



CORMP



COASTAL OCEAN RESEARCH AND MONITORING PROGRAM

Coastal Ocean Research and Monitoring Program at the University of North Carolina at Wilmington

A Collaborative Coastal Ocean Research And Monitoring Program

Funded by the National Oceanic and Atmospheric Administration



NC STATE UNIVERSITY



- Since 1999, UNCW has conducted a sustained, long-term program of coastal ocean observations and research off North Carolina.
- Interdisciplinary research program includes physical oceanography, marine biology, chemical oceanography and marine geology.
- A collaborative program at UNCW with NC State & University of South Carolina

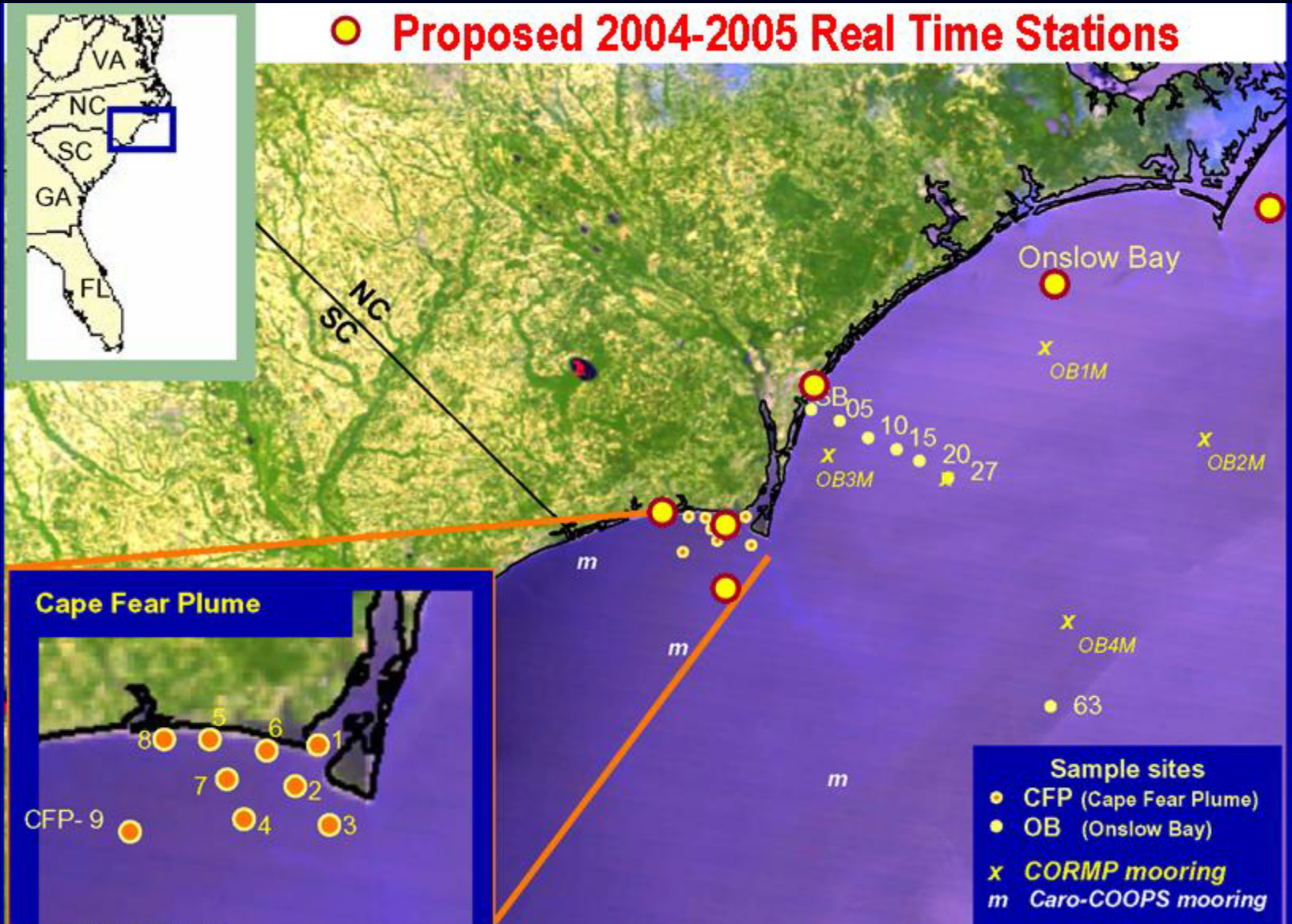


Goals

- to become a full-featured coastal ocean observing system
- to provide a science-based framework for wise coastal use
- to be a regional node in a national system of coastal observatories
- to engage local and regional user groups and provide the timeliest, most useful dataset possible



