Physical Oceanography Division

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AOML Laboratory Review, *18-20 March 2008*

Outline

- Mission
- Who we are
- Main areas of research
- AOML and IOOS
- Vision

Mission

The mission of the Physical Oceanography Division at AOML is to conduct research relevant to the role of the oceans in climate and ecosystem dynamics and to provide quality ocean data and products in a timely and cost-effective manner to satisfy NOAA's objectives.

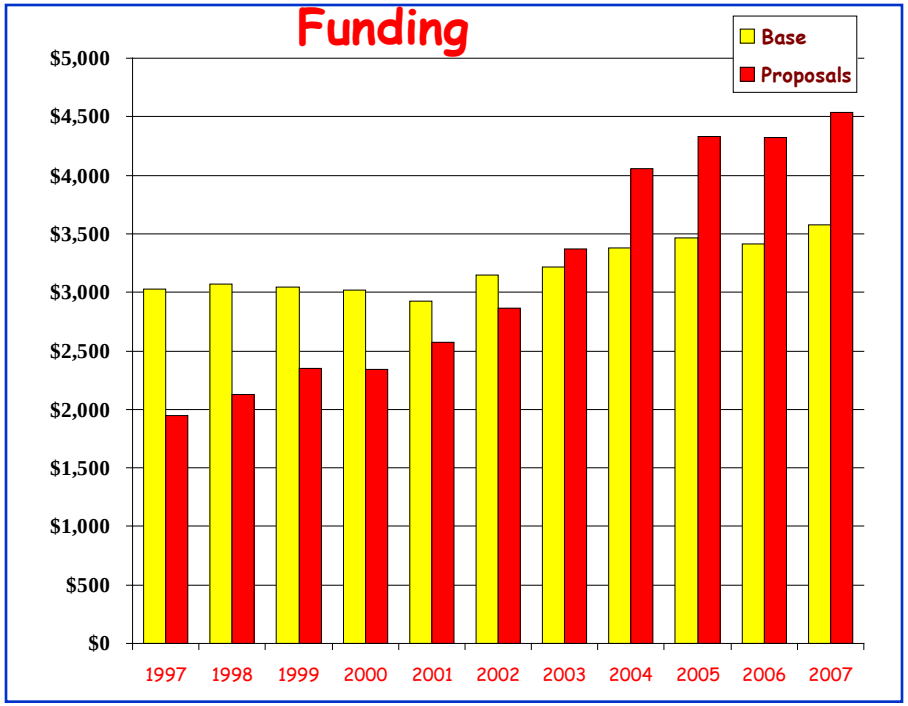

CELEBRATING
200
YEARS
of Science, Service, & Stewardship
NOAA
1807
2007
celebrating200years.noaa.gov
NOTICE
THIS PROPERTY PROTECTED BY ELECTRONIC SURVEILLANCE

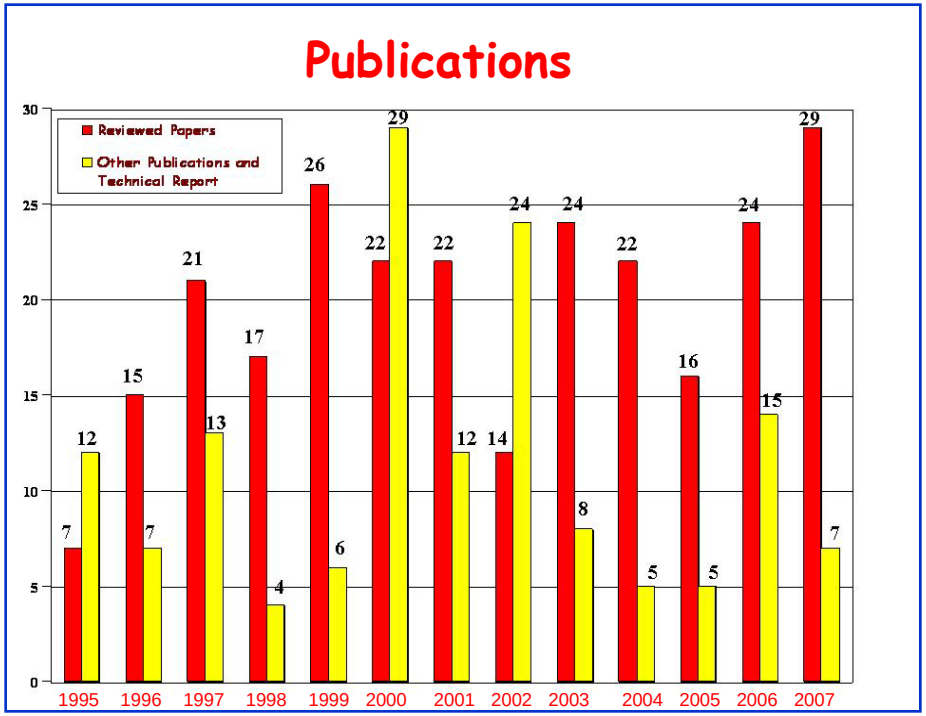
We are an energetic group of scientists who:

- Conduct cutting edge research crossing disciplines in close cooperation with others throughout AOML, NOAA, and the greater scientific community.
- Provide data and products in support of the NOAA mission to improve weather and climate forecasts.
- Are a main partner in the development, deployment and improvement of the NOAA/IOOS sustained Ocean Observing Systems for Climate and Ecosystems.
- Are a major center for the collection, dissemination, interpretation and use of global oceanographic and surface marine atmospheric data.

Funding and Publications

PhOD was funded in FY07 with $3,579,000 in base and $4,535,800 in proposals. A total of 21 proposals were funded.





The average number of peer reviewed scientific publications has steadily increased (at the rate of 1.5 papers per year). In FY07 29 papers were published.

Main Areas of Research

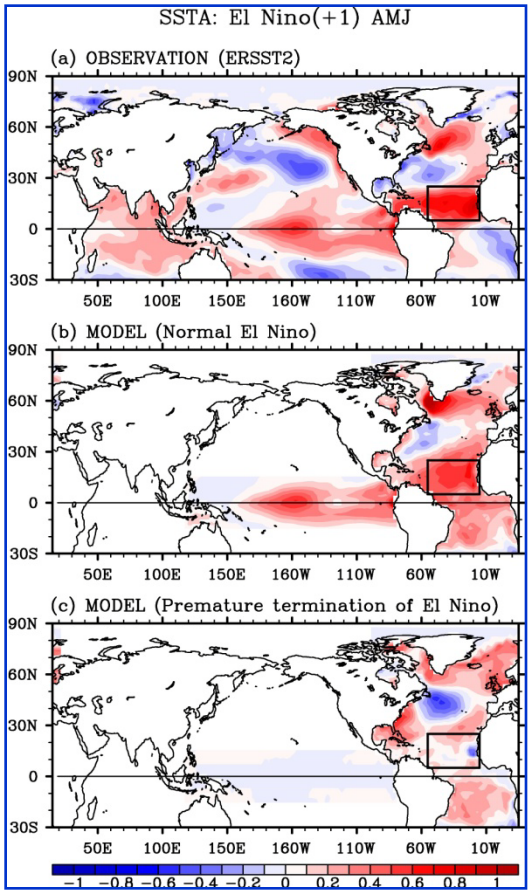
AOML Conducts research related to three NOAA formal Goals

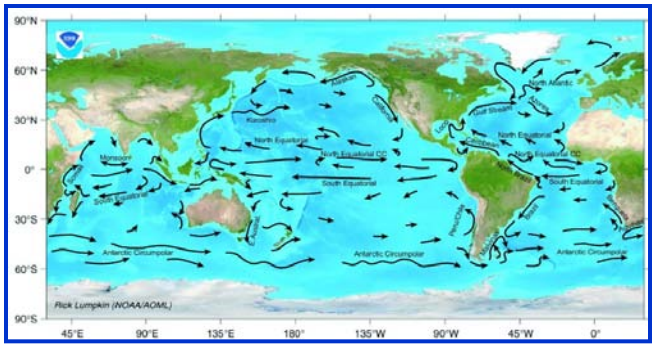
- **Climate**
- Ecosystems
- Weather and Water

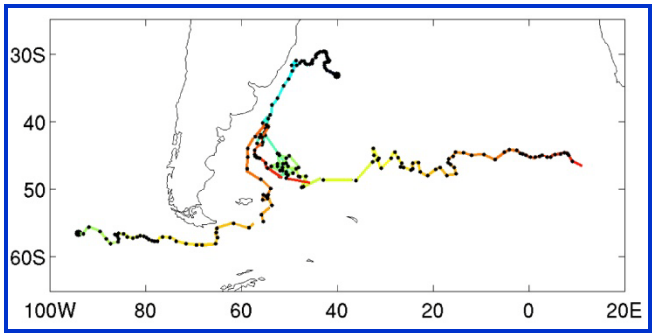
NOAA's Climate Goal, as stated in the NOAA Strategic Plan, is to:

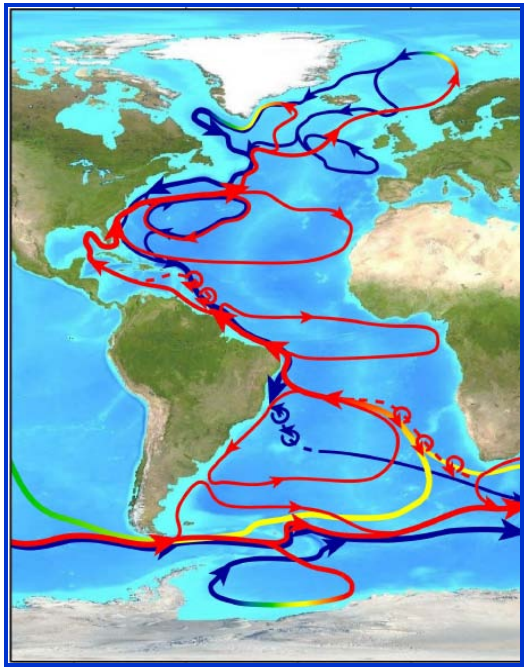
"Understand and describe climate variability and change to enhance society's ability to plan and respond".

