

# AOML/PhOD and SEFSC/ELH Collaborative Endeavors, 2002 - Present

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AOML/SEFSC Workshop  
June 1, 2009

# Methods / Collaboration

## ❖ SEFSC – Early Life History Lab

*Isotope analyses for reef fish ecology*

*Reef fish recruitment indices for population assessments*

*Multiple in-shore sampling and assessment techniques*

*Acoustic tagging and telemetry for tracking of reef-fish movements and site-fidelity*

*Reef fish spawning aggregations & larval transport surveys*

*Multivariate analyses of reef fish assemblages*

*GIS mapping and spatial analyses of reef fish distributions, recruitment, and MPAs*

## ❖ AOML – Physical Oceanography Division

*Large scale and regional water mass and circulation assessment via collection and analyses of multiple oceanographic data sets:*

*in-situ station data (CTD, LADCP)*

*hull-mounted instrumentation (SADCP, TSG, FLUORO)*

*satellite tracked drifters*

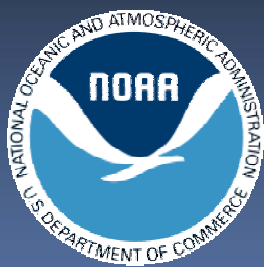
*remote sensing / satellites (SST, OCEAN COLOR)*

# Methods / Equipment

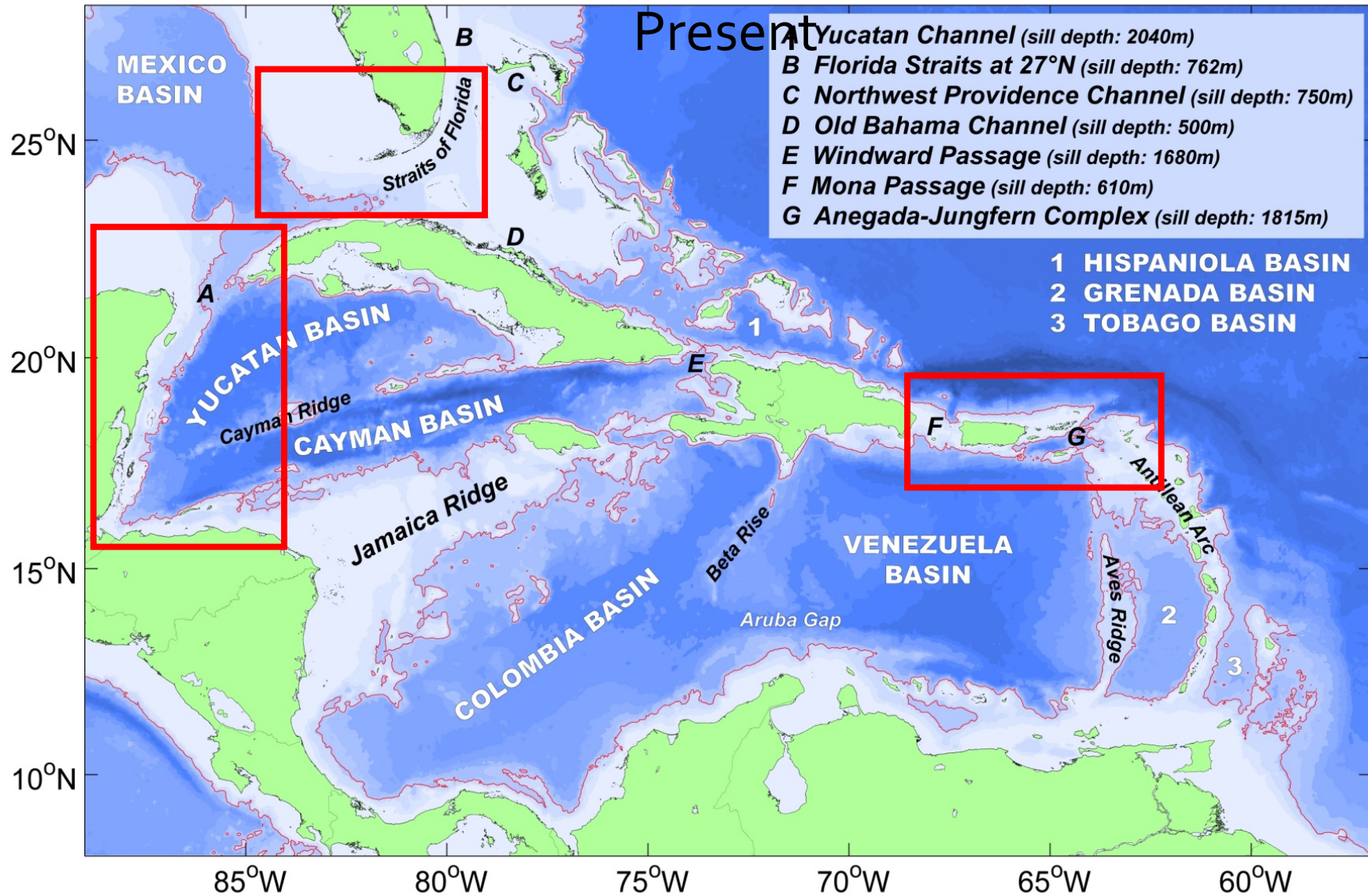


# PhOD / ELH Collaborative Endeavors

Project	Ship	Date
Tortugas Gyre / Florida Keys	<i>NOAA Ship Gordon Gunter</i>	May 2002
Tortugas Gyre / Florida Keys	<i>NOAA Ship Gordon Gunter</i>	August 2002
MASTER - Mexico (Yucatan)	<i>NOAA Ship Gordon Gunter</i>	Mar/Apr 2006
MASTER - Mexico, Belize (Yucatan)	<i>NOAA Ship Gordon Gunter</i>	Jan/Feb 2007
CRER - DR, PR, USVI, BVI, Leeward Is.	<i>NOAA Ship Nancy Foster</i>	Mar/Apr 2007
CRER - PR, USVI, BVI, Leeward Is.	<i>NOAA Ship Nancy Foster</i>	March 2008
CRER - PR, USVI, BVI, Leeward Is.	<i>NOAA Ship Nancy Foster</i>	April 2009



# PhOD / ELH Collaborative Endeavors, 2002 - Present



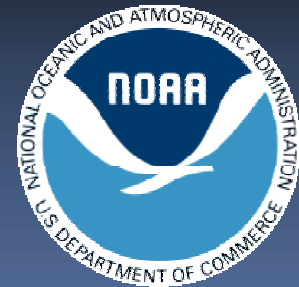
2006 - 2007 - Meso-American System  
 2007 - Present - ~~Caribbean Key Research~~ Transport & Ecology Research

# CRER Motivation

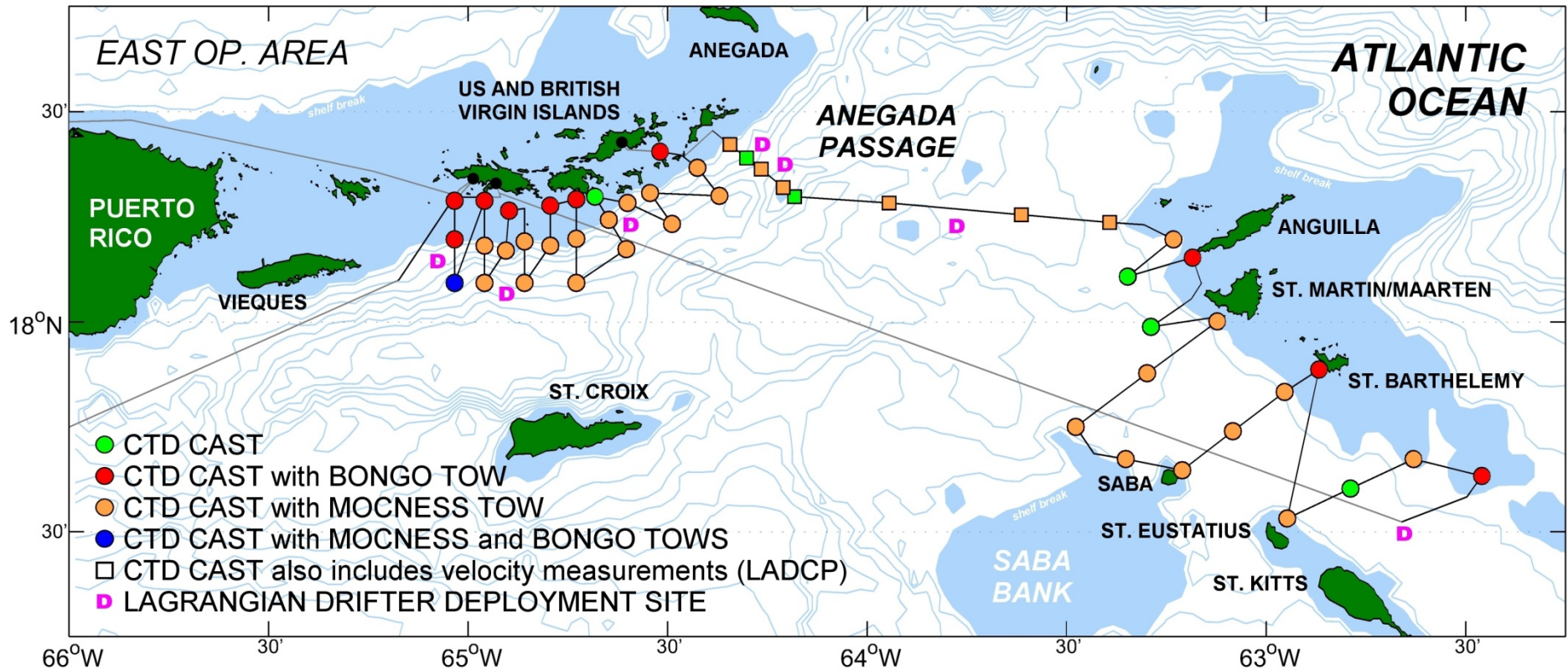
- ❖ *A multi-species spawning aggregation located on banks south of St. Thomas includes several economically important fish species: dog snapper, yellowfin grouper, Nassau grouper, tiger grouper.*
- ❖ *Increased fishing pressure prompted the US Caribbean Fishery Management Council (CFMC) to take actions such as seasonally closing fishing grounds (Grammanik Bank) and establishing Marine Protected Areas (Hind Bank Marine Conservation District).*
- ❖ *Present management decisions are based on professional judgment rather than scientific data (none available).*

# CRER Objectives

- ❖ *Determine how unprotected VI banks, MPAs such as the Hind Bank Marine Conservation District, seasonally closed areas such as Grammanik Bank, inshore areas and adjacent islands are ecologically linked via regional reef fish larval dispersal, transport, and life-history patterns.*
  