Proposed 2004-2005 Real Time Stations



By the end of 2005, we will have:

Six sites in Long Bay: a three station line along the extended NC/SC border, two moorings in the Cape Fear River plume and one instrumented fishing pier

Three sites in Onslow Bay, one instrumented pier, one in mid-shelf and one near New River inlet

One site in Raleigh Bay

Plus CMAN stations at Frying Pan Shoals and Cape Lookout



Each site will report in real time, approximately hourly:

Current profiles

Temperature and salinity

Meteorological data (winds, air temp, etc.)

Some with fluorescence and turbidity

Wave directional spectra

Data will be quality-controlled and available for free on the web (www.cormp.org)

Bi-monthly, Monthly, and other Sampling Cruises:

Water Quality (Turbidity, Nutrients, etc.)

Physical parameters (Temp, Salinity & Currents)

Sea floor characteristics

Bioptical measurements

Primary productivity

Fisheries



CFR Discharge Plume and Fisheries Recruitment: Aggregation and Trophic Enhancement



Also supported by:



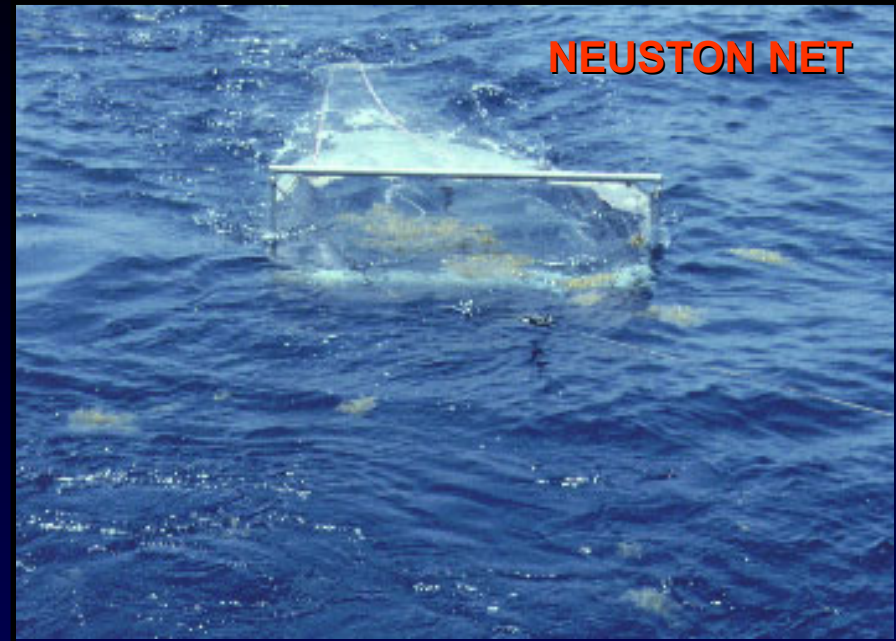
Sampling Methods

Neuston Net

- 950 μm mesh net
- 1 m X 2 m mouth opening
 - 10 minutes @ ~ 2 knots
 - half in/half out at surface

Bongo Net

- 333 μm mesh net
- 60 cm diameter mouth openings
 - 5-10 minutes @ ~ 1.5 knots
 - stepped oblique pattern
- Deployed to ~10 m from bottom, or 100 m at GS



Hamilton

MONTVALE,

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Top N.C. Commercial Fisheries

2001 Landings
(million dollars)

Plume-impacted ?