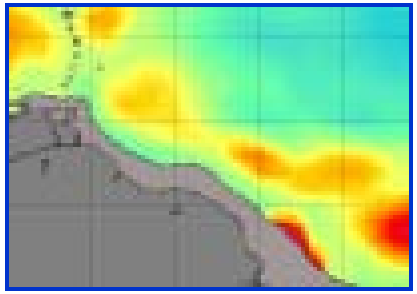
Ocean Circulation and Climate

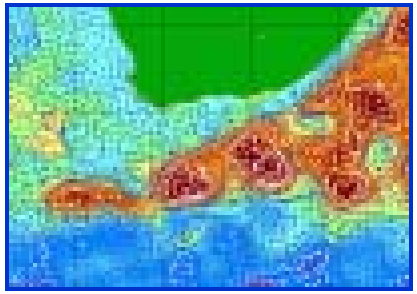


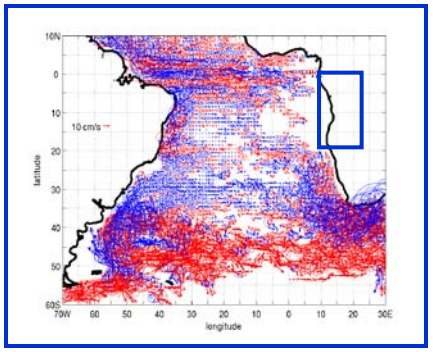






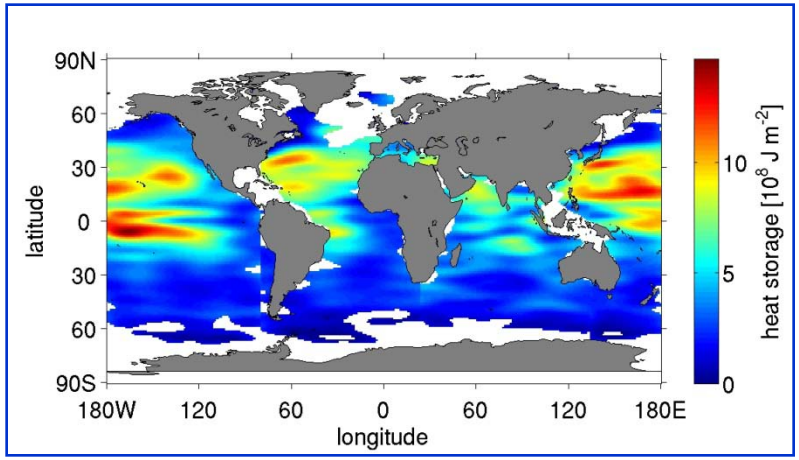




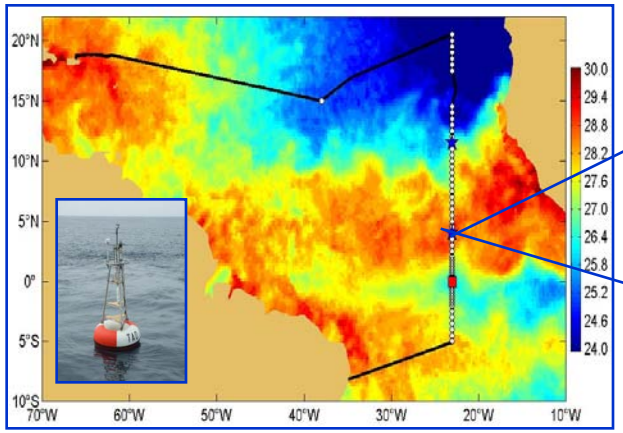


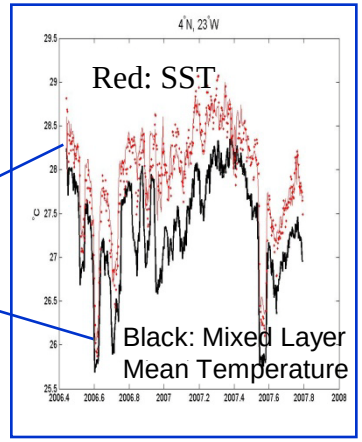
Mesoscale and Upper Ocean Processes

Mixed layer heat storage in 1/2007 (Argo, XBT)

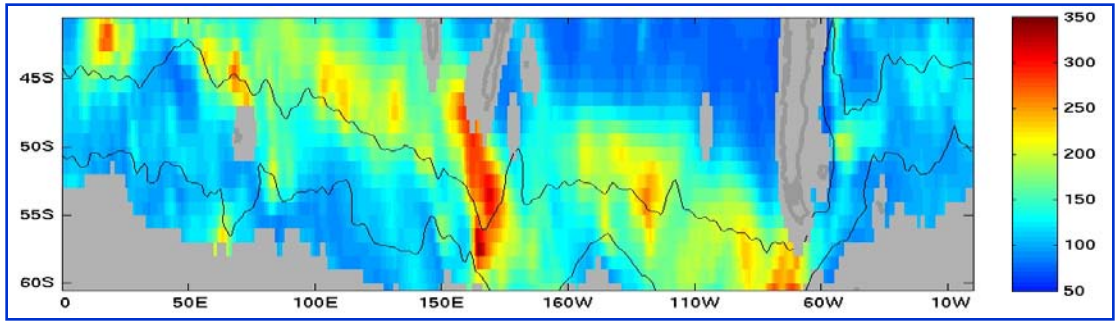


Track of Ronald Brown 2006 PIRATA NEE cruise

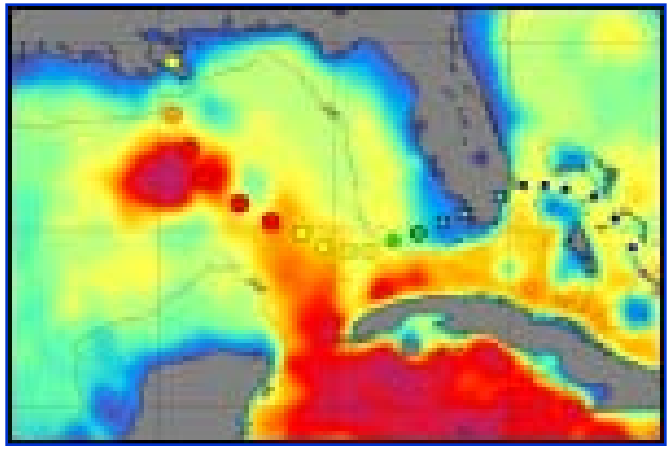




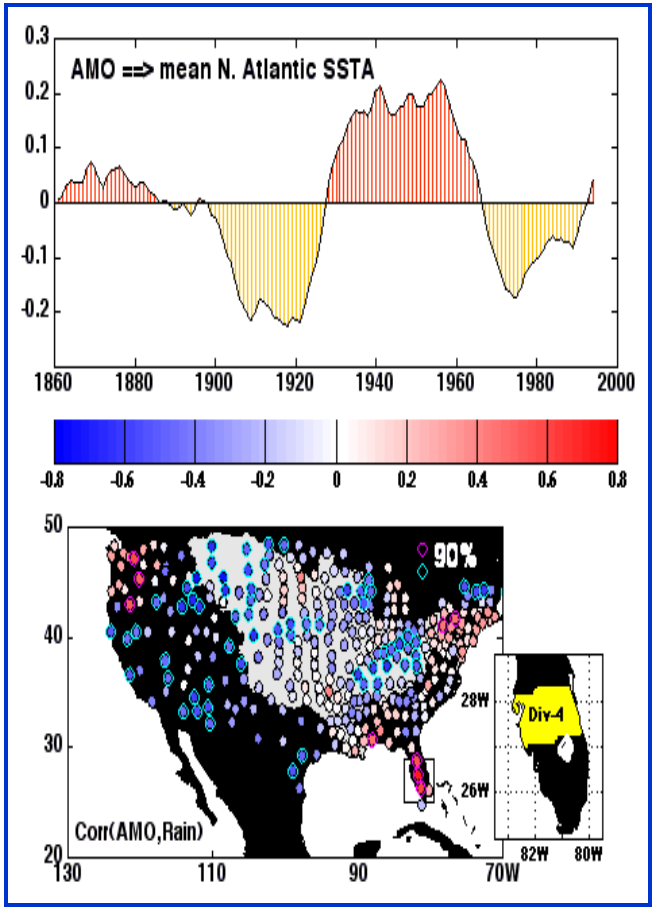
Imbalances in Southern Ocean heat budget accounting (W/m^2)