- ❖ *Improve existing / generate new indices of abundance for the study area*



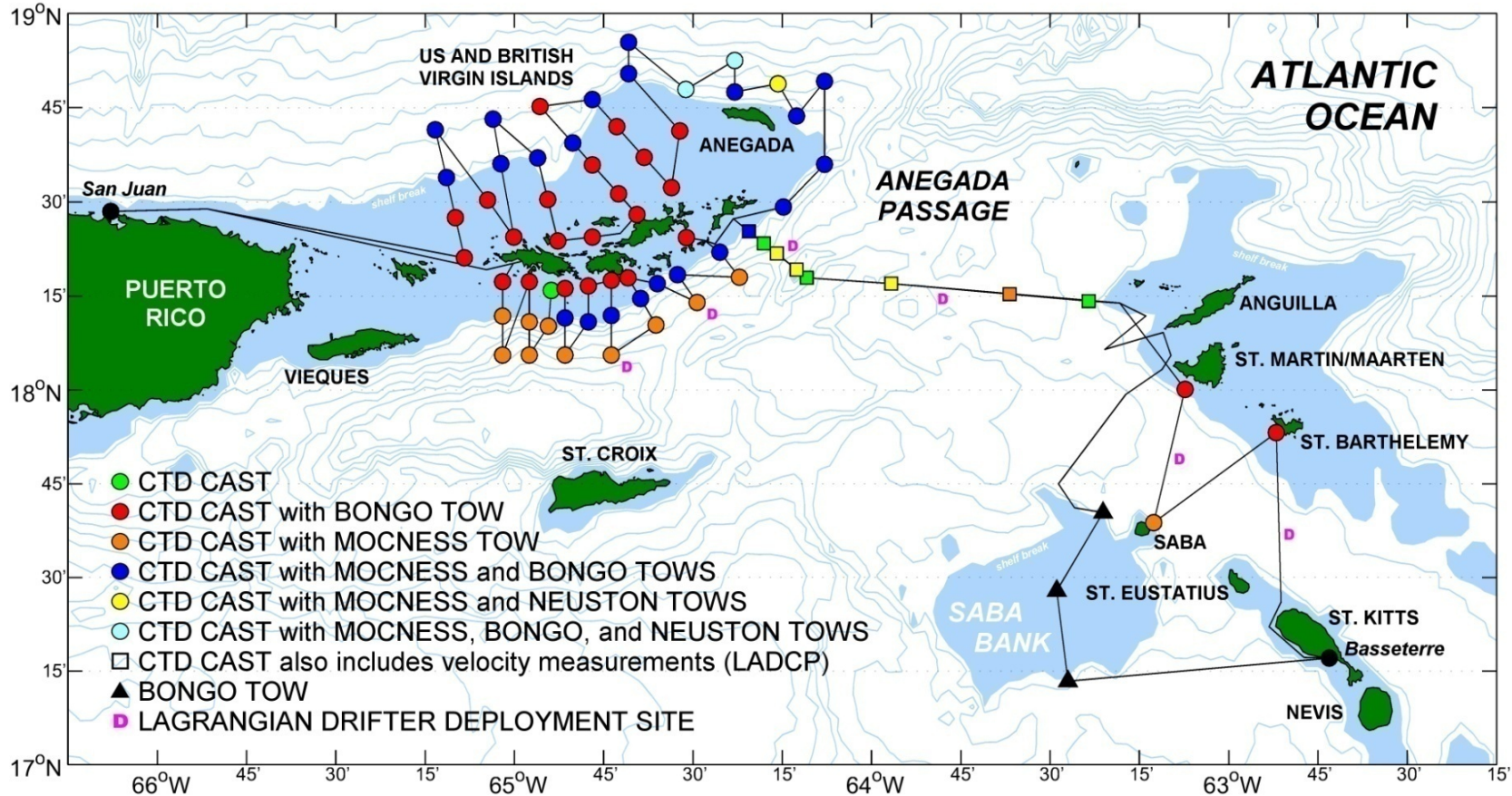
# ***CRER-1 Eastern Operations Area - March 28 - April 9, 2007***



- ❖ ***55 CTD casts (14 included lowered ADCP)***
- ❖ ***11 bongo tows, 33 MOCNESS tows***
- ❖ ***13 Lagrangian satellite-tracked drifter deployments***
- ❖ ***continuous water-quality and currents via flow-through and hull-mounted systems***

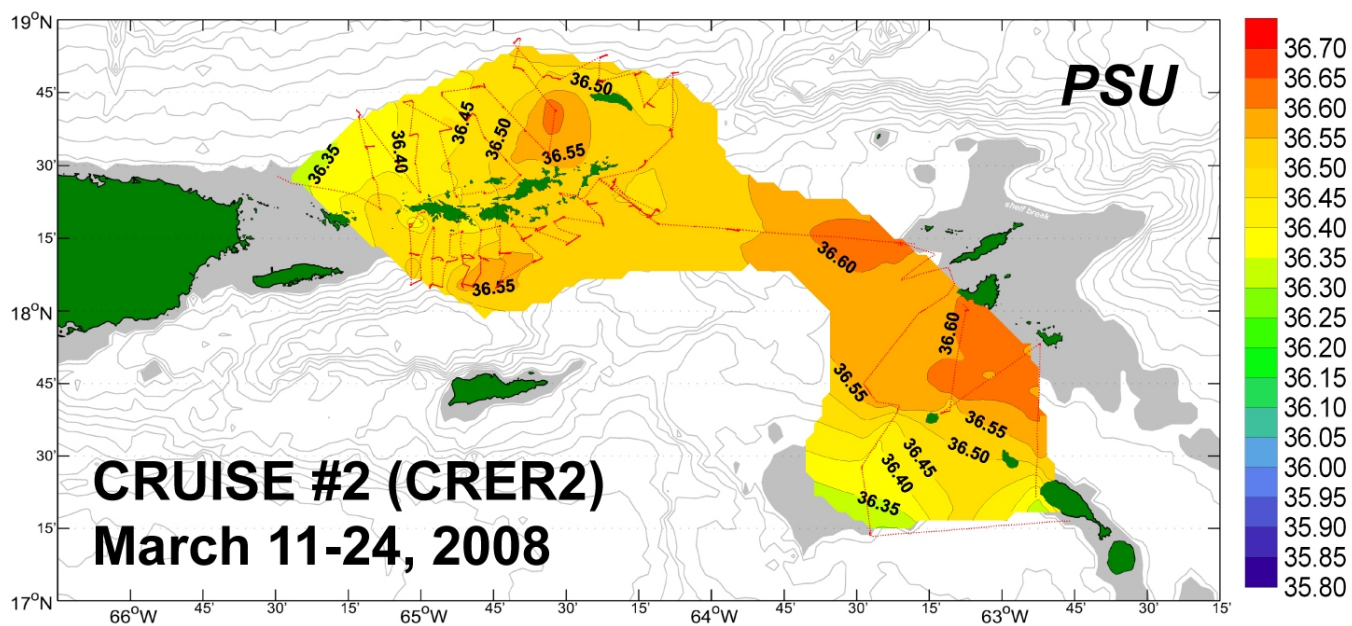
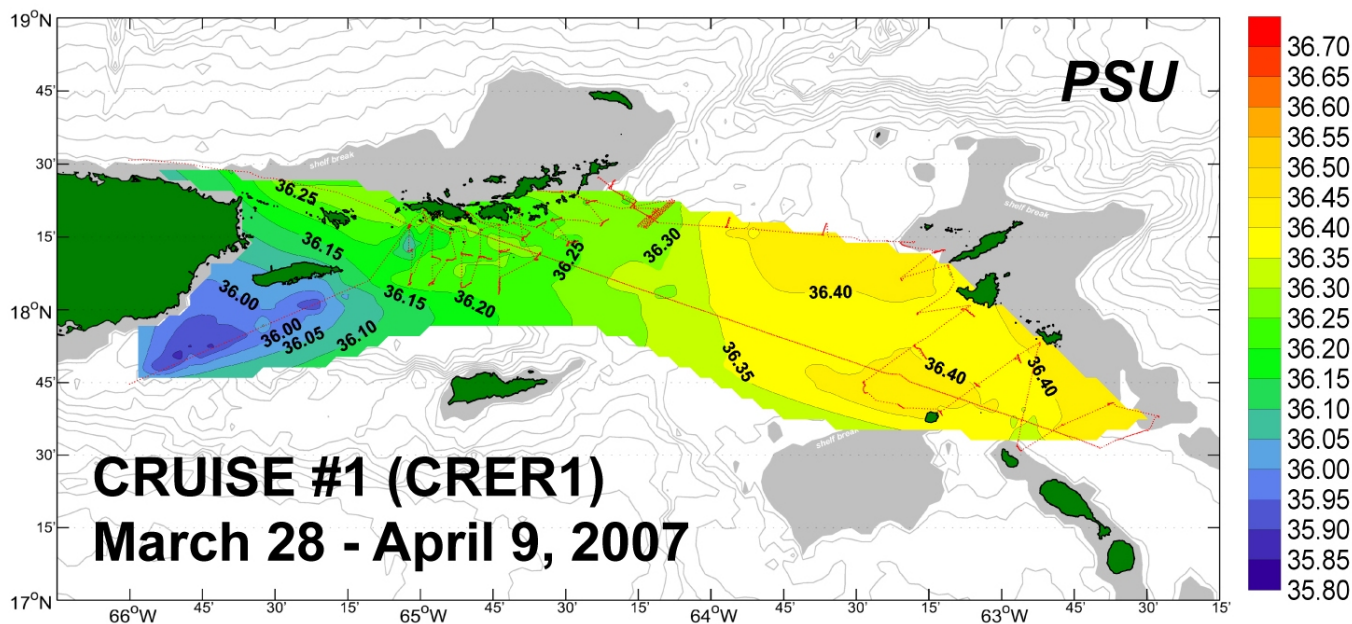