(\$72,000,000)

1. Blue crab	32.0	*****
2. Shrimps	11.9	*****
3. Southern flounder	5.6	*****
4. Atlantic menhaden	4.6	*****
5. Summer flounder	4.4	*****
6. Atlantic croaker	3.1	*****
7. King mackerel	1.3	
8. Swordfish	1.3	
9. Spot	1.3	*****
10. Mulletts	1.2	*****
11. Vermillion snapper	1.2	
12. Bluefish	1.1	*****
13. Oysters	1.1	
14. Seabasses	1.1	
15. Weakfish	1.0	*****

Role of Discharge Plumes in Life-Histories and Recruitment Success

Juveniles

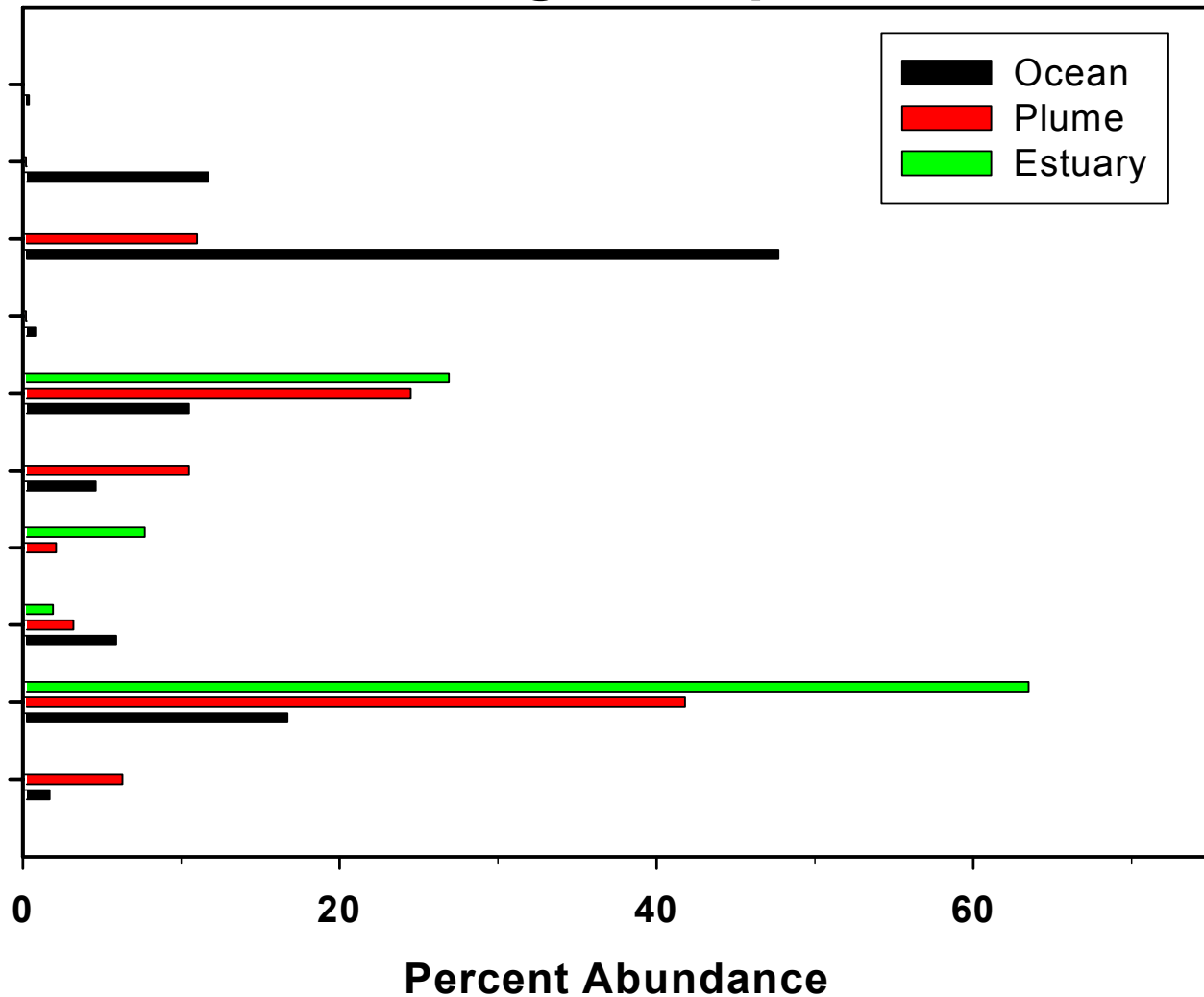
Larval ingress

Larval transport

Eggs

Assemblage Composition

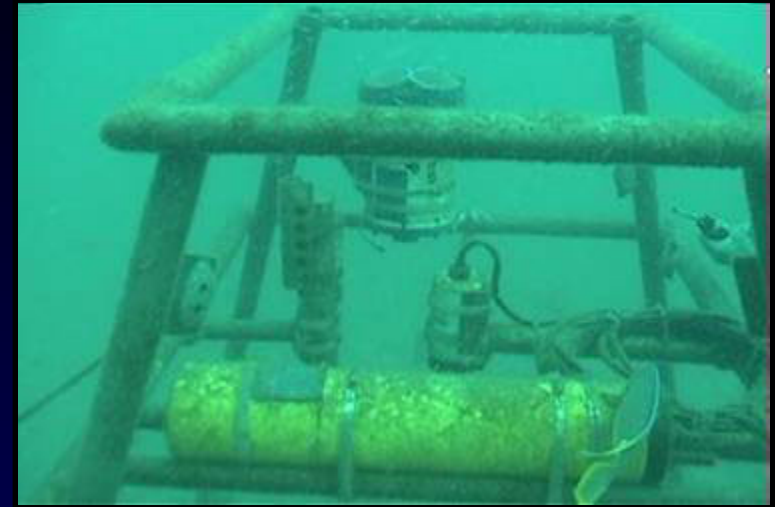
