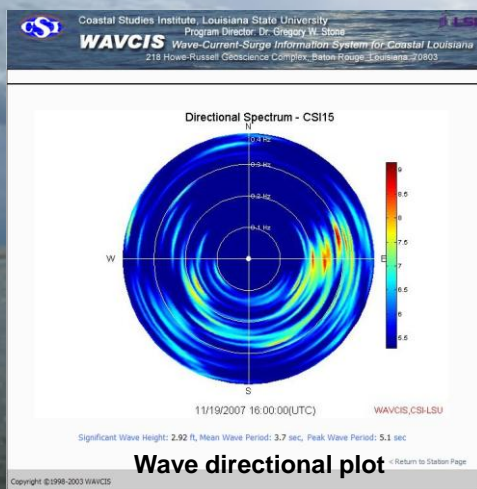
Water Level in NAVD 88



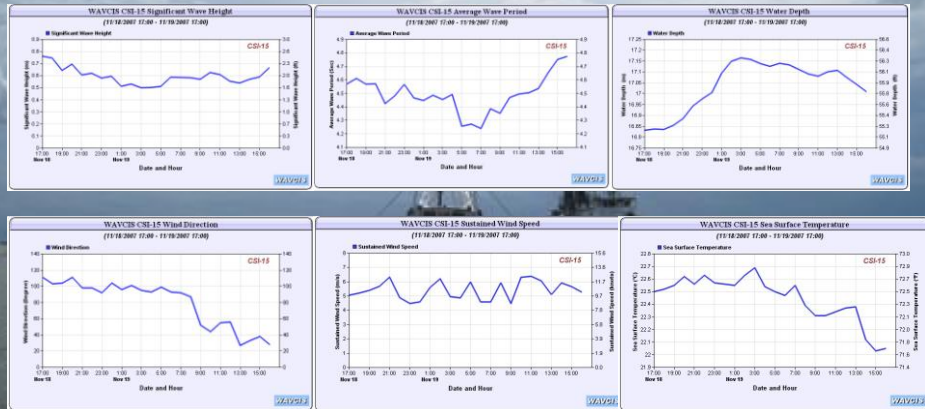
Water Level in NAVD 88



Real-Time Directional Spectra and Spectral Evolution from the ADCP

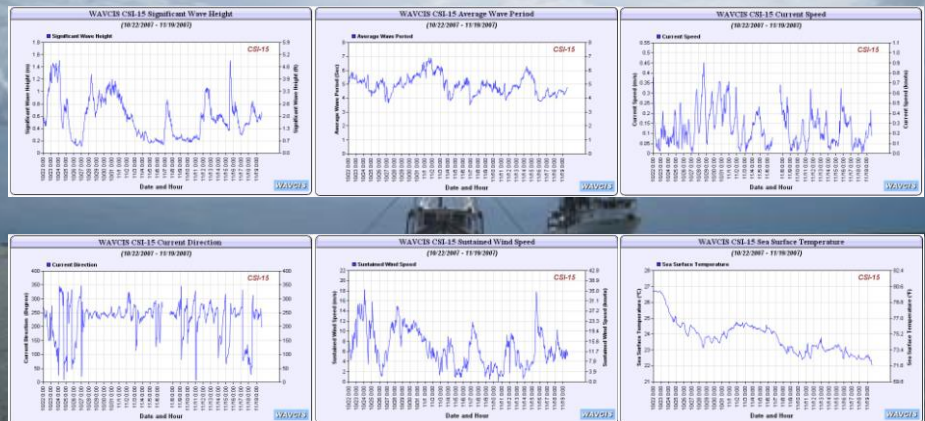


Past 24 Hour Data



A way to view of short-term trends.