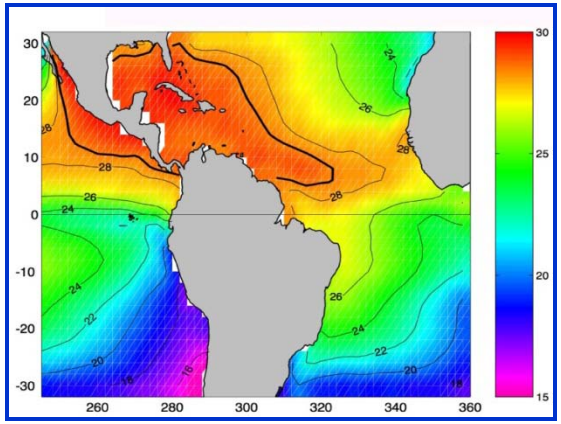


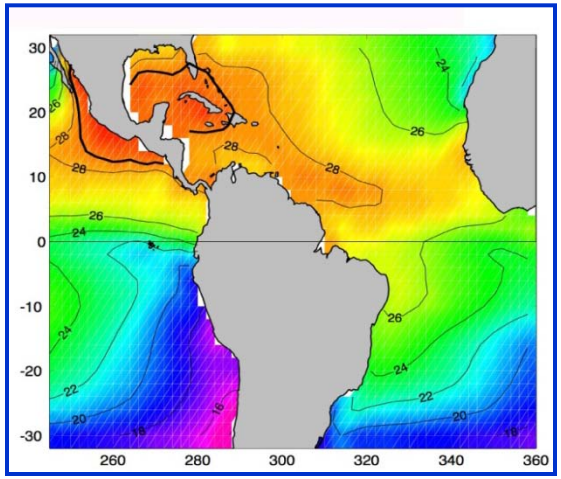
Real time Tropical Cyclone Heat Potential (Altimeter)

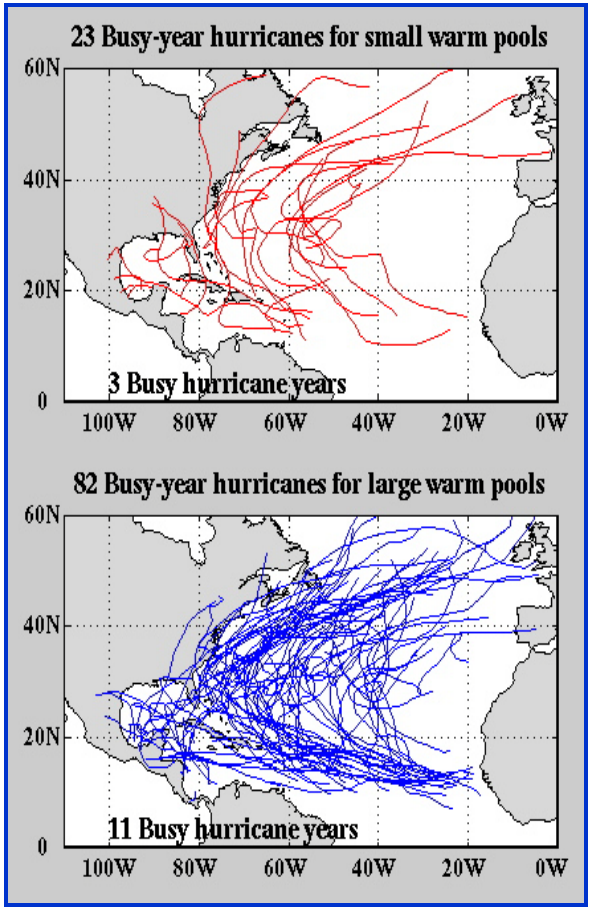


Ocean variability and its influence on the climate and weather of the surrounding continents