## CRER-2 Operations Area - March 11-24, 2008

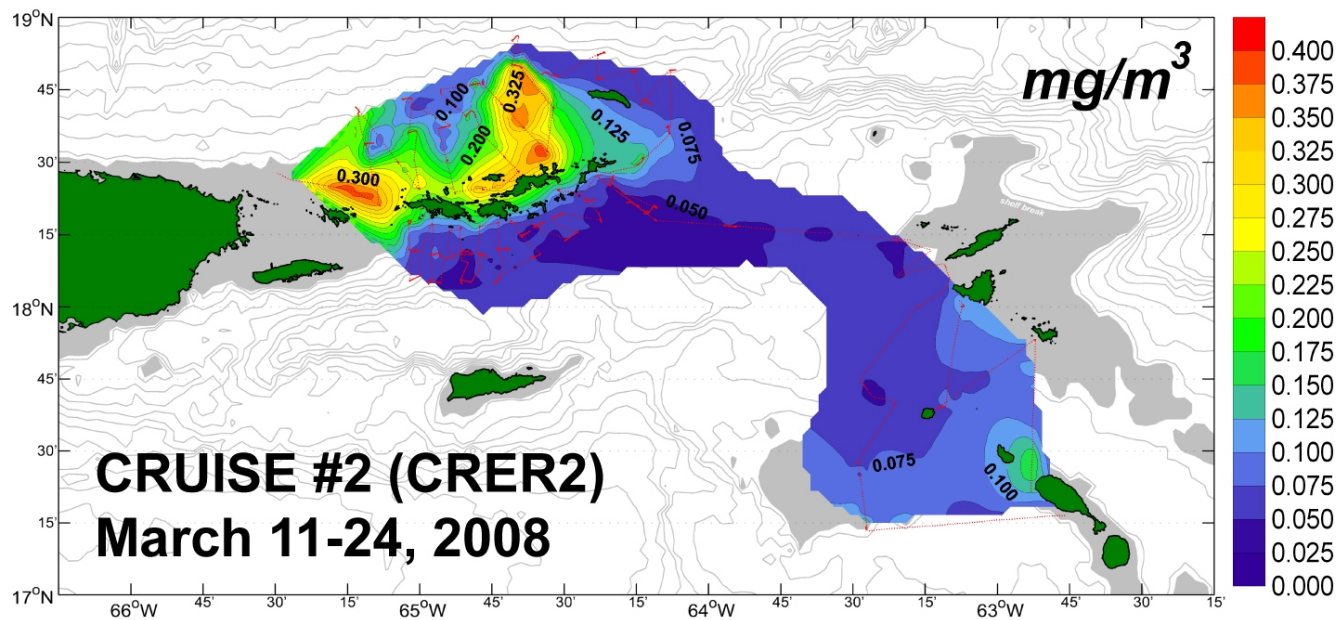
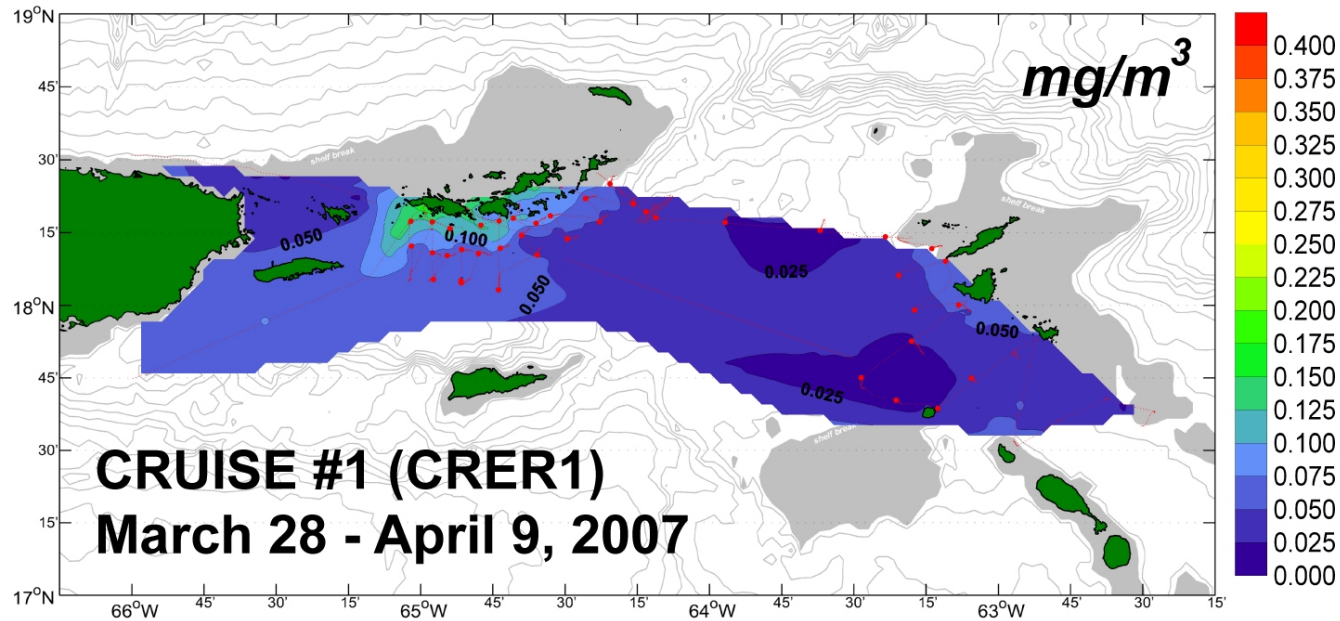


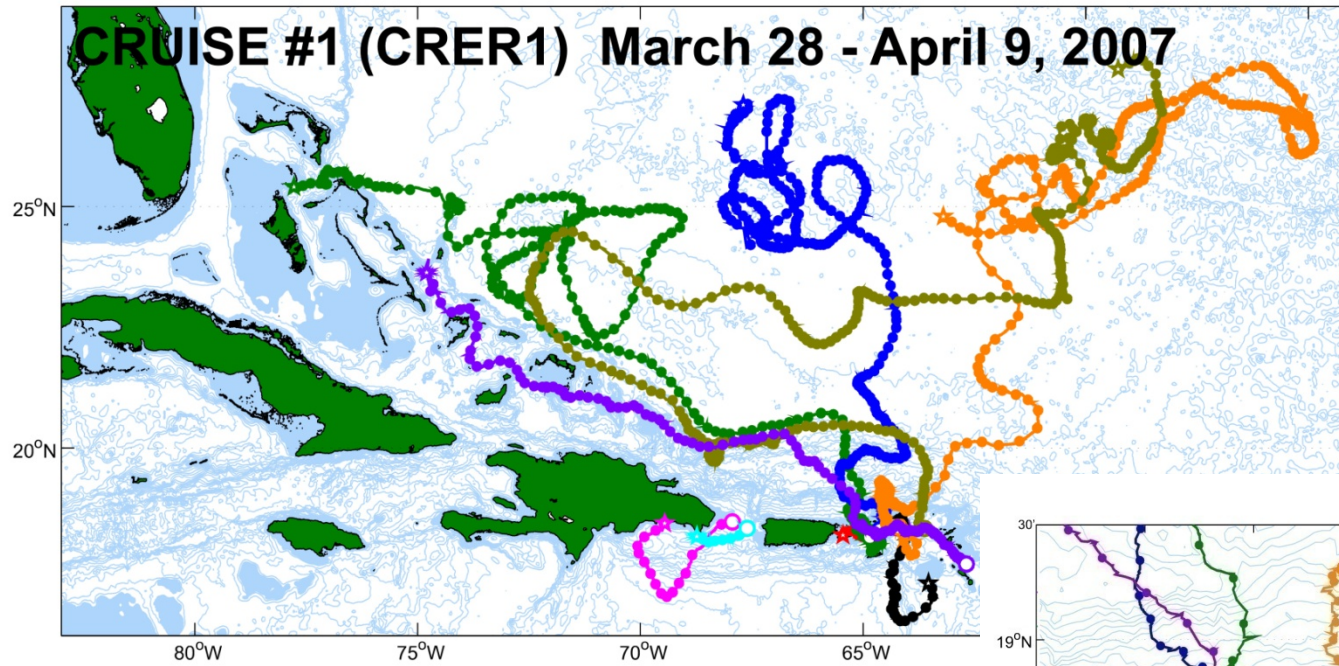
- ❖ **76 CTD casts (16 included lowered ADCP)**
- ❖ **51 bongo tows, 40 MOCNESS tows, 7 neuston tows**
- ❖ **6 Lagrangian satellite-tracked drifter deployments**
- ❖ **continuous water-quality and currents via flow-through and hull-mounted systems**

# Sea Surface Salinity



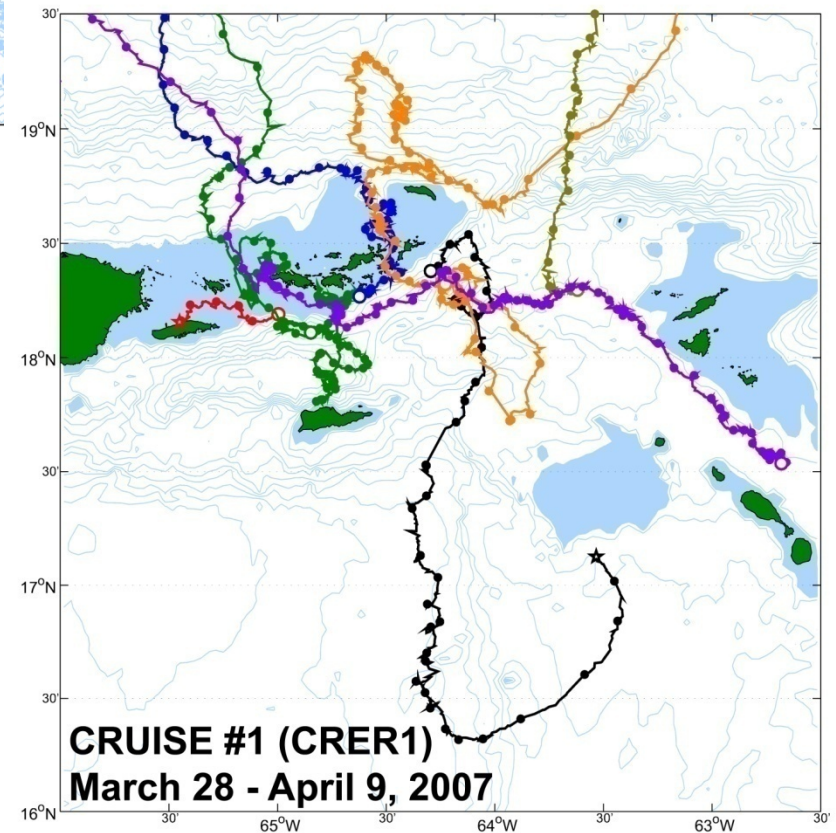
# Sea Surface Chlorophyll-a





*A Highly Variable  
Current Regime...*

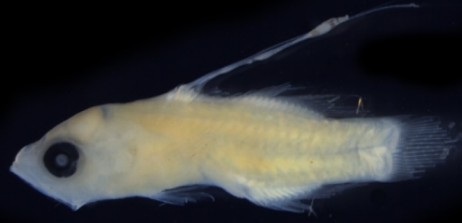
*Surface Drifter Trajectories...*



## Larval fishes collected...



*Serranus tabacarius*  
Tobaccofish (bass)



*Liopropoma sp.*  
basslet



*Lutjanus sp.*  
snapper



Opistognathidae  
jawfish



*Crepticus parrae*  
Creole wrasse



*Sparisoma sp.*  
parrotfish



*Scarus sp.*  
parrotfish

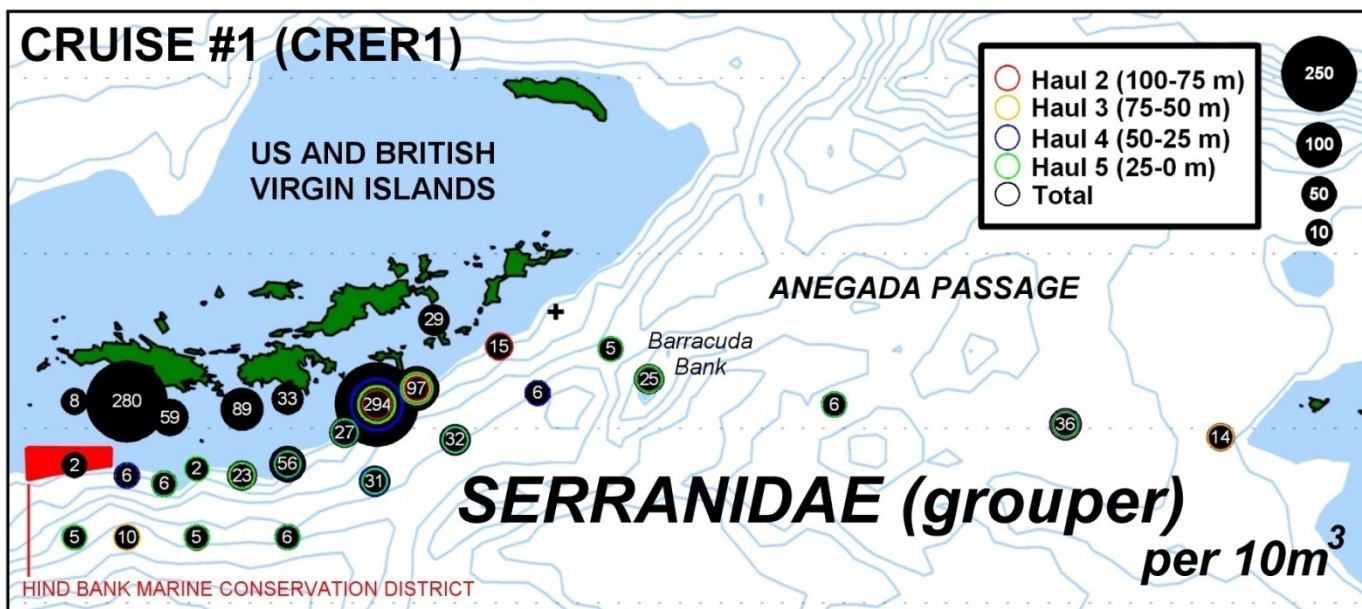
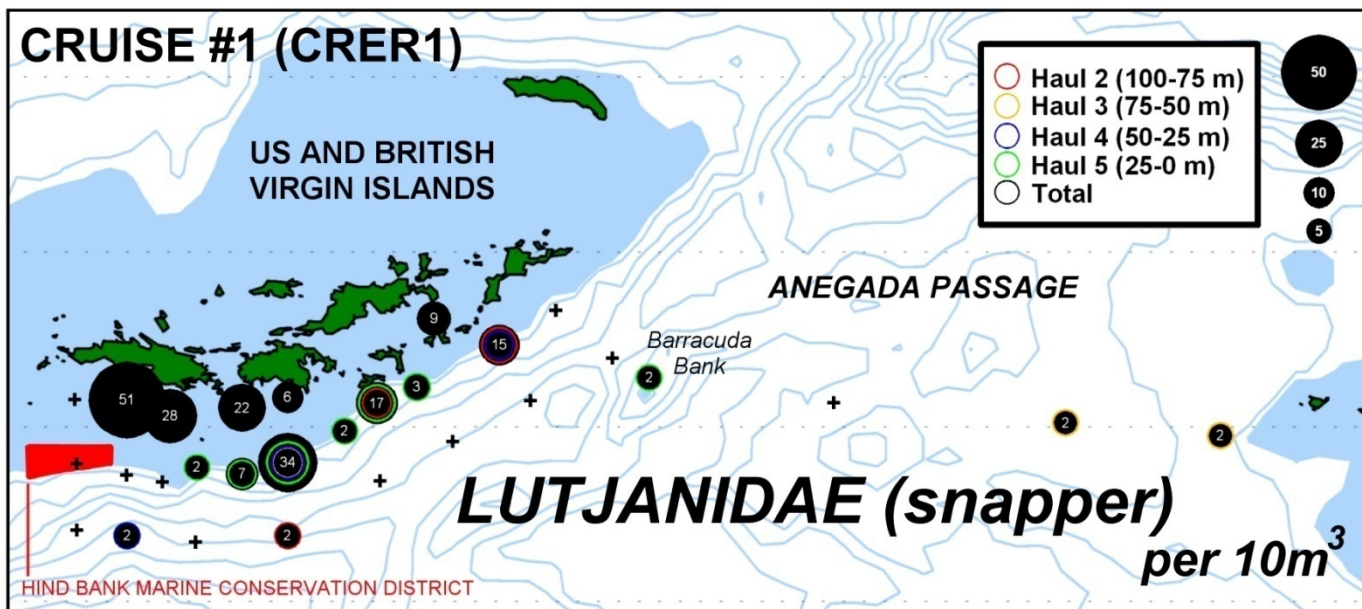