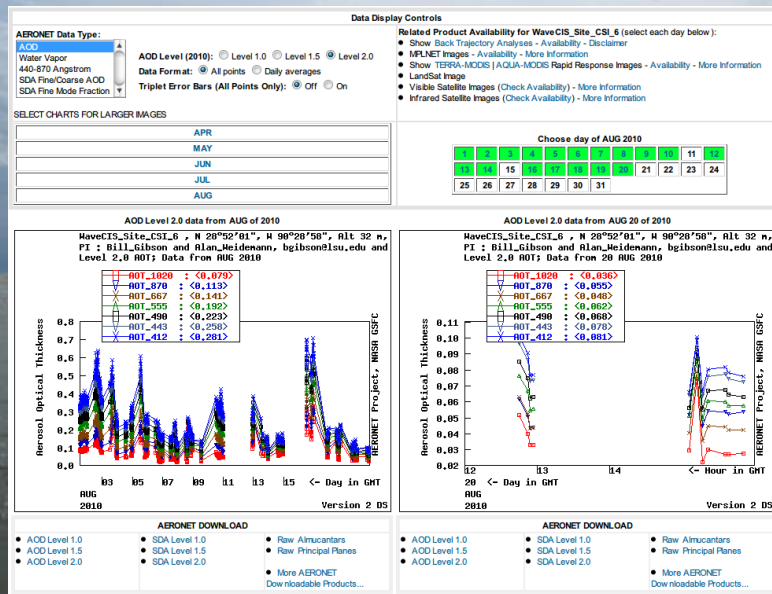
Past 1 Month Data



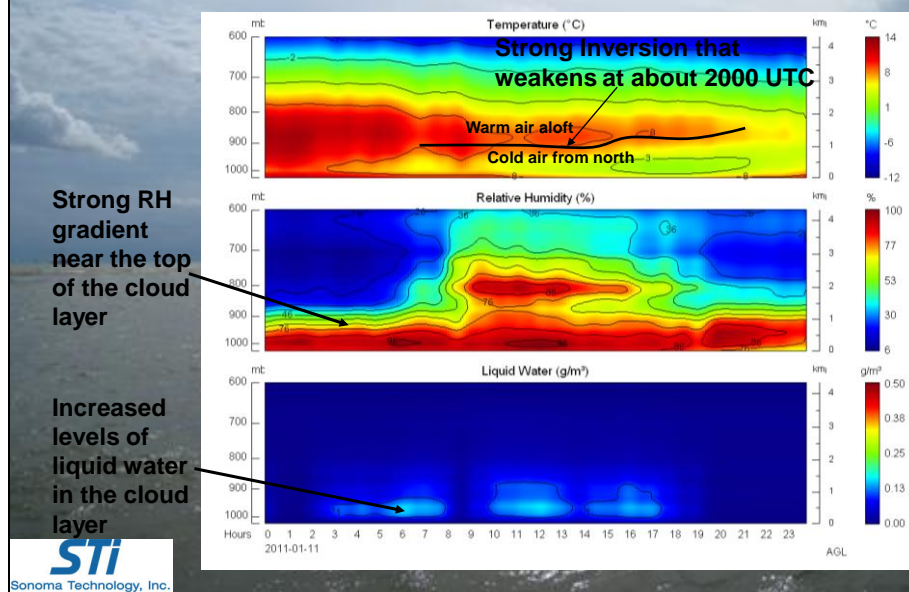
A way to view of long-term trends.

