Coastal GOOS in the Americas

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GOOS Panel for Integrated Coastal Observations (PICO)

GEOSS in the Americas Forum
On Coastal Zone Management

Washington, D.C., USA
20 November 2009

The Global Ocean Observing System (GOOS)

GOOS is designed to:

- Monitor and better understand climate
- Improve weather and climate prediction
- Provide ocean forecasts
- Improve management of marine and coastal ecosystems and resources
- Mitigate damage from natural hazards and pollution
- Protect life and property on coasts and at sea
- Enable scientific research

GOOS Provides:

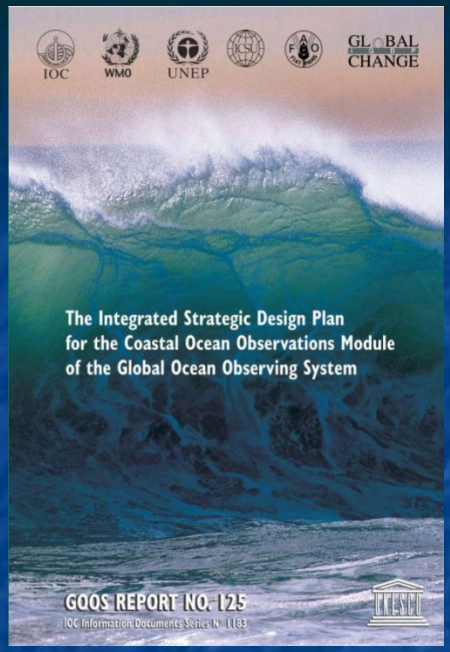
- International and intergovernmental coordination of sustained ocean observations
- A platform for the generation of oceanographic products and services
- A forum for interaction between research, operational, and user communities

GOOS is comprised of:

An open ocean module

Advised by the Ocean Observations Panel for Climate (OOPC) [with JCOMM/WCRP/GCOS]

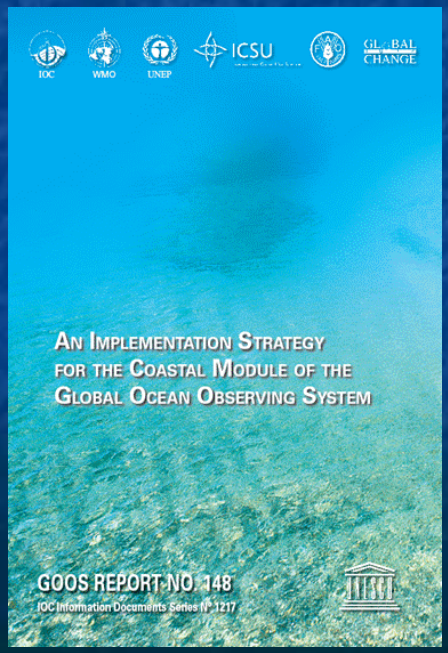
Implemented by member states usually cooperating through the Joint WMO-IOC Commission for Oceanography & Marine Meteorology (JCOMM)



