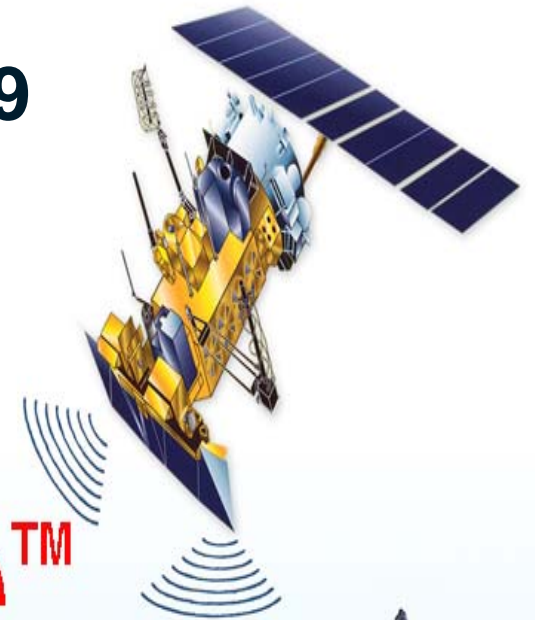


**Miami Remote Sensing, June 01, 2009  
NOAA\_NMFS\_SEFSC**



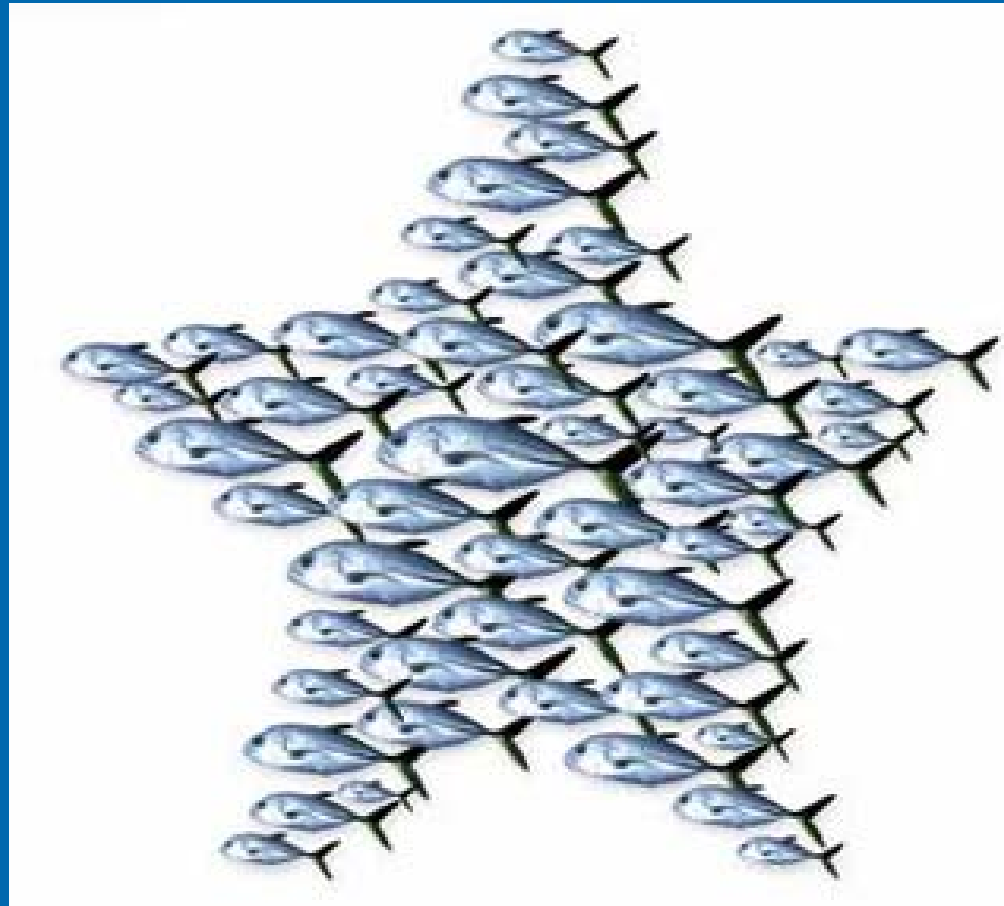
**ROFFS<sup>TM</sup>**



**ROFFER'S OCEAN FISHING FORECASTING SERVICE, INC.**

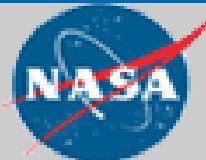
# THANK YOU

Gustavo Goni & John Lamkin



# PURPOSE TODAY

- **INTRODUCE ROFFS™**
  - **WHO WE ARE**
  - **PHILOSOPHY**
- **UPDATE ROFFS™**
- **HOW WE CAN WORK TOGETHER**



National Aeronautics  
and Space Administration

# ROFFS™

**BEST KNOWN FOR FISH FORECASTING**

## IMPROVE YOUR CATCH FIND FISH FASTER

ROFFS™ WILL SHOW YOU WHERE THEY ARE  
BEFORE YOU LEAVE THE DOCK



THAT'S WHY WINNERS  
USE ROFFS™ EVERY TRIP

### 2004 HIGHLIGHTS

#### OVERALL WINNERS IN:

BAHAMAS BILLFISH CHAMPIONSHIP  
GEORGIA GOVERNOR'S CUP  
NORTH CAROLINA GOVERNOR'S CUP  
SOUTH CAROLINA GOVERNOR'S CUP  
MID-ATLANTIC \$500,000  
OCEAN CITY WHITE MARLIN OPEN  
BIG ROCK BLUE MARLIN  
MOBILE BIG GAME FISHING CLUB  
SOUTHERN KINGFISH ASSOCIATION  
POCO BUENO AND OTHERS

#### COMPREHENSIVE ANALYSIS:

PINPOINTS HOT SPOT AREAS  
TELLS HOW MANY DAYS  
THE OCEAN CONDITIONS  
HAVE BEEN FAVORABLE

#### CATCH REPORTS

FREE UPDATES WHILE FISHING  
CURRENT DIRECTION  
CHLOROPHYLL/PLANKTON

#### SHOWS WATER COLOR

CURRENT EDGES  
WATER TEMPERATURE  
BOTTOM TOPOGRAPHY  
NAVIGATIONAL COORDINATES

#### EXPERT INTERPRETATION

OPTIMIZED FOR SATELLITE  
TELEPHONE TRANSMISSION



# FISHING OCEANOGRAPHIC ANALYSES

## ROFFER'S OCEAN FISHING FORECASTING SERVICE, INC.

TOLL FREE 800 677-7633 & (321) 723-5759 // EMAIL: FISH7@ROFFS.COM

### ROFFS™ FISHERIES OCEANOGRAPHIC ANALYSIS

FOR THE JACKSONVILLE TO NEW SMYRNA OFFSHORE AREA (LAT./LONG.)

UPDATED ON FRIDAY 03 APRIL 2009 FOR FRIDAY P.M. & SATURDAY FISHING ONLY

Based on a multiple factor analysis, the symbols (hot spot spots) mark the areas where bait concentrations are expected and where fishing action is expected to be better compared with other (non-marked) areas. These are not based on dock rumors or hearsay fishing reports. Fishing reports are stated as such. You should start fishing where you recognize other signs of good fishing conditions near these marked areas. It is very important to use your sea surface temperature (sst) gauge to locate the boundaries of the water masses, which are outlined. Rather than trying to find water temperature values shown on the map, search for the relative change in sst where the water mass boundaries occur. Arrows indicate the main current direction. Numbers inside of the dots indicate the number of consecutive days that we have seen favorable conditions in that location.

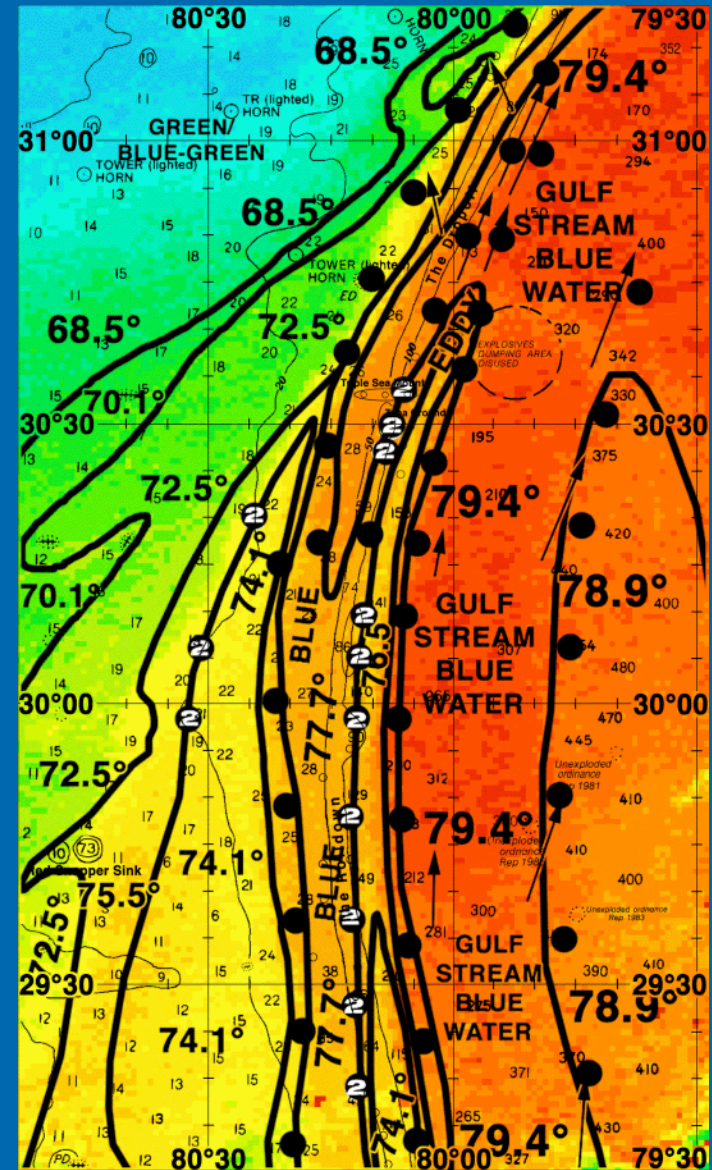
We were able to see the ocean conditions in this area relatively clearly today using a combination of satellite imagery from this morning and afternoon. The estimated morning sst<sup>o</sup> of the main body of the Gulf Stream is 79.4°F. Due to hot afternoon air temperatures forecasted through the weekend (90°F), do not be surprised if the sst<sup>o</sup> you find while out on the water are as much as 1°F warmer than what we have shown here. It appears as if the sst<sup>o</sup> have risen by approximately 0.5°F over the past 48 hours. Please remember to look for relative rather than absolute sst<sup>o</sup> while out on the water. Overall, we observed one Gulf Stream eddy feature influencing the ocean conditions in this area. This eddy was located offshore of the Jacksonville area this afternoon and was centered just offshore of the 100 fathom ledge (southeast of the Dropoff area) near 79°57'W & 30°45'N. As this feature has progressed northward through the chart area it appears to have pulled inshore and left behind a large finger shaped filament of blue (77.7°F) Gulf Stream water over the 30-100 fathom depths throughout the chart area that is likely to provide increased chances for fishing action along both its inshore and offshore edges.

With this in mind, some relatively good chances for tuna and perhaps sailfish and wahoo action occur on your way offshore from the St. Augustine area where we observed a 1.4°F warmer to cooler water mass boundary and favorable conditions for two days now over the 20 fathom ledge near 80°25'W & 30°20'N, 80°31'W & 30°06-07'N, and 80°32-33'W & 29°58-59'N. East/southeastward, increased chances for fishing action occur where we observed the inshore edge of the blue (77.7°F) water finger for the first time this afternoon over the 20-28 fathom depths from 80°21'W & 30°15'N to 80°17'W & 29°48'N to 80°17'W & 29°24'N. Better chances for action occur along the offshore edge of this same finger of blue water where we have observed favorable conditions for two days now over the 50-100 fathom ledge including the Rolldown area from 80°11'W & 30°10'N to 80°12-13'W & 29°58'N and southward from 80°11-12'W & 29°48'N to 80°12'W & 29°20'N. Offshore, increased chances for tuna, wahoo, dolphin, and billfish (marlin and swordfish) occur where we believe you will encounter the western edge of the dark blue (79.4°F) Gulf Stream water over the 190-230 fathom depths from 80°03-04'W & 30°26'N to 80°06-07'W & 29°58'N to 80°03-04'W & 29°24-25'N. There are no strong oceanographic indicators as to where along this water mass boundary your better chances for fishing action are likely to occur.

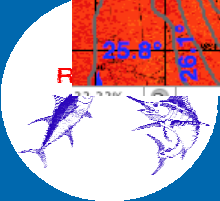
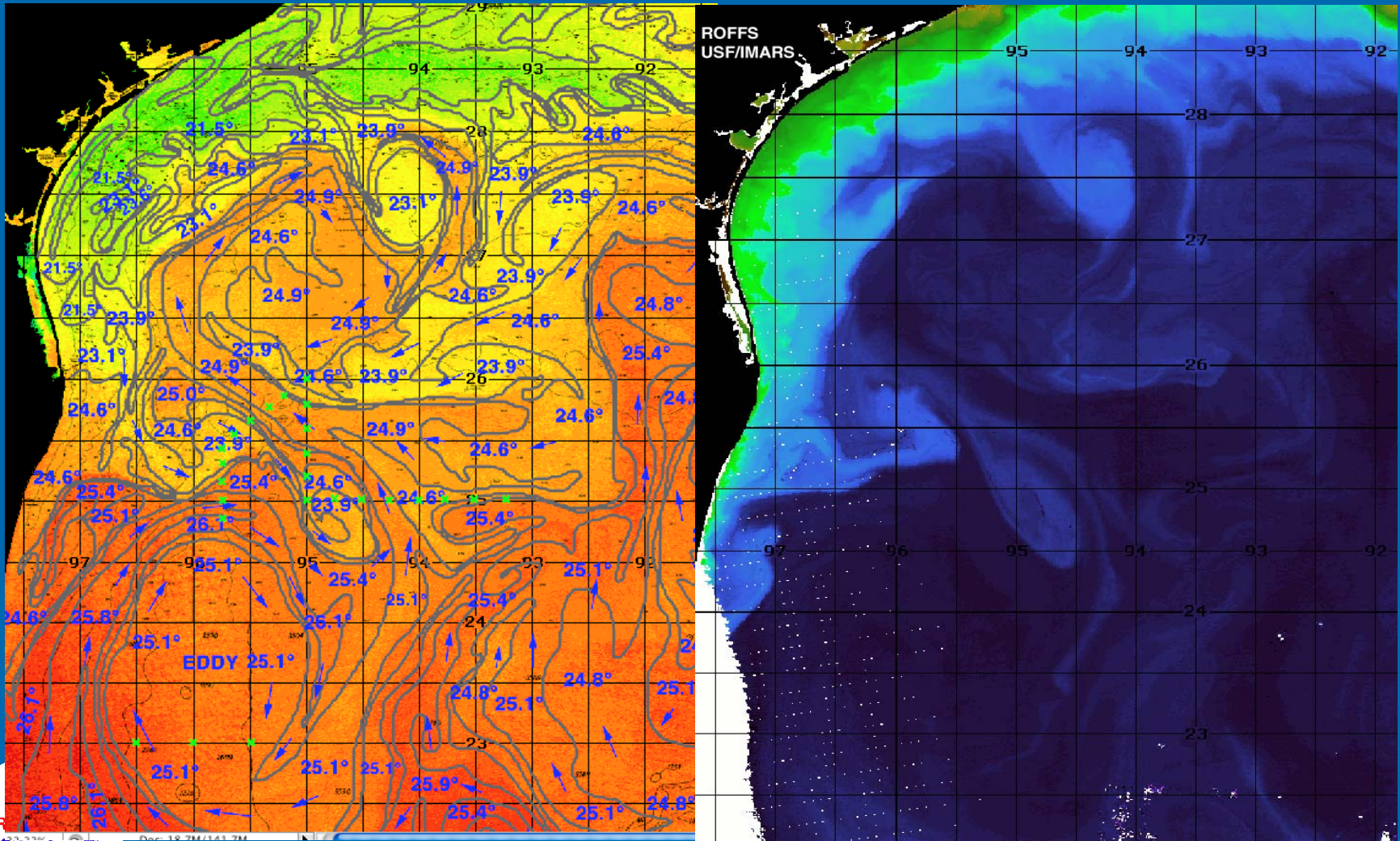
Northward, offshore of the Jacksonville area, increased chances for fishing action occur where we believe you will find the northwestern edge of the finger of blue water by fishing time tomorrow morning over the 22-25 fathom depths from 80°15'W & 30°27'N to 80°05'W & 30°55'N to 79°52'W & 31°13'N. East of the Dropoff area, we believe your overall chances for fishing action will also be increased where we believe you will find both the warmer to cooler and cooler to warmer water mass boundaries of the eddy by early tomorrow morning just offshore of the 50-100 fathom ledge from 80°02'W & 30°41'N to 79°49'W & 31°07'N and from 80°00'W & 30°36'N to 79°49'W & 30°58-59'N. Better chances for fishing action occur southward in the areas of the Tuna Grounds and the Triple Sea Mount where we have observed favorable conditions for two days now from 80°05'W & 30°33-34'N to 80°08'W & 30°25'N.

**EASTERN SIDE:** We did observe a piece of cooler (78.9°F) dark blue water moving northward in the cooler of the Gulf Stream. The western edge of this cooler (78.9°F) water is likely to provide some increased chances for tuna, marlin, and perhaps swordfish action over the 340-440 fathom depths from 79°47'W & 29°35'N to 79°45'W & 30°07'N to 79°38'W & 30°44'N. The true eastern side of the Gulf Stream was observed late this afternoon EAST of the chart area from 79°00'W & 29°07'N to 79°10'W & 29°37'N and from 78°45'W & 30°00'N to 79°03'W & 30°30'N to 78°45'W & 31°00'N.

Winter office hours: Mon. - Fri. 9:00 AM - 05:00 PM. Not open Saturday or Sunday until April 2009. If you are planning to fish on Sunday or Monday we will provide an analysis on Friday. If for some reason that Friday analysis is not useful for you, then call our office by Monday 5:00 PM to ask for a credit.