NASA AERONET

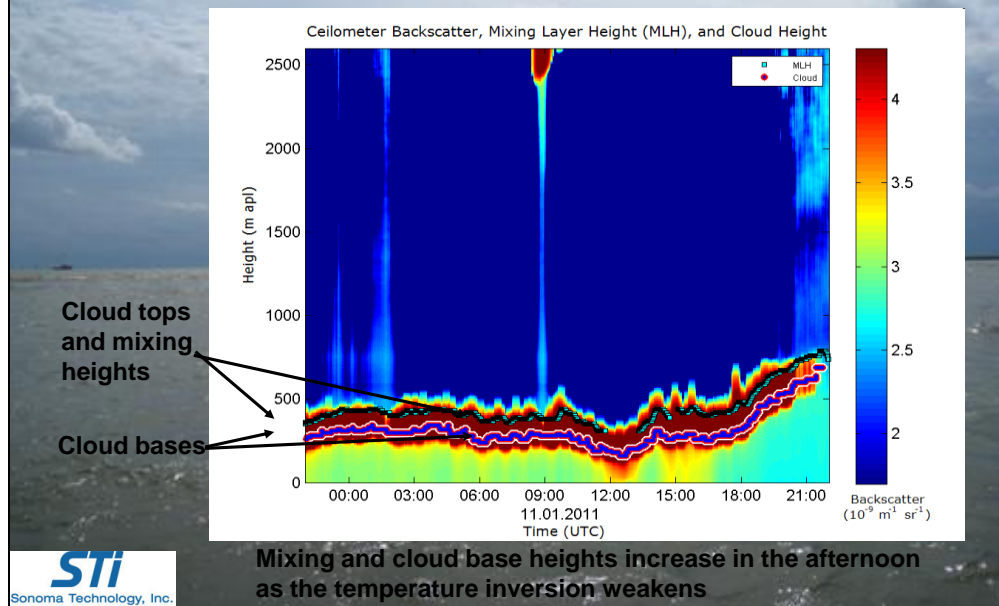
(Click to view real-time)