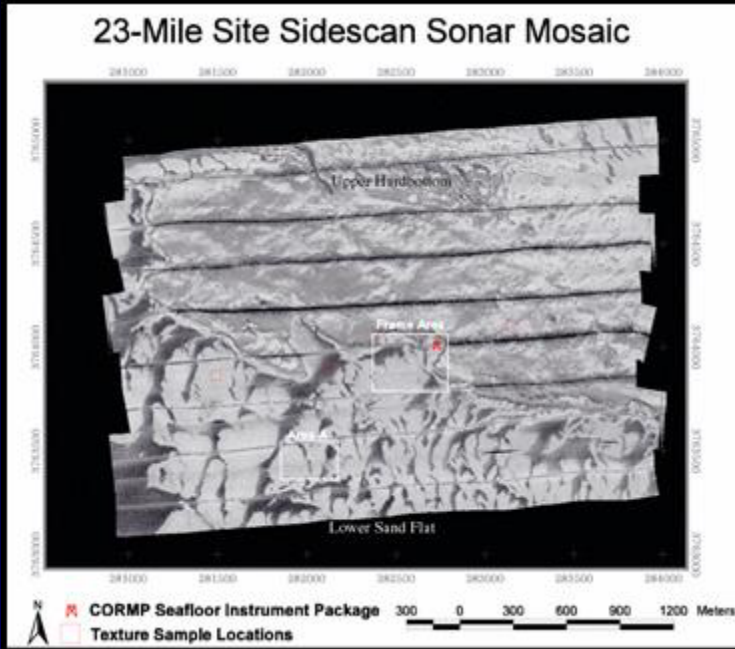
Gobiosocidae
Carangidae
Blenniidae
Clupeidae
Gobiidae
Engraulidae
Cynoglossidae
Syngnathidae
Sciaenidae
Sparidae



Boundary Layer Processes and Sediment Transport on the Continental Shelf

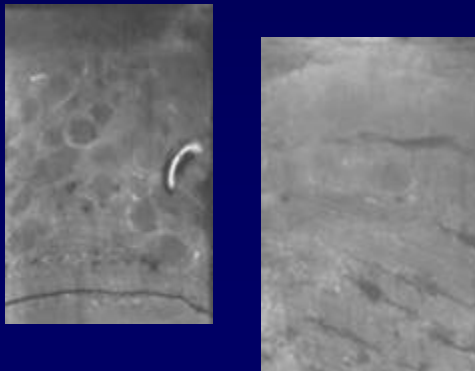
- Quantification of wave/current boundary layer processes and sediment mobility during fair weather and storms;
- Examination of the Cape Fear River plume's influence on the composition and distribution of inner shelf sediments;
 - Identification of interactions between physical processes and primary and secondary consumers.