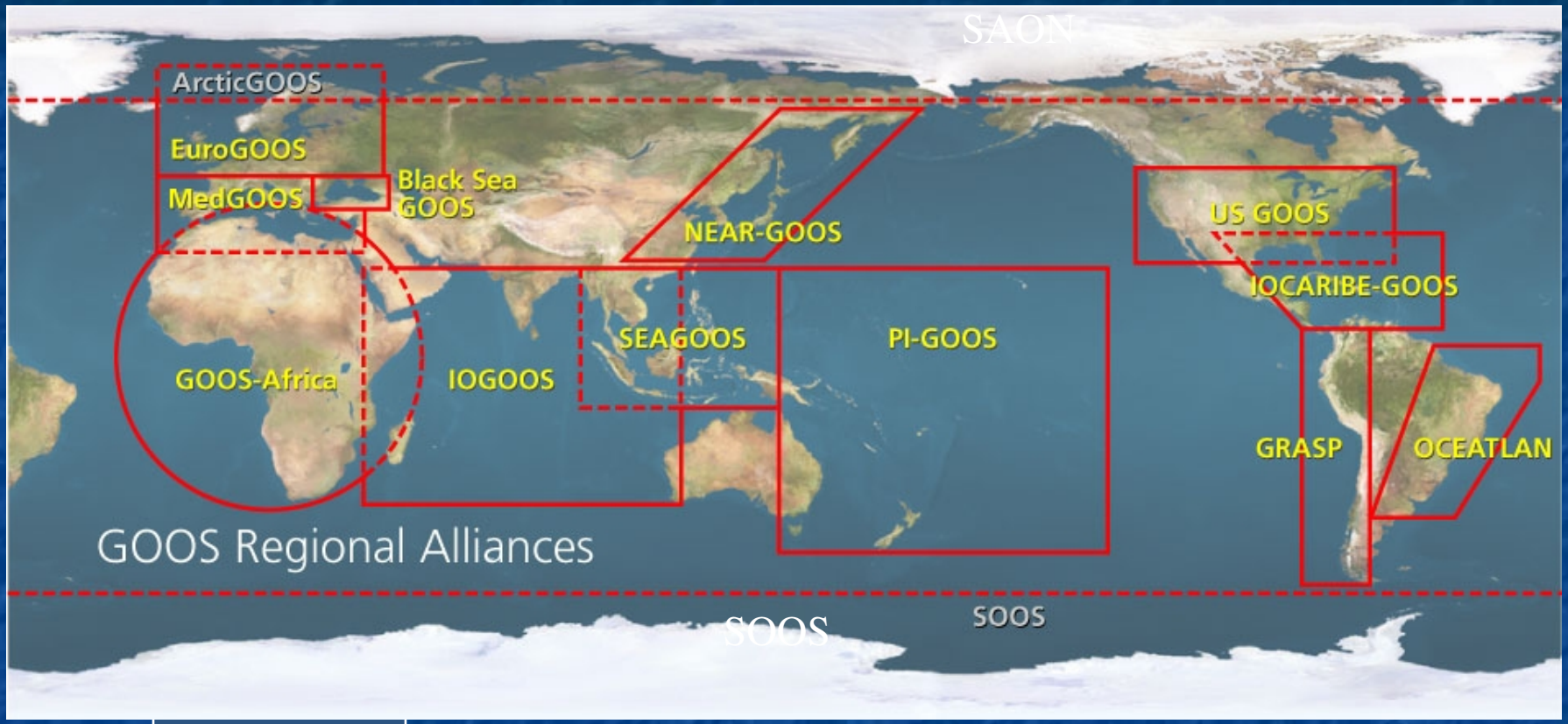
A coastal module

Advised by the *Panel on Integrated Coastal Observations (PICO)*

Implemented by member states usually cooperating through **GOOS regional alliances**.



Implementing Coastal and Regional GOOS



1st GOOS Regional Forum, Athens, Greece, 2002

2nd GRA Forum, Nadi, Fiji, 2004

3rd GRA Forum, Cape Town, S. Africa, 2006

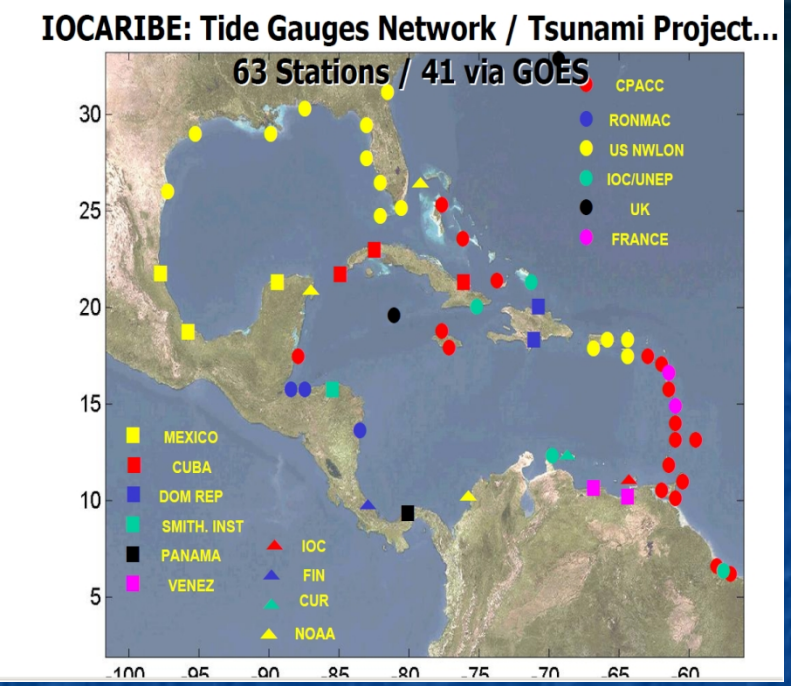
4th GRA Forum, Guayaquil, Ecuador, 2008

IOCARIBE-GOOS

The GOOS Regional Alliance for the IOCARIBE Region

IOCARIBE-GOOS was conceived at a Regional Users Forum in 1999, leading to a Strategic Plan (GOOS Report 115) published in 2002.

- In 2003, IOCARIBE-GOOS was approved as a GRA by I-GOOS.
- Subsequent Implementation of that plan has been delayed due to lack of funding.
- Small grant support from US DoS did allow IOCARIBE-GOOS to begin work on a *priority topic*, *Development of a Caribbean Multi-Hazards Water Level Network*, as the basis for an observing system.



IOCARIBE-GOOS

Caribbean Multi-Hazard Water Level Network Development

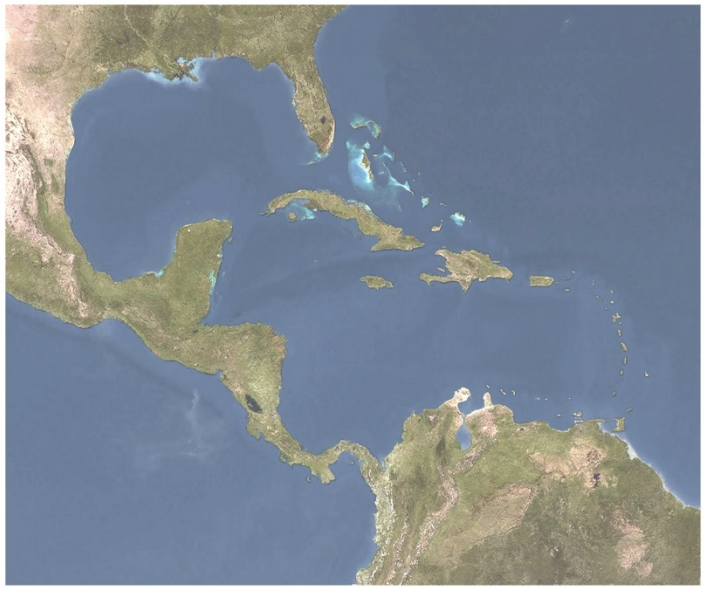
- Conducted analysis of existing Caribbean Sea Level Network; published in 2005 (GLOSS IX).