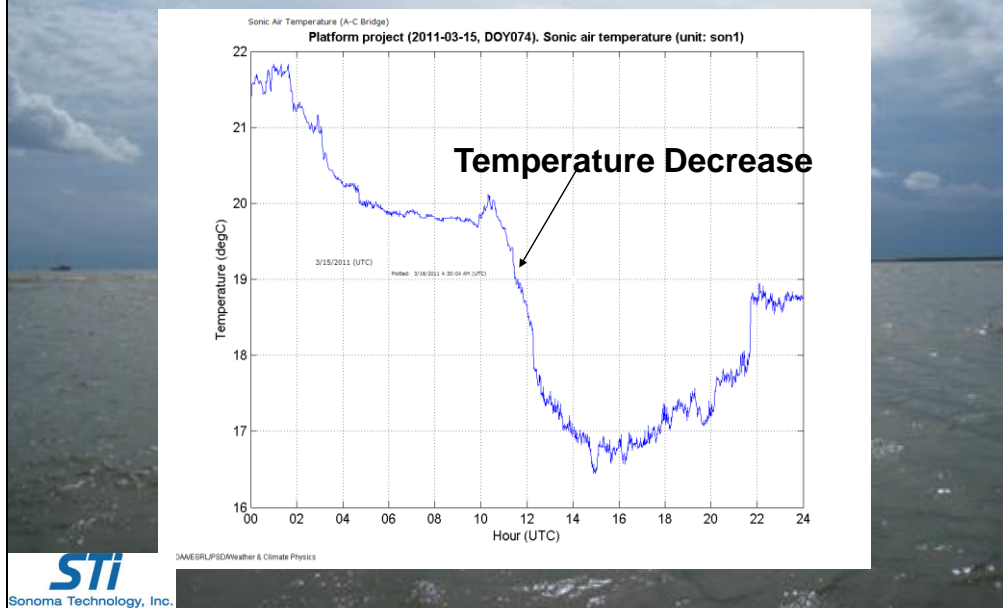
Radiometer Data on 1/11/2011



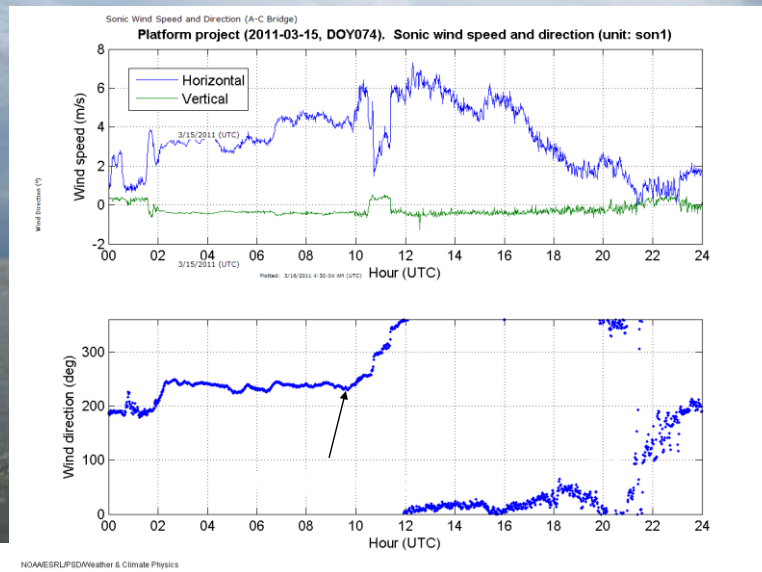
Ceilometer Data on 1/11/2011



Sonic Anemometer A-C Bridge Data on 3/15/2011

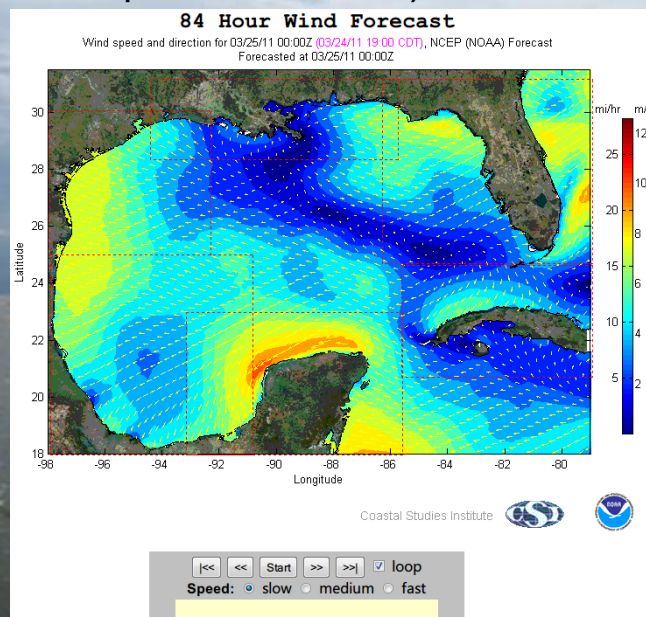


Sonic Anemometer A-C Bridge Data on 3/15/2011



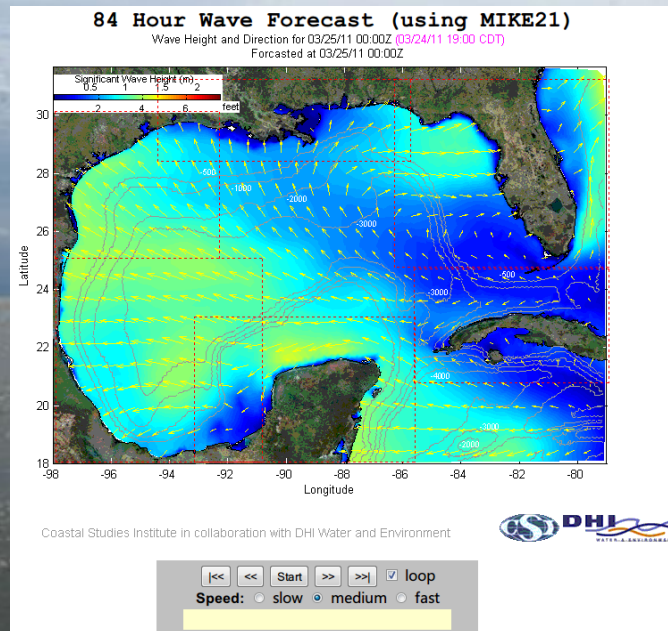
Numerical Modeling (NCEP/NOAA)