*Katsuwonus pelamis*  
Skipjack tuna

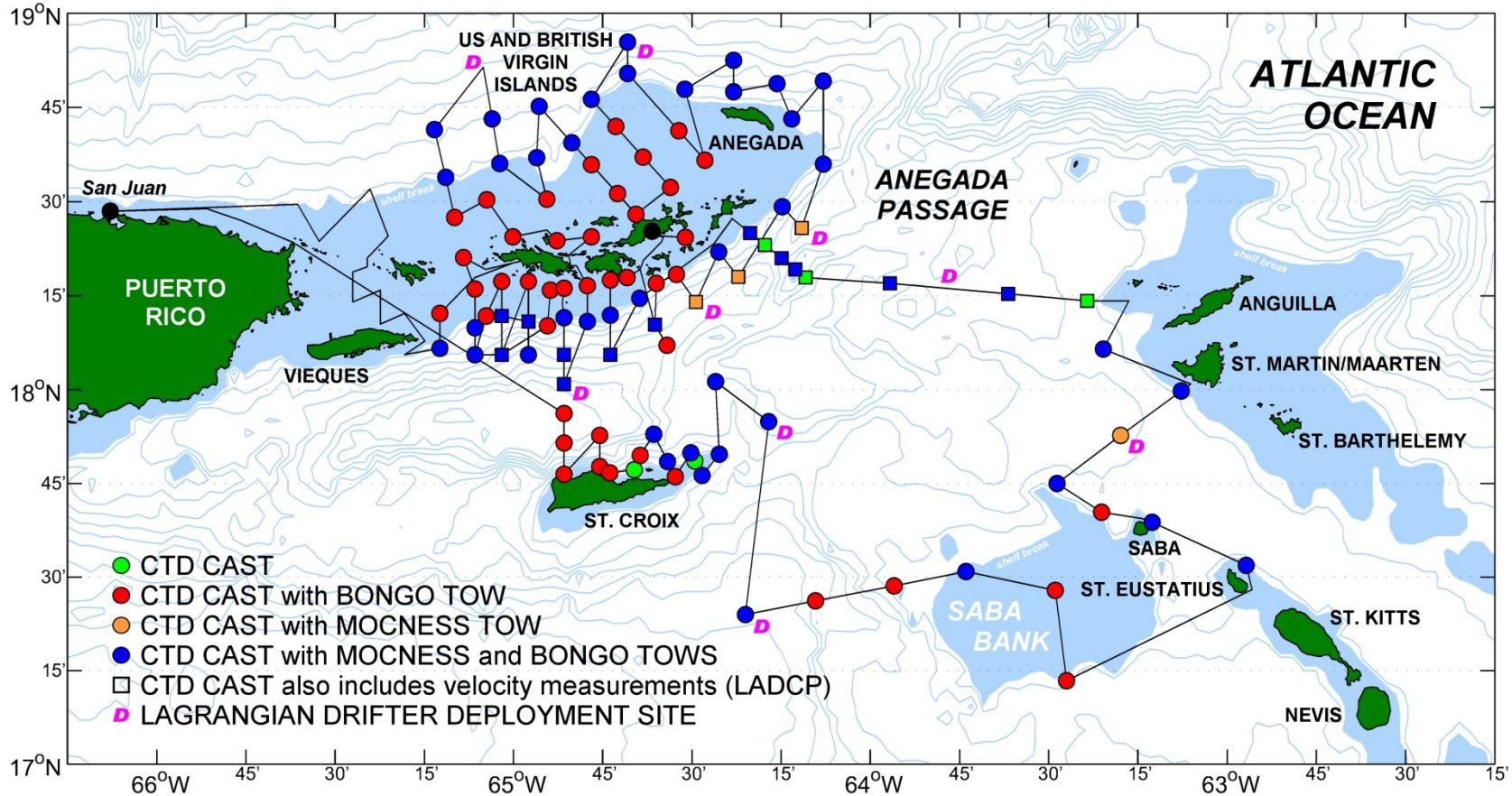
### CRER-1, southern VI banks...

- 16,769 fishes collected and sorted, 15,211 fishes identified
- 90% from 15 families: Gobiidae, Labridae, Myctophidae, Apogonidae, Scaridae, Gonostomatidae, Serranidae, Phosichthyidae, Paralepididae, Callionymidae, Labrisomidae, Balistidae, Clupeida, Bothidae, and Carangidae

# CRER1 - Larval Distribution and Abundance

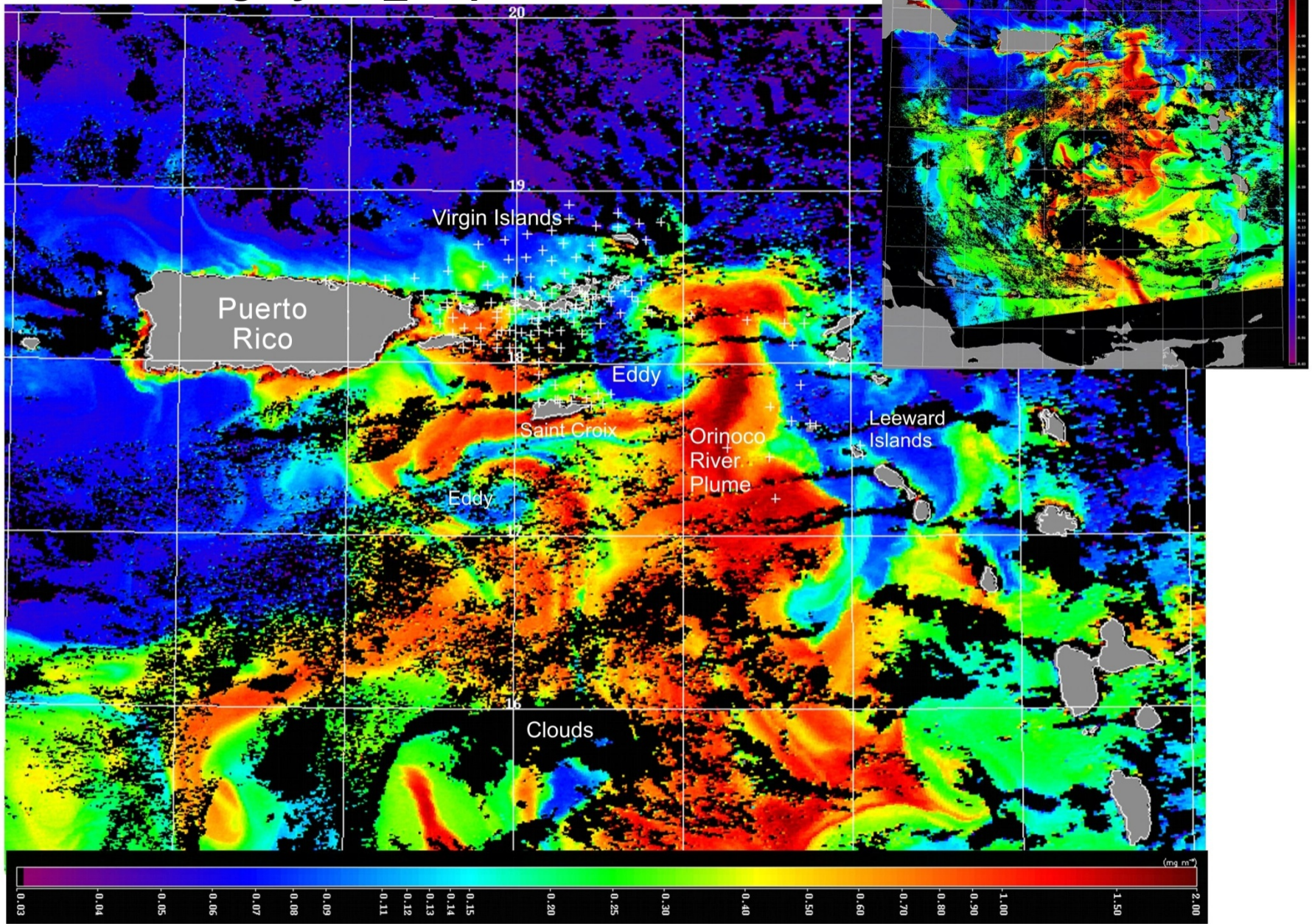


# CRER-3 Operations Area - April 7-20, 2009



- ❖ **105 CTD casts (18 included lowered ADCP)**
- ❖ **97 bongo tows, 57 MOCNESS tows**
- ❖ **10 Lagrangian satellite-tracked drifter deployments**
- ❖ **continuous water-quality and currents via flow-through and hull-mounted systems**