Data Collection Efforts



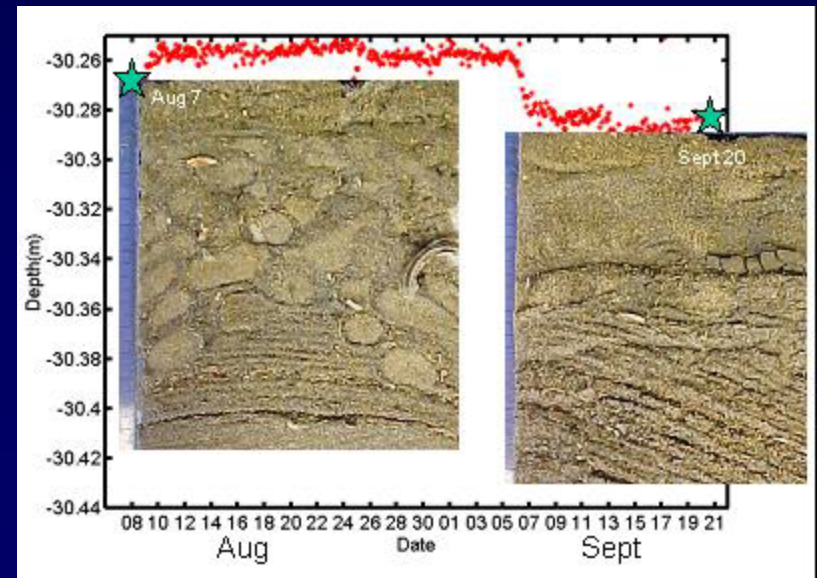
Moored Instruments

Sidescan mapping

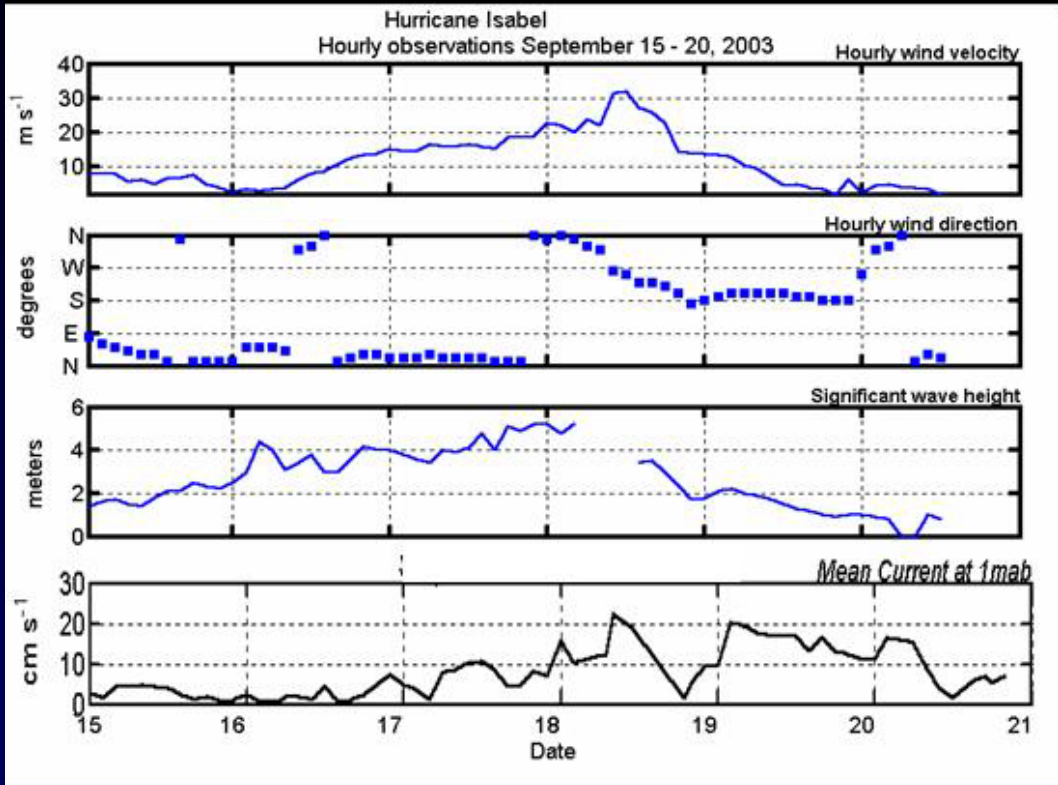


X-radiographs

Box cores & relief peels



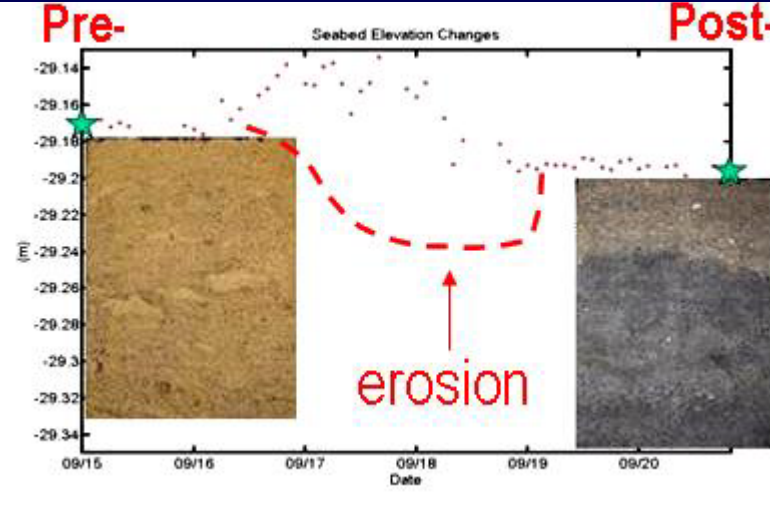
Documented Effects of Hurricane Isabel on shelf...



Max wave height ~ 6m

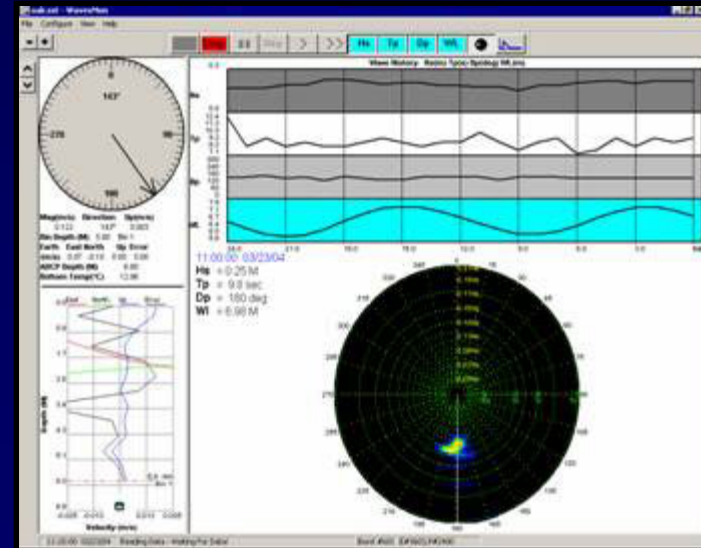
Max bottom current ~ 20 cm/s

- ~ 4 cm net erosion of sea bed
- ~ 5 cm storm deposition
- ~ 9 cm total reworking by storm (region where most infauna reside)



New research directions for FY2004-2005:

- Collection of coastal meteorological and wave/current data on the inner shelf (< 12m water depth)