# BLUEFIN TUNA OCEANOGRAPHY



# WHAT IS ROFFS™

➤ FISHERIES OCEANOGRAPHERS THAT USE SATELLITE AND OTHER OCEANOGRAPHIC AND METEOROLOGICAL DATA TO PROVIDE DATA PRODUCTS FOR A VARIETY OF APPLICATIONS

- **FISHERIES & AQUACULTURE**

- RECREATIONAL & COMMERCIAL

- RESEARCH

- DECISION MAKING TOOLS AND DATA FOR RESOURCE MANAGERS

- **OIL & GAS INDUSTRY**

- **HOMELAND SECURITY**

- SEARCH & RESCUE

- HAZARDOUS MATERIALS ID & TRACKING

- **ENVIRONMENTAL PROTECTION**

- HAZARDOUS MATERIALS ID & TRACKING

- ALGAE BLOOMS, E.G. RED TIDE



# ROFFS™ PHILOSOPHY

**SUSTAINABLE CONSUMPTION**

✓ **RIGHT TO FISH SHOULD REMAIN**

**TAG & RELEASE**

**LEAVE SOME FOR TOMORROW**

**HABITAT IS CRITICAL**

✓ **WATER QUALITY IS CRITICAL**

**THE SOLUTION TO POLLUTION IS NOT DILUTION**

**ECOSYSTEM BASED MANAGEMENT**

**COOPERATIVE TEAM WORK**

**SEE [WWW.ROFFS.COM](http://WWW.ROFFS.COM)**

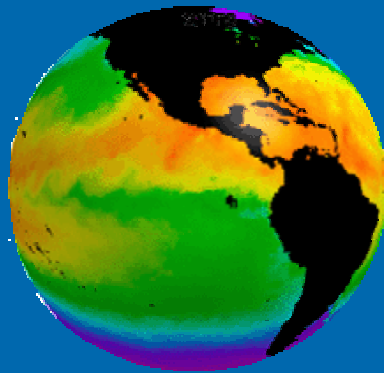
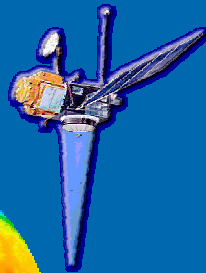
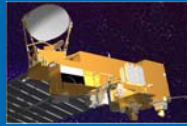




# OPERATIONAL SUPPORT

## RISK AVERSION

Data  
Capture

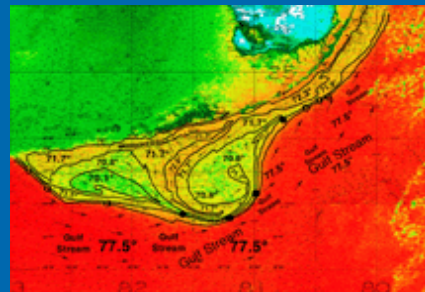
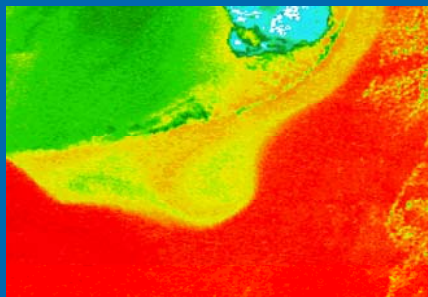
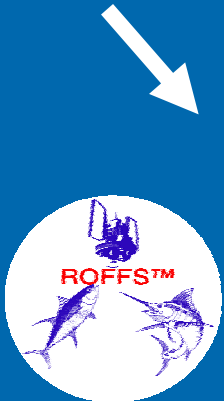


Optimal  
Efficiency  
& Management



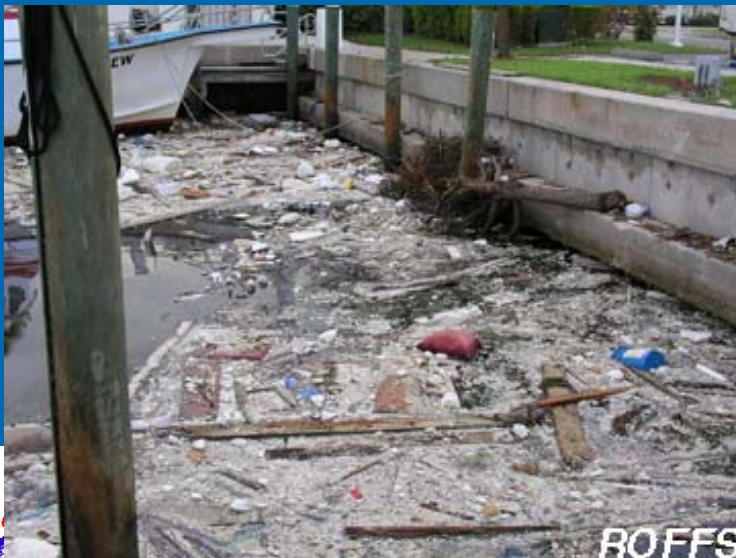
Image Analysis

Reduces  
Search Time  
Transit Time



# ENVIRONMENTAL WORK

PINEY POINT- FLORIDA DEP  
HURRICANE KATRINA & RITA  
FLORIDA OCEANS & COASTAL COUNCIL  
NORTH CAROLINA DEPT. OF HEALTH



<http://www.roffs.com/katrina.htm>

# WHILE EVERYONE WAS WATCHING NEW ORLEANS



WHO WAS WATCHING  
THE OCEAN ?

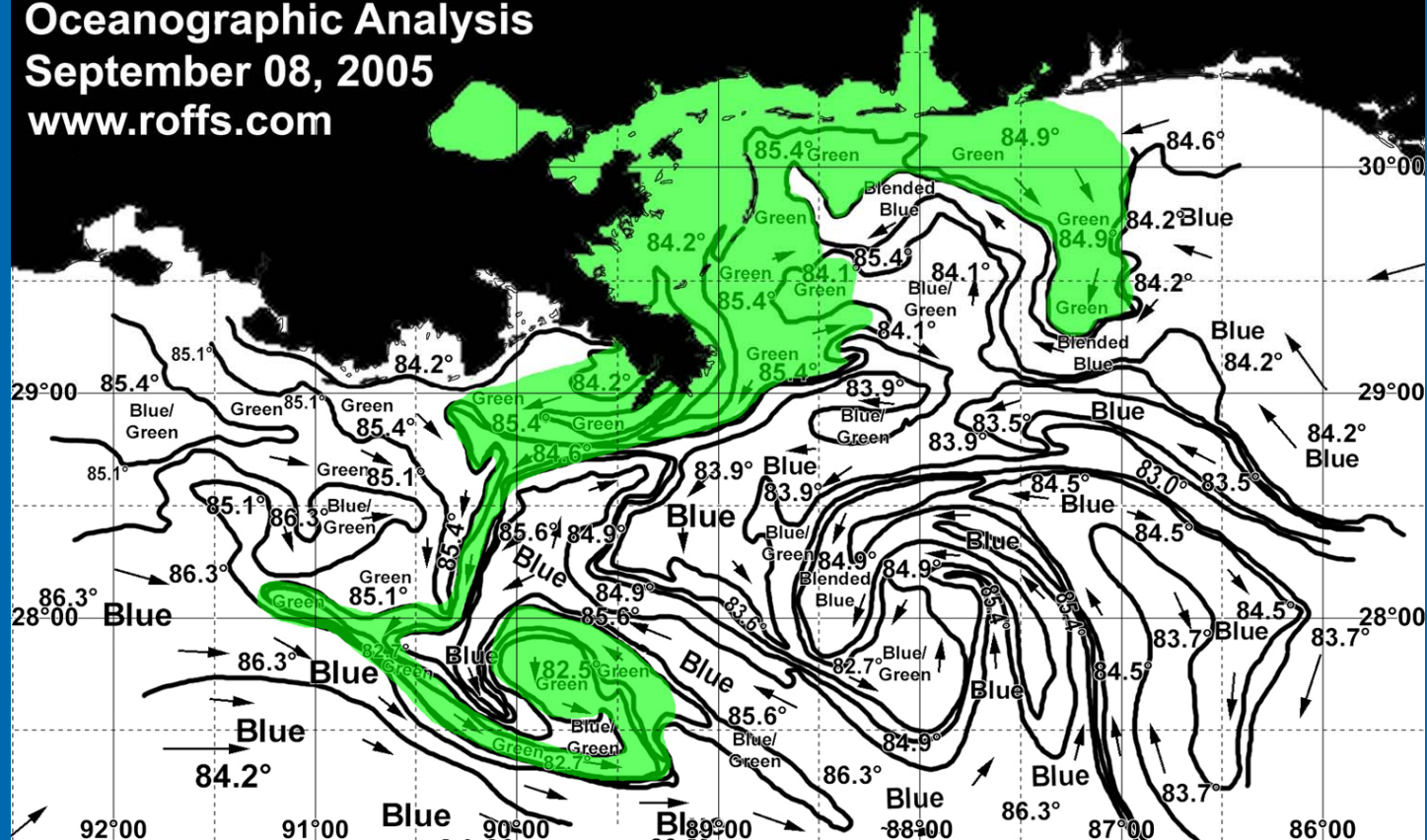
# SEPTEMBER 08, 2005

ROFFS™

Oceanographic Analysis

September 08, 2005

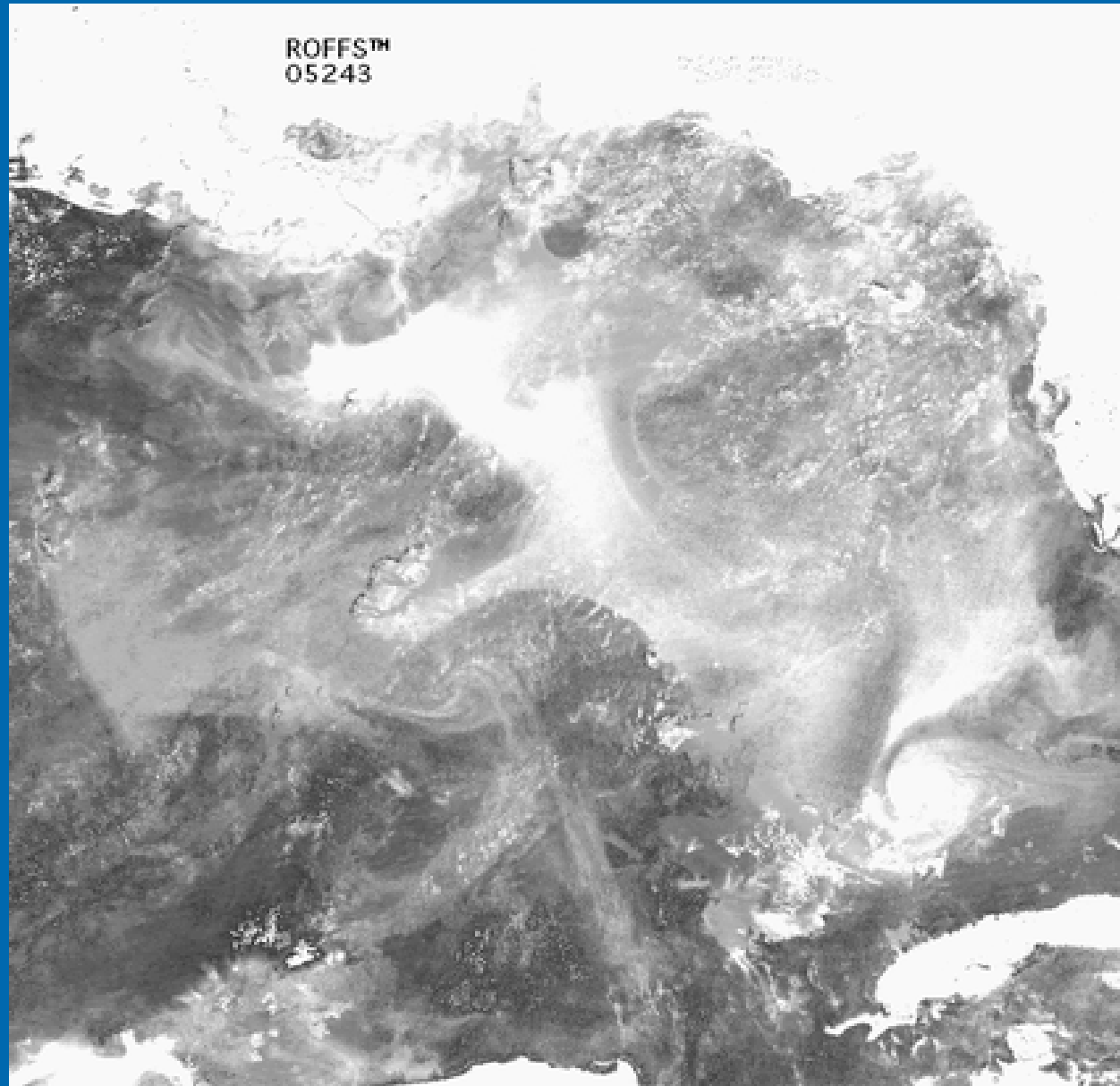
www.roffs.com



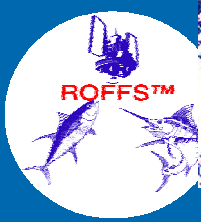
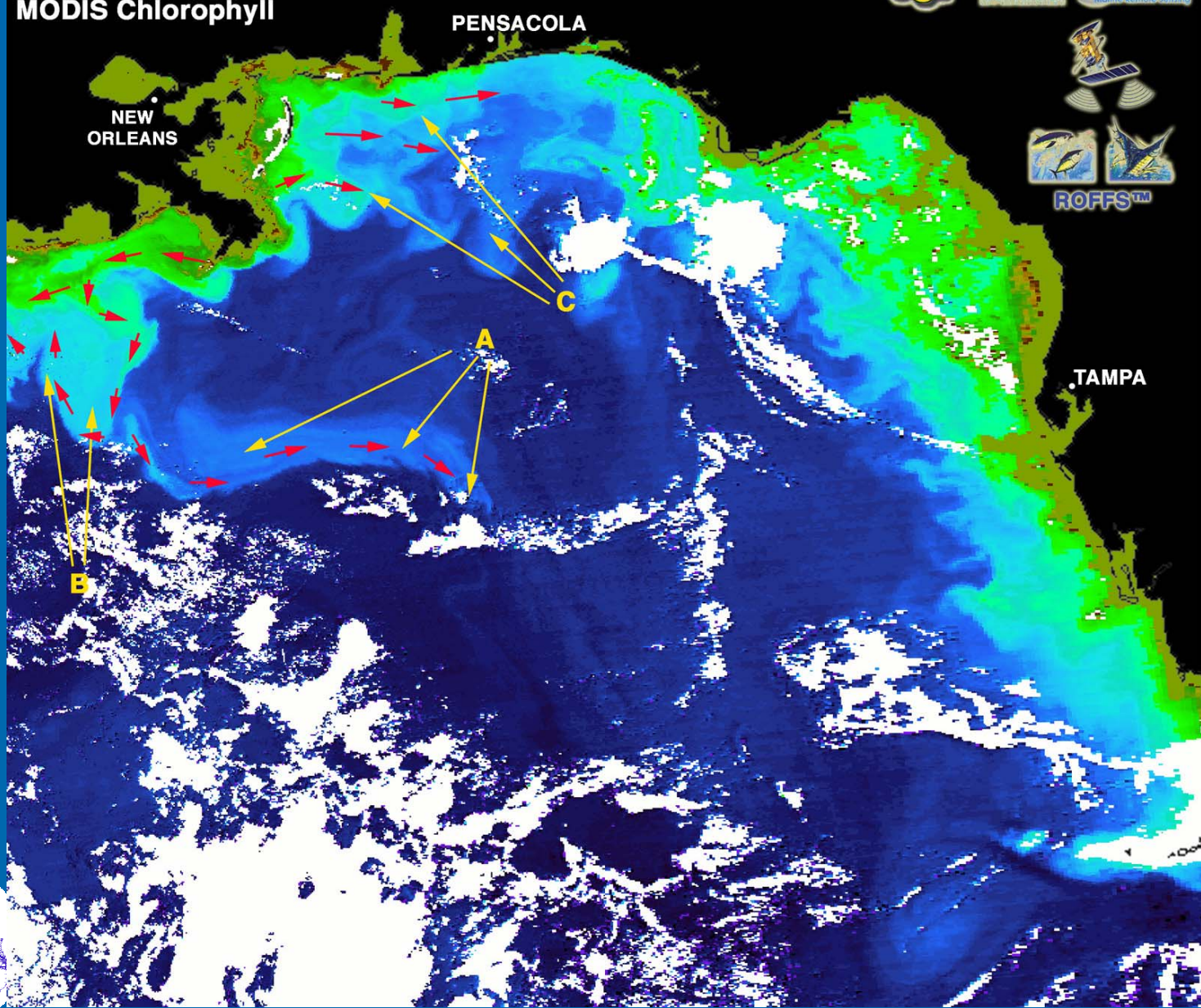
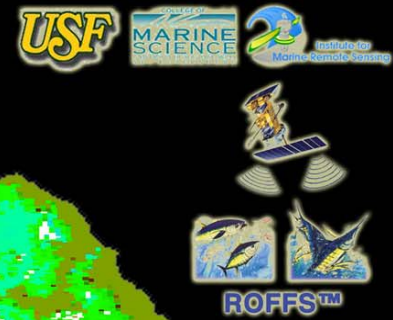
**FIRST DAILY ANALYSIS DISTRIBUTED  
NUMBEROUS FEDERAL, STATE, LOCAL AGENCIES  
INDUSTRY, MEDIA, OTHERS**