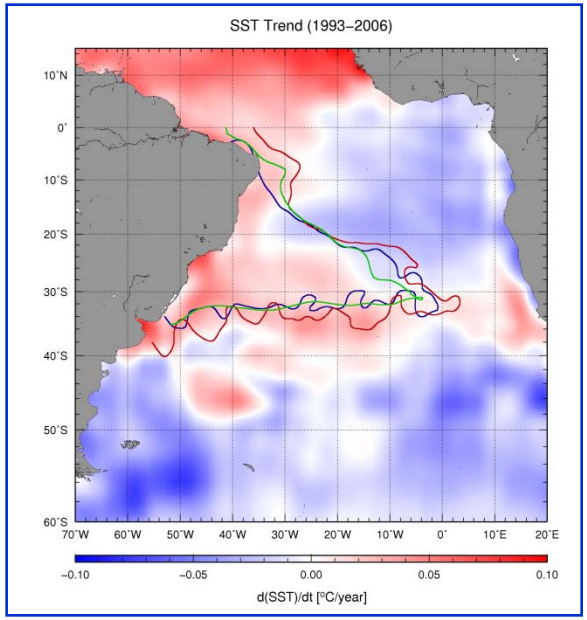


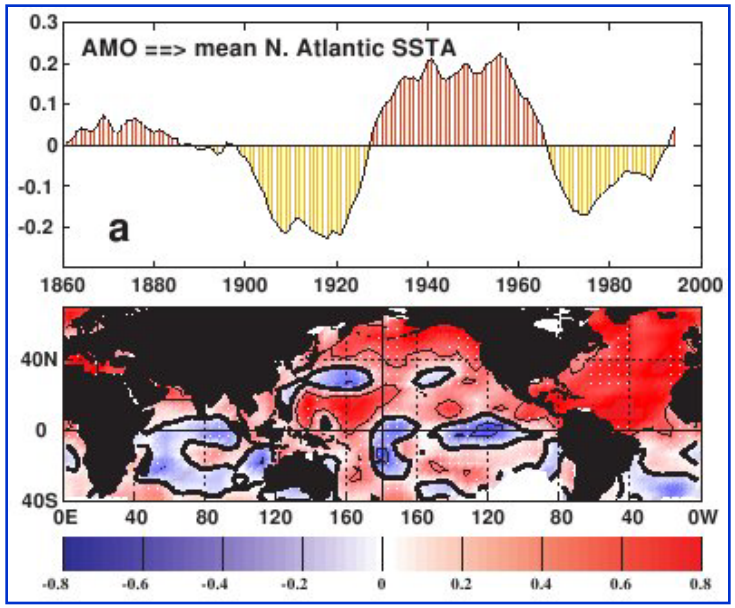




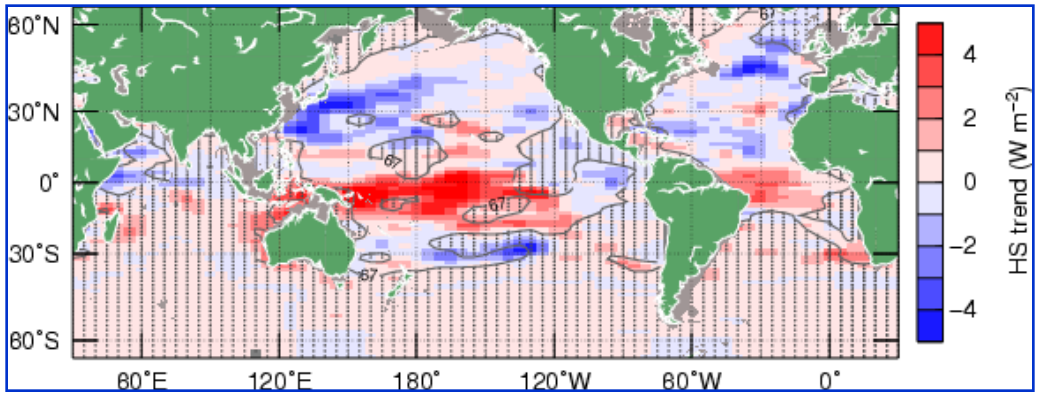


Global Ocean Variability and Trends

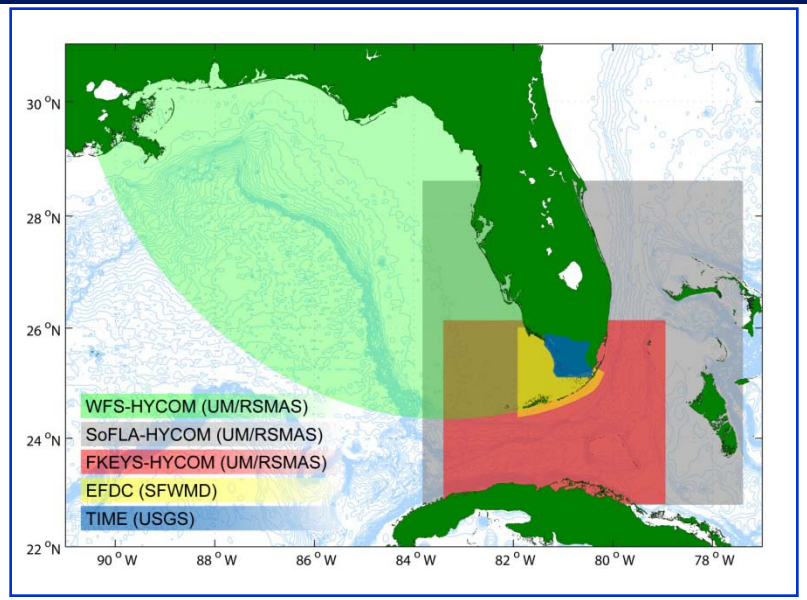




Heat content trend in the Mixed layer (Argo + XBT) 2000-2006

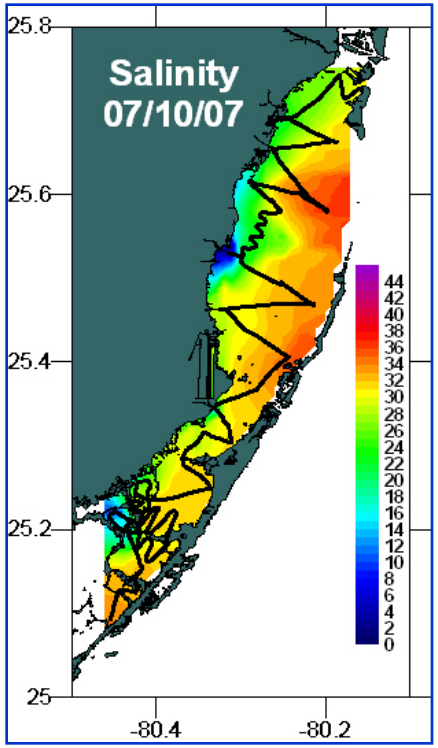


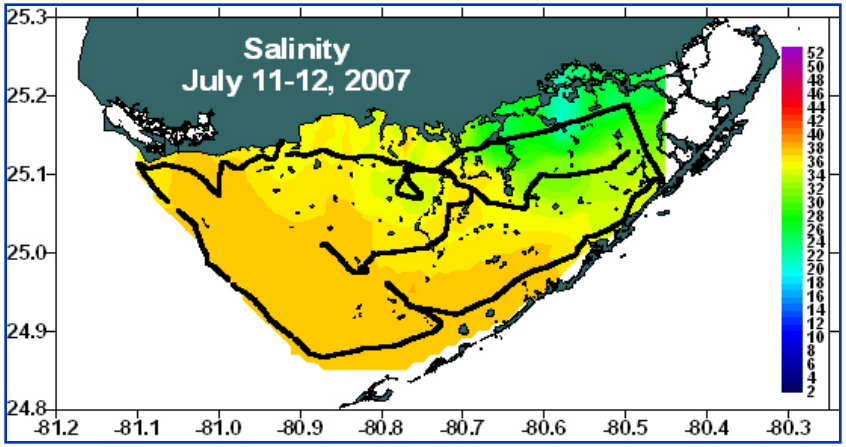
Physical characteristics of coastal areas and their role in ecosystem dynamics



Extended areas

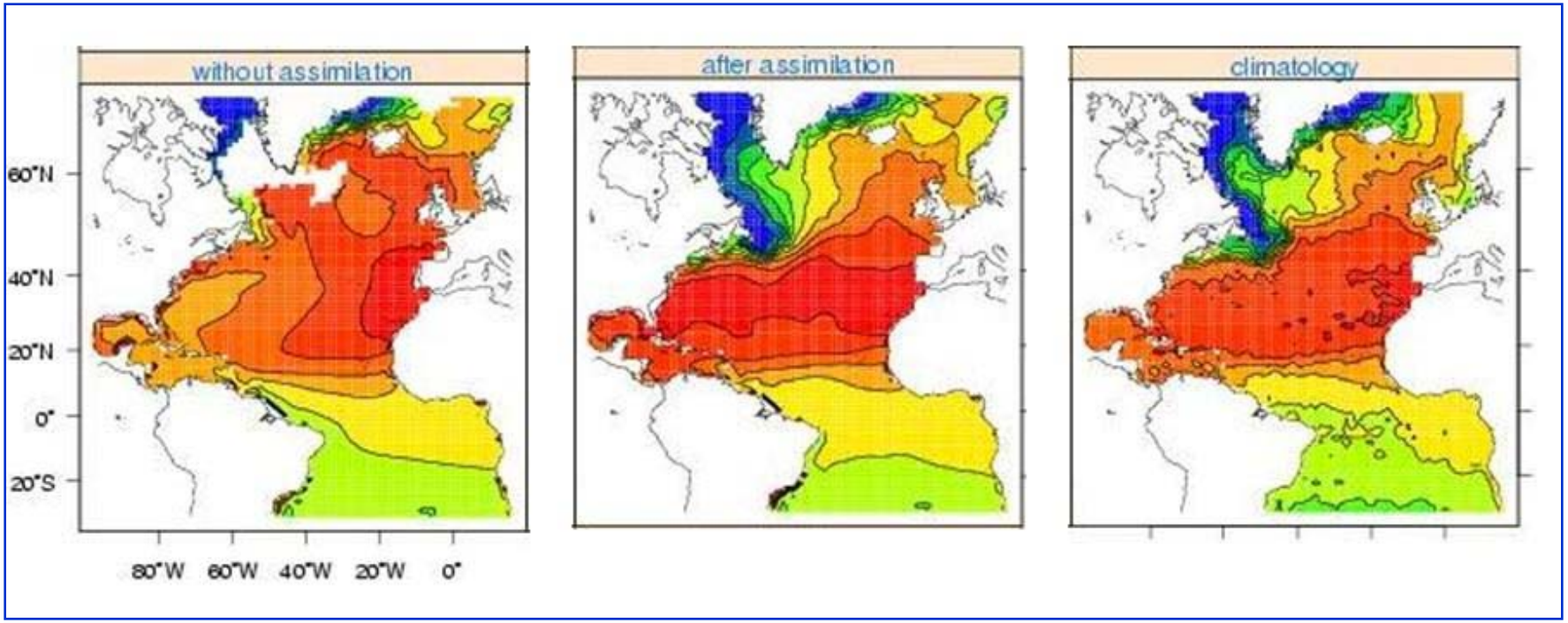
Biscayne Bay





Florida Bay

Data analysis and assimilation for ocean prediction



AOML and IOOS

NOAA INTEGRATED OCEAN OBSERVING SYSTEM (IOOS) PROGRAM

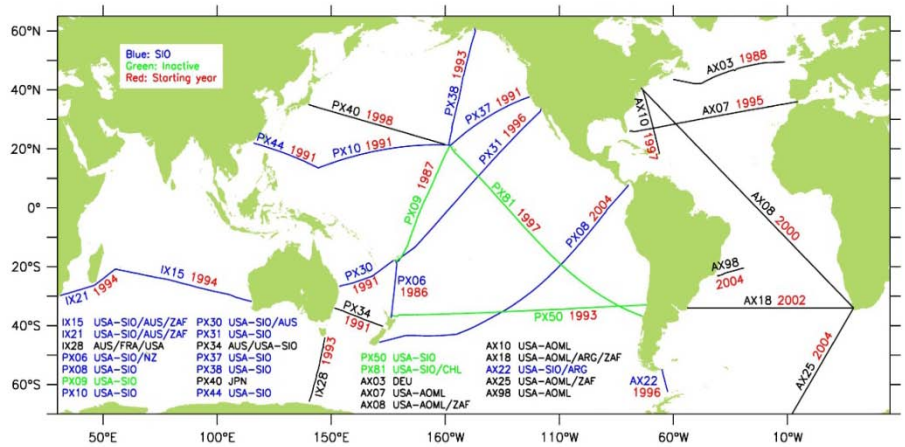
STRATEGIC PLAN 2008-2014

OCTOBER 2007

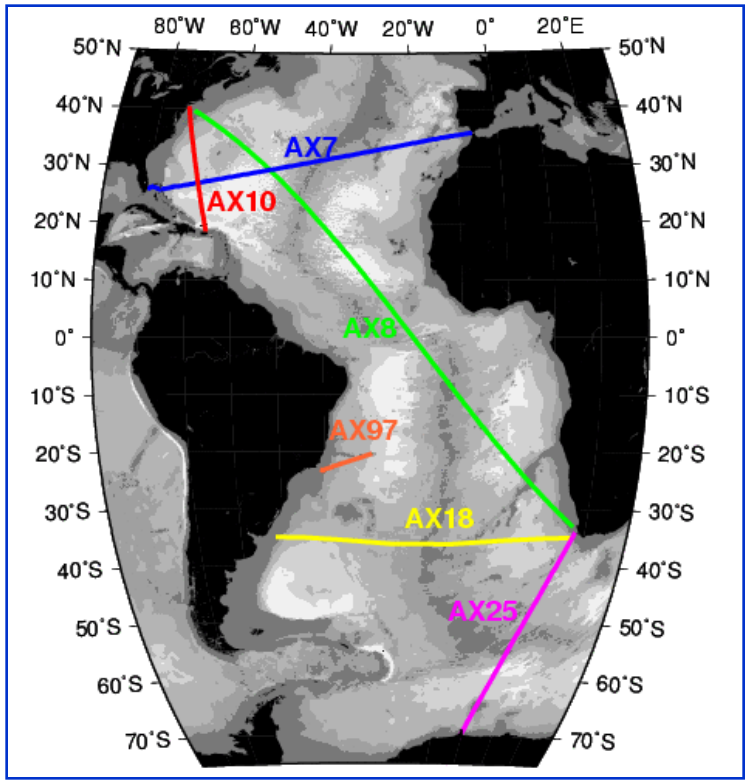
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
NOAA IOOS PROGRAM