- Organized First Caribbean Tsunami Warning System (TWS) meeting and subsequent IOC Intergovernmental Coordination Group (ICG)-I; served as chair of first Tsunami ICG WG-1.

- Produced study of prioritized TWS WL gauge locations used by Tsunami ICG (Henson, et al., 2006, Science of Tsunami Hazards)

- Proposal to manage and support WL system accepted by GCOS in 2007 as regional project

- Has led to successful initiative, albeit primarily supported by Tsunami ICG – good as a WL system but NOT available for expansion into other observations by GOOS.



IOCARIBE-GOOS

Summary:

Well-founded program but struggling for relevancy and progress due to lack of support

US has provided funds for ‘re-organizational’ steering committee meeting in 2010

IOCARIBE-GOOS welcomes discussions with GEO partners

Guillermo Garcia Montero ggarcia@ama.cu

Doug Wilson doug.wilson@noaa.gov

IOCARIBE-GOOS co-chairs

REGIONAL ALLIANCE IN OCEANOGRAPHY FOR THE UPPER SOUTHWEST AND TROPICAL ATLANTIC- *OCEATLAN*

OCEATLAN – PRESENT STATUS

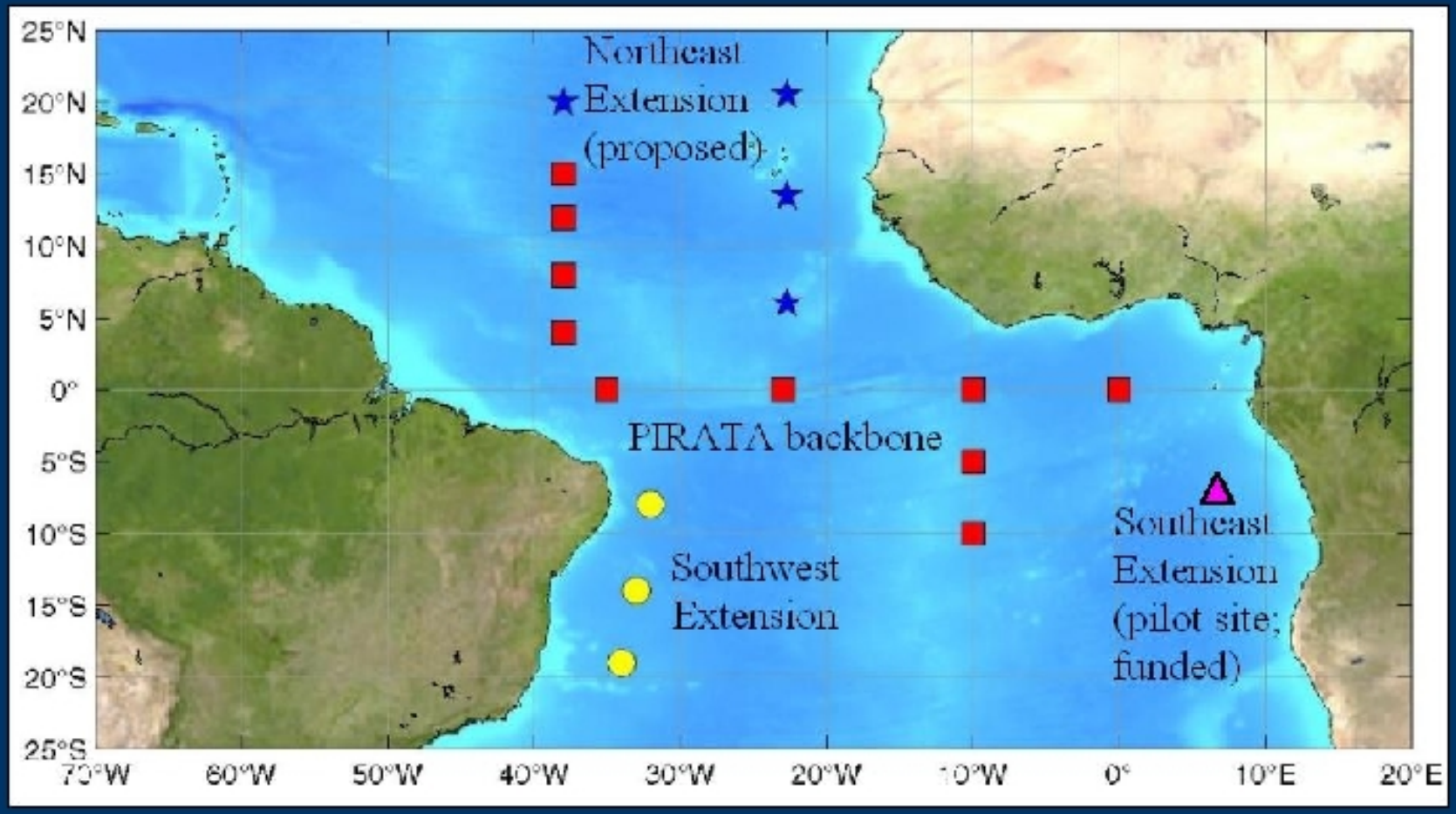
http://oceatlan.org/es/index.html

HIGH PRIORITY TO OCEANS, WEATHER AND CLIMATE PREDICTION

GREATER IMPORTANCE FOR THE DEFINITION OF PUBLIC POLICIES FOR THE COASTAL ZONE (Coastal Erosion) AND EDUCATION (Argo floats)