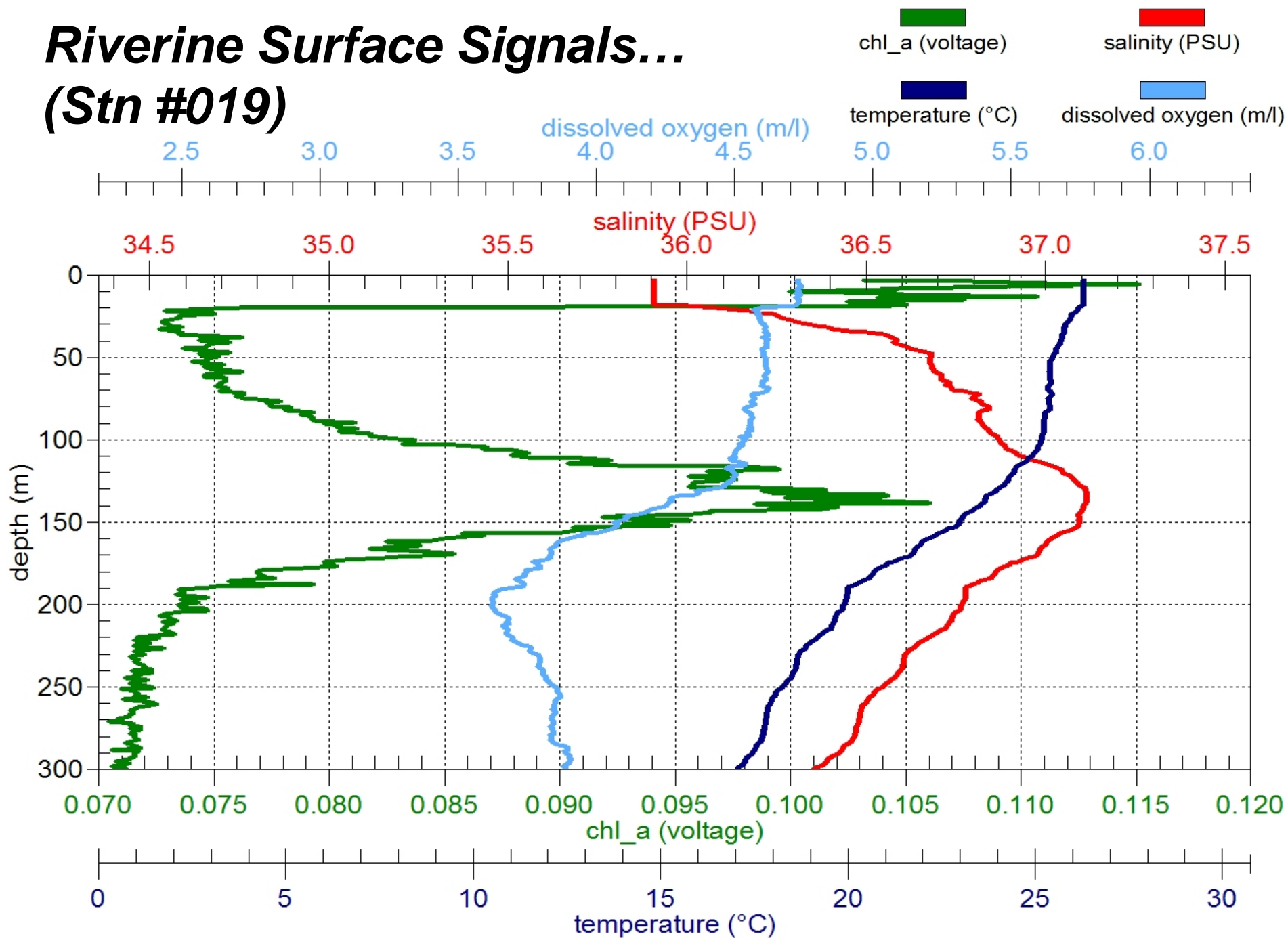
# MODIS Imagery chl\_a April 14, 2009



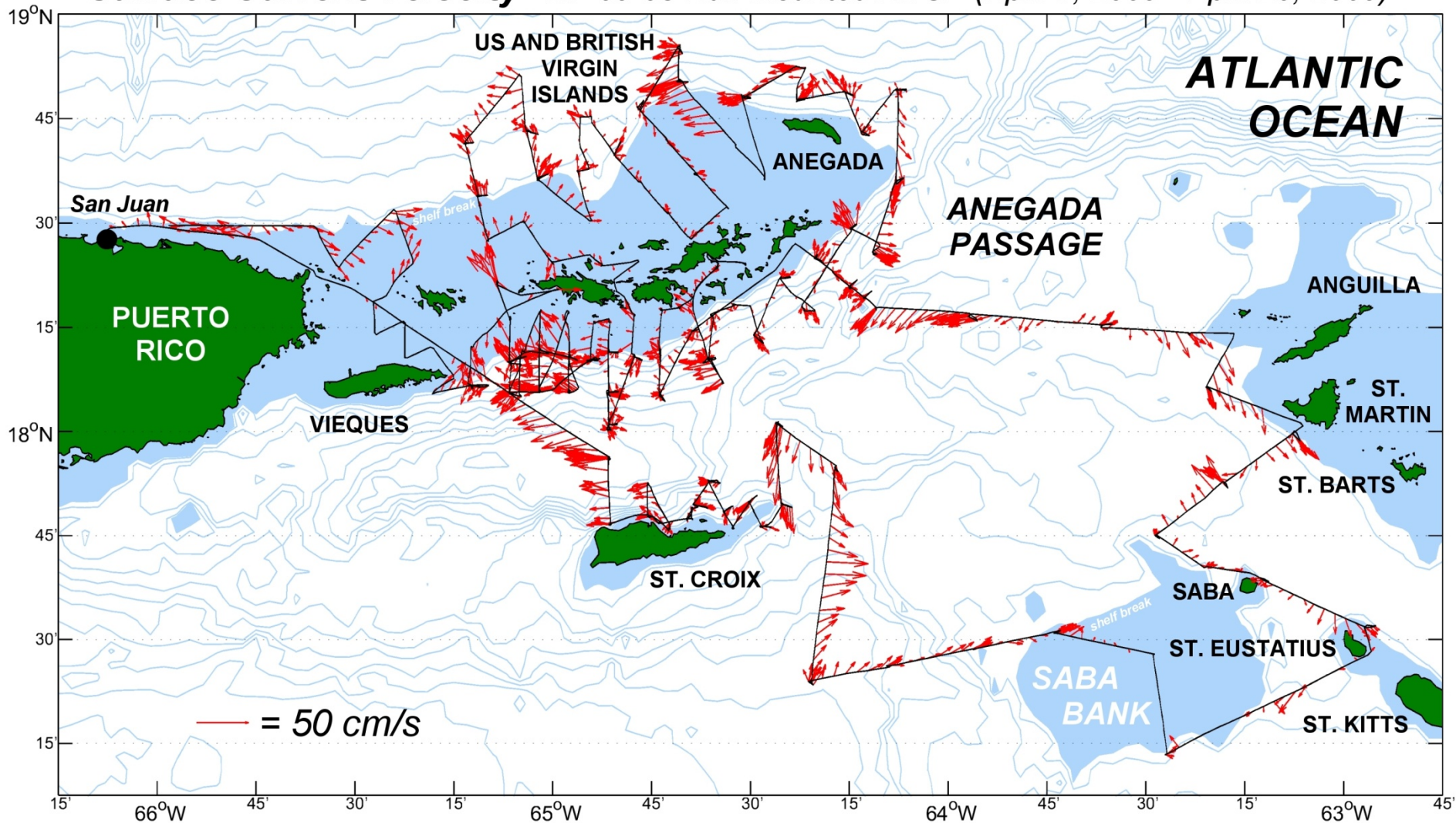
Chl  $\text{mg}/\text{m}^3$



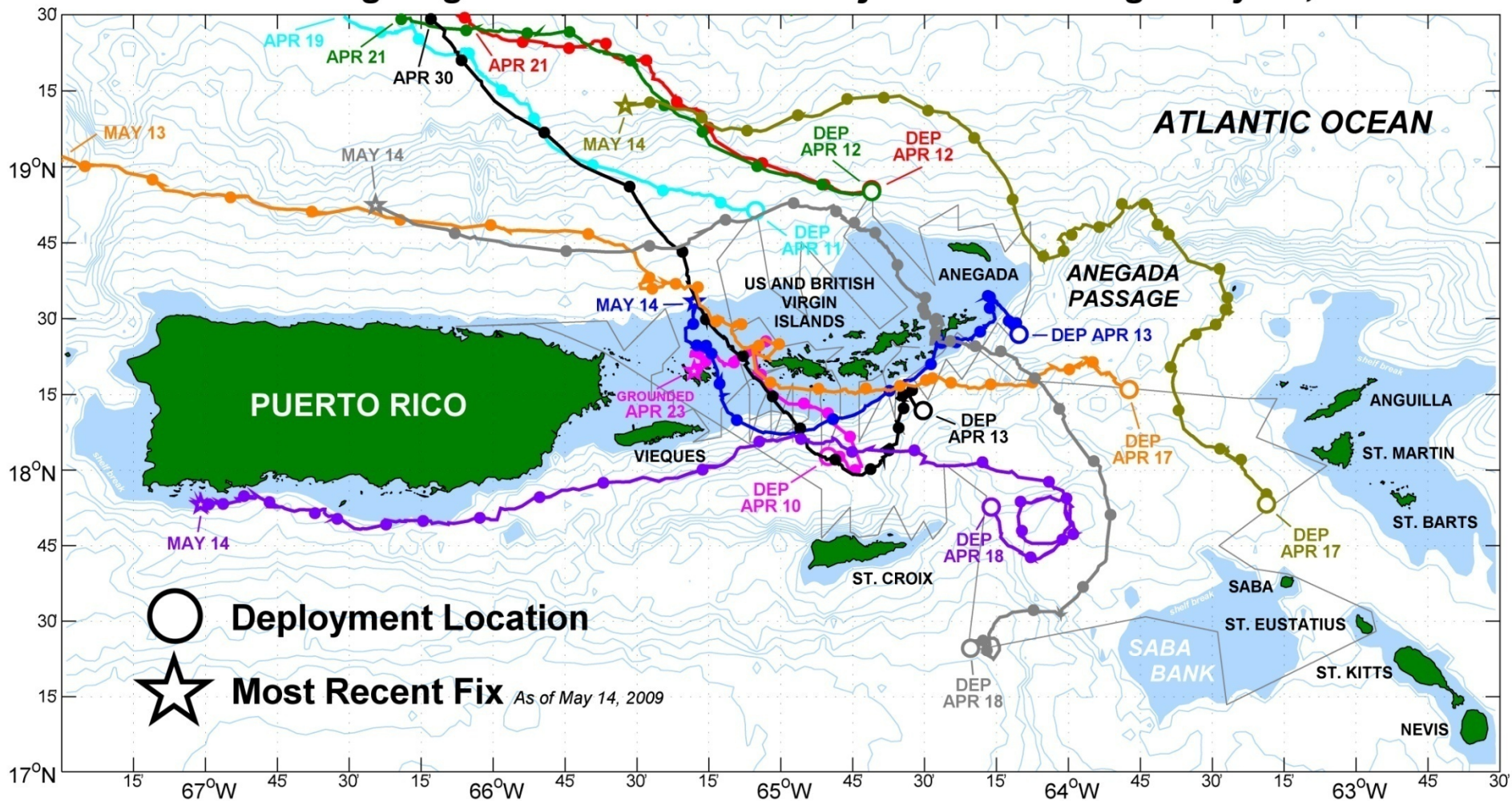
# Riverine Surface Signals... (Stn #019)