# SEQUENTIAL IMAGE ANAL

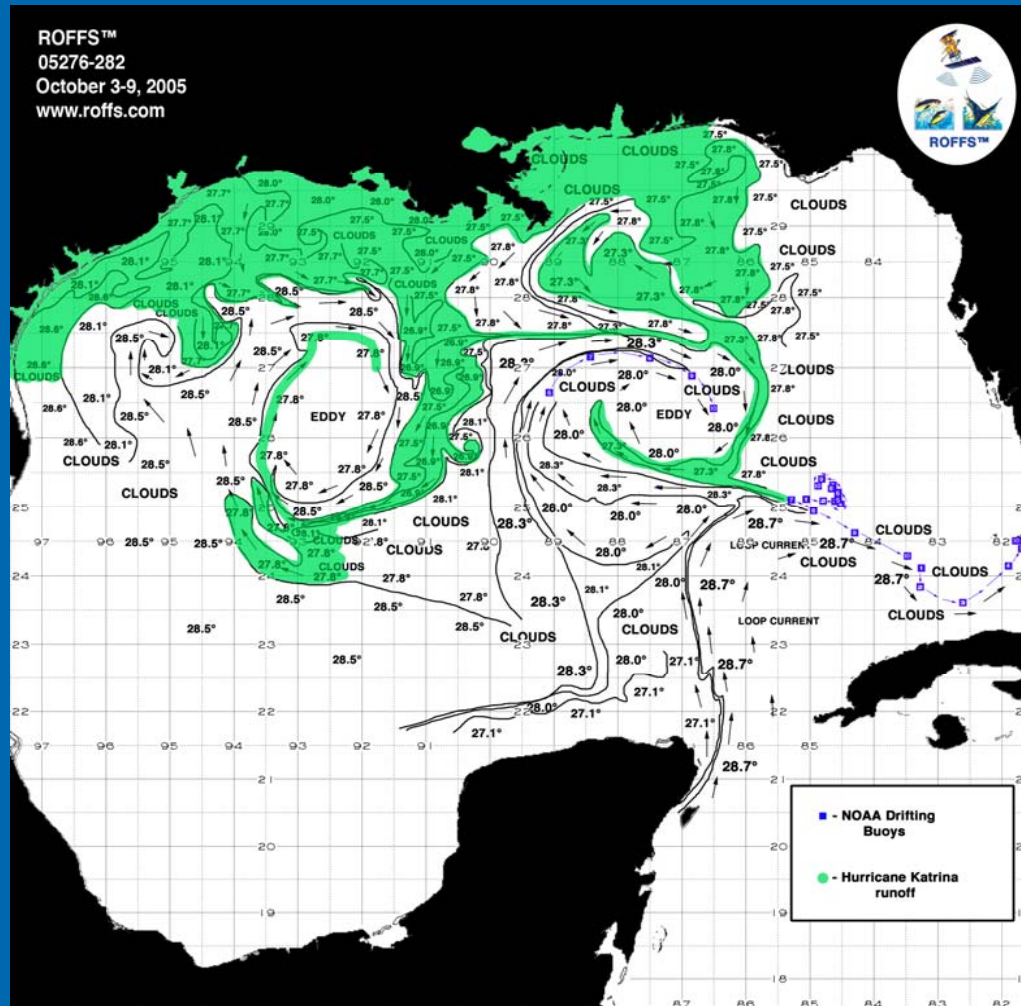


ROFFS™ 12 SEPTEMBER 2005 19z  
USF IMaRS  
MODIS Chlorophyll



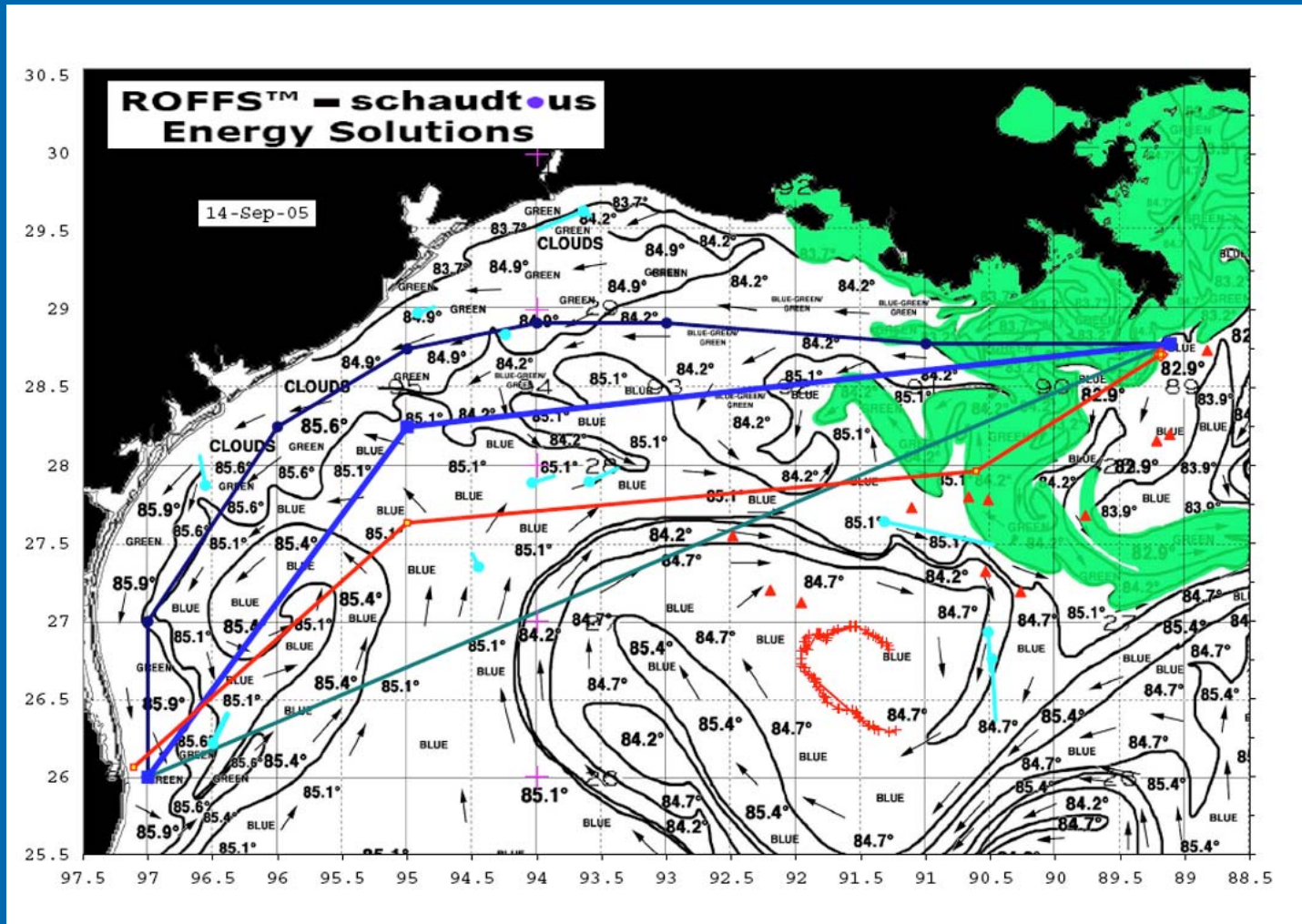
# COOPERATIVE EFFORT

ROFFS™ NOAA\_AOML UM\_RSMAS USF



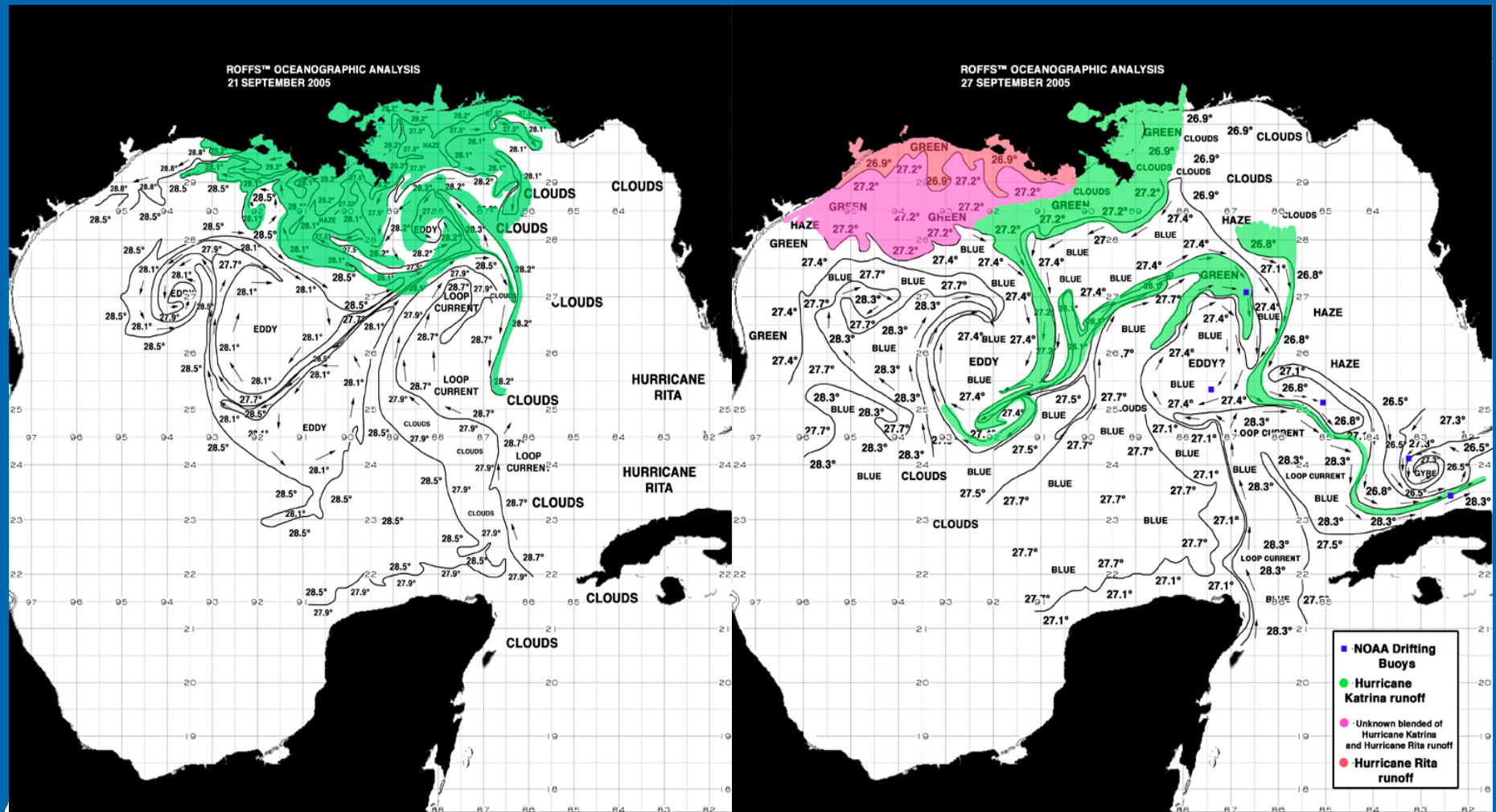
# MANY SOURCES OF DATA

## SATELLITES - ADCP - BUOYS - SHIPS





# BEFORE & AFTER RITA



CUBA <-> USA

# COOPERATION -> RESULTS

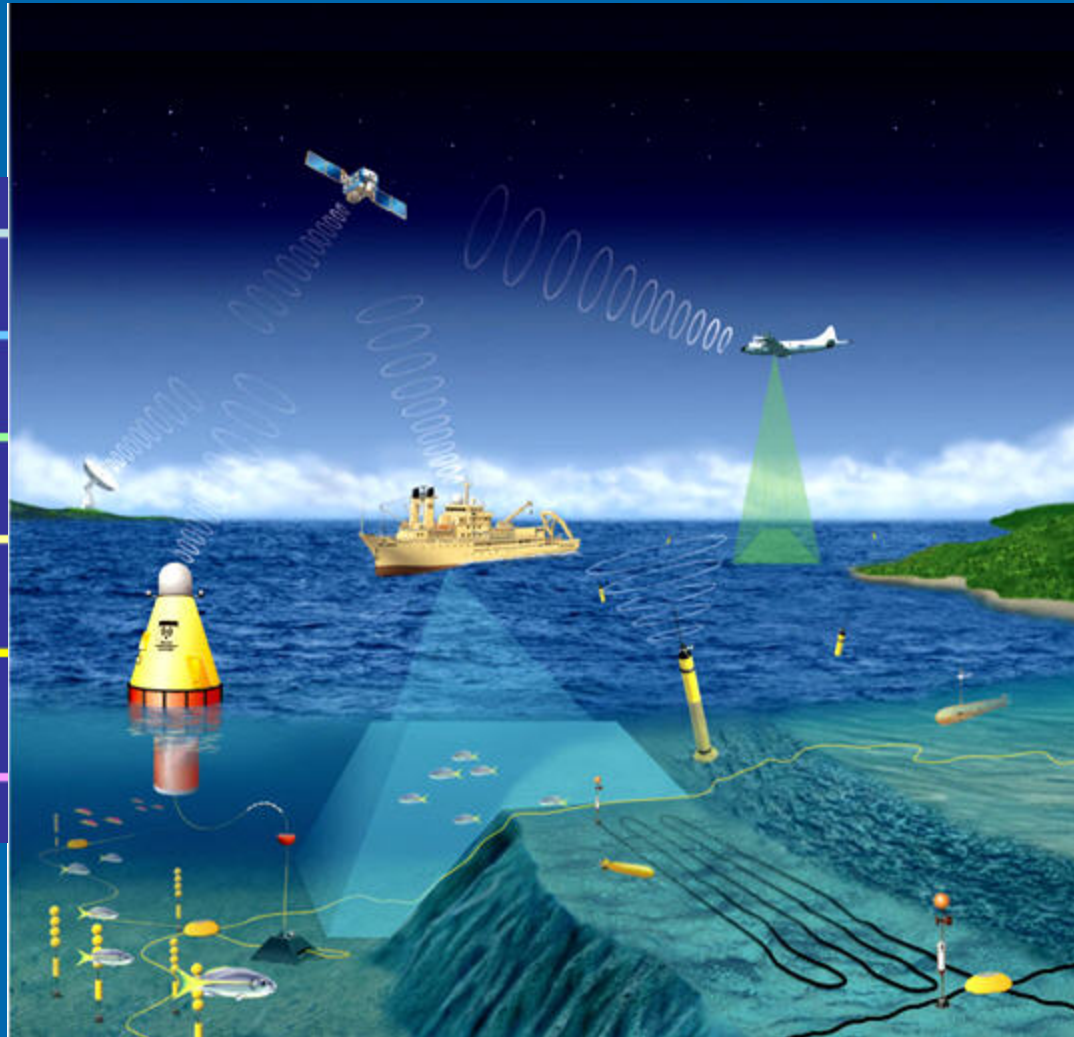
♥ PARTNERSHIPS BETWEEN INDUSTRY, ACADEMIA AND GOVERNMENT PROVIDED:

- ✓ COST EFFECTIVE, USEFUL INFORMATION ON A TIMELY BASIS TO EMERGENCY MANAGERS, OTHER GOVERNMENT DECISION MAKERS, RESEARCHERS, THE MEDIA, AND THE PUBLIC.



# INTEGRATED OCEAN OBSERVING MAPPING - MONITORING - MODELING

- Satellites
- Aircraft
- Fixed Platforms
- Ships
- Drifters & Floats
- AUVs



**SURFACE  
SUBSURFACE  
THERMOCLINE**



Source: <http://ocean.us>

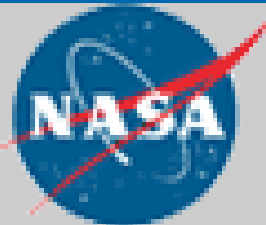


# FISHERIES RESEARCH

- ATLANTIC BLUEFIN TUNA (*Thunnus thynnus*)-NASA
- MAHIMAHI (*Coryphaena hippurus*)-NASA\_IDS
  - SOUTH CAROLINA
- KING MACKEREL (*Scombermorus cavalla*)-NASA\_IDS
  - TAMPA, FLORIDA, USA
- BLUE MARLIN (MAKAIRA NIGRICANS)
  - BAHAMAS
- KING MACKEREL, SARDINE (*Sardinella aurita*), & GAG GROUPER (*Mycteroperca microlepis*)
  - SOUTHWEST FLORIDA COAST
- OTHER FISH – OTHER AREAS
  - REEF FISH LARVAE & ADULTS
  - COASTAL AND OCEANIC PELAGICS - WORLDWIDE
    - SARDINE, PILCHARD, SQUID, TUNA, SHARK, BILLFISH



# MANAGEMENT APPLICATIONS DECISION SUPPORT ATLANTIC BLUEFIN TUNA DOLPHINFISH



National Aeronautics  
and Space Administration



NOAA FISHERIES SERVICE



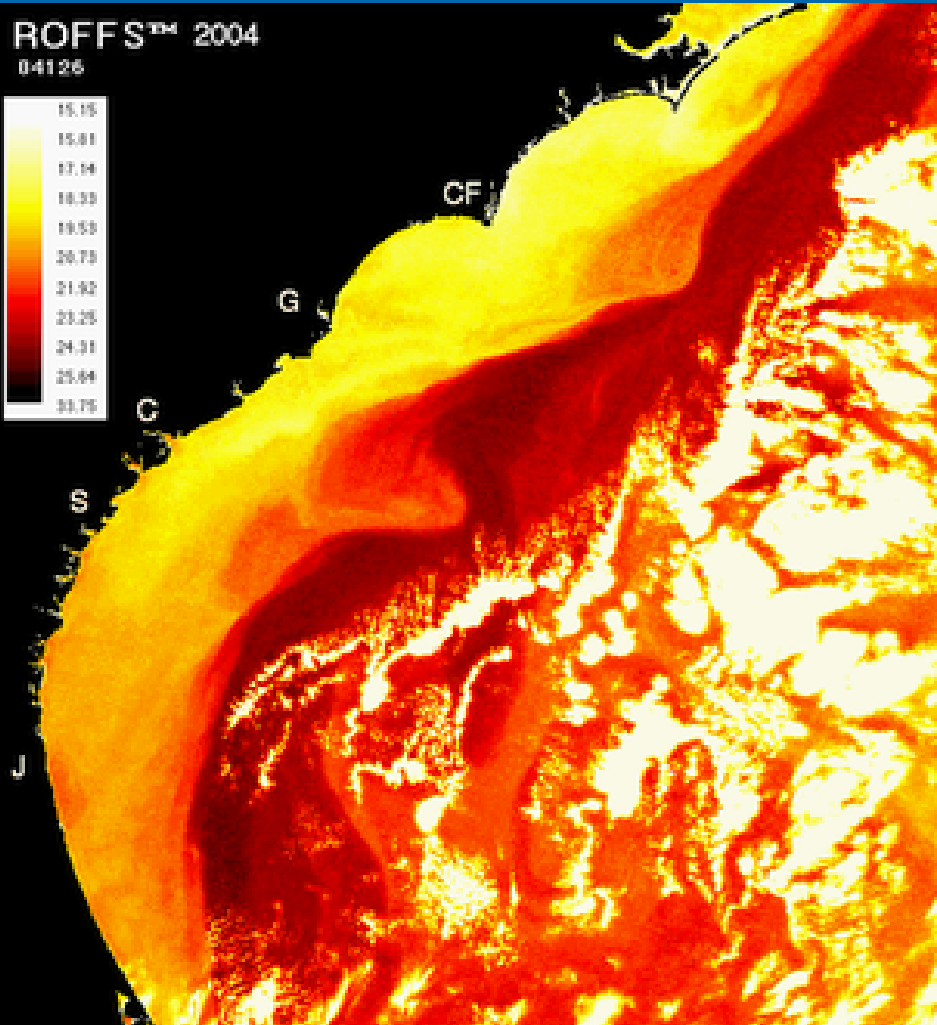
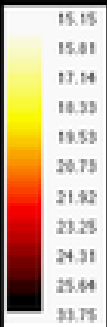
# DECISION SUPPORT SYSTEMS