- Characterization of coastal wave climate and associated coastal erosion;
- Providing wave and meteorological data in real time





Remote Sensing & Optics

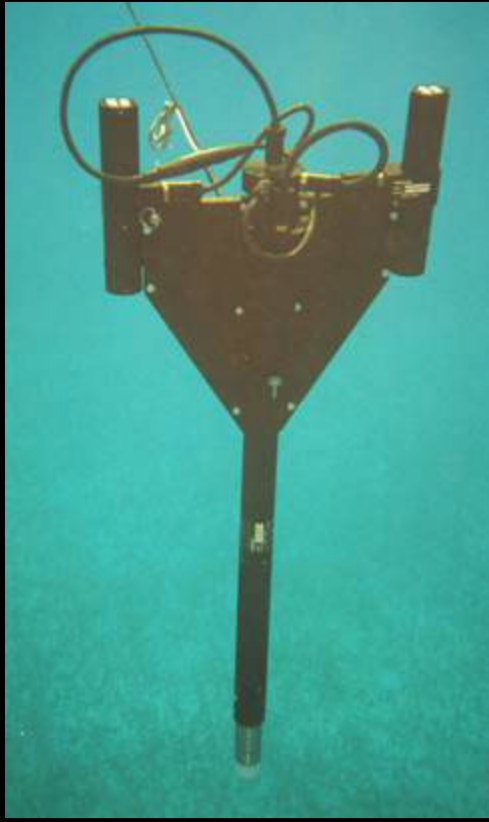
Extrapolate in-situ data collected during cruises to larger spatial and temporal scales, providing a regional context for interpreting in-situ monitoring data

Monitor long-term regional patterns in chlorophyll and primary production, and their relationships to environmental conditions

Determine location and extent of shelf waters influenced by the turbid Cape Fear River blackwater plume

Relate optical environment to larval and benthic monitoring results and primary production measurements.