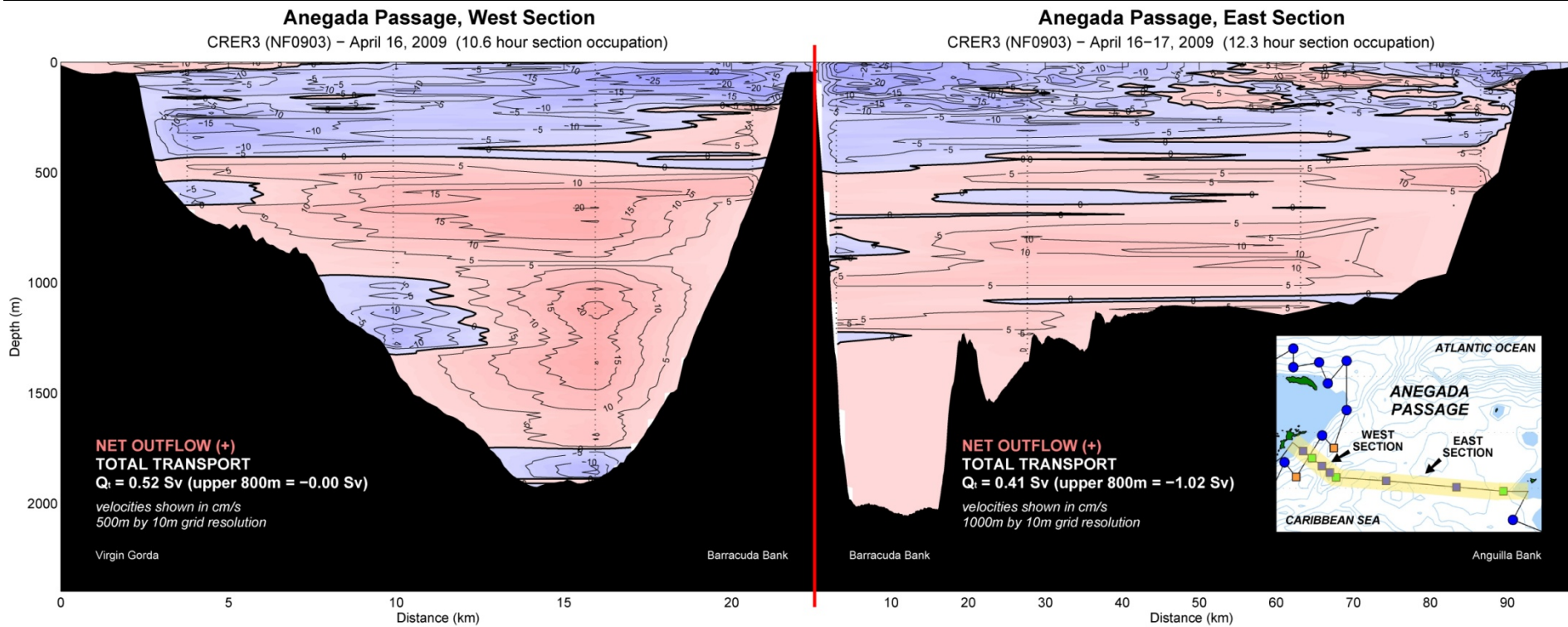


# Surface Current Velocity NF-09-03 Hull-Mounted ADCP (April 7, 2009 - April 20, 2009)



# NF-09-03 Lagrangian Surface Drifter Trajectories through May 14, 2009

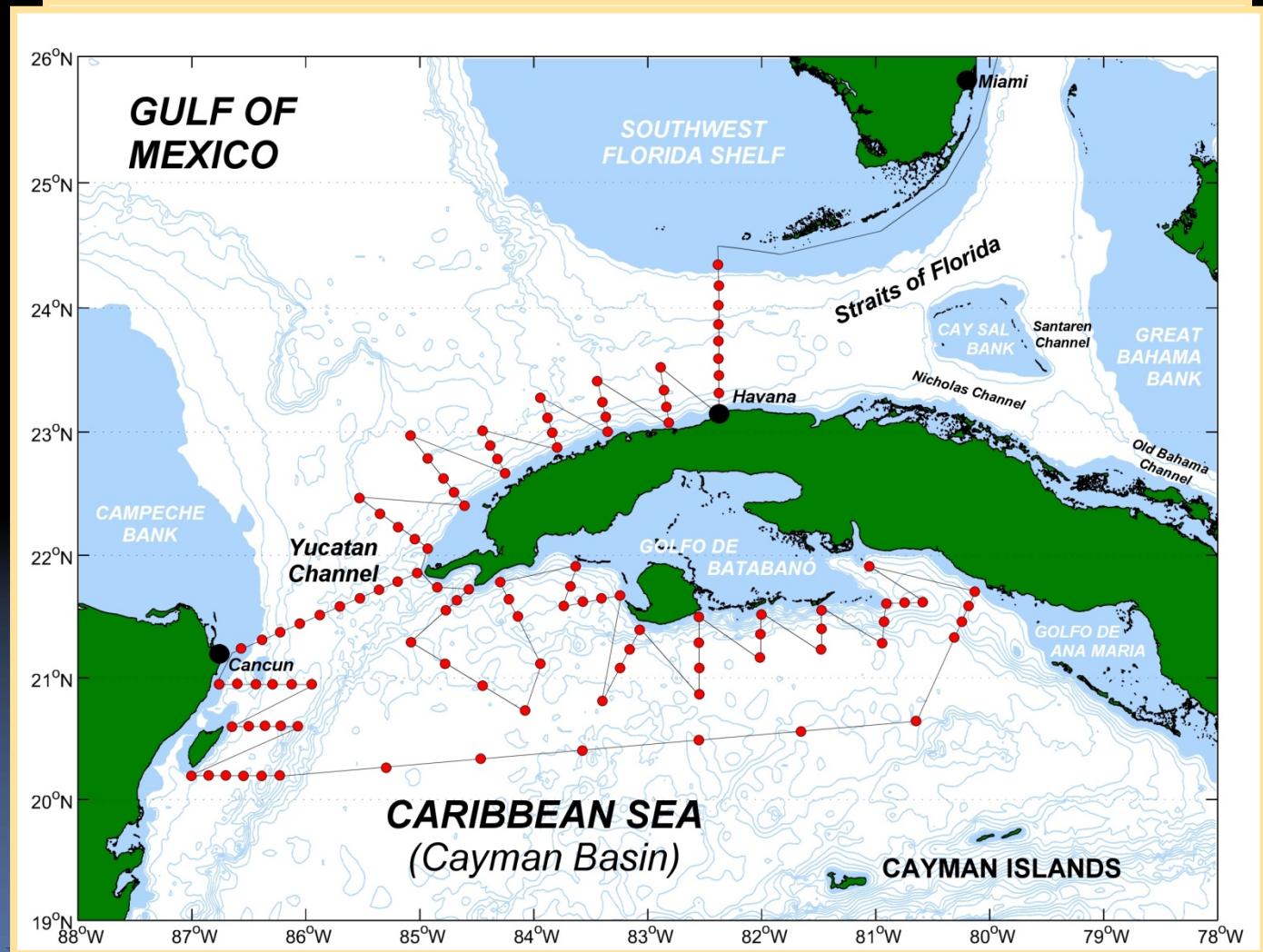


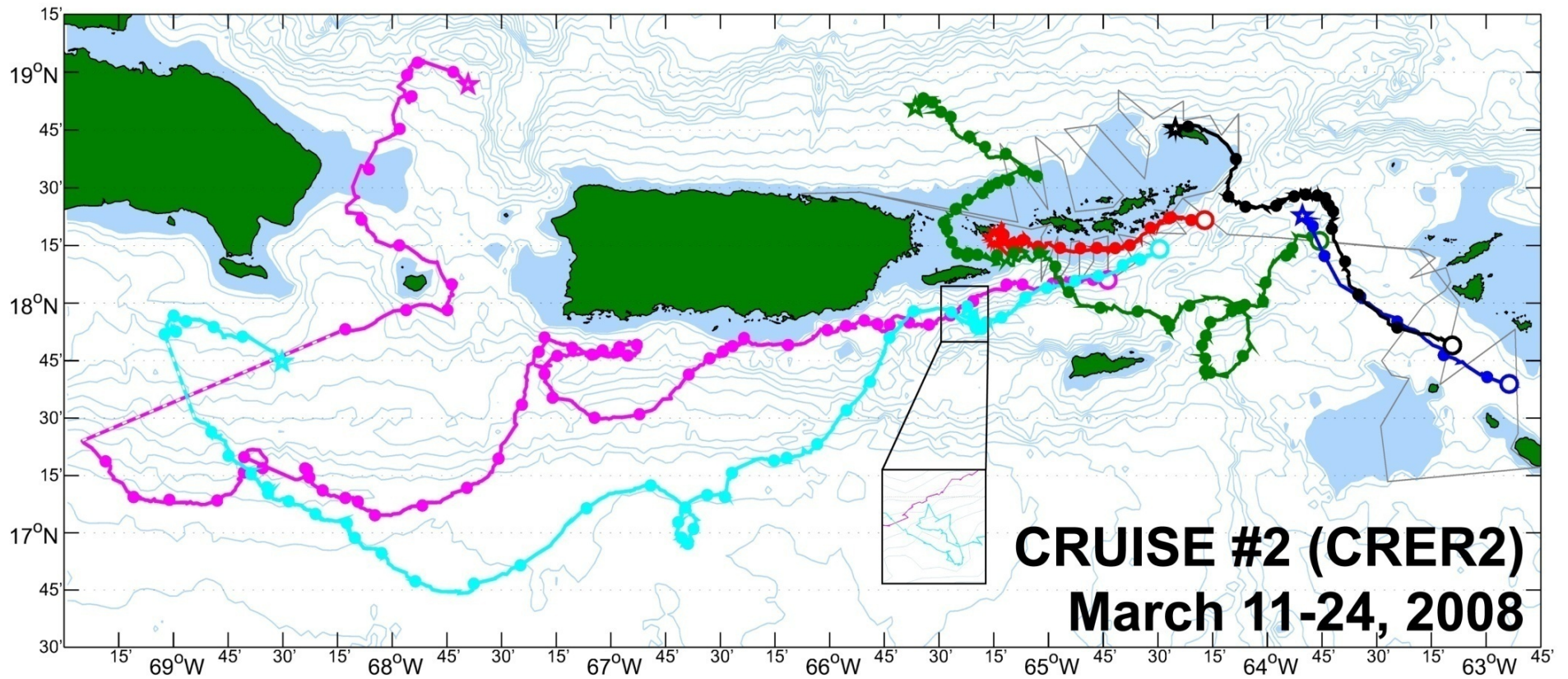


# Future Work

❖ *Continued Coral Reef Ecosystem Research (CRER) in 2010.*

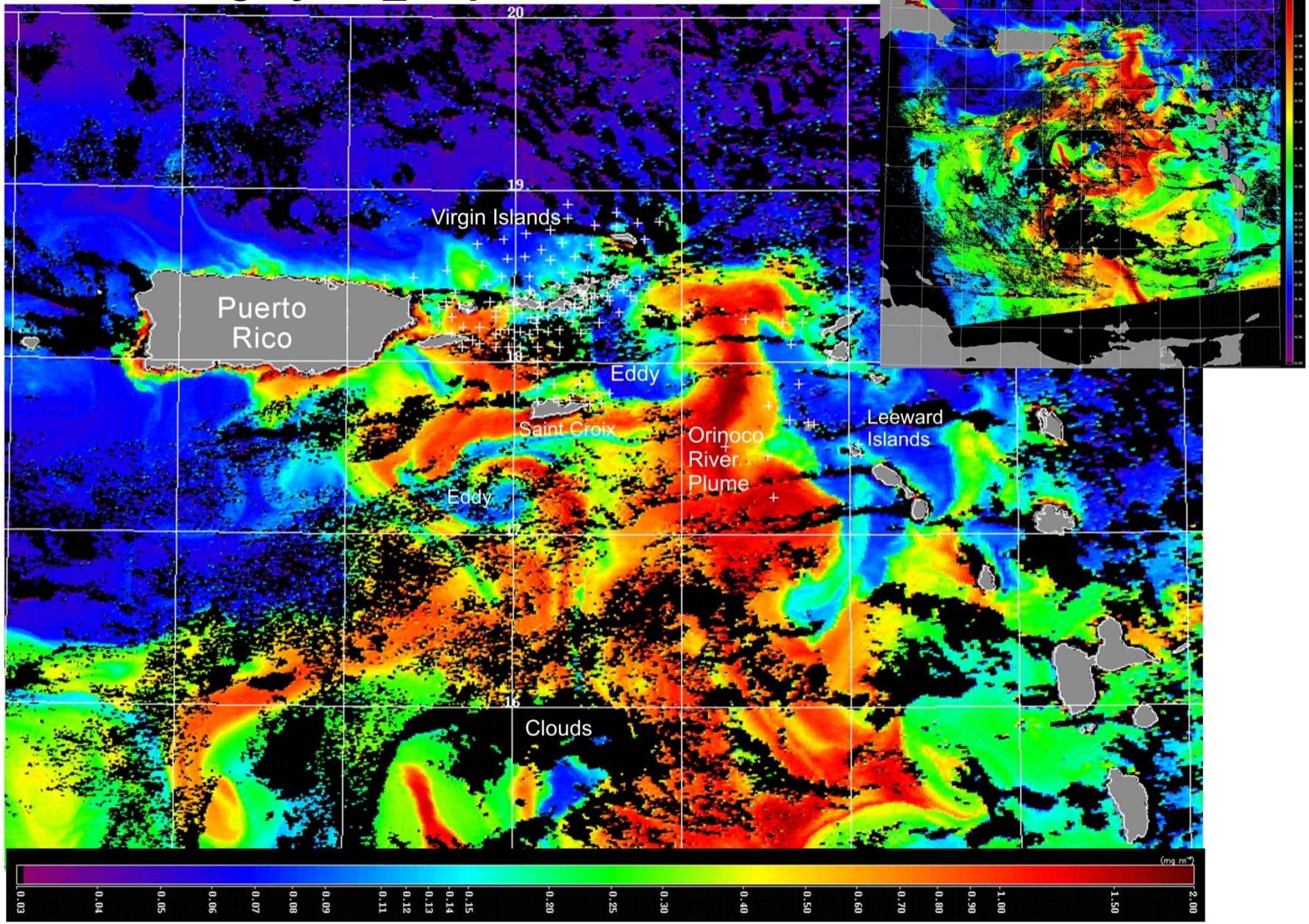
❖ *Cuba?*



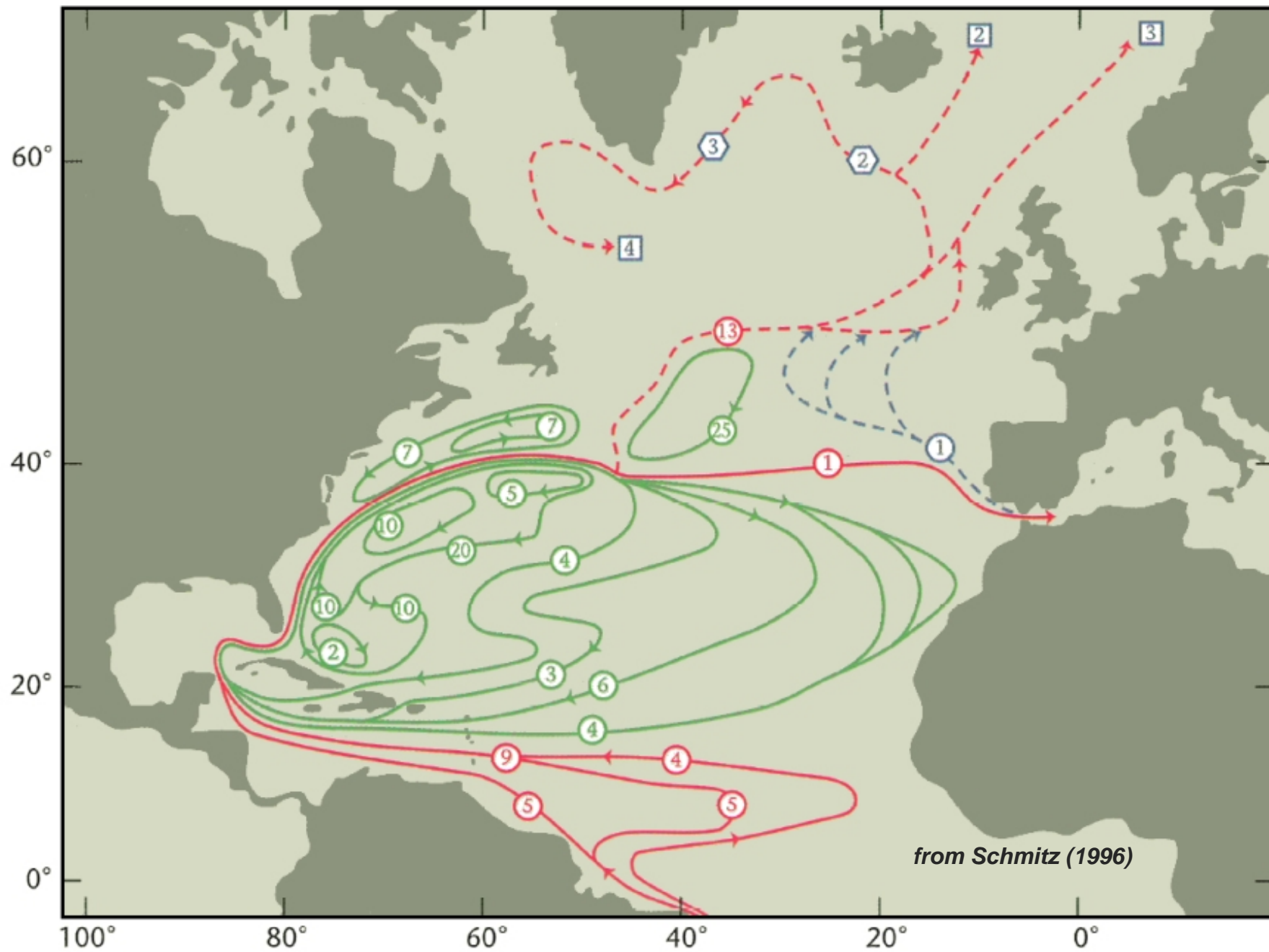