National Aeronautics  
and Space Administration

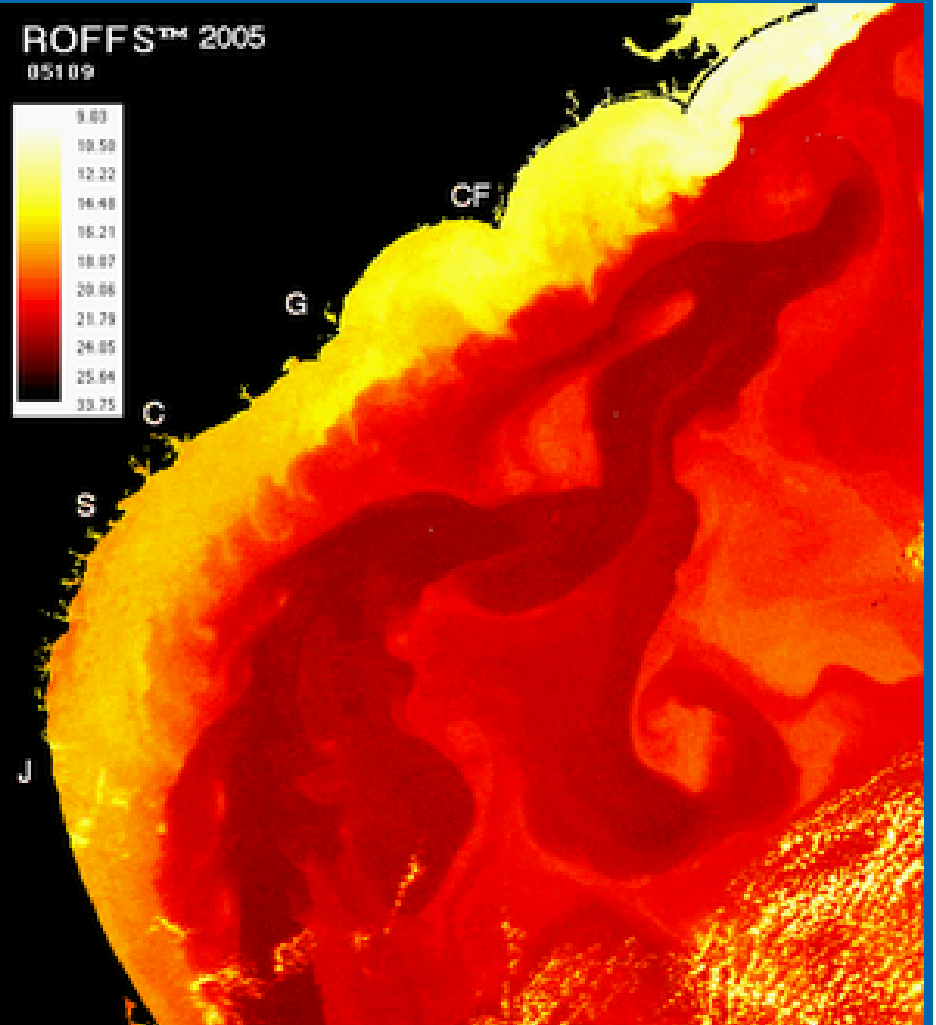
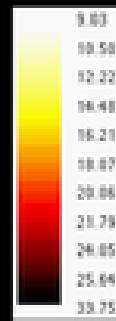
ROFFS™ 2004

04126



ROFFS™ 2005

05109



# ATLANTIC BLUEFIN TUNA POPULATION ASSESSMENT

Mitchell A. Roffer – Co-PI (ROFFS™)

John T. Lamkin - Co-PI (NOAA, NMFS, SEFSC, Miami Lab. Miami FL)

Frank Muller-Karger - Co-PI (Univ. Mass. SMAST, New Bedford, MA /Univ. South Florida IMaRS, St. Petersburg, FL)

Barbara Muhling (NOAA, NMFS, SEFSC, Miami Lab. Miami FL)

G. Walter Ingram, Jr. (NOAA, NMFS, SEFSC, Pascagoula Lab. Pascagoula, MS)

Gregory J. Gawlikowski, Mathew A. Upton, Daniel C. Westhaver (Roffer's Ocean Fishing Forecasting Service, Inc. West Melbourne, FL)

Sennai Habtes (Univ. Mass. SMAST, New Bedford, MA)



NOAA – NASA PROJECT WITH  
GOVERNMENT MANAGERS, ACADEMIC  
AND INDUSTRY PARTNERS



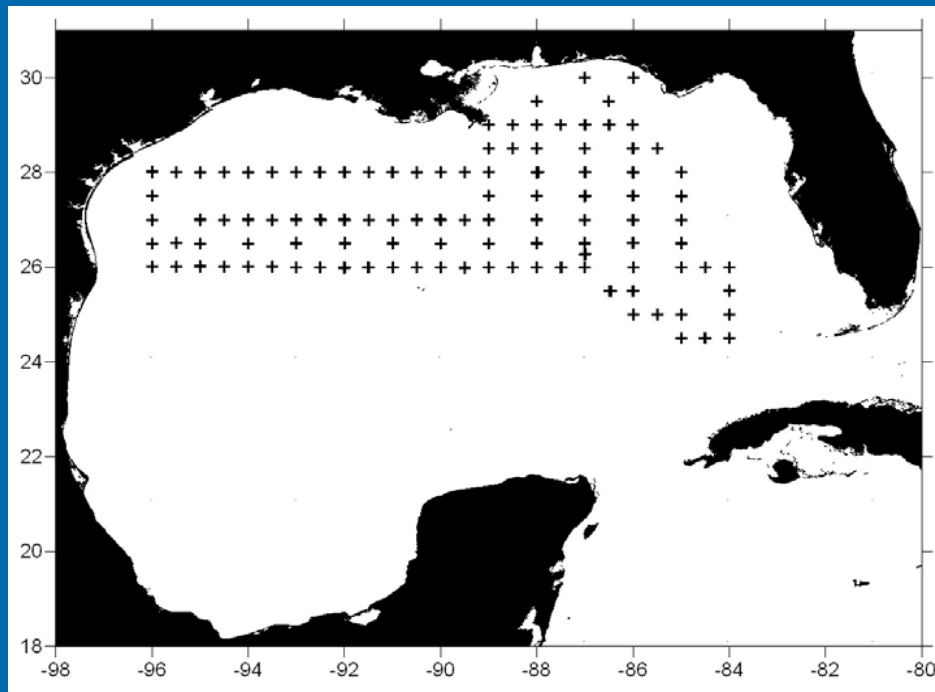
# LARVAE SURVEY IS THE ONLY FISHERY INDEPENDENT DATA SOURCE OVER ANY CONSIDERABLE TIME PERIOD

- **LARGE ERROR DERIVED FROM RELATIVELY SMALL SAMPLE SIZES, AND AN INCREASED FREQUENCY OF ZERO CATCH STATIONS IN RECENT YEARS**
  - THE LARVAE INDICES ARE USED IN THE INTERNATIONAL STOCK ASSESSMENT AND MANAGEMENT.
- **THE INDICES ARE THE ONLY TOOL THAT INCORPORATES THE FISHERY-INDEPENDENT ESTIMATES OF ABUNDANCE, AND THEY ARE CONSISTENT WITH RESULTS OF THE VIRTUAL POPULATION ANALYSES**

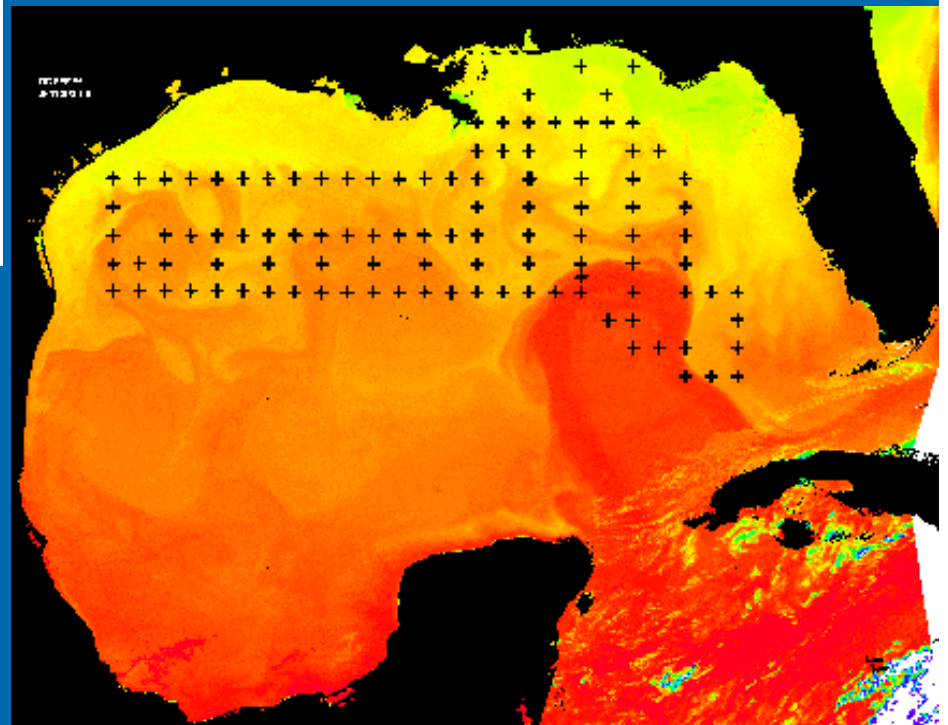




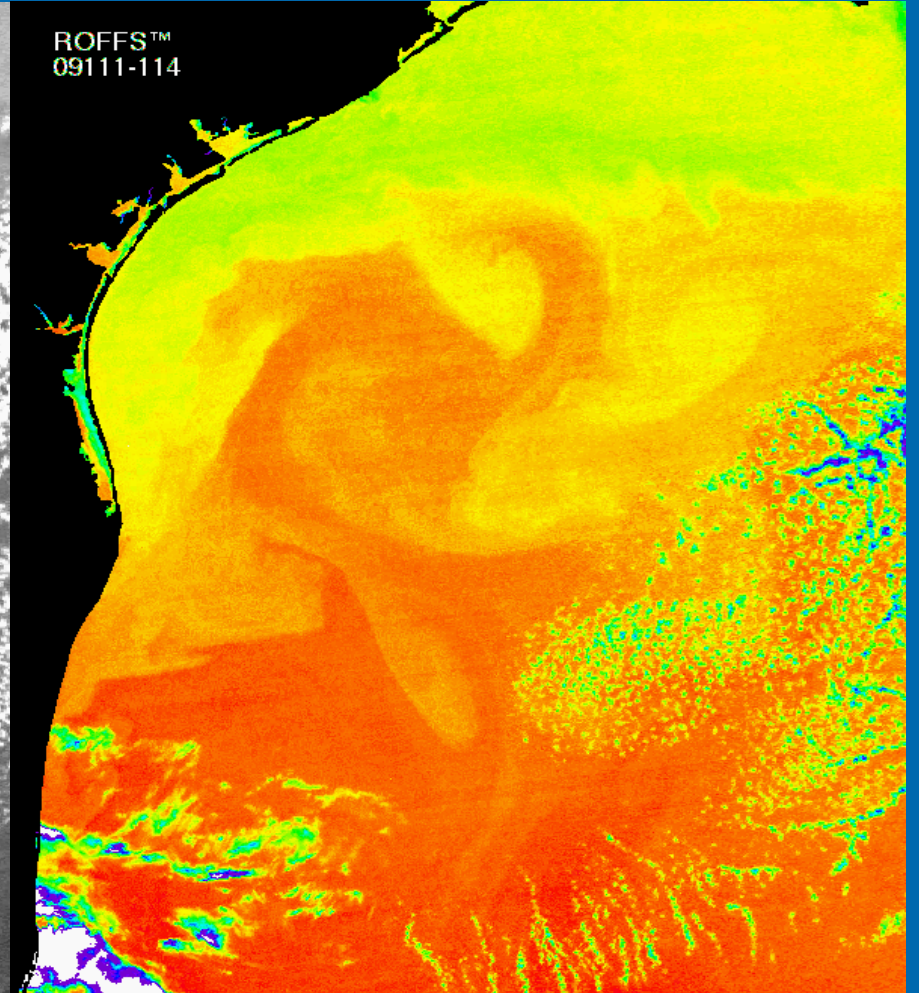
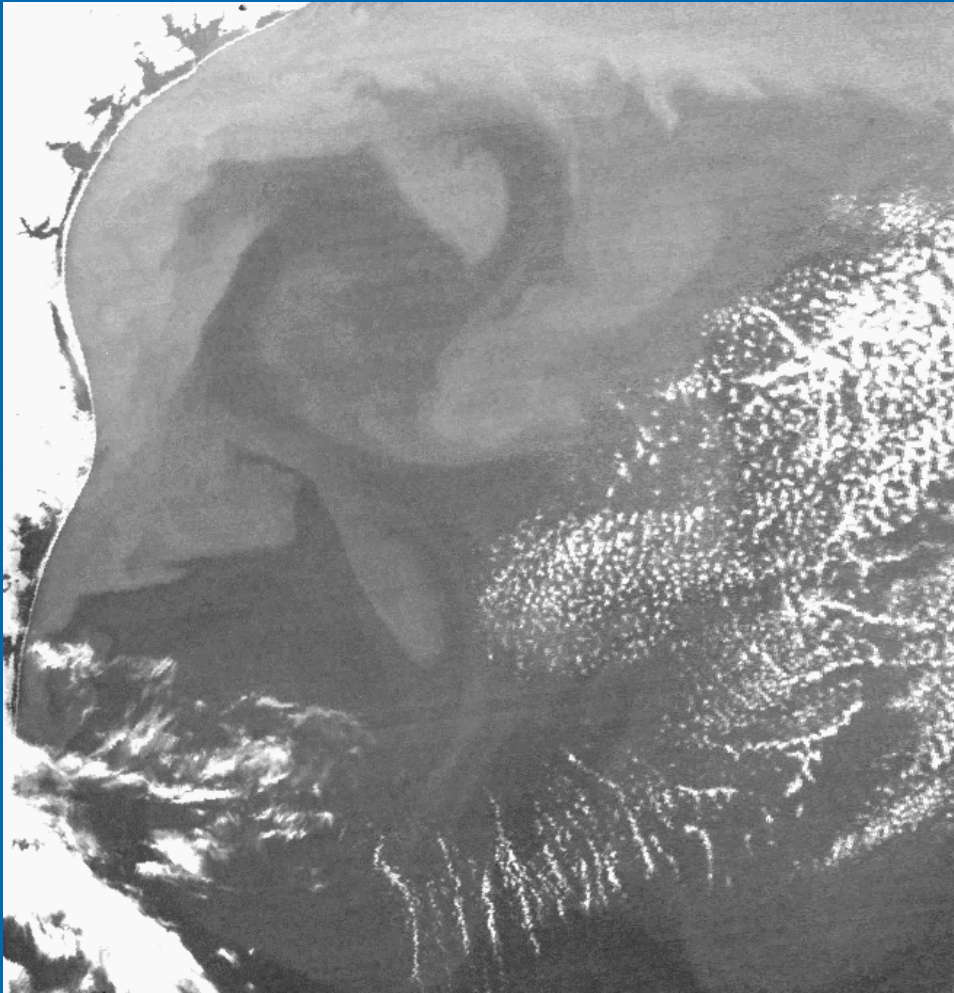
# NMFS SEAMAP ICHTHYOPLANKTON SURVEYS