Ship of Opportunity Program

Low Density and Frequently Repeated XBT Lines



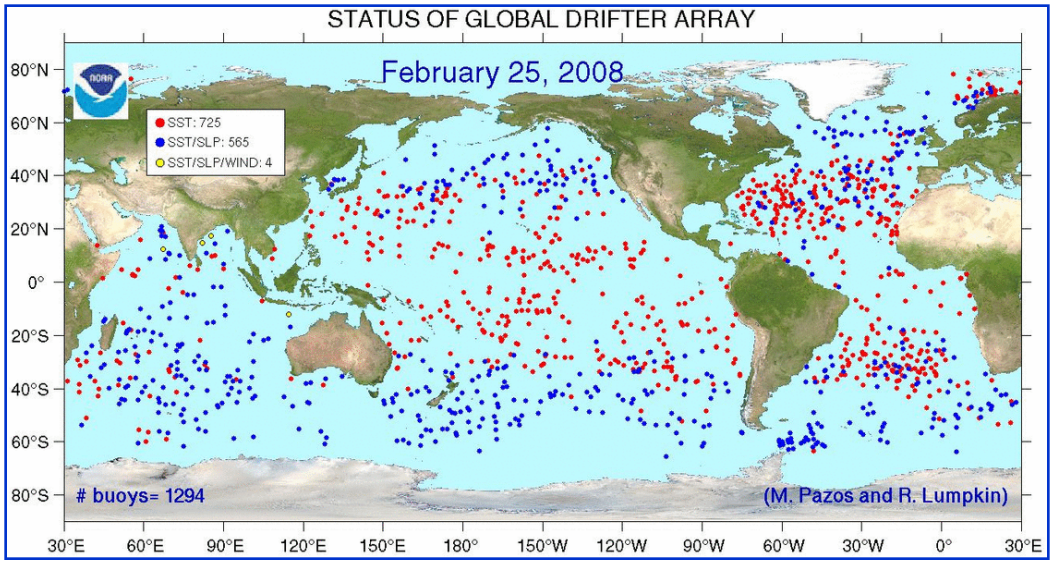
High Density XBT Lines



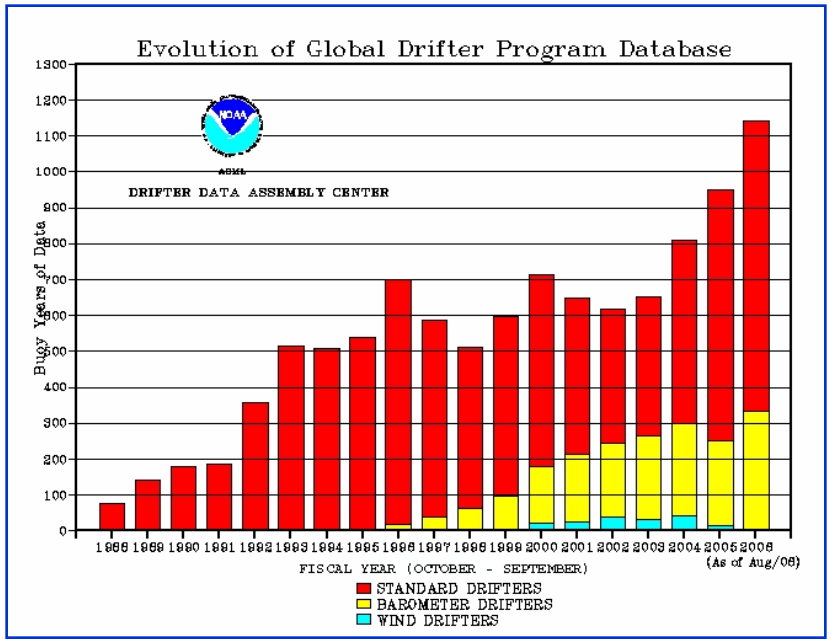
Thermosalinographs (TSGs)

SEAS - AMVER/SEAS Shipboard Environmental (data) Acquisition System (SEAS)

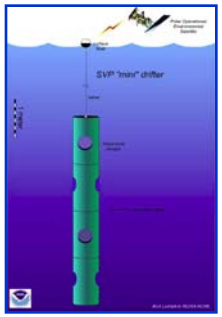
Global Drifter Program



Drifter Data Assembly Center



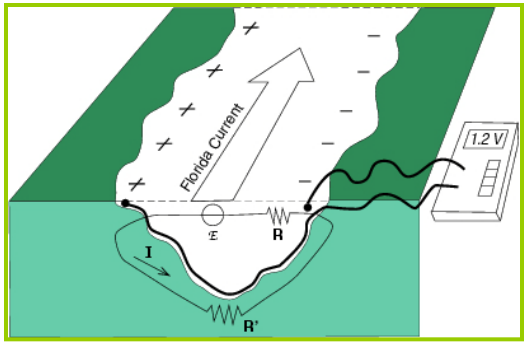
The GDP Operational Center



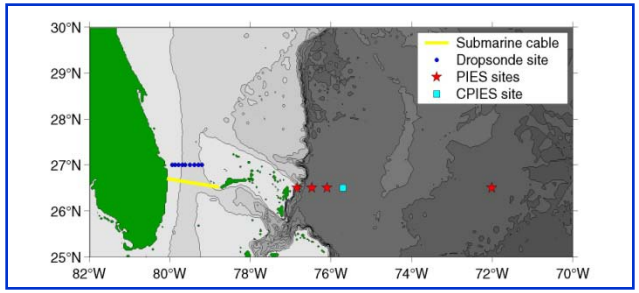
Western Boundary Time Series in the Atlantic Ocean