Optical Measurements

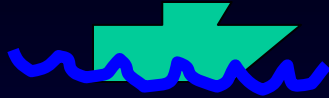


Surface and profiling reflectances at SeaWiFS wavelengths

The Micropro (left, photograph by courtesy by Satlantic Inc., Canada) and MicroSAS (Kowalczuk, et al., 2004)

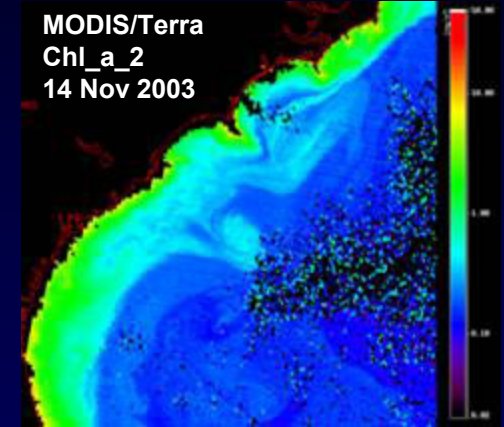
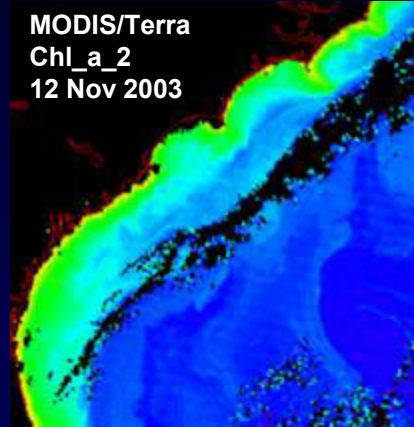
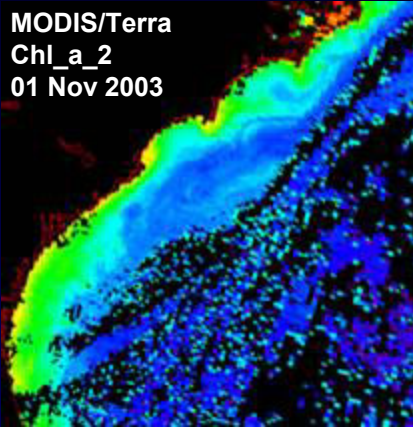
MODIS images before and after November 2003 fieldwork

Before

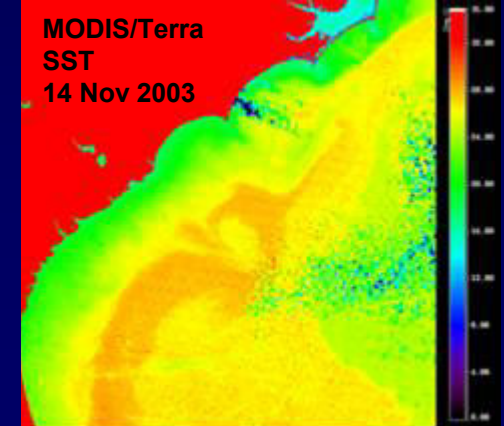
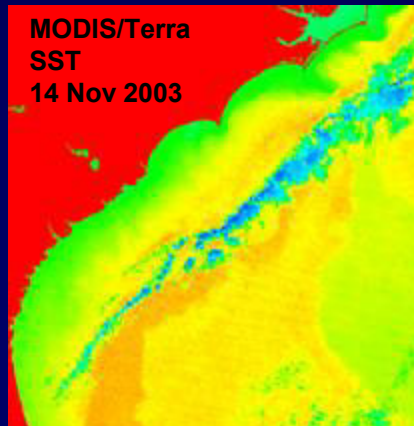
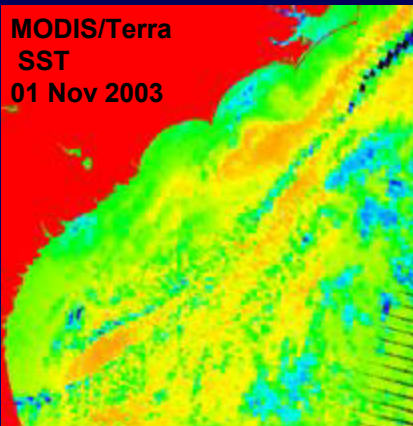