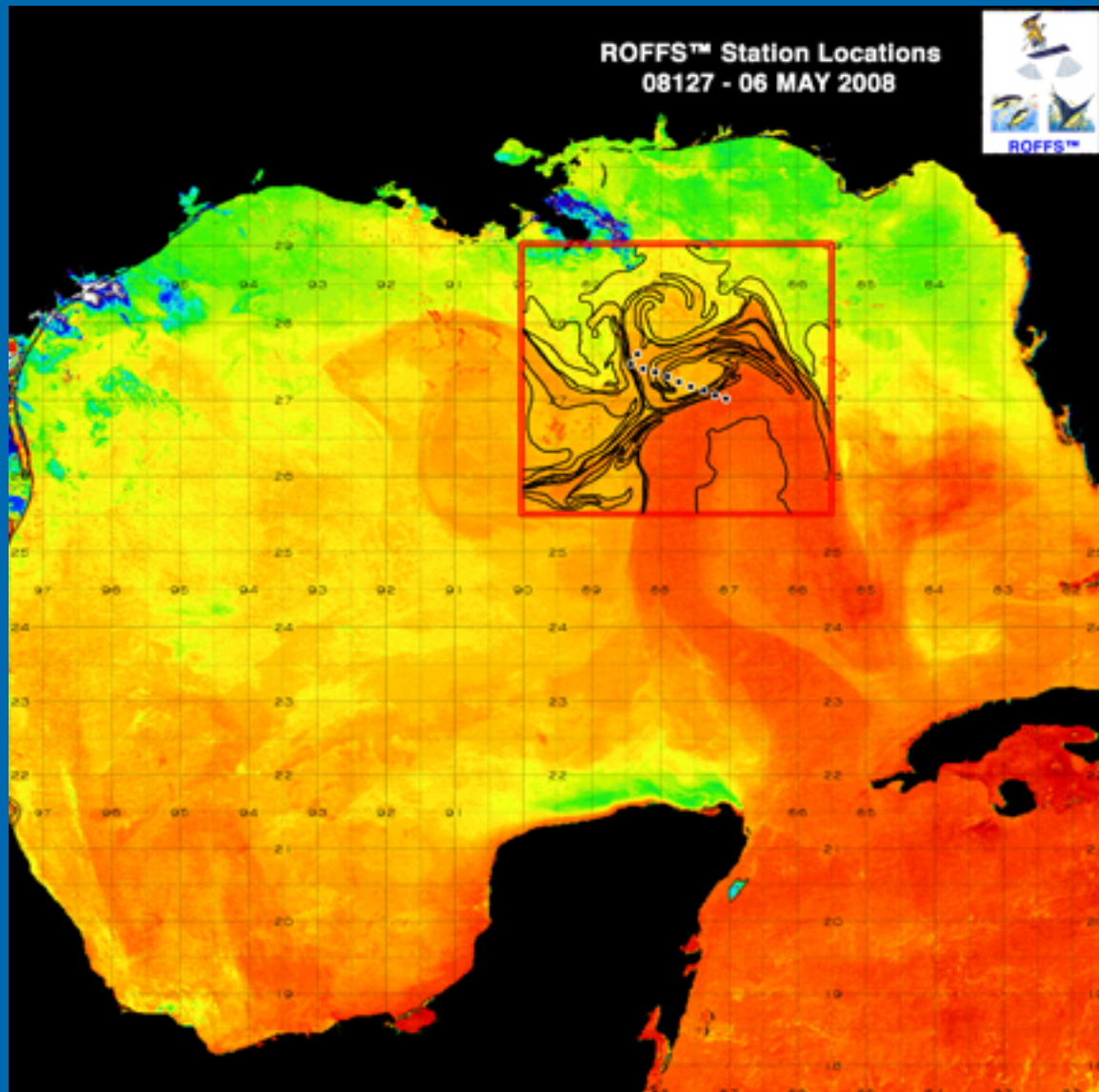
➤ **1982 - PRESENT**



# EVER CHANGING WORLD



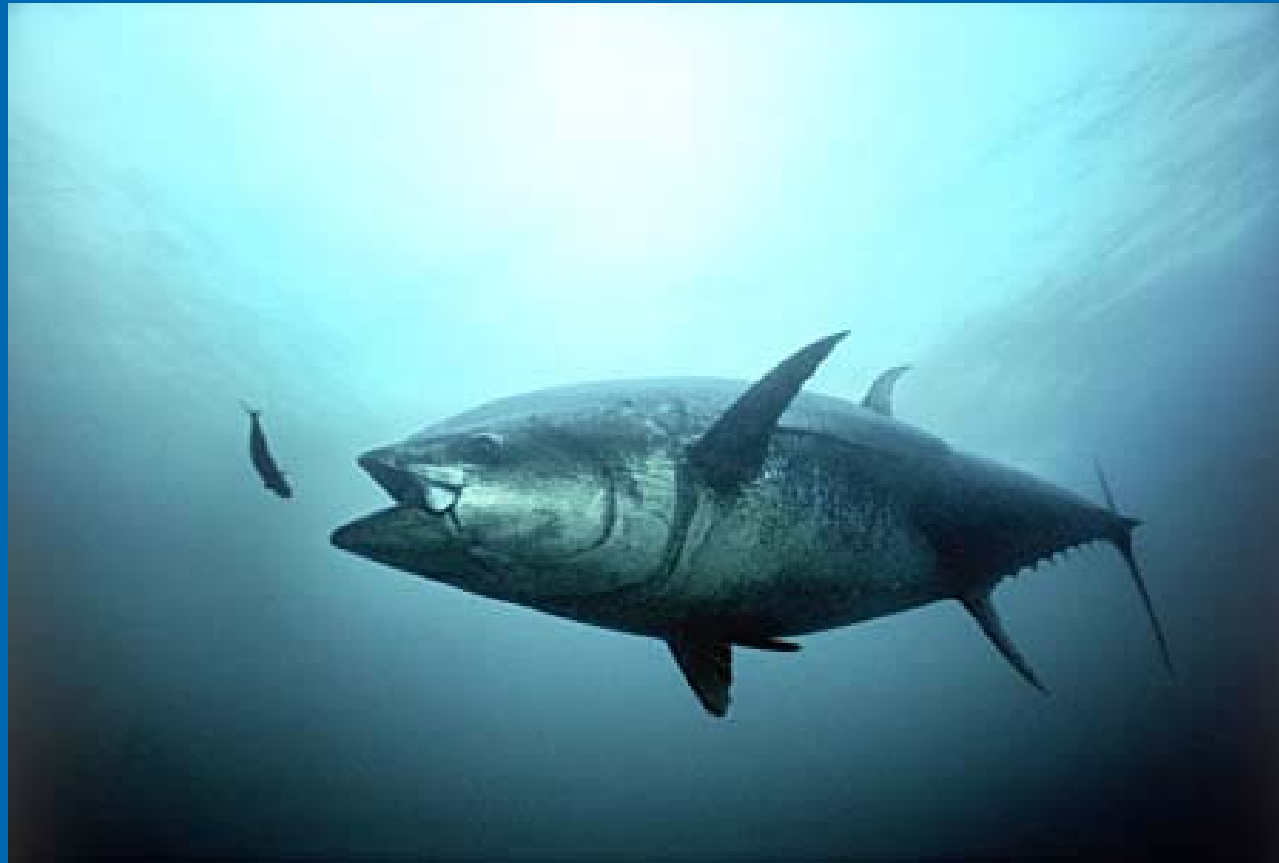
# DEFINING LARVAE HABITAT



# OCEAN FRONTAL ZONES

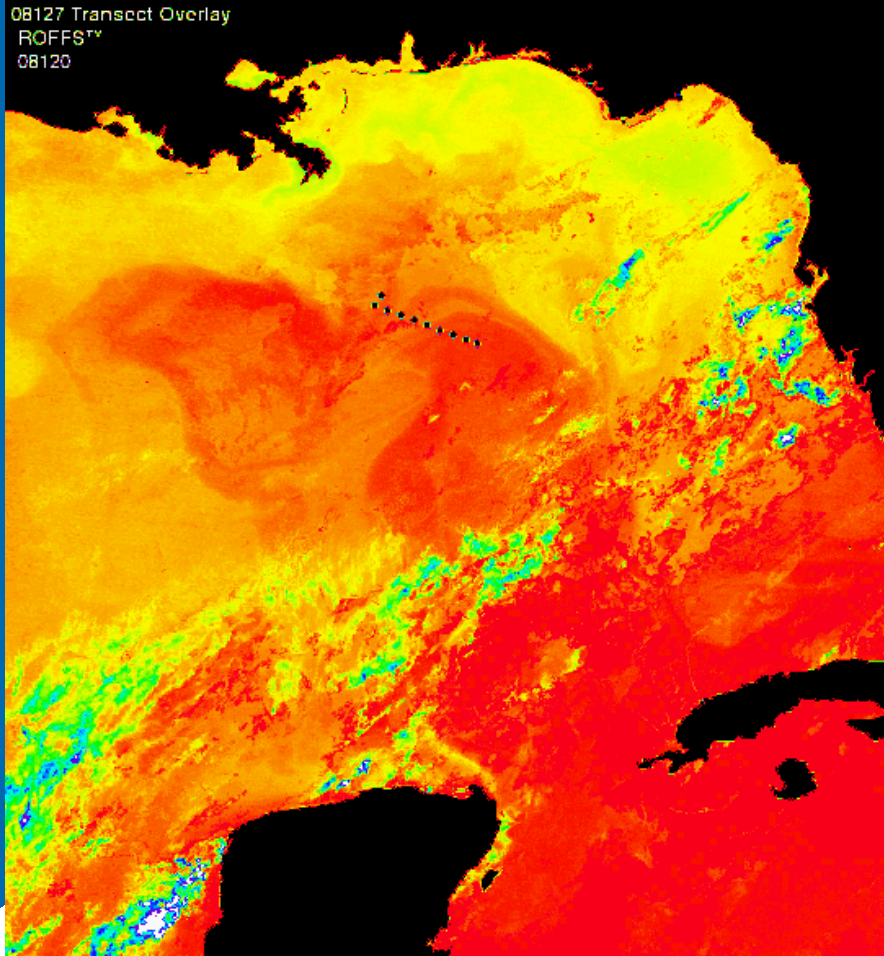


**TO FIND THE LARVAE  
UNDERSTAND ADULT DISTRIBUTION  
USE LARVAL HABITAT KNOWLEDGE  
UNDERSTAND THE CURRENTS**

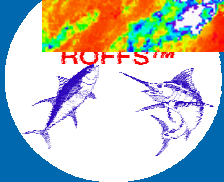
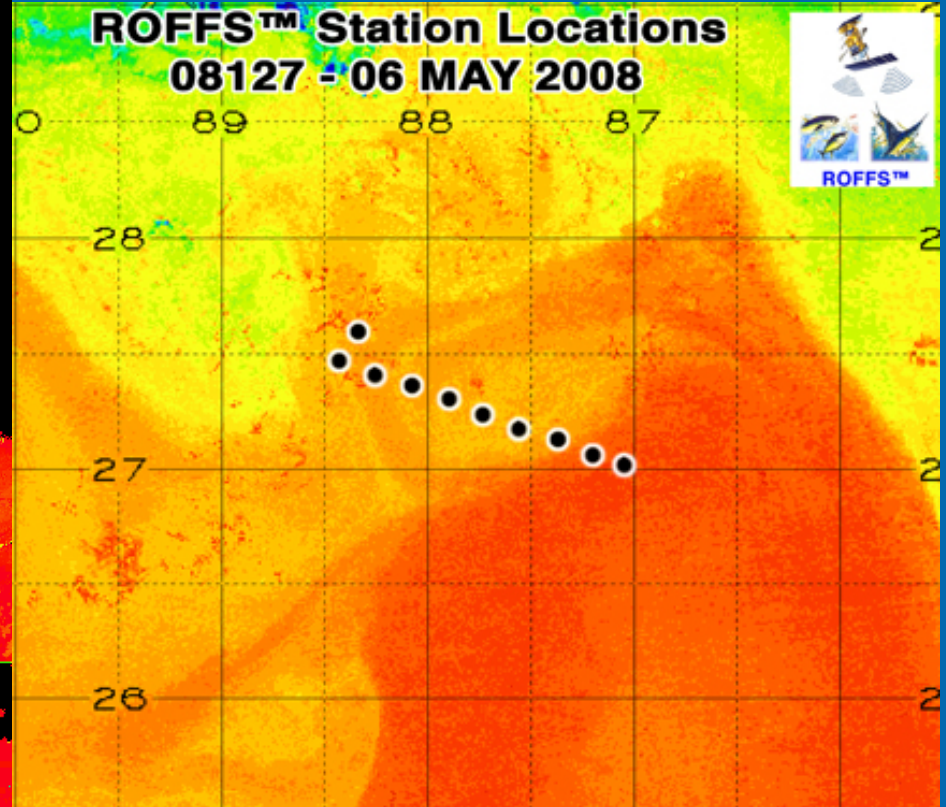


# UNDERSTANDING THE CURRENTS

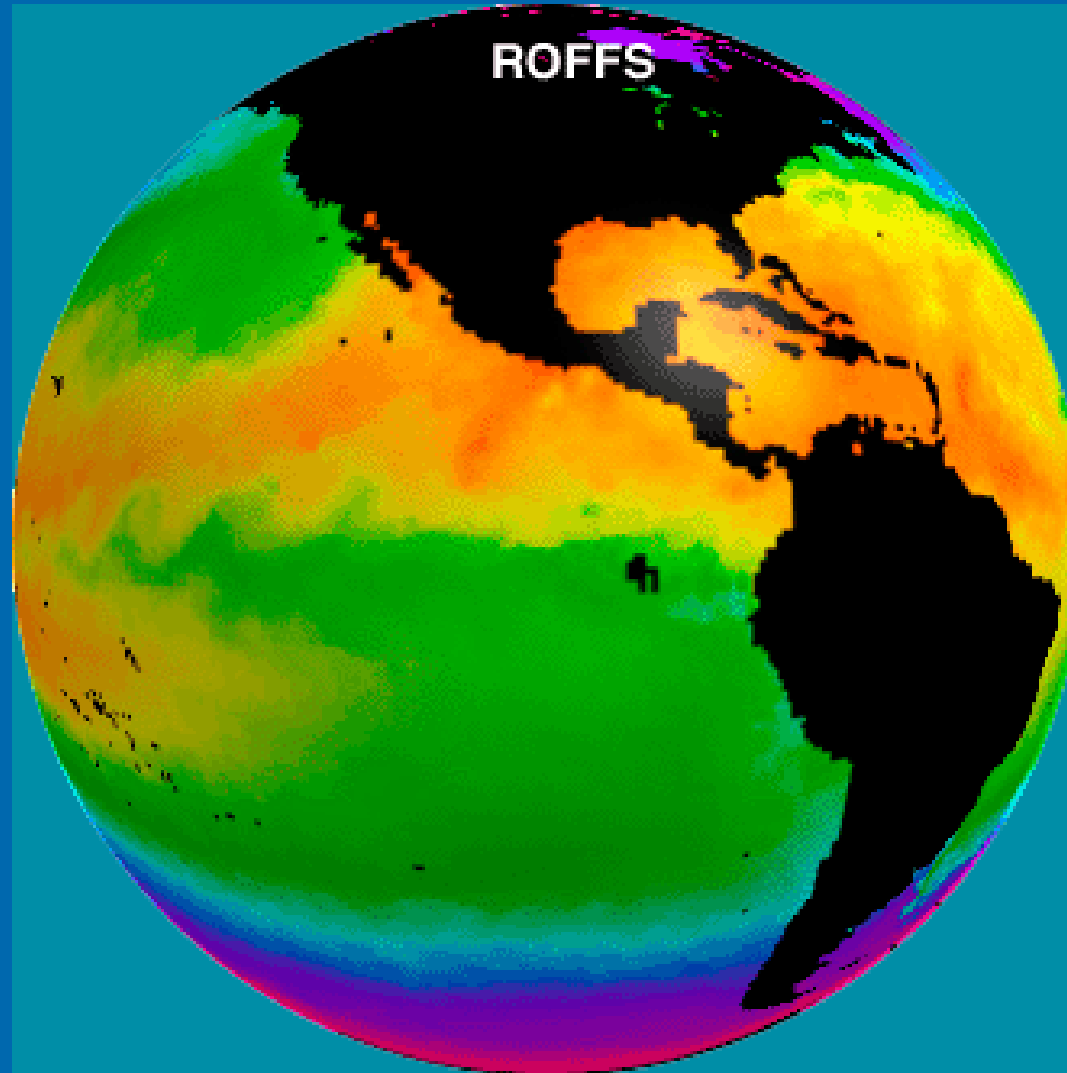
08127 Transsect Overlay  
ROFFS™  
08120



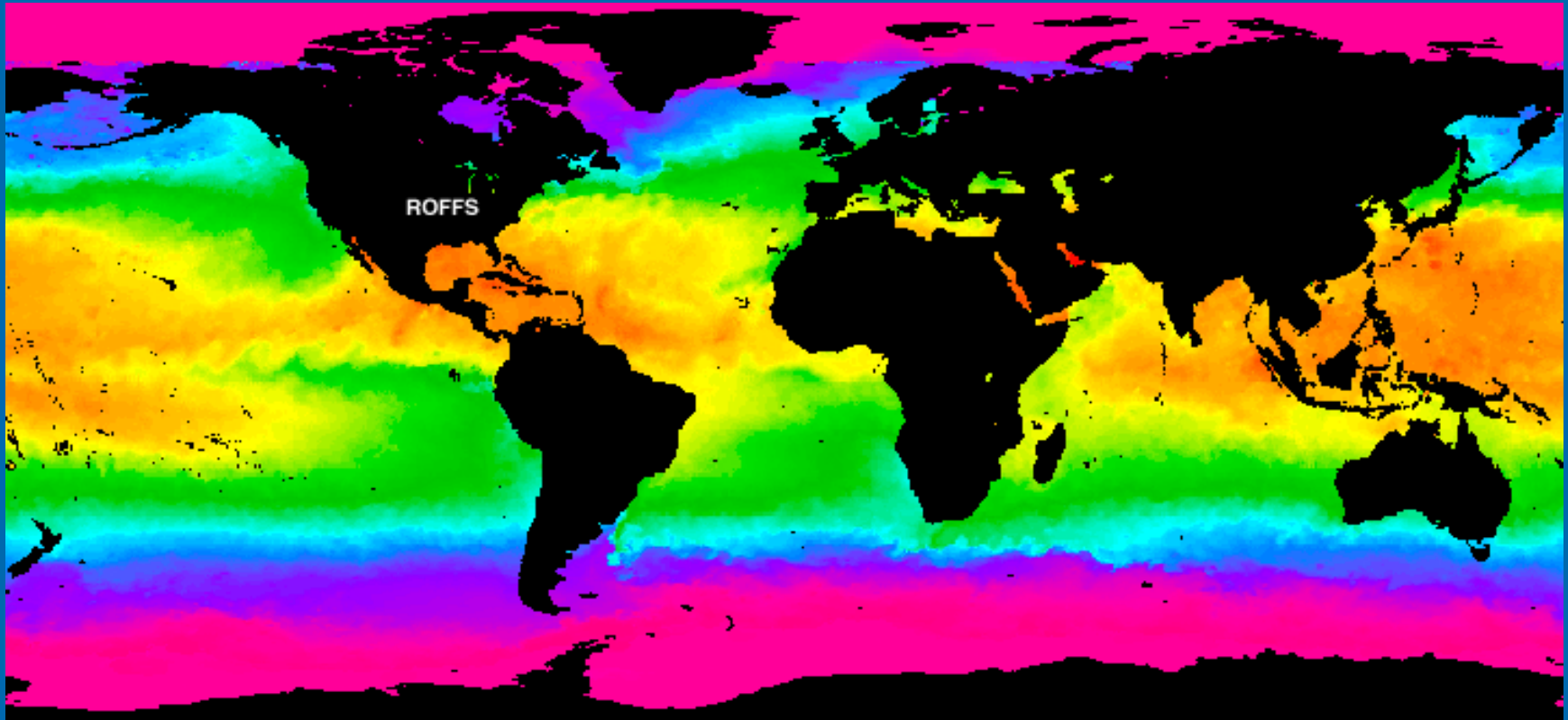
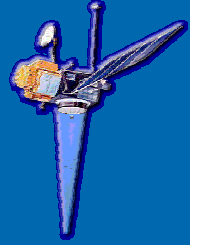
ROFFS™ Station Locations  
08127 - 06 MAY 2008



# SATELLITES PROVIDE SYNOPTIC VIEW



# FLAT EARTH - FULL VIEW



NOT JUST A SURFACE VIEW  
WHEN ONE UNDERSTANDS THE  
DYNAMICS





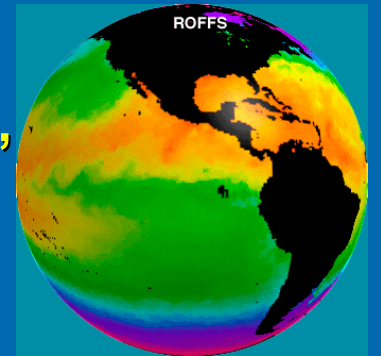
# WHERE DO WE GO FROM HERE ?

## COOPERATIVE – COLLABORATIVE USING STRENGTHS

### FUNDING CONSIDERATIONS

EXPAND ONGOING EFFORTS:

-SANTUARIES, CORAL REEFS, TURTLES, MAMMALS,  
COASTAL & OCEANIC PELAGICS  
NATIONAL AND INTERNATIONAL IMPORTANCE

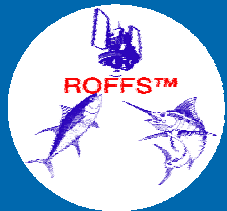


# CUBA

# CONVENTIONAL WISDOM

THEY LIKE FISH  
THEY LIKE CURRENTS

WHERE WOULD WE BE  
TODAY IF THEY HAD  
FOLLOWED THE LIMITED  
ATTITUDES OF THEIR TIME?