Bronze Medal 2007

Florida Cable Transport Time Series



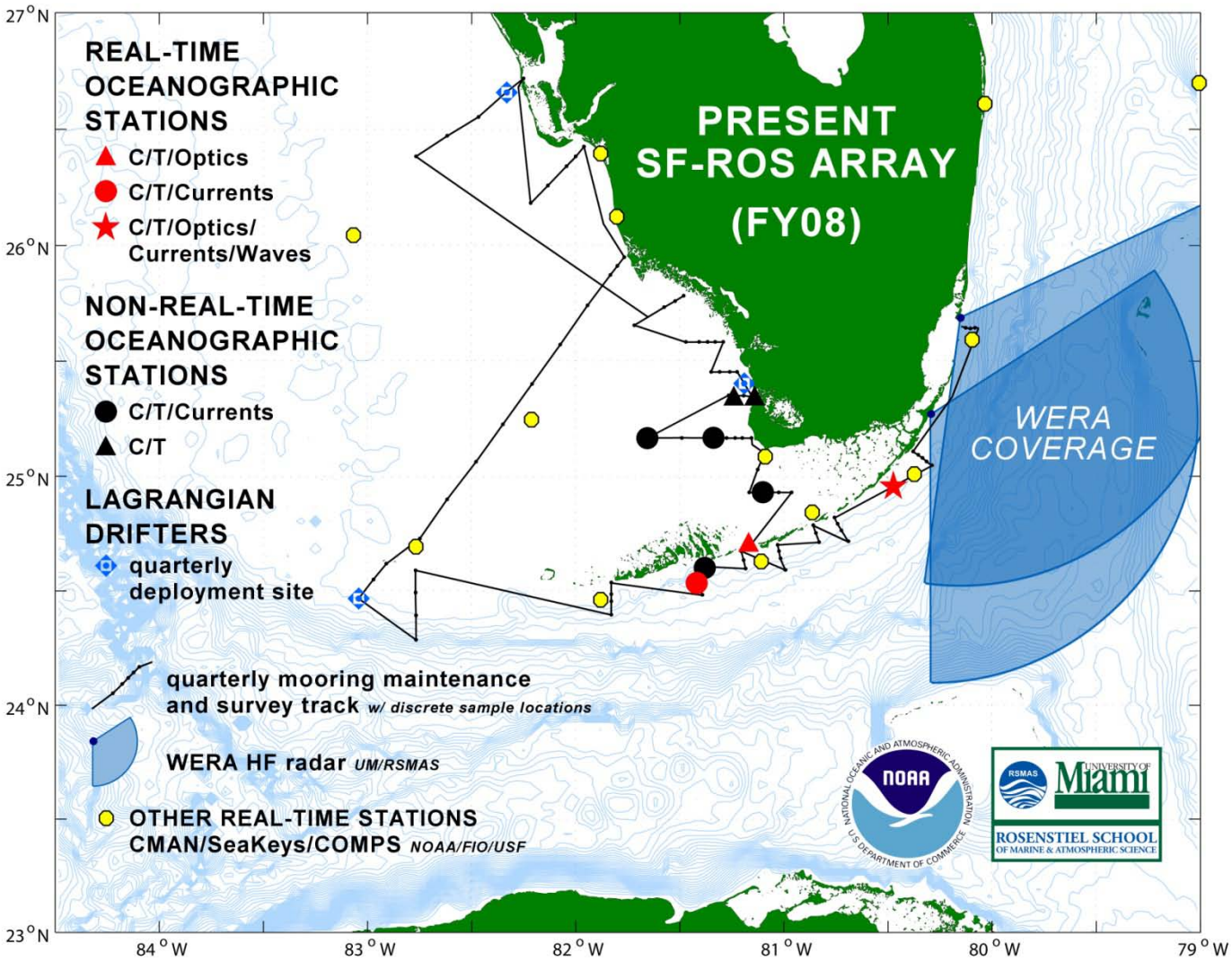
Florida Current Cruises



Deep Western Boundary Current Hydrography

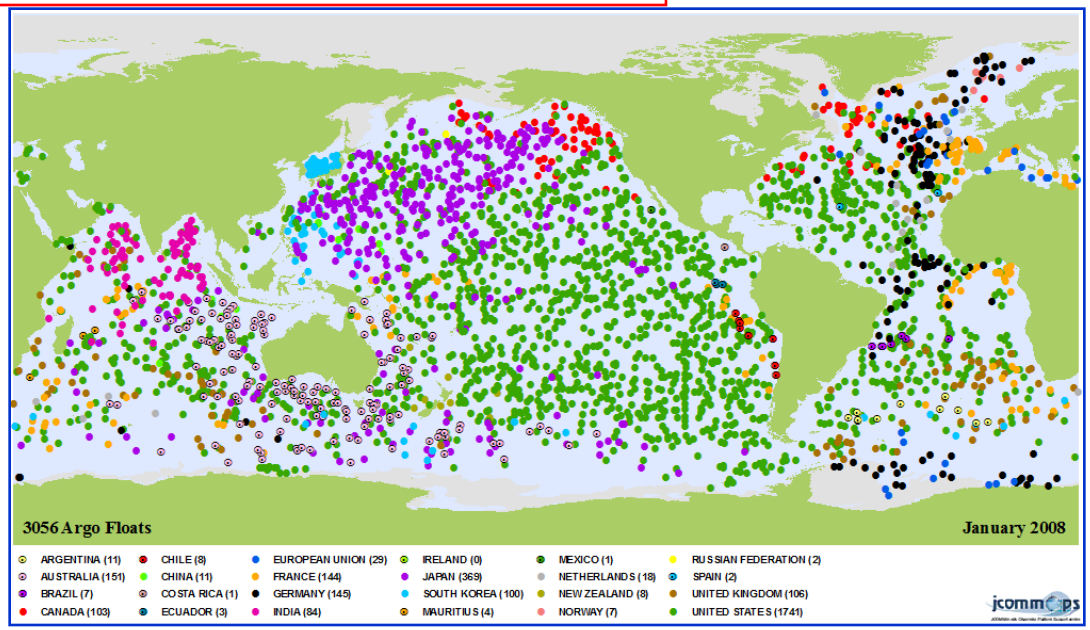
Deep Western Boundary Current Transport Time Series

South Florida sub-Regional Observing System

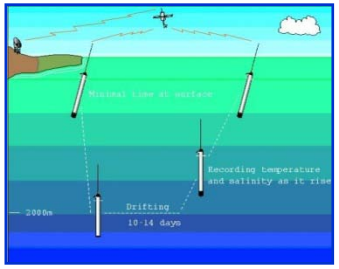


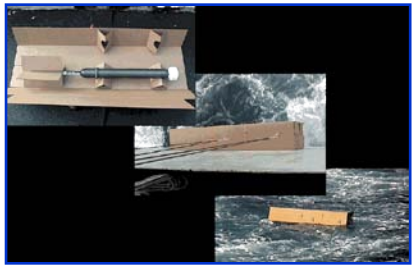
Argo

2003 NOPP Excellence in Partnership Award



2004 NOAA Administrator's Award





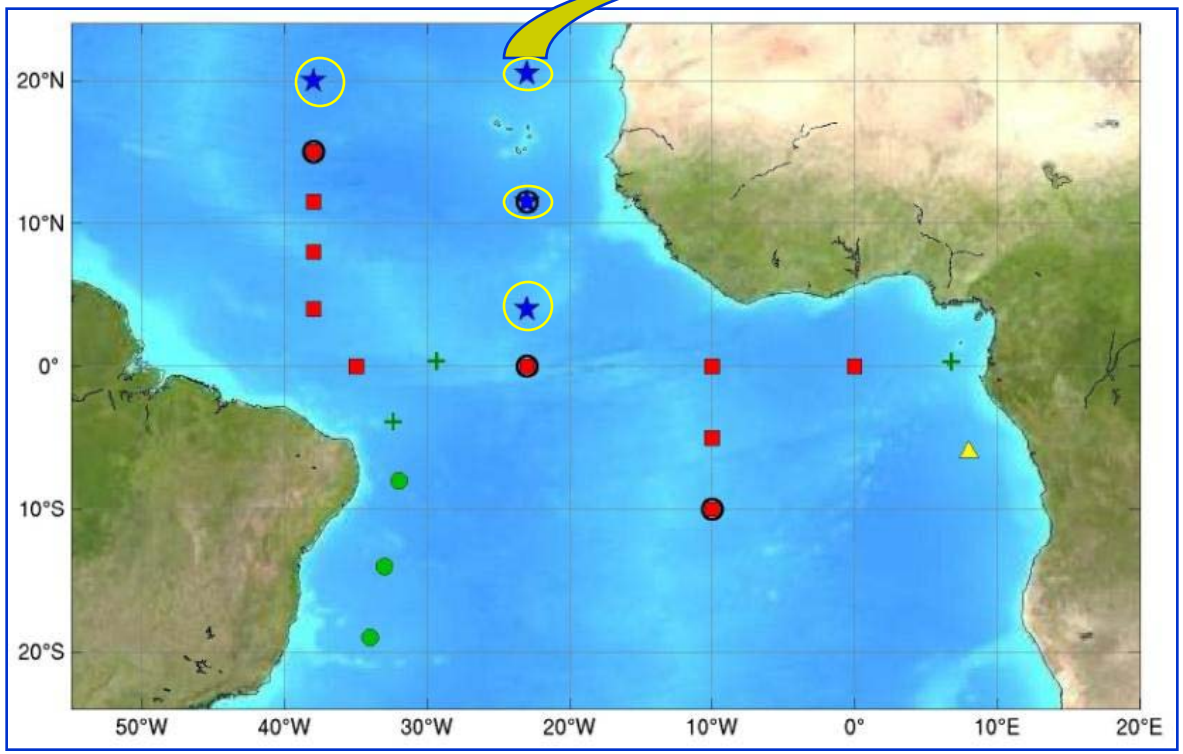
At AOML:

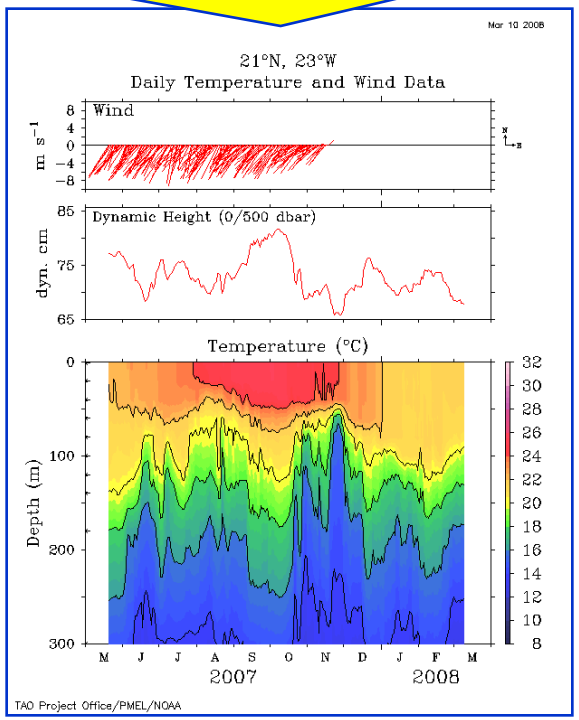
- US Argo Data Assembly Center
- Deployment of Atlantic floats
- South Atlantic Argo regional Center

Consortium:

SIO PMEL
WHOI AOML
UW

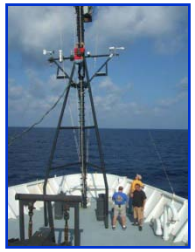
Pirata North – East Extension





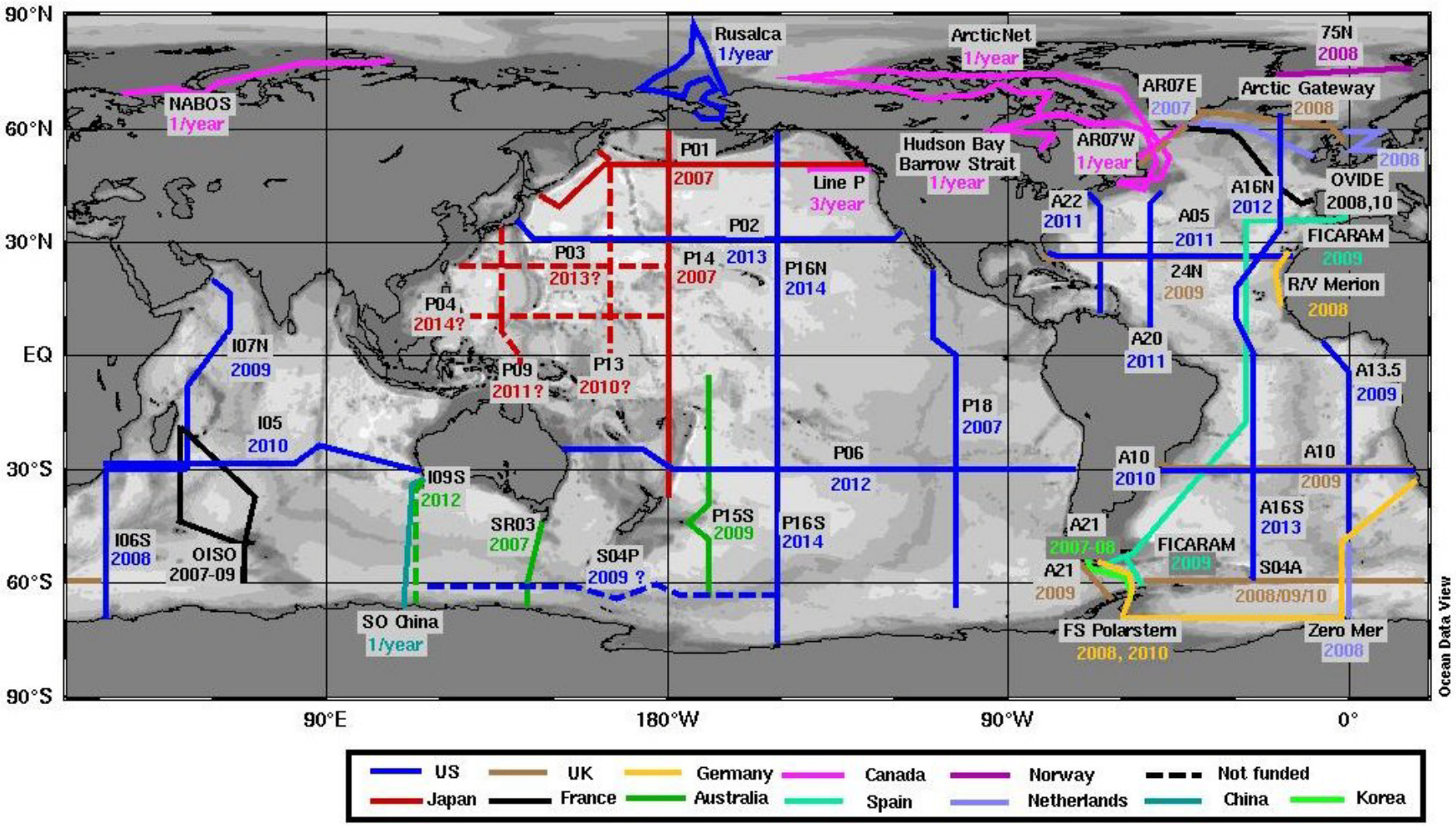






AOML Collaboration with PMEL and ESRL

CLIVAR/CO2 repeat hydrography lines

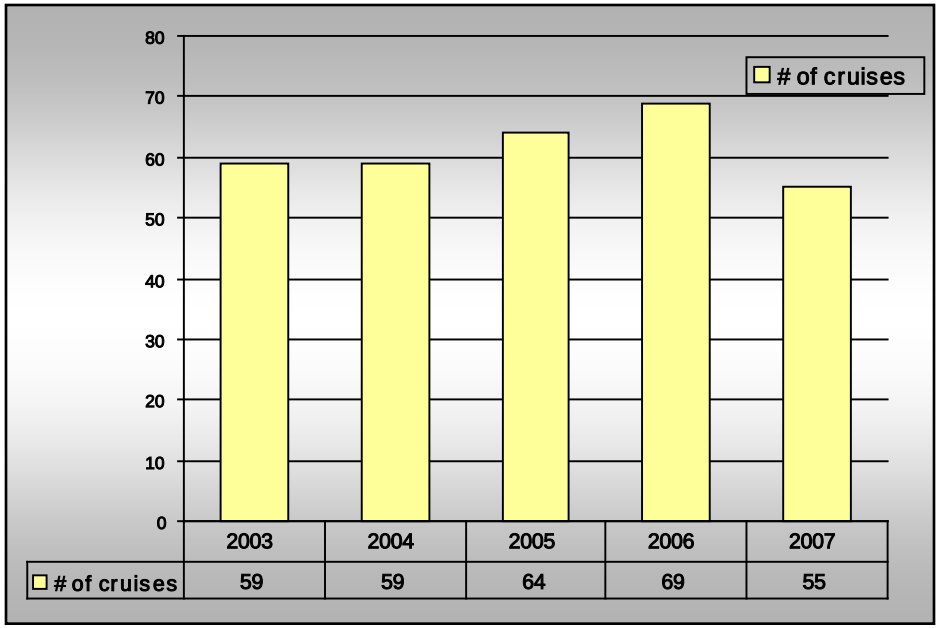


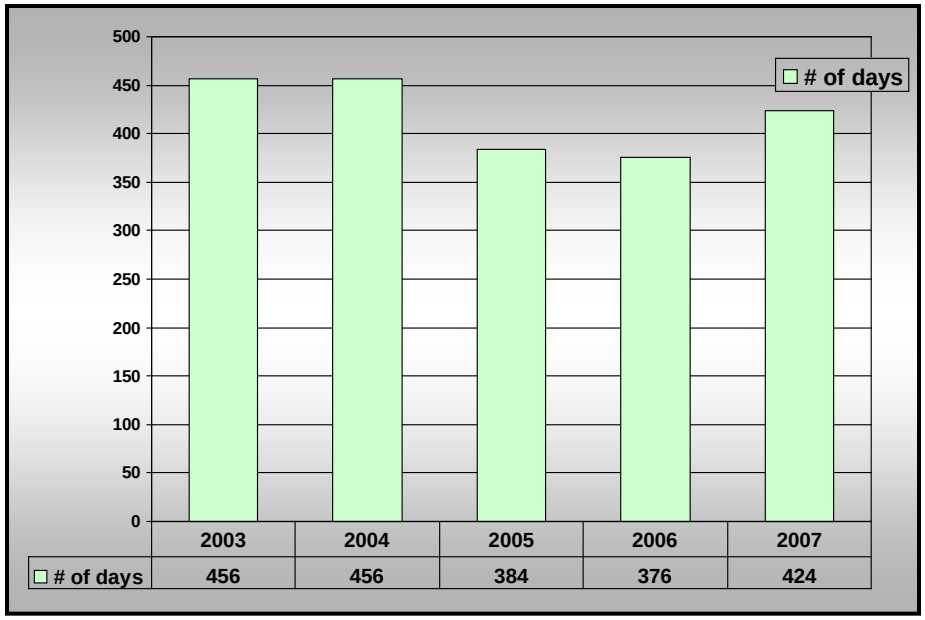
NSF/NOAA program

AOML in charge of the Atlantic lines.