- PIRATA – Pilot Research Moored Array in the Tropical Atlantic;
- ISABP – International South Atlantic Buoy Programe
- GLOSS – Global Sea Level Observing System;
- MOVAR – Monitoramento do Transporte de Calor no Atlântico Sul;
- *ANTARES – CHLOROGIN NETWORK;*
- *SACC* – South Atlantic Climate Consortium
  - *Importância dos oceanos nas Mudanças Globais do Clima = circulação do oceano e interações com a atmosfera em grande- e meso escalas;*
  - *Teleconexões nas regiões Tropical e Sul*

PIRATA: Improve knowledge of ocean-atmosphere interactions over the Tropical and South Atlantic towards generating skillful SST and climate predictions



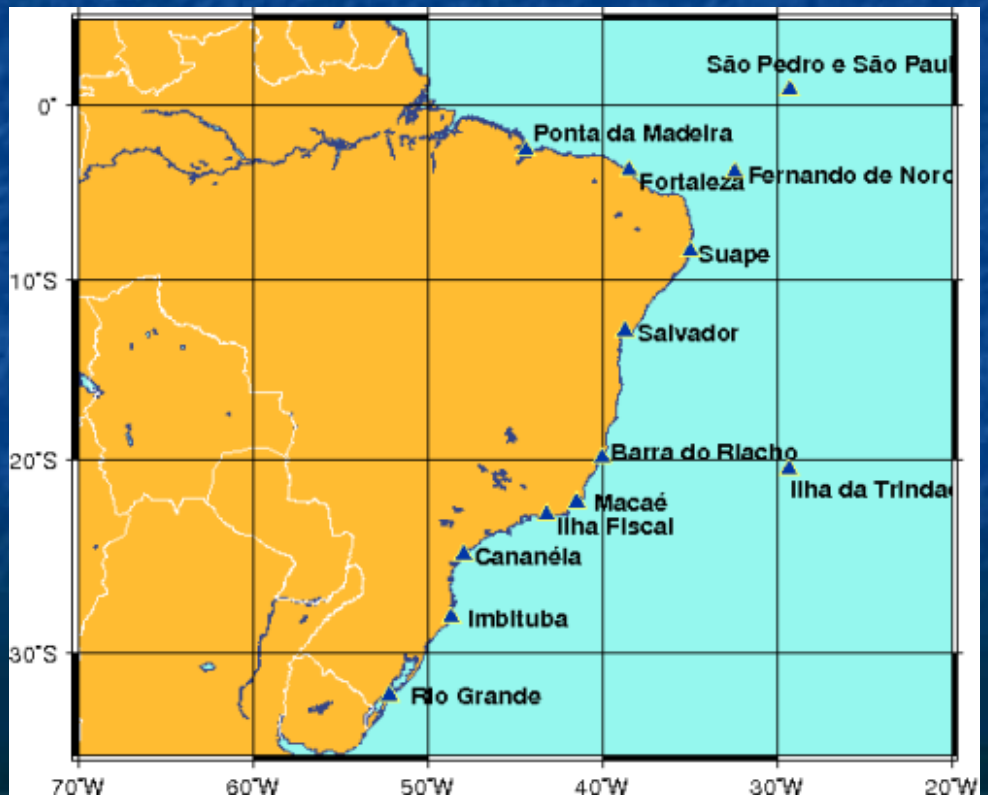
Courtesy R. Lumpkin

http://goosbrasil.org/produtos/pirata/index.php

GOOS Brasil

GLOSS-BRAZIL

Brazil's coastline extends more than 8,000 km long. Therefore, to monitor and understand the variations of sea level becomes a crucial step to protect the lives and properties located near the coastal regions.