(With area zoom capabilities and animation)



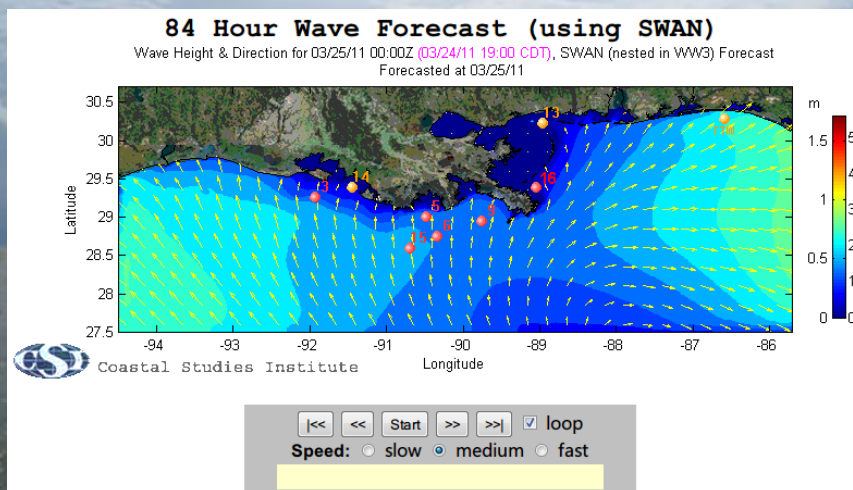
Numerical Modeling (Mike 21)

(With area zoom capabilities and animation)



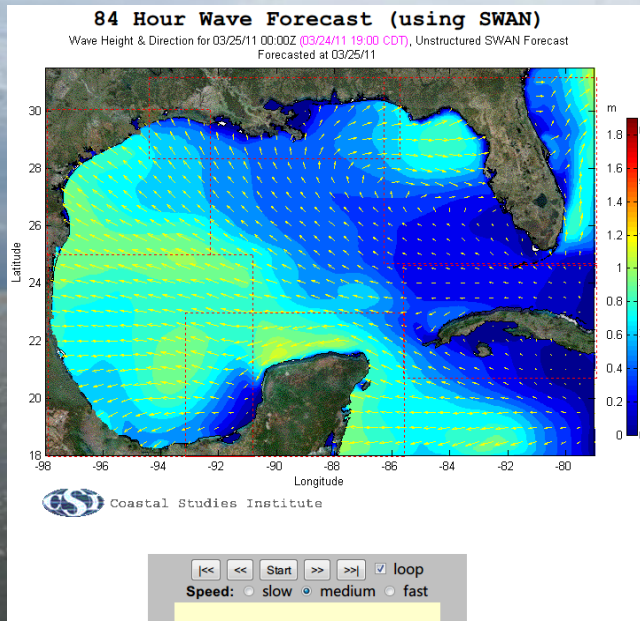
Numerical Modeling (SWAN/WW3)

(SWAN nested in WW3, Louisiana coast only)



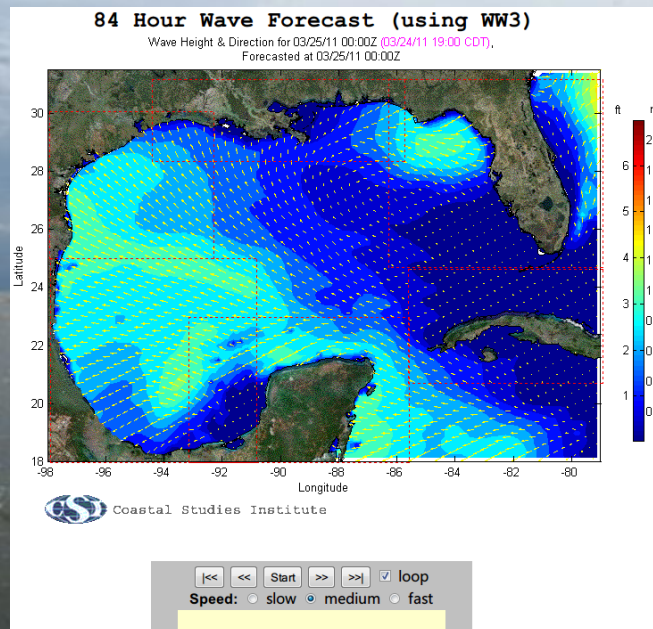
Numerical Modeling (SWAN)