After

Chl

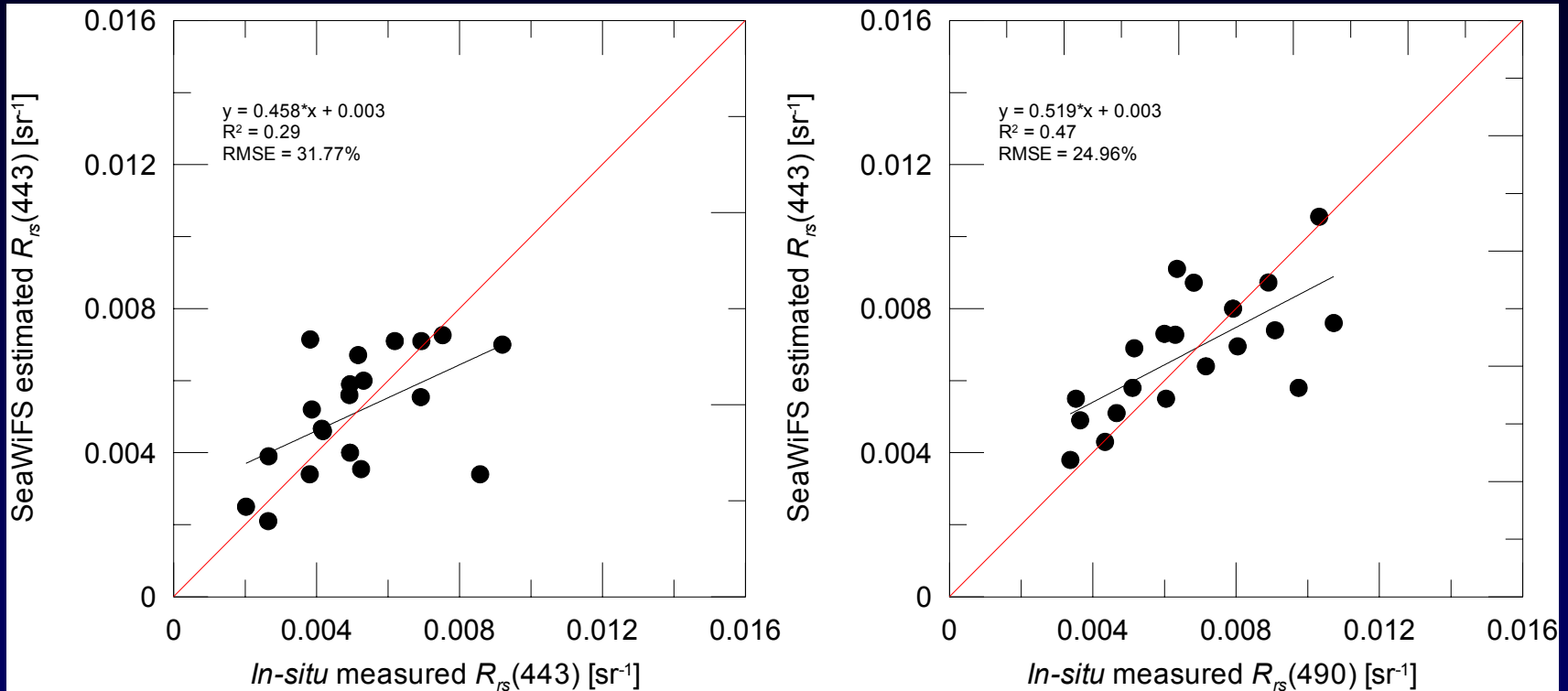


SST



Satellite ground-truthing

- Comparison between remote sensing reflectances measured in-situ and estimated from SeaWiFS imagery data



(Kowalczyk, et al. 2004)

Alternate atmospheric correction strategies for coastal satellite data are under investigation to improve quantitative retrieval of ocean color reflectances from satellite

Ongoing and new program directions:

Satellite algorithm development:

- Evaluate alternative atmospheric correction algorithms for quantitative retrieval of water-leaving reflectances from ocean color satellite data (in collaboration with Rick Stumpf at NOAA and Bob Arnone & Paul Martinolich at NRL)
- Develop local algorithms for calculating chlorophyll and light attenuation from remote sensing satellite reflectances

Primary production measurements:

Determine spatial and temporal patterns in primary production using in-situ fast repetition rate fluorescence measurements

Educational Outreach

Graduate and Undergraduate Research Experiences





GK-12 Education and Web-based Learning

Ocean View

The *Ocean View* Data Display Tool allows the user to observe and interact with ocean buoy data from around the world

Demo

Thank you!