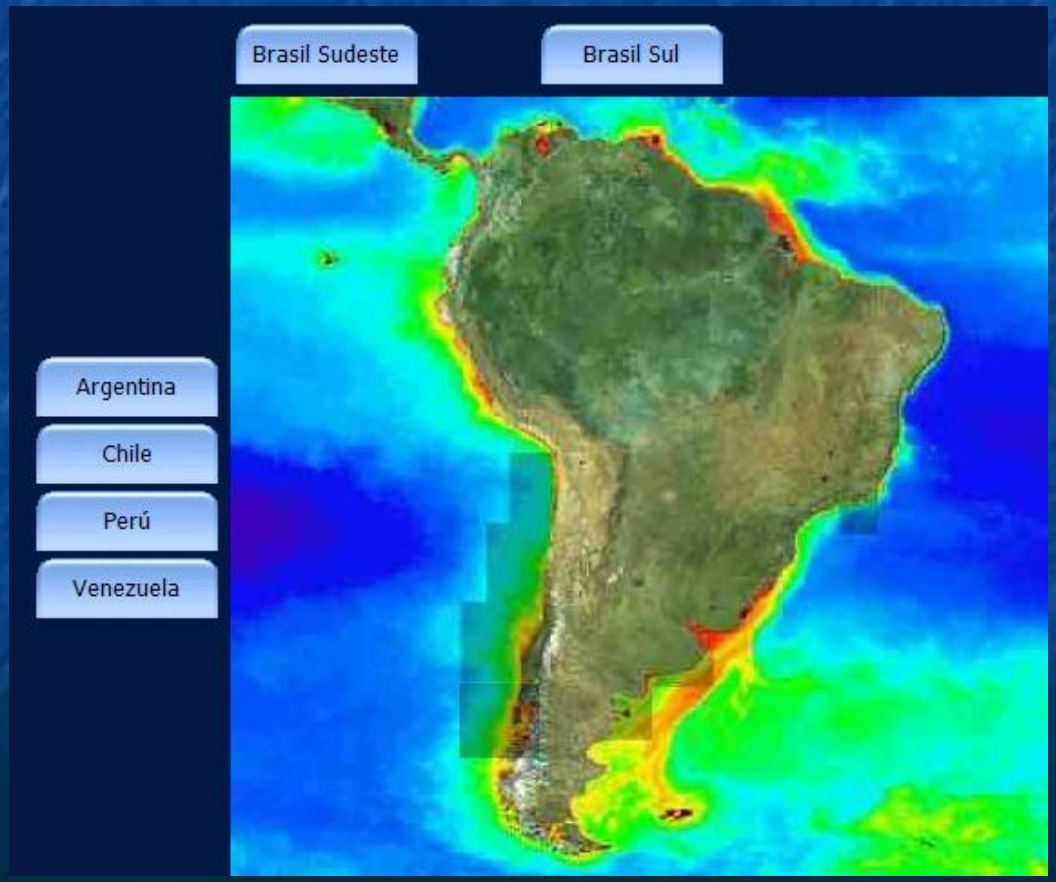
ANTARES – ChloroGIN

The Antares network served as a seed for "Chlorophyll Global Integrated Network (ChloroGIN)" a GOOS Pilot Project.

ChloroGIN is a global network of regional networks for observing of chlorophyll concentration by remote sensing and in situ methods

Antares forms its Latin American Regional branch.