(With area zoom capabilities and animation)



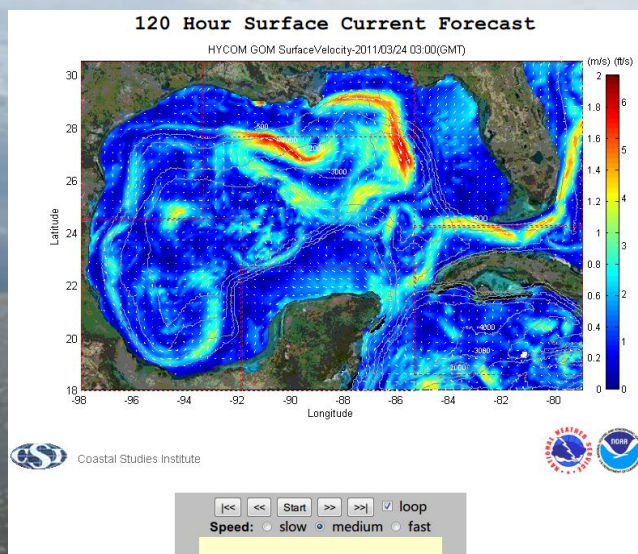
Numerical Modeling (WW3)

(With area zoom capabilities and animation)



Numerical Modeling (HYCOM)

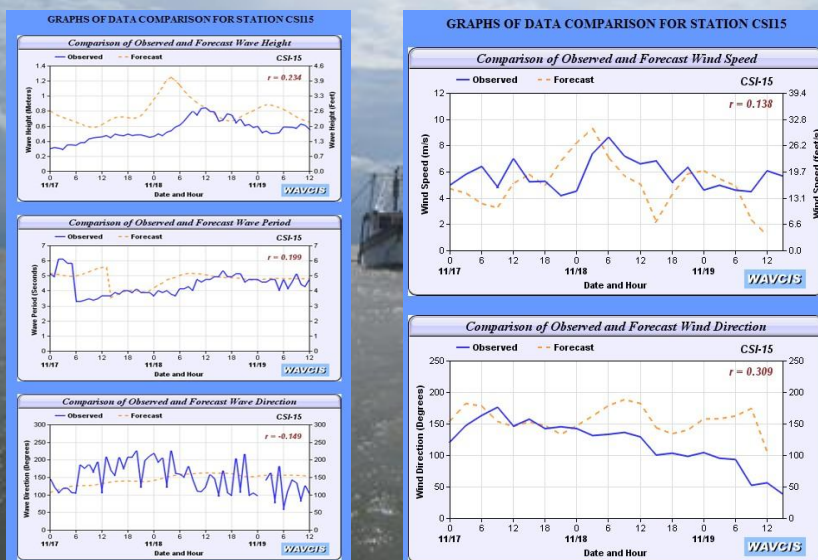
(With area zoom capabilities and animation)



Other HYCOM products are water level, temperature and salinity.

Model Validation

(by clicking on WavCIS sites on the Louisiana coast map, to skill assess models)



Access to Archived Processed Data

Coastal Studies Institute, School of the Coast and Environment, Louisiana State University
Program Director: Dr. Chunyan Li
WAVCIS Wave-Current-Surge Information System for Coastal Louisiana
218 Howe-Russell Geoscience Complex, Baton Rouge, Louisiana 70803

Thanks for visiting WAVCIS and downloading archived processed data!