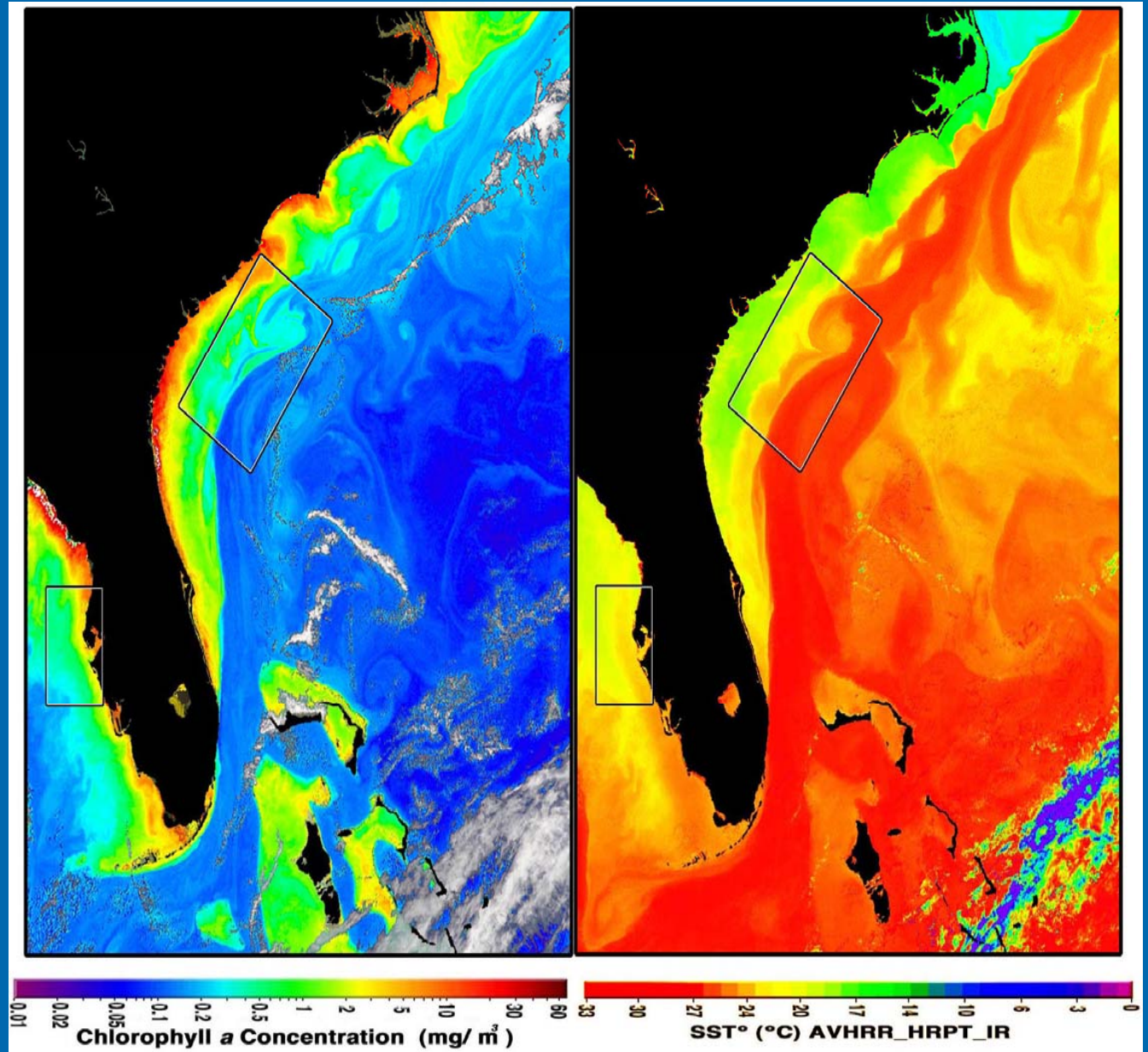


LET'S WORK  
TOGETHER

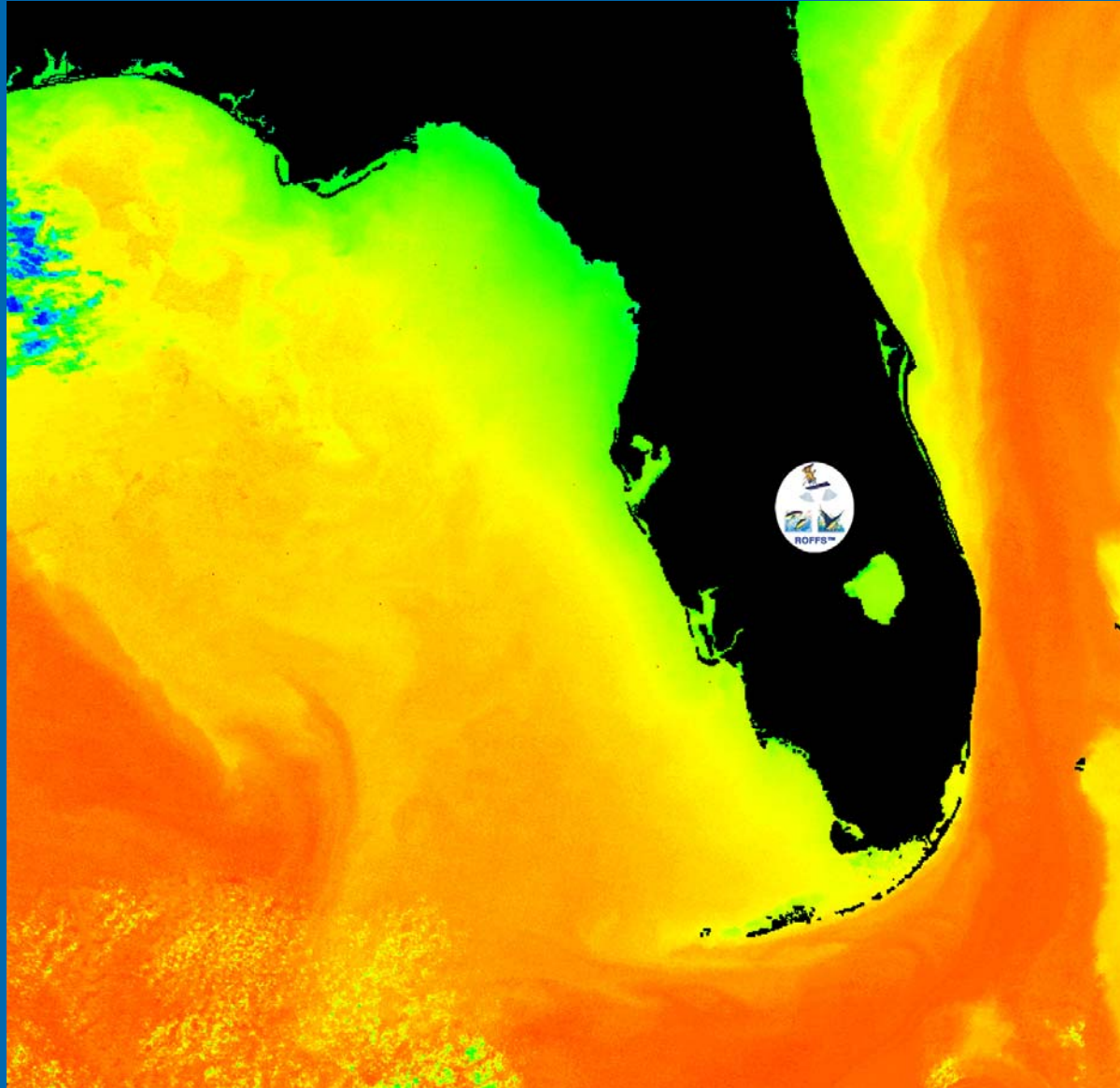




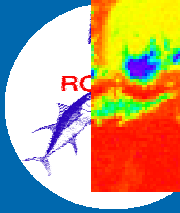
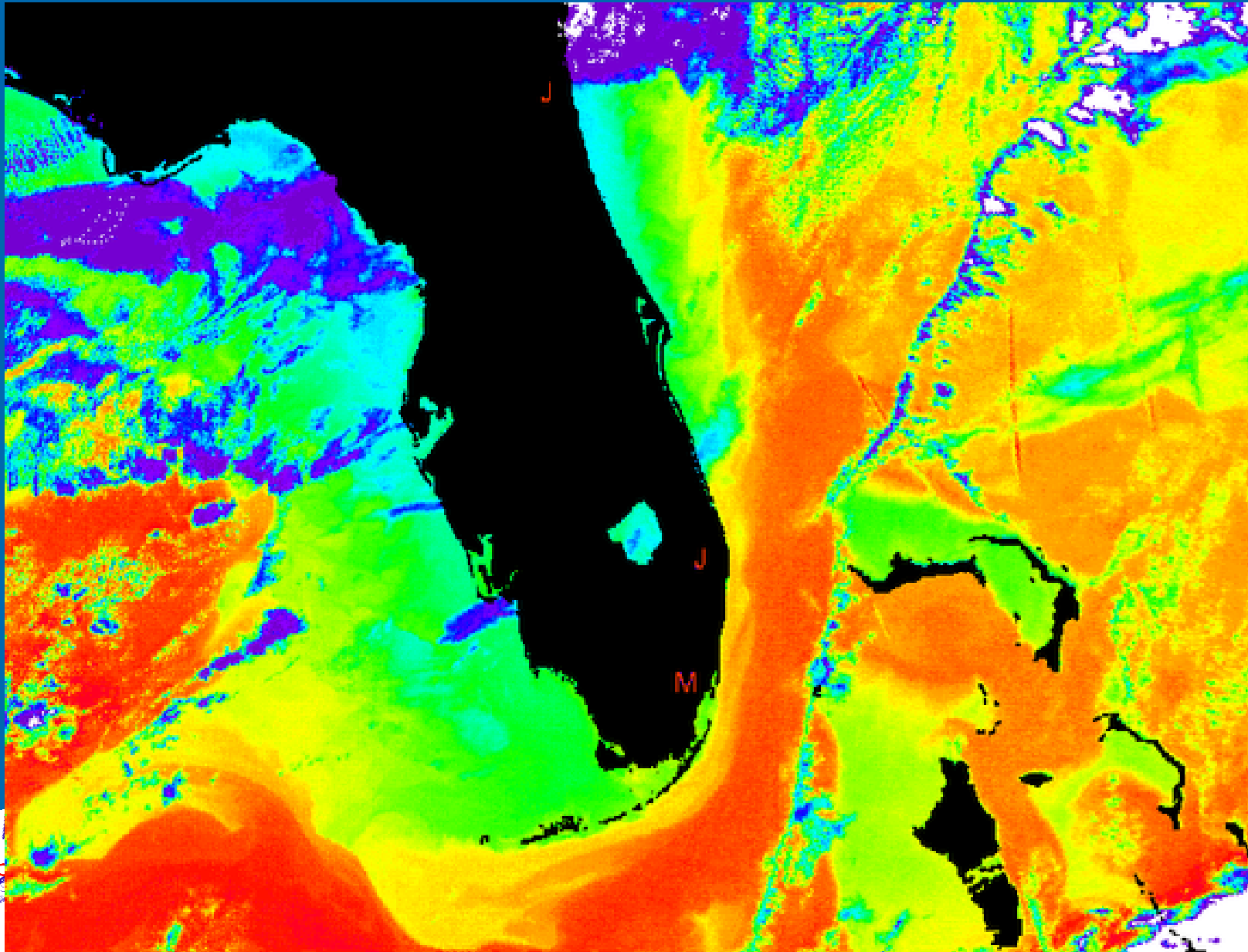
# VISUALIZE THE CURRENTS



# CLOSER TO HOME

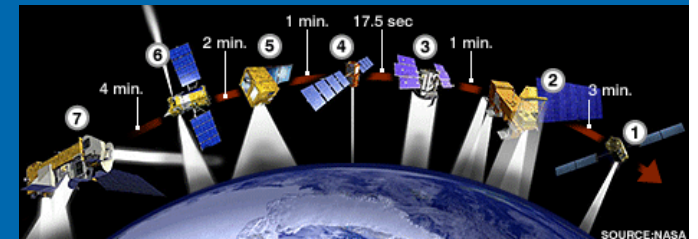


# MOVIE LOOPS



# USEFUL IR SATELLITES

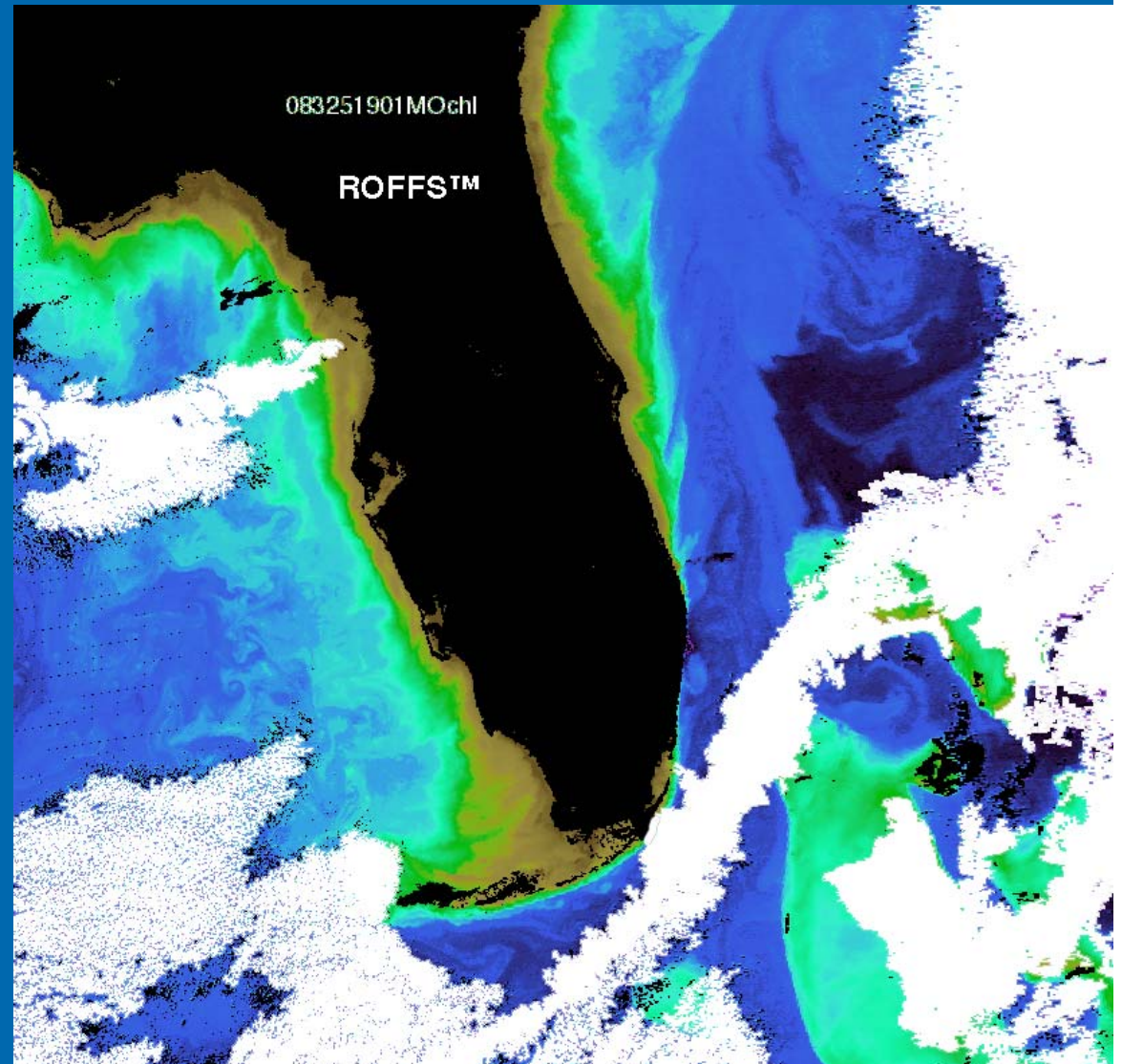
- NOAA 15, 16, 17, 18, 19; TERRA, AQUA, METOP\_A, ENVISAT
  - 1.1KM (5/8 MILE) RESOLUTION IN IR
  - TWO PASSES EACH 24 HOUR PERIOD
  - 18 PASSES/DAY ->ALLOWS MOVIE LOOPS
  - SEQUENTIAL IMAGE ANALYSIS
  - COMPOSITES - MOSAICS
- GOES
  - 24 PASSES EACH 24 HOURS
  - 6 KM RESOLUTION IN IR