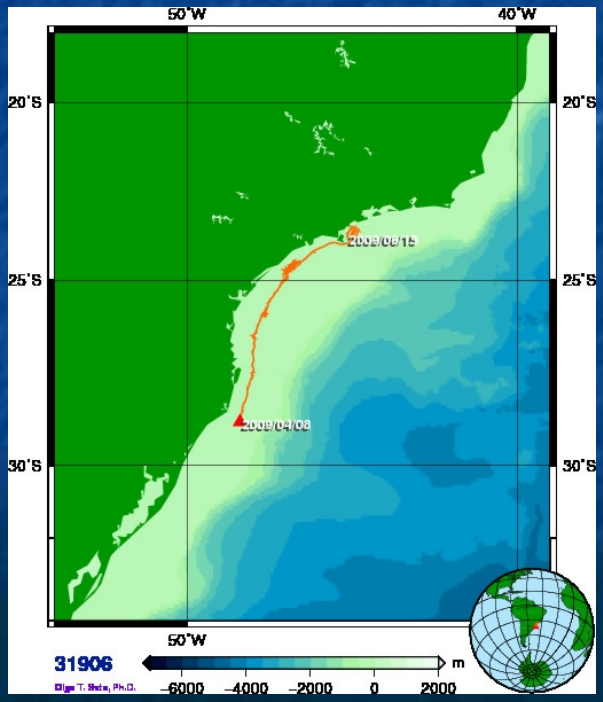
http://home.antares.ws/

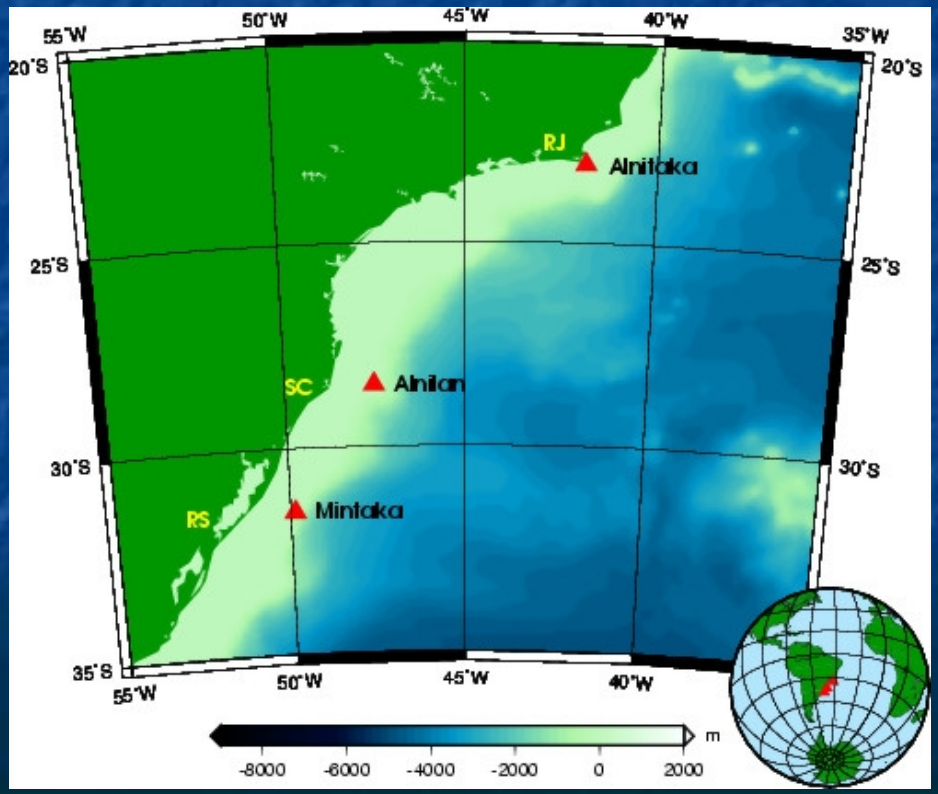


GOOS Brasil

PNBOIA

The National Buoy Program is the Brazilian program to implement an array of drifters and coastal moorings, both monitored by satellite, and to make the data available to the scientific community in near real time.





GOOS Regional Alliance for the South Pacific (GRASP)

- GRASP is comprised of 29 scientific and academic agencies of the region, 7 from Colombia, 6 from Chile, 7 from Ecuador and 8 from Peru, and by the International Centre for El Nino Research – CIIFEN, with seat in Guayaquil, Ecuador.

GOOS Regional Alliance for the South Pacific (GRASP)

Why?

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To strengthen the Operational Oceanography and Meteorology in the South East Pacific region in order to:

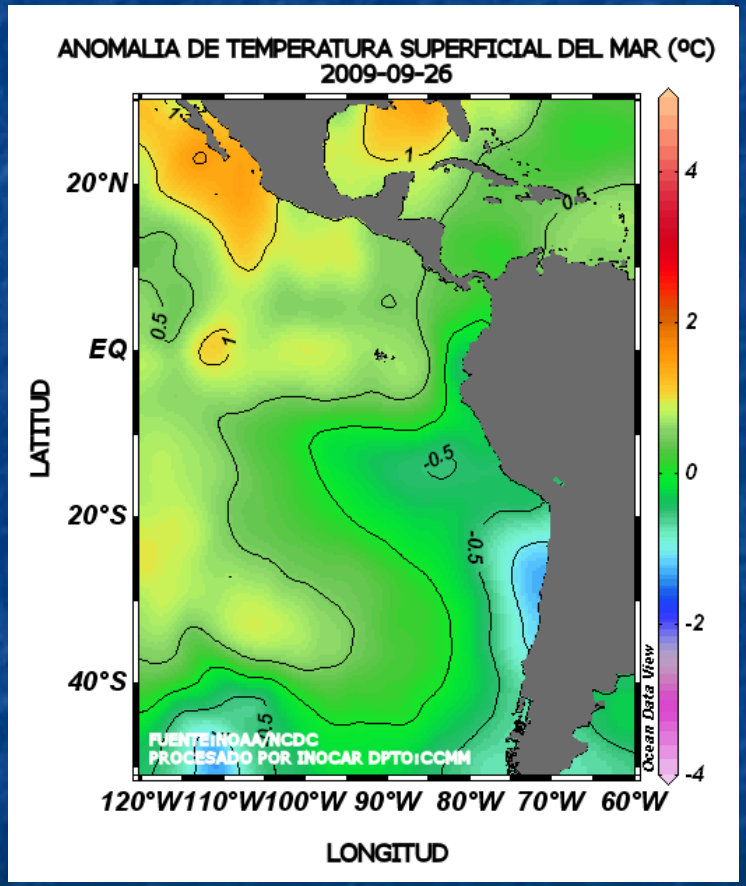
- Enhance the Early Warning for marine hazards in the region, reducing social and economical impacts.
- Improve the monitoring, understanding and environmental management of Humboldt Current Ecosystem and,
- Contribute with a sustainable and Integrated Coastal Management along the region.

GOOS Regional Alliance for the South Pacific (GRASP)

- *The priorities of the GRASP Strategic Plan of Action include:*
  - Establishing a regional sea level network, taking advantage of the existing capacities in the 4 countries.
  - Improving data information exchange in coordination with the other regional alliances, especially with IOCARIBE-GOOS and OCEATLAN, taking advantage of contributions such as the recent Spanish translation of “Ocean Teacher”.
  - Developing and implementing a regional policy for the use of sensors and buoys, in view of the liaisons with other extra regional bodies such as the laboratory of Oceanic Buoys TDOINPE/NATAL and the Flops project.
  - Developing a multi-threat early warning system with an initial emphasis on tsunamis.
  - Integrate the work of GRASP with the work of GEO 2010-2011.
  - Support the approval of a data exchange policy as proposed by the CPPS for the region to facilitate the exchange of data bases and information collected among the members of GRASP.