*A Highly Variable Current Regime...  
Surface Drifter Trajectories...*

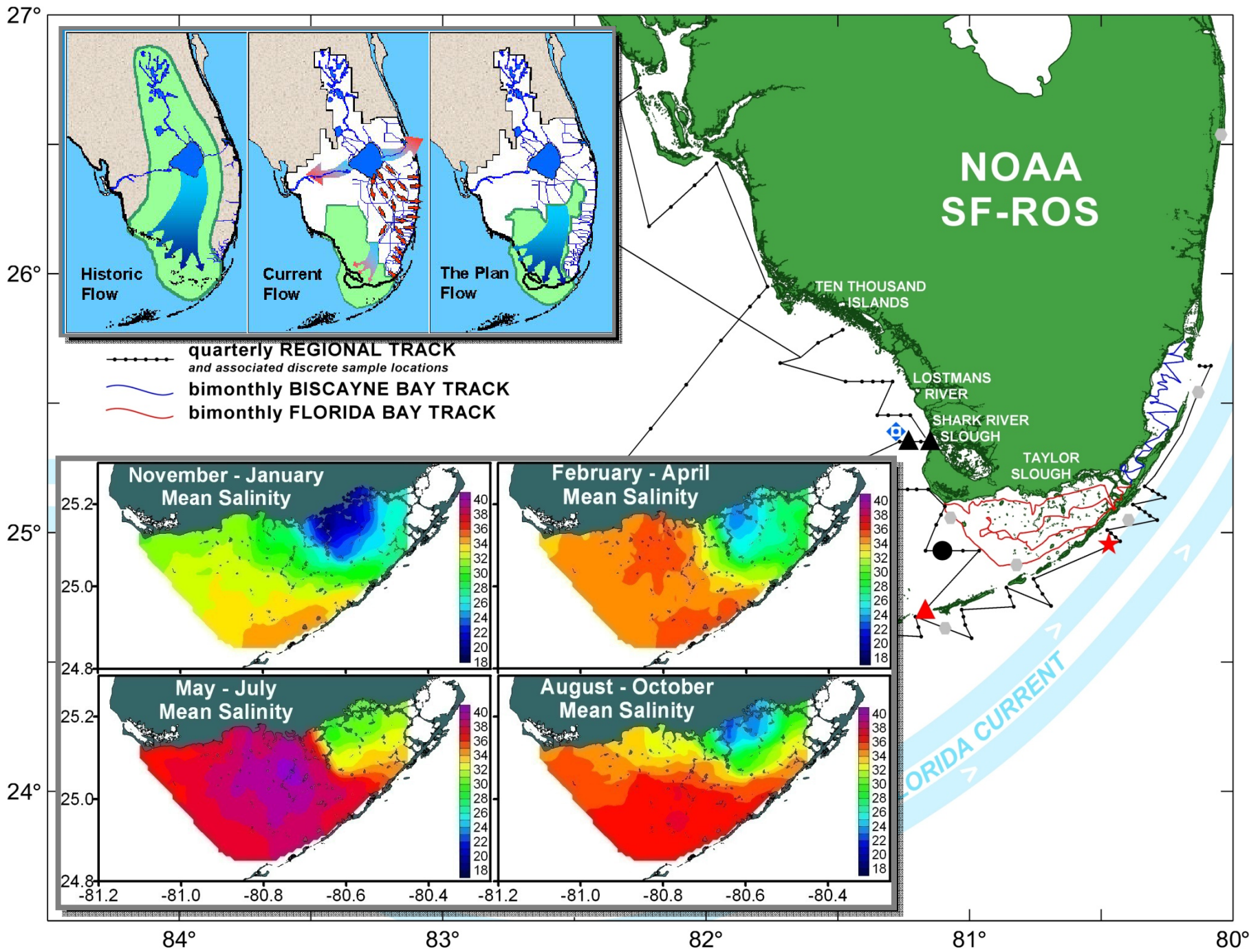
# MODIS Imagery chl\_a April 14, 2009



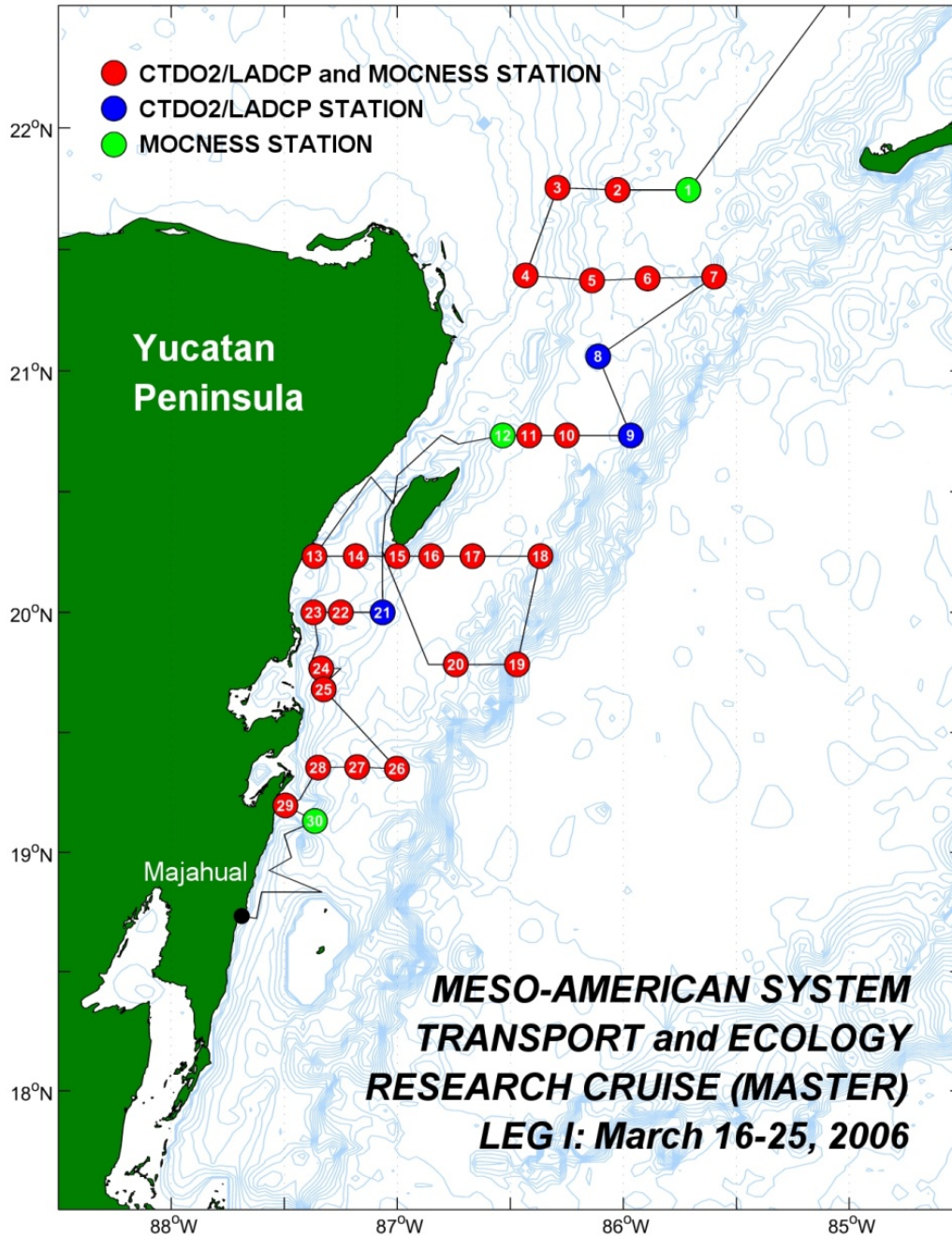
Chl mg/m<sup>3</sup>







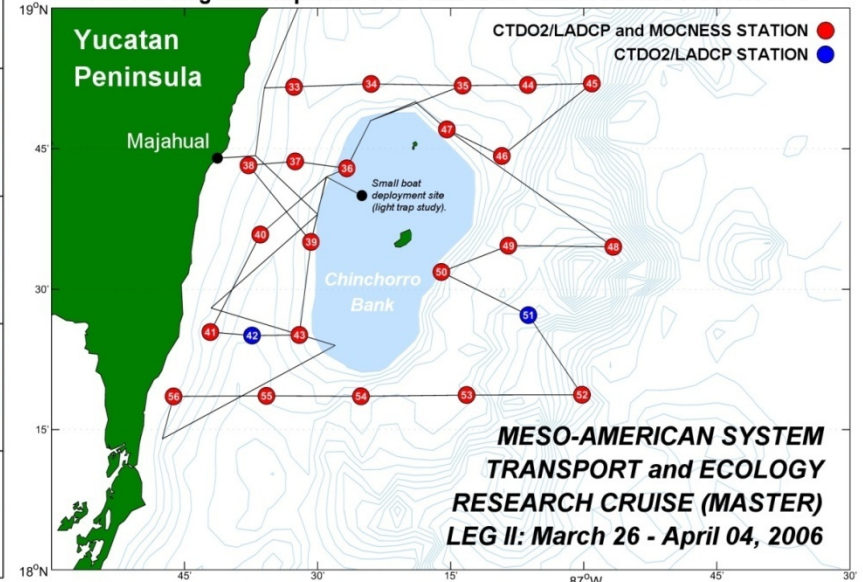
GU0601 Leg I: Completed CTDO2/LADCP and MOCNESS STATIONS



❖ *what is the level of larval dispersal and recruitment connectivity within and amongst the Meso-American Reef, the Dry Tortugas, and the FKNMS?*