SOURCE: NASA

# DIFFERENT SPECTRAL BANDS: NASA AQUA OCEAN COLOR

PLANKTON  
CHLOROPHYLL  
CDOM  
TURBIDITY

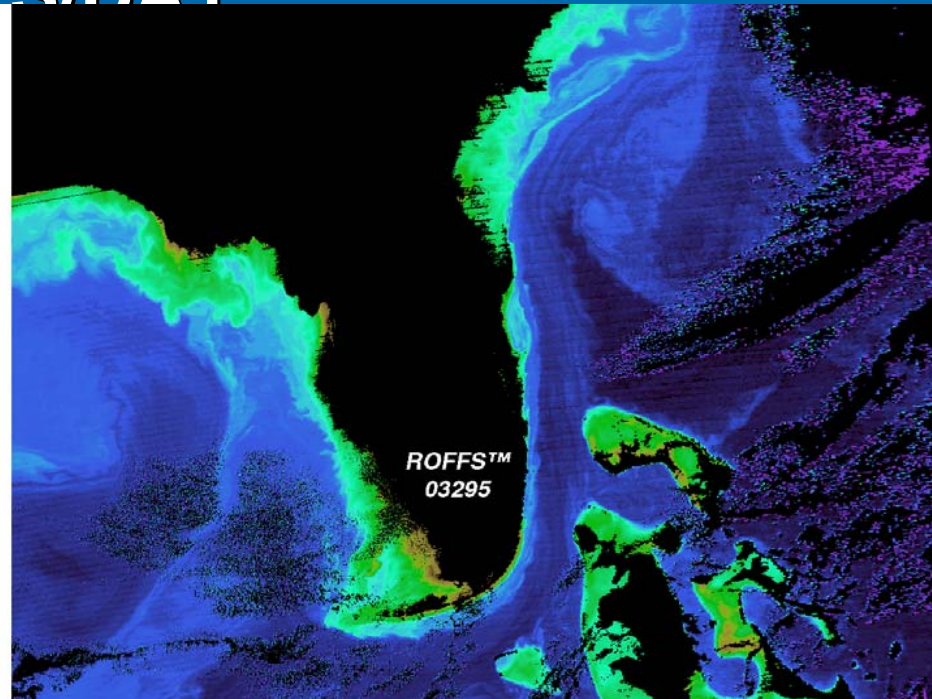


## Food Chain Dynamics and Clarity

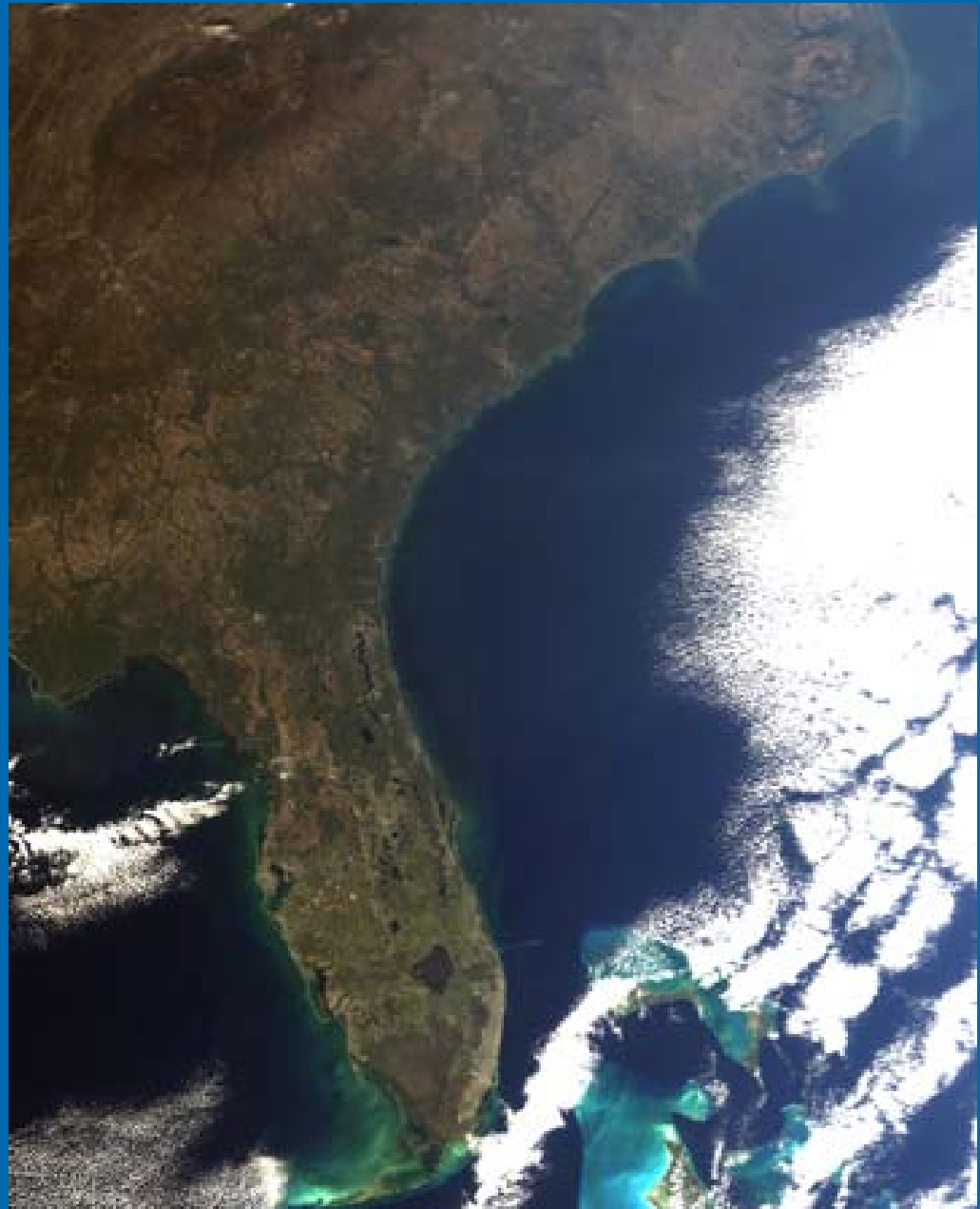


# OCEAN COLOR

- **NASA'S TERRA AND AQUA- MODIS**
- **ESA ENVISAT-MERIS**
  - **1.1 KM RESOLUTION**
  - **ONE PASS EACH 24 HRS = THREE PASSES/DAY**



**DIFFERENT  
SPECTRAL  
BANDS:  
NASA AQUA  
RGB**



# OTHER SATELLITES – SENSORS

MODIS 250m RESOLUTION

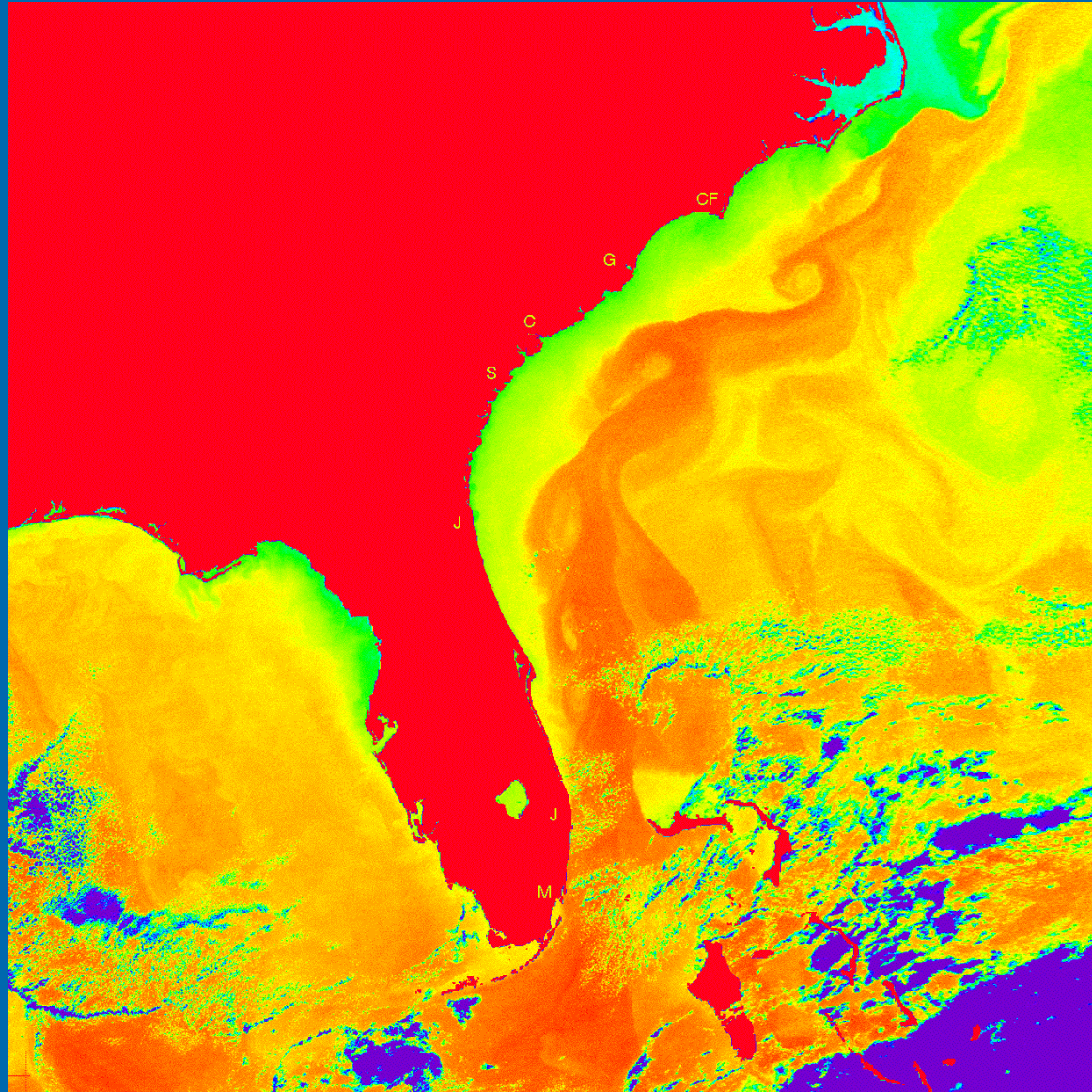
FLUORESCENCE LINE HEIGHT

ALTIMETERS

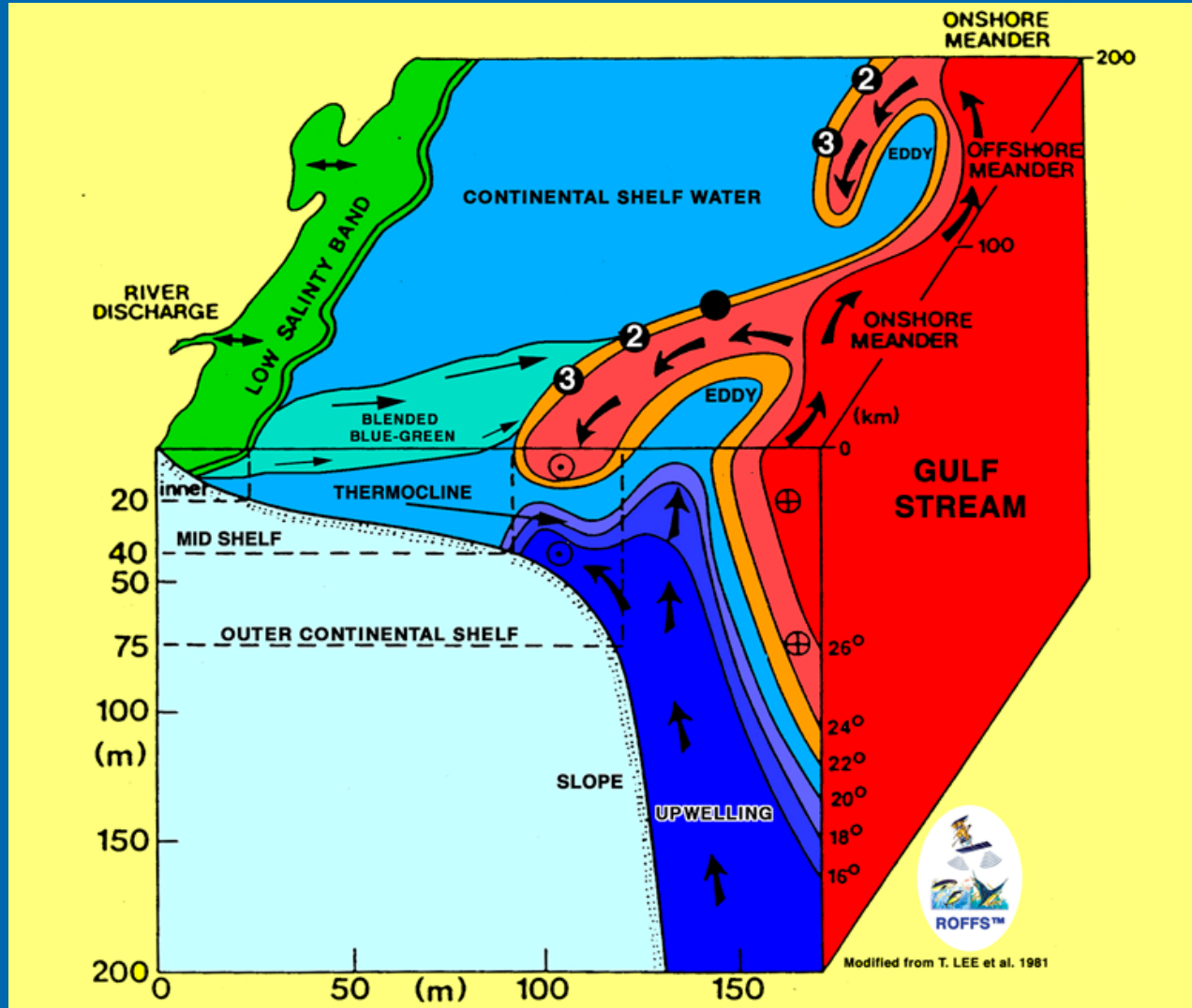
SYNTHETIC APERTURE RADAR



# IMPORTANCE OF EDDIES



# DYNAMICS



# IT IS NOT AS EASY AS IT LOOKS

## ➤ CHALLENGES

- CLOUDS & OTHER ATMOSPHERIC INTERFERENCE
- NAVIGATION
- UNDERSTANDING MOTION
- IDENTIFYING THE IMPORTANT FRONTS

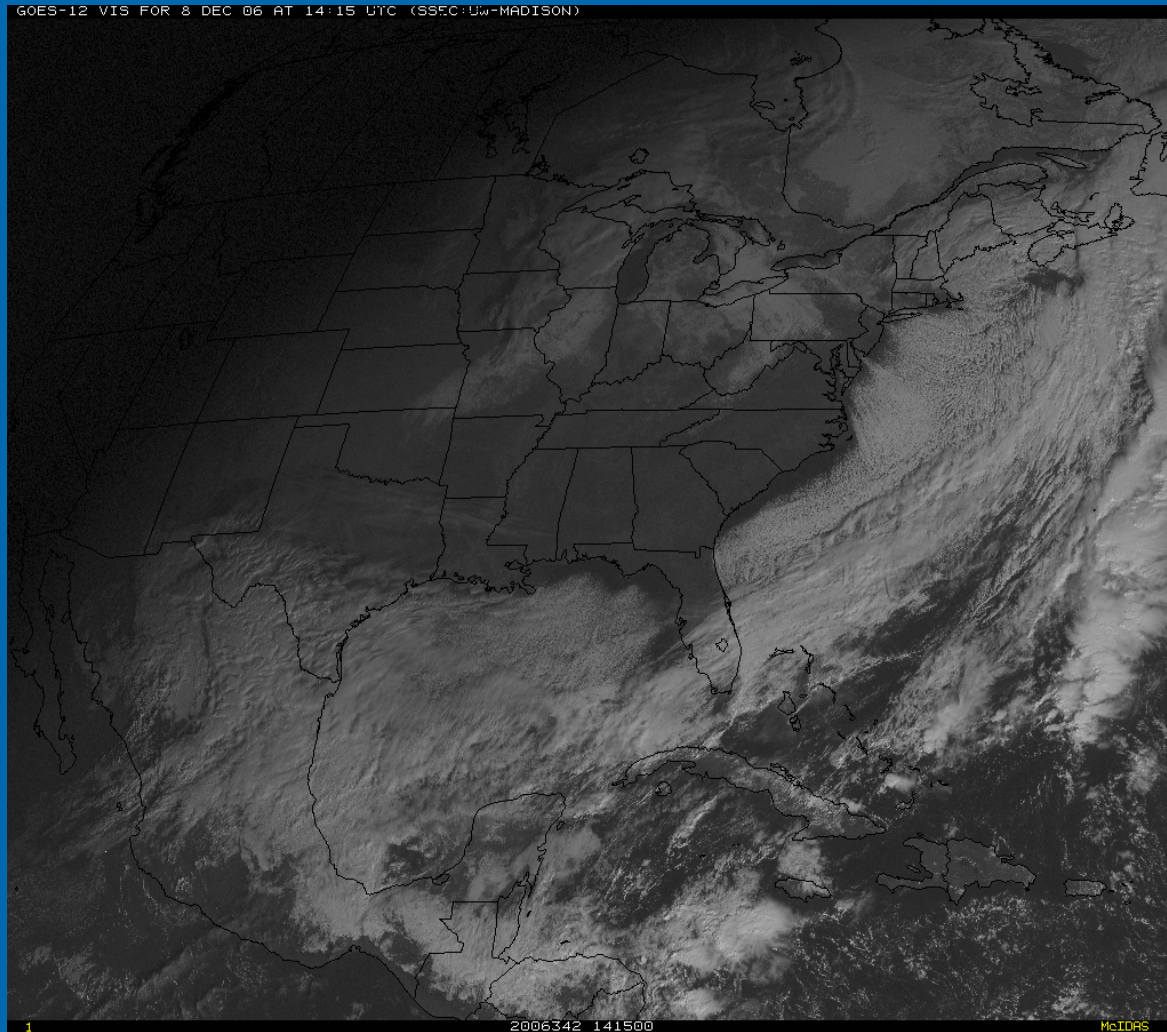
AND  
FINDING THE FISH!