User Name :
Password :

New User, please register.

Forget your password?

[Return to Wavcis](#)

Access to Archived Processed Data

ARCHIVED PROCESSED DATA
(ASCII format)

Please provide the following information:

Select the start date (UTC)
Starting date:


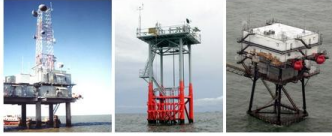
Select the end date (UTC)
Ending date:

Select the station from which you need the information:
Station id:

Select The Parameters:
Parameter:
Significant Wave Height
Average Wave Period
Peak Wave Period

[Return to WAVCIS Home Page](#)

Today's date(CST): Wednesday, November 16, 2011 9:44:44 AM



Access to Archived Processed Data

ARCHIVED PROCESSED DATA
 (ASCII format)
 Please provide the following information:
 Select the start date (UTC)
 Starting date: 2011-09-15
 Select the end date (UTC)
 Ending date: 2011-11-16
 Select the station from which you need the information:
 Station id: Station 9
 Select The Parameters:
 Significant Wave Height
 Average Wave Period
 Peak Wave Period
 Dominant Wave Direction
 Parameter:
 Query Reset Form
 Return to WAVCIS Home Page

Date	WVHT	WVPD	TIDE	WSPD	WDIR	ATMP
9/15/2011 0000	0.164	4.327	0.5488000000000001	4.283	226	27.31
9/15/2011 0100	0.172	4.45	0.5728000000000002	3.86	229	27.41
9/15/2011 0200	0.173	4.441	0.5938000000000001	4.061	219	27.42
9/15/2011 0300	0.194	5.145	0.5848000000000002	5.491	235	26.89
9/15/2011 0400	0.191	4.499	0.5798	5.484	230	27.05
9/15/2011 0500	0.166	4.324	0.5647999999999999	5.522	223	27.03
9/15/2011 0600	0.187	4.93	0.5498000000000002	5.413	240	26.91
9/15/2011 0700	0.164	5.062	0.5228000000000001	5.436	253	26.91
9/15/2011 0800	0.168	4.957	0.4828000000000002	4.98	260	26.94
9/15/2011 0900	0.155	4.366	0.4418000000000002	5.023	248	26.56
9/15/2011 1000	0.152	4.652	0.4138000000000002	4.496	252	26.49
9/15/2011 1100	0.139	4.606	0.3847999999999999	5.278	266	26.18
9/15/2011 1200	0.152	4.853	0.3708	5.366	298	26.03
9/15/2011 1300	0.128	4.615	0.3588000000000001	5.157	305	25.99
9/15/2011 1400	0.206	5.562	0.3538000000000001	4.99	298	26.07
9/15/2011 1500	0.163	4.636	0.3618	4.759	301	26.53
9/15/2011 1600	0.134	4.498	0.3748	4.663	300	26.9
9/15/2011 1700	0.172	5.032	0.3928000000000002	3.433	294	27.54
9/15/2011 1800	0.171	5.401	0.4098000000000002	2.344	281	27.77
9/15/2011 1900	0.165	4.619	0.4387999999999999	3.128	258	28.04
9/15/2011 2000	0.138	4.468	0.4548	3.506	261	28.36
9/15/2011 2100	0.169	4.754	0.4717999999999999	5.79	249	28.37
9/15/2011 2200	0.199	4.842	0.4977999999999999	4.15	241	27.88
9/15/2011 2300	0.134	4.602	0.5127999999999999	4.187	244	27.95
9/16/2011 0000	0.139	4.47	0.5428000000000001	2.989	258	27.89
9/16/2011 0100	0.393	3.4	0.5498000000000002	9.96	19	26.37
9/16/2011 0200	0.512	3.622	0.5528000000000002	9.88	19	24.89
9/16/2011 0300	0.538	3.808	0.5548000000000001	10.01	28	24.32
9/16/2011 0400	0.534	3.771	0.5628	9.81	16	23.47