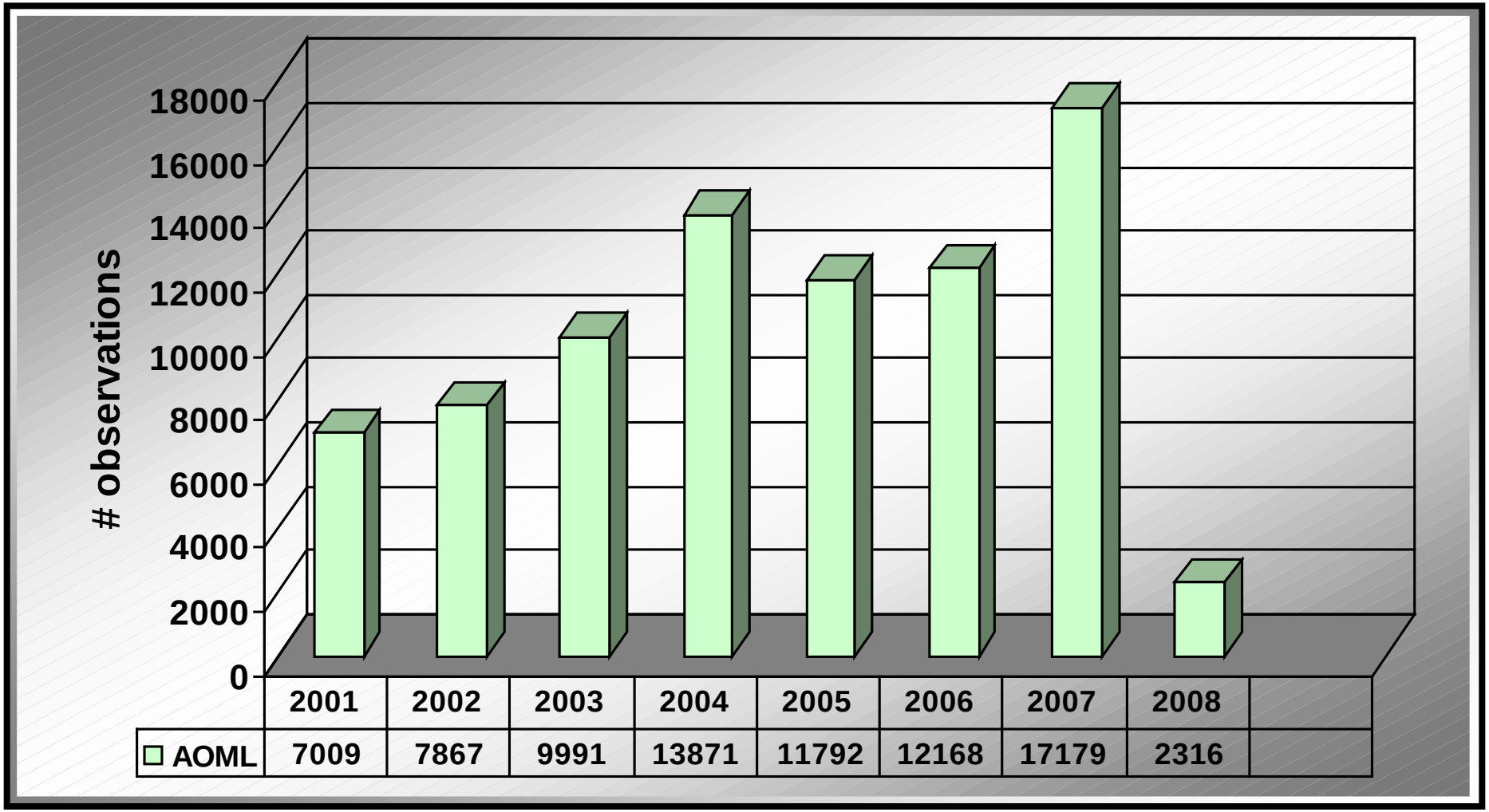
Collaborate with PMEL and others in the other oceans.

Number of cruises and days at sea





XBT Data

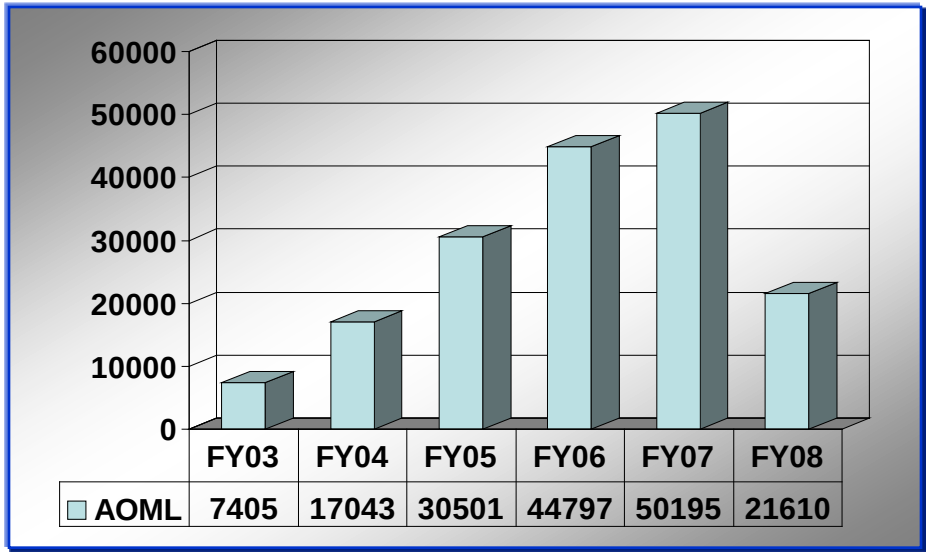


	2001	2002	2003	2004	2005	2006	2007	2008
AOML	7009	7867	9991	13871	11792	12168	17179	2316

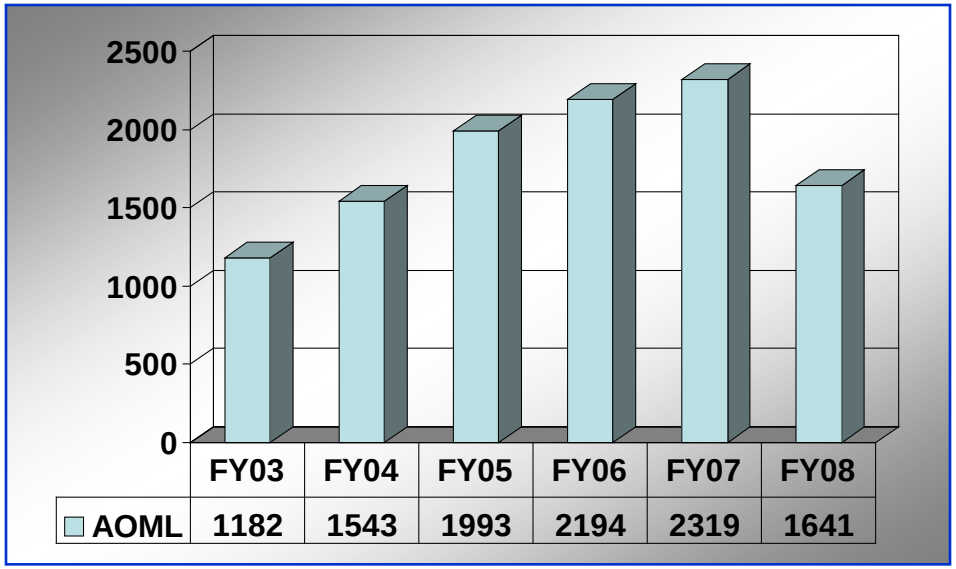
Number of XBT data processed at AOML

Float and drifters observations

Number of Argo float profiles processed at AOML



Number of surface drifters processed at AOML



Stakeholders

- Operational Agencies Worldwide (*e.g.* NCEP, NASA, NMSS, NRL, ECMWF, UK Met, Mercator, JMA, etc)
- International Research Community (*e.g.* More than 350 reviewed papers using drifter data, 364 acknowledging the use of Argo data)
- Search and Rescue (*e.g.* Coast Guard)
- Maritime industry
- Equipment manufacturers
- Recreation
- Education (*e.g.* schools K-12, Adopt a buoy , Semester at Sea, etc.)
- Outreach
- General public

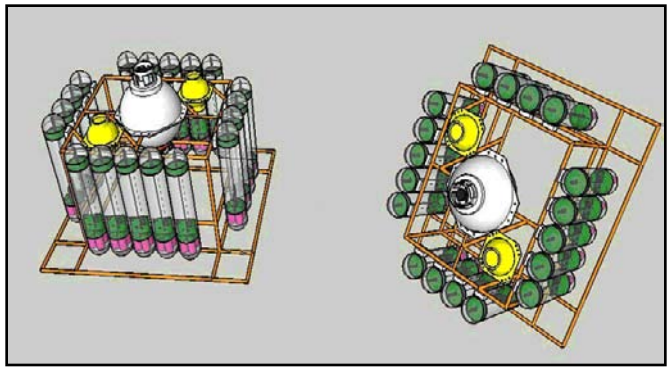
Instrument Development

XBT 8-probe Auto launcher

Mini drifters

Dropsonde

Pop-up System



Real time data transmission systems using satellites, cellular phones, and radio modems

Our Vision for the Future

- **Be a major center for the collection, dissemination, interpretation and use of global oceanographic and surface marine atmospheric data.**
- **Conduct research to improve our understanding of the role of the ocean in climate variability and change scenarios.**
- **Conduct interdisciplinary research in coastal waters to support NOAA's strategic goal to protect, restore, and manage the use of coastal and ocean resources.**

Play a major role in bridging the gap between observations and models by:

- Analyzing and interpreting the data collected, and to generate products to develop a better understanding of the state of the ocean and the implications of its variability for climate.

- Jointly analyzing model products and observations to validate models, determine what phenomena different models resolve, enhance the observations, and provide feedback to the modeling community on potential deficiencies and solutions.

Improve the Observing System by

- Optimizing our understanding of the ocean dynamics and performing model experiments to establish a cost effective, observing system.

- Designing and developing new cost effective technology to allow near real-time observations over the full depth of the ocean.

Thank You