GOOS Regional Alliance for the South Pacific (GRASP)

- The operational products included in the GRASP web page are:
  - The Climate Alert Bulletins – BAC of the ERFEN Program, that contains a description of the main parameters of the coupled ocean – atmospheric system of the Southeast Pacific;
  - the Sea Surface Temperature Anomaly chart developed by INOCAR;
  - the wave, speed and wind direction forecasts coordinated by DHN of Peru;
  - the Seasonal Rain Forecast provided by CIIFEN;
  - The Wind Fields provided by the Pollution Control Centers of the Pacific – CCCP of Colombia



http://gosic.org/goos/GRASP-data-access.htm

US Integrated Ocean Observing System® IOOS®

US IOOS: a National Endeavor

Federal Players

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

=

USGS

Marine Mammal Commission

But Part of a Global Framework

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

GOOS

Global Ocean Observing System

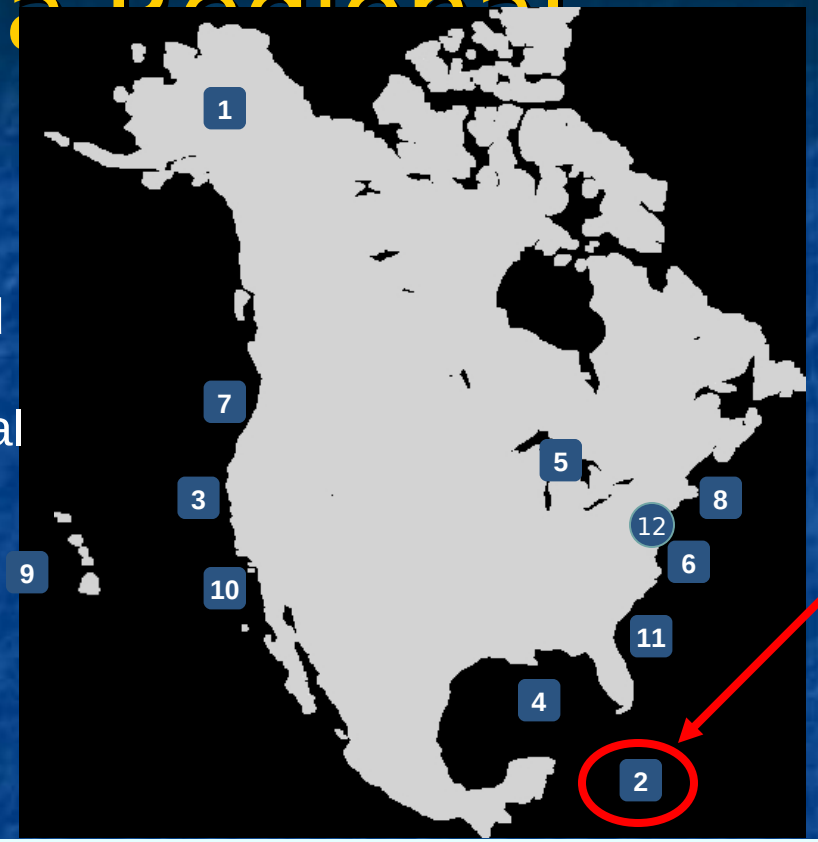
GEOSS

And Extends to a Regional Level

IOOS Regional Component

A network of 11 regional coastal ocean observing systems that meet national and regional needs for local ocean observations, data

- Meeting National missions through…
  - Expanded observations and modeling capacity
  - Connections to users and stakeholders
  - Implementation of national data standards
  - Products transitioned to other regions and to National operations
  - Sensor validation/verification



1. Alaska Ocean Observing Systems (AOOS)
2. Caribbean Regional Association (CaRA)
3. Central and Northern California Coastal Ocean Observing System (CeNCOOS)
4. Gulf Coastal Ocean Observing System (GCOOS)
5. Great Lakes Observing System (GLOS)
6. Mid-Atlantic Coastal Ocean Observing System Regional Association (MACOORA)

1. Northwest Association of Networked Ocean Observing Systems (NANOOS)
2. Northeast Regional Association of Coastal Ocean Observing Systems (NERACOOS)
3. Pacific Islands Ocean Observing System (PacIOOS)
4. Southern California Coastal Ocean Observing System (SCCOOS)
5. Southeast Coastal Ocean Observing System Regional Association (SECOORA)
6. Alliance for Coastal Technologies (ACT) {Sensor V & V}

Data Integration Framework

Improve management and delivery of an initial subset of ocean observations, by addressing technical infrastructure, standards, protocols, *consistent* formats

Months 0-12	Month 18	Month 24	Month 36
Integration	Model Ingest	Benchmark	Performance Assessment

Completed

- Temperature
- Salinity
- Water Level
- Currents
- Winds
- Waves
- Ocean Color

In Progress

Requirements

Standards

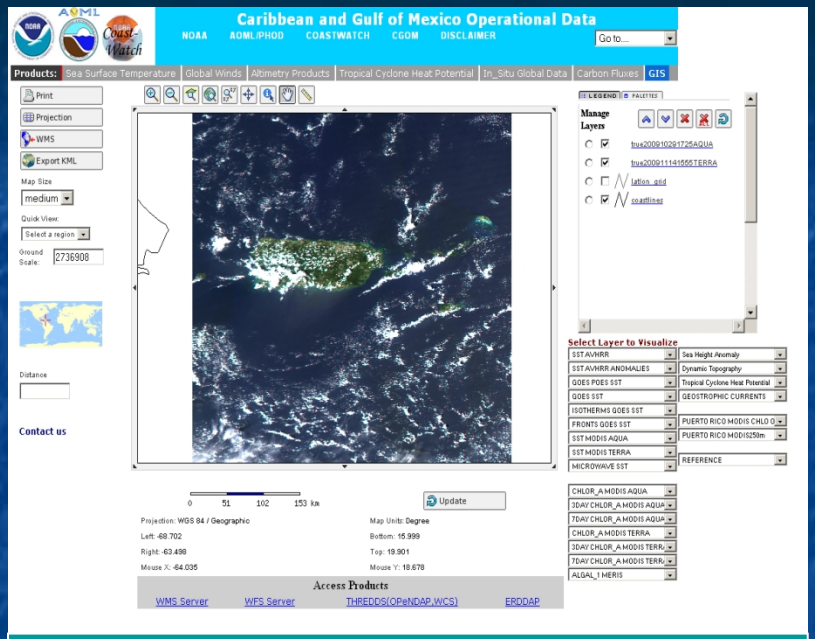
- Coastal Inundation
- Harmful Algal Bloom Forecast
- Hurricane Intensity Forecast
- Integrated Ecosystem Assessment