9/16/2011 0500	0.526	3.81	0.5638000000000001	9.93	34	23.12
9/16/2011 0600	0.502	3.774	0.5688000000000001	9.56	33	23.26
9/16/2011 0700	0.508	3.785	0.5518000000000001	5.239	60	23.29
9/16/2011 0800	0.708	3.835	0.5278	9.36	42	22.73
9/16/2011 0900	0.718	3.92	0.4728	8.49	66	22.35
9/16/2011 1000	0.678	3.899	0.4337999999999999	7.57	40	22.01
9/16/2011 1100	0.562	3.893	0.4098000000000002	6.498	42	21.76
9/16/2011 1200	0.485	3.583	0.3838000000000002	5.827	62	21.82
9/16/2011 1300	0.326	3.664	0.3688000000000001	5.473	53	22.03
9/16/2011 1400	0.286	3.901	0.3598000000000001	5.047	58	22.38
9/16/2011 1500	0.216	4.318	0.3548000000000002	3.996	52	22.78
9/16/2011 1600	0.228	4.475	0.3578000000000002	4.398	56	23.09
9/16/2011 1700	0.253	4.386	0.3538000000000001	3.948	67	23.35
9/16/2011 1800	0.225	4.539	0.3748000000000001	4.071	18	23.54
9/16/2011 1900	0.154	4.164	0.3978000000000001	3.628	8	23.99
9/16/2011 2000	0.157	4.426	0.4167999999999999	4.003	0	24.6
9/16/2011 2100	0.127	4.298	0.4448000000000002	4.847	12	25.17
9/16/2011 2200	0.125	4.814	0.4728	4.324	17	25.89
9/16/2011 2300	0.127	4.28	0.5007999999999999	3.341	24	26.23
9/17/2011 0000	0.128	4.051	0.5388	3.433	24	25.83
9/17/2011 0100	0.121	4.812	0.5658	3.367	24	25.55
9/17/2011 0200	0.162	5.41	0.5888	5.993	70	24.45
9/17/2011 0300	0.205	3.618	0.6138000000000002	6.226	62	24.43
9/17/2011 0400	0.283	3.563	0.6218000000000001	6.318	62	24.42
9/17/2011 0500	0.32	3.607	0.6238	6.636	53	24.33
9/17/2011 0600	0.349	3.591	0.6227999999999999	7.153	61	24.3
9/17/2011 0700	0.452	3.58	0.6138000000000002	7.28	72	24.2
9/17/2011 0800	0.484	3.618	0.5898000000000001	7.19	79	24.09
9/17/2011 0900	0.457	3.633	0.5438000000000001	6.524	83	23.85
9/17/2011 1000	0.387	3.53	0.5028000000000001	6.182	76	24.25
9/17/2011 1100	0.353	3.563	0.4657999999999999	4.39	74	24.26
9/17/2011 1200	0.234	3.653	0.4238000000000001	3.21	77	24.33
9/17/2011 1300	0.191	3.94	0.3938	2.659	101	23.09
9/17/2011 1400	0.156	3.93	0.3718000000000001	2.943	77	23.15

Summary

- WavCIS stations: maintained by CSI + FSG with a strong coastal dynamics, oceanographic, web technology and engineering expertise.
- It provides valuable info, esp. during the hurricane season.
- For near real-time model skill assessment of wind induced waves, hydrodynamics and wave models.
- WavCIS provides the data portal for the Hypoxia Program through LUMCON, NGOMEX/NOAA.

Summary (Con't)

- **NASA AERONET Program provides critical calibration data that is used to correct all satellite imagery and to better improve the infrared imagery products such as sea surface temperatures, chlorophyll, salinity, etc.**
- **The Sonoma Technology project - to provide better met info for use in improving predictions of the boundary layer parameters, improving regional-scale met. model predictions and providing a framework for advanced offshore measurements.**