❖ *is there evidence of self-recruitment within these ecosystems?*

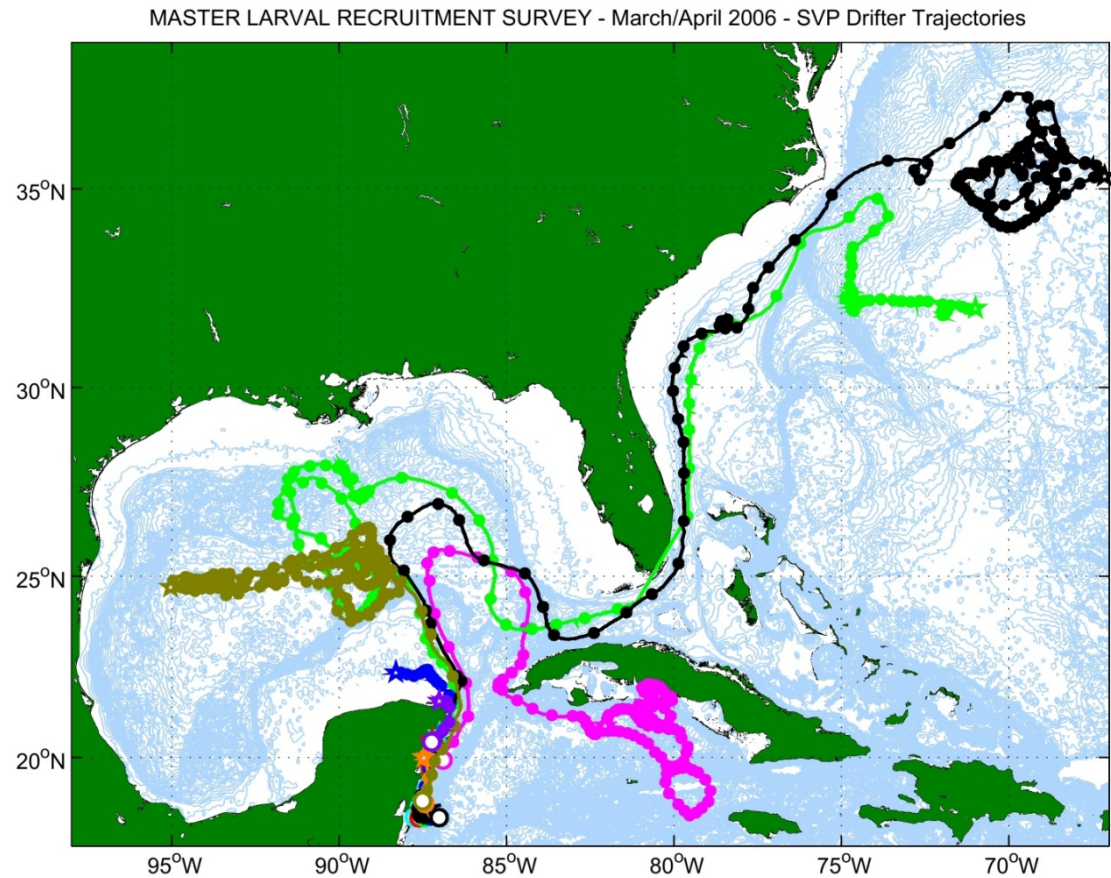
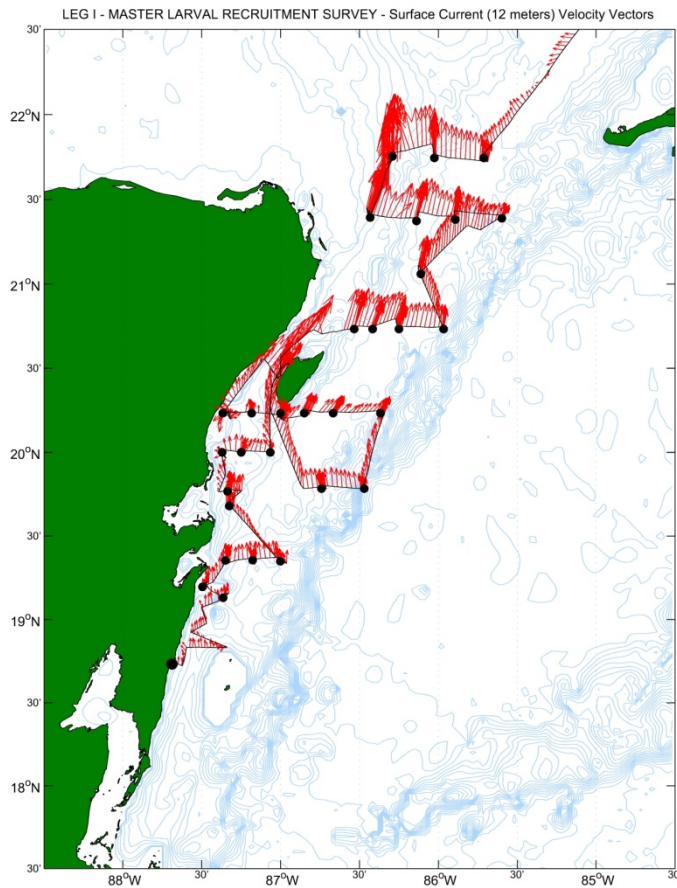
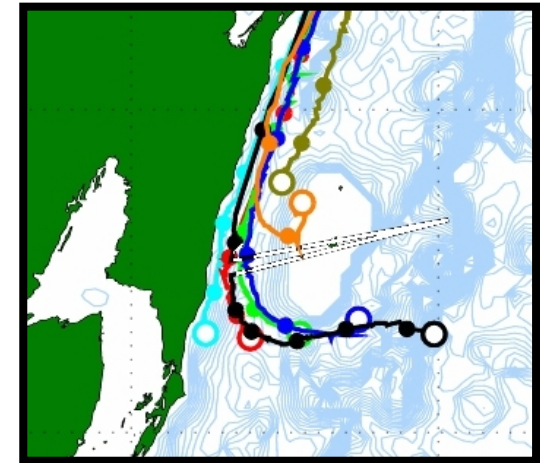
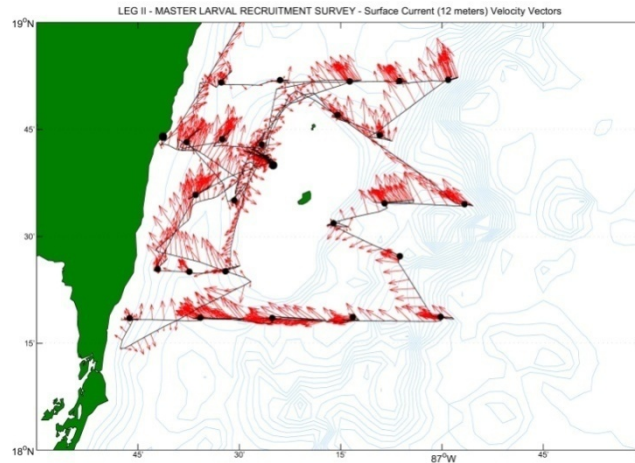
GU0601 Leg II: Completed CTDO2/LADCP and MOCNESS STATIONS



# MASTER 2006 - March 14-April 4, 2006

## SADCP and drifters...

NOAA Ship Gordon Gunter



# MASTER 2007 - January 8 - February 5, 2007

NOAA Ship Gordon Gunter

SADCP and drifters...