# IF YOU ARE NOT PAYING ATTENTION TO DETAILS



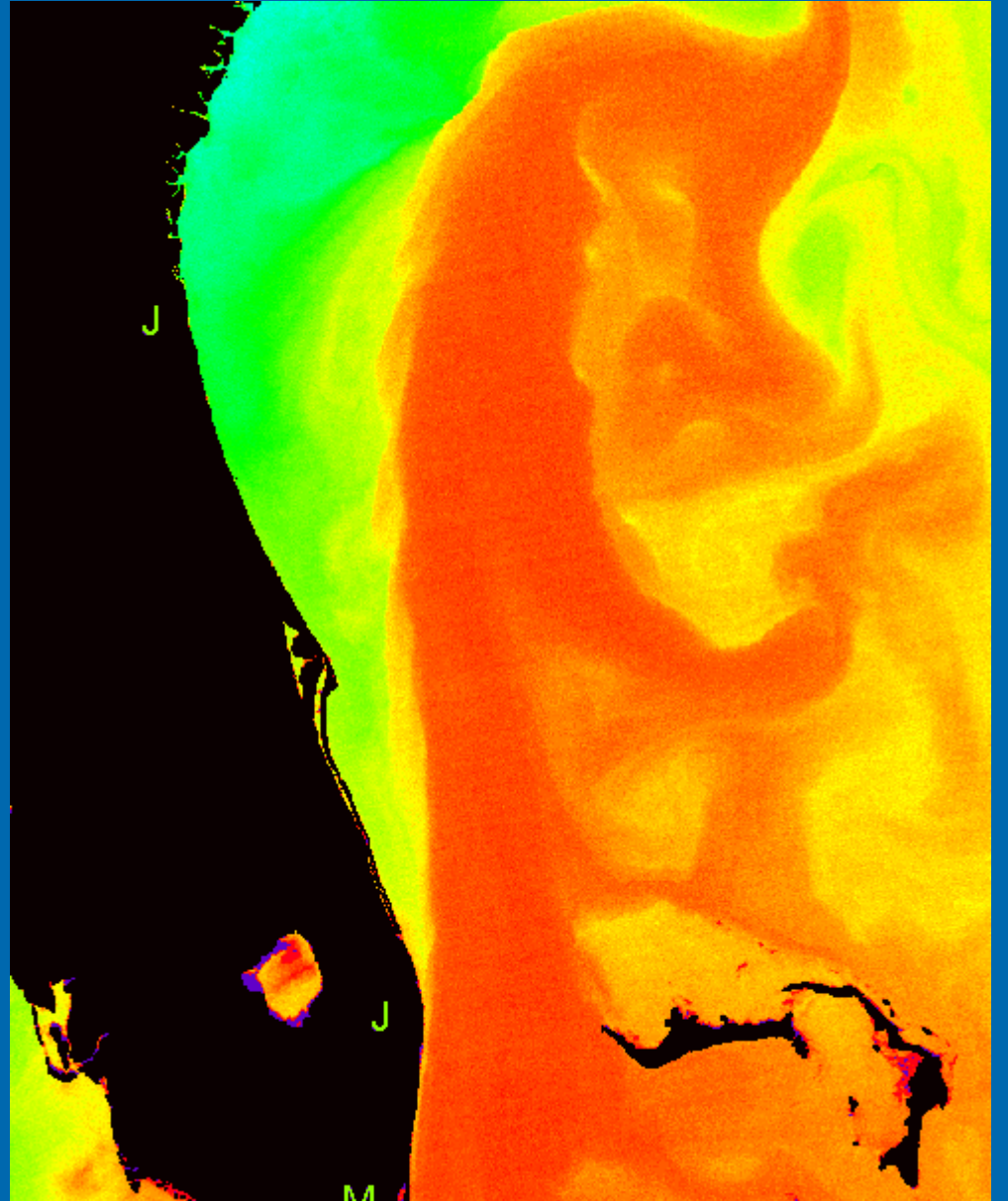
# CLOUD CHALLENGES





# OVERCOMING CLOUDS

- MORE IMAGERY
- COMPOSITES



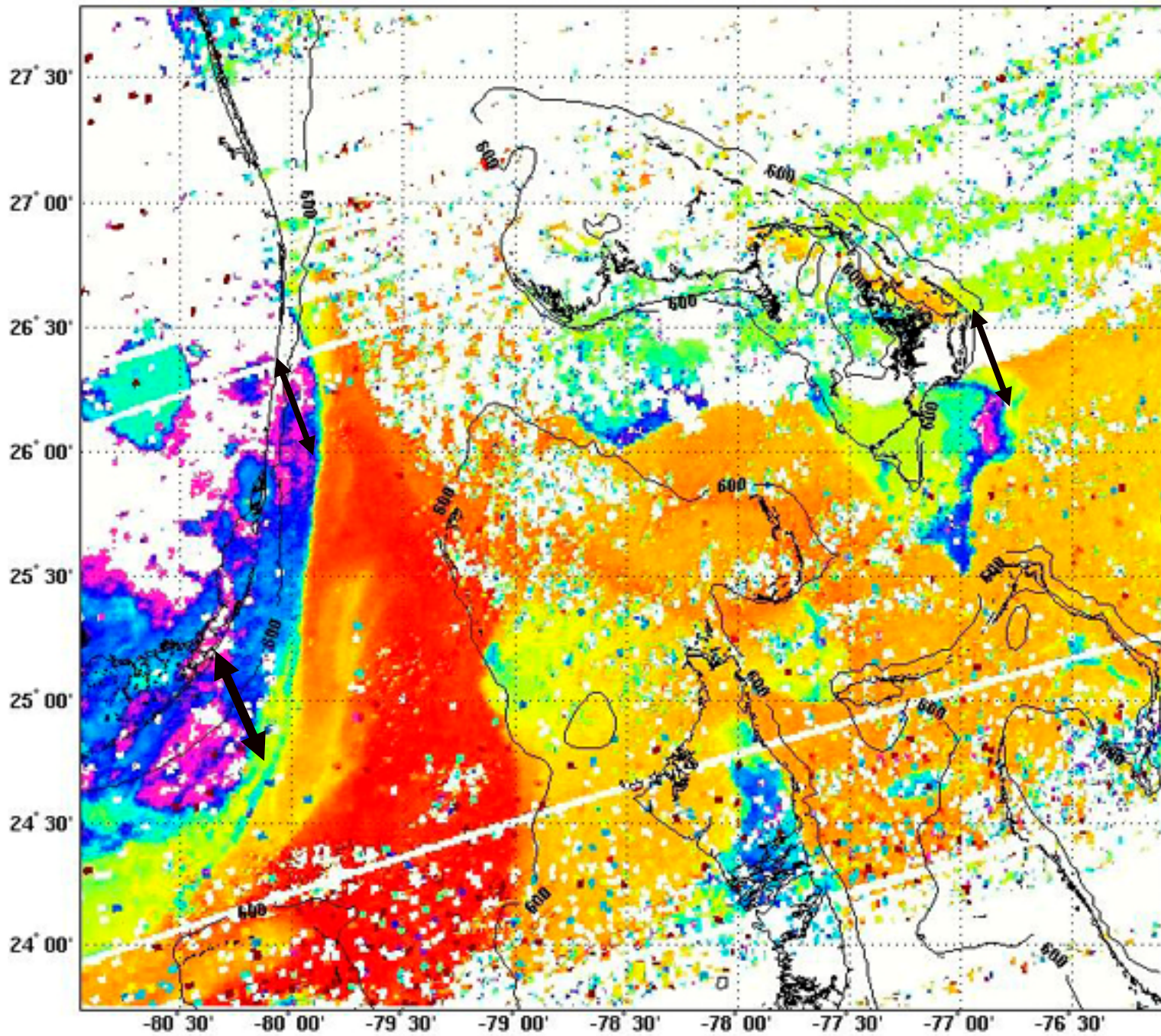
# CONFUSED?



# USE EXPERTS



**RU COOL NOAA-15 Sea Surface Temperature: March 10, 2004 2318 GMT**



**Navigation  
15+  
Miles  
Off !**

# OTHER THAN ROFFS™

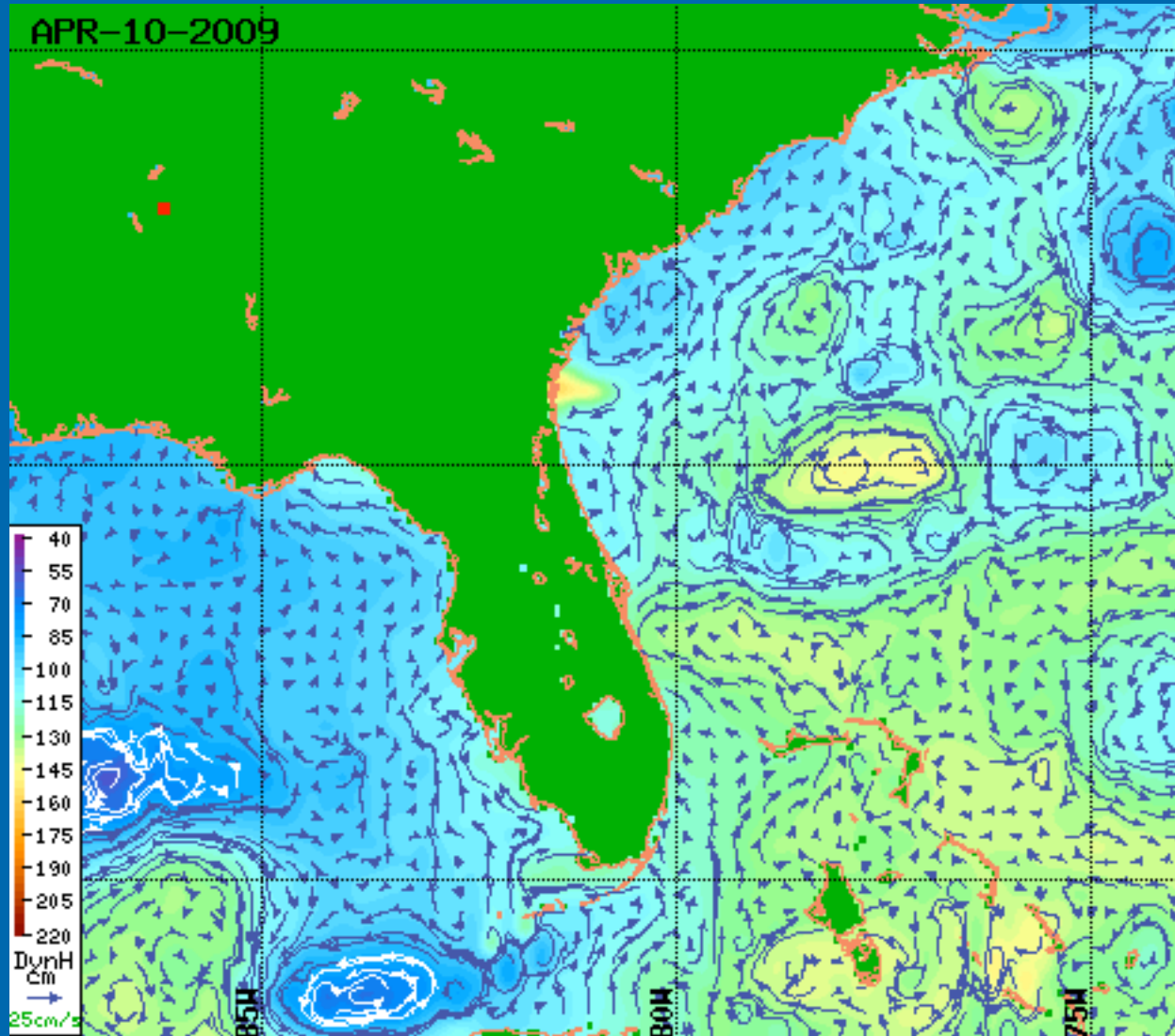
- **ALTIMETRY**
- **OCEAN NOWCAST & FORECAST MODELS**
  - **SST, SSH, SSSAL**

**✓ LIMITED BY TEMPORAL AND SPATIAL RESOLUTION**

**✓ BIASES IN STATISTICAL BASIS**



# ALTIMETER: NOAA\_AOML



# WINNERS USE ROFFS™

DURING 2008, OUR CLIENTS WON **441** DIFFERENT CATEGORIES IN **115** MAJOR TOURNAMENTS (REPORTED TO US) WHILE USING OUR ANALYSES.

- ✓ ROFFS™ CLIENTS WON FIRST PLACE HONORS YAMAHA/CONTENDER MIAMI BILLFISH, SILVER SAILFISH, SAILFISH CUP, FLW KINGFISH, CANAVERAL MAC ATTACK

OVER THE LAST **17** YEARS THE TOTAL NUMBERS OF REPORTED WINNERS TALLIES AT **4248**.

FOUR WORLD RECORDS

ONE UNITED STATES RECORDS

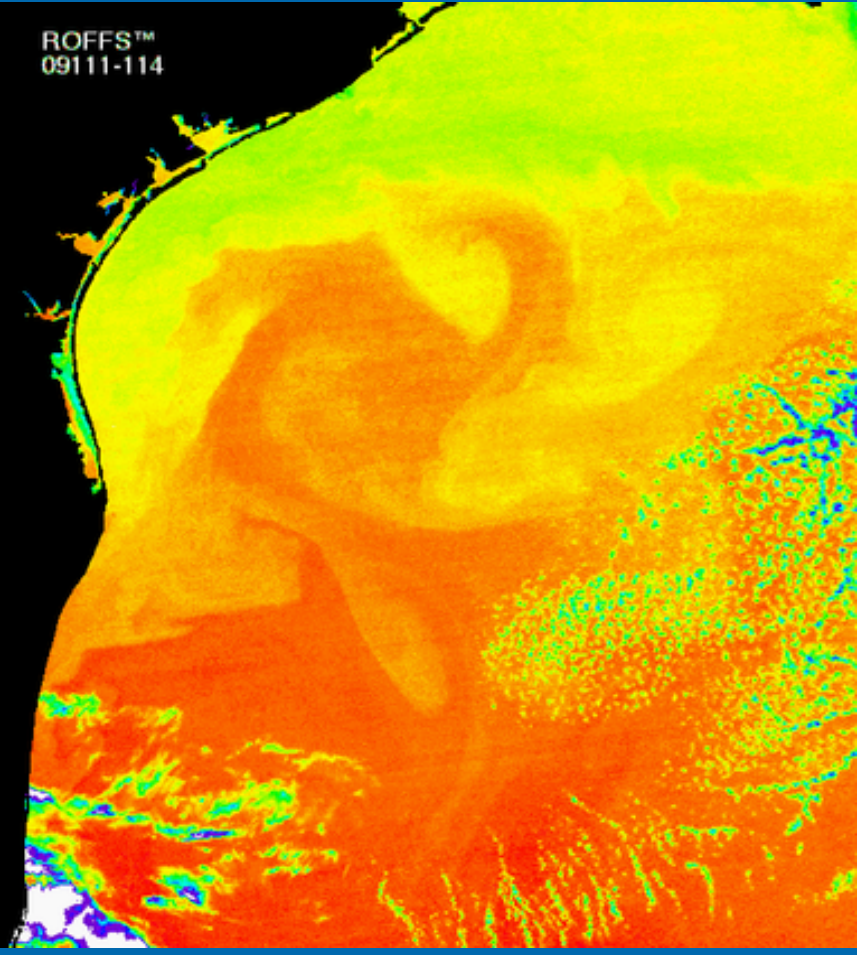
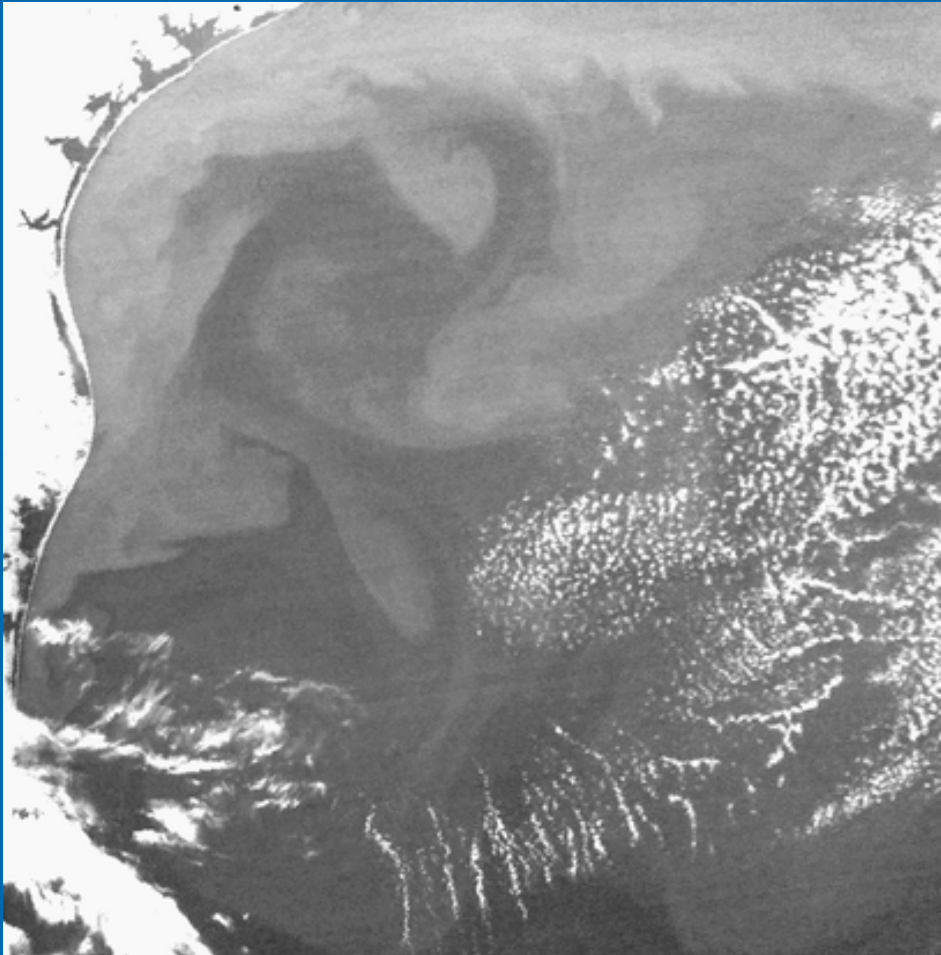
16 STATE RECORDS

2009: 50 Sailfish Releases in One Day

**YOU DO NOT HAVE TO USE ROFFS™ TO CATCH FISH AND WIN TOURNAMENTS, BUT IT HELPS!**

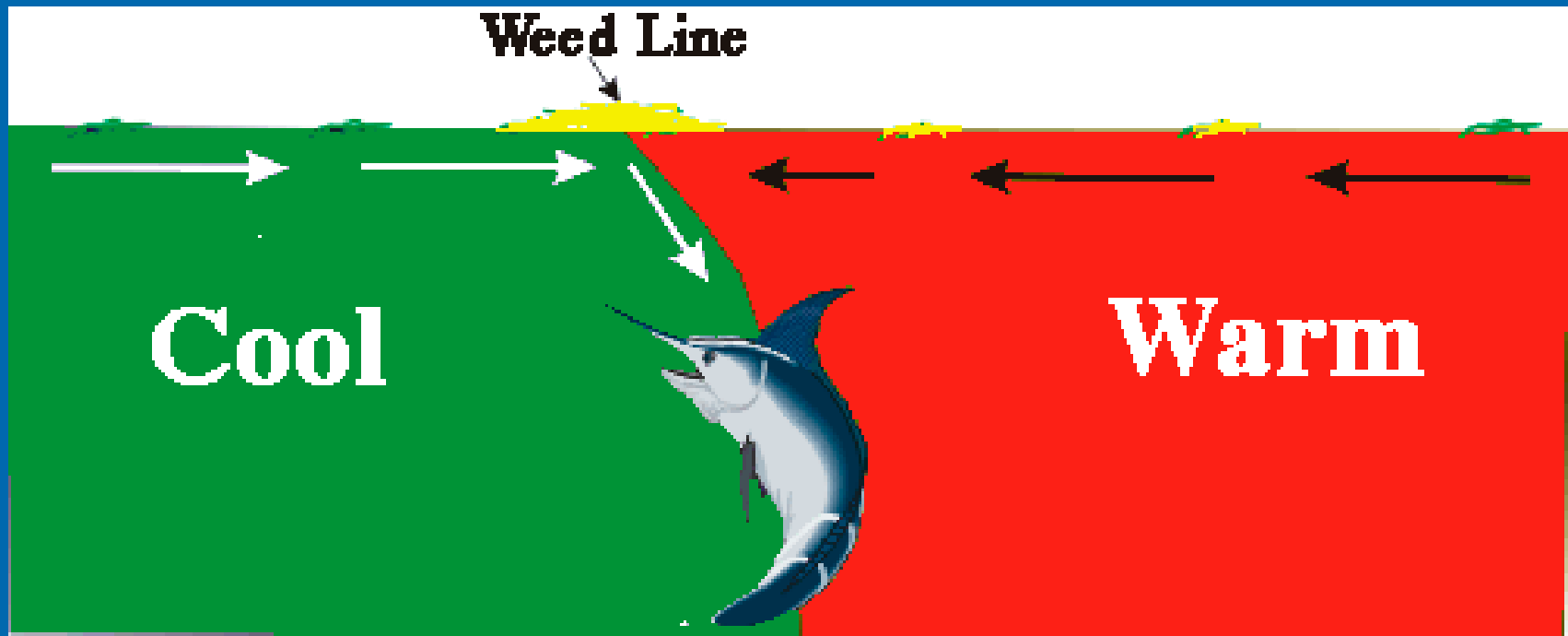


**21-23 APRIL 2009**



# OCEAN FRONTS

## WATER MASS BOUNDARIES



**PERSISTENT CONVERGENCE**