- Regional Implementation of the DIF
- Interagency/GEOSS data management collaborations
- Documents at www.ioos.noaa.gov

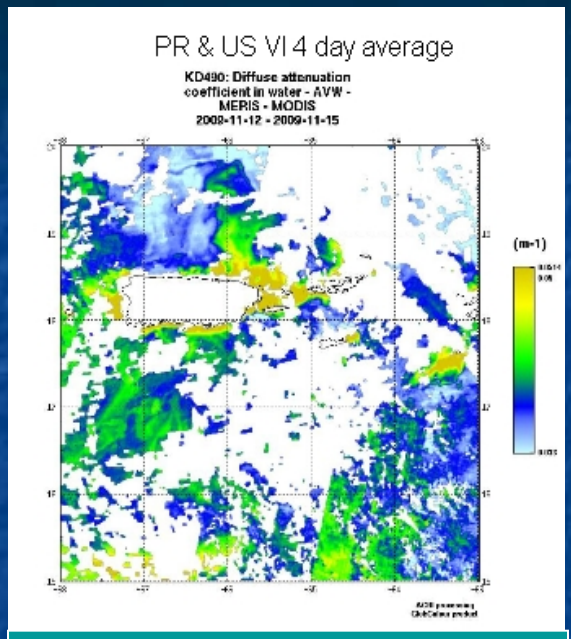
Data Integration: Path Forward

- Delivered interoperable data for 7 data variables
- Documented return on investment for data integration
- Enhancing NOAA's storm surge predictions with inclusion of integrated water level data
- Supporting hurricane intensity forecasting by incorporating integrated temperature and salinity into NWS models
- Increasing accuracy of harmful algal bloom forecasts in the Gulf of Mexico with real-time currents
- Advancing development of Integrated Ecosystem Assessments in the Gulf of Mexico and California Current
- Formally engaging industry to discuss requirements for national DMAC expansion

CaRA CariCOOS :Remote Sensing Products



NOAA Caribbean & Gulf of Mexico CoastWatch imagery interface



European Space Agency GlobColour Meris/MODIS Imagery

Applications:

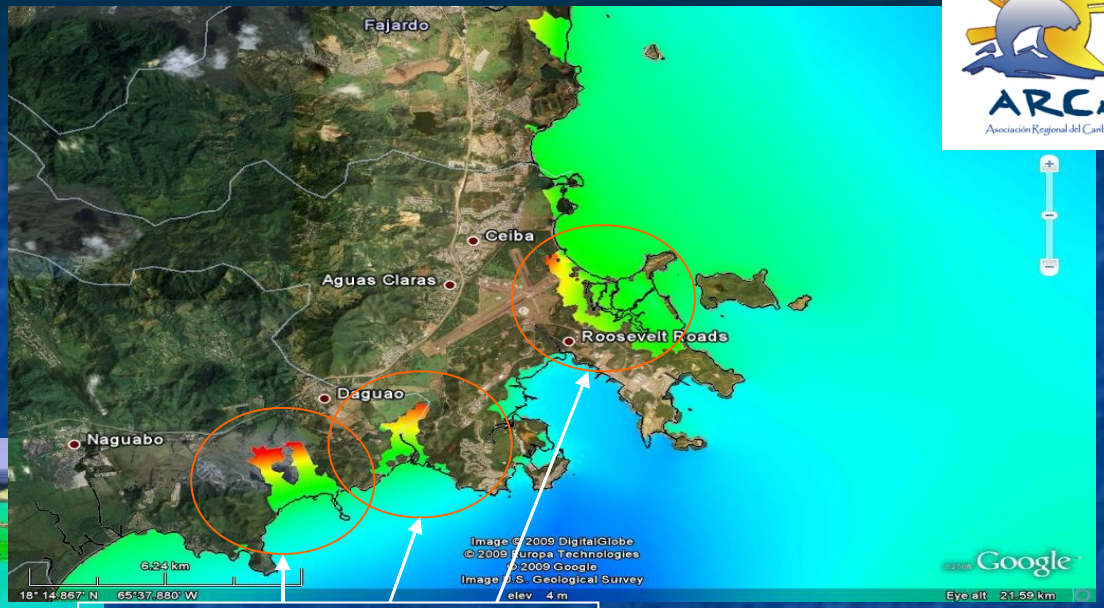
- Plume dispersal
- Plume source ID
- Pelagic sport fisheries
- Coral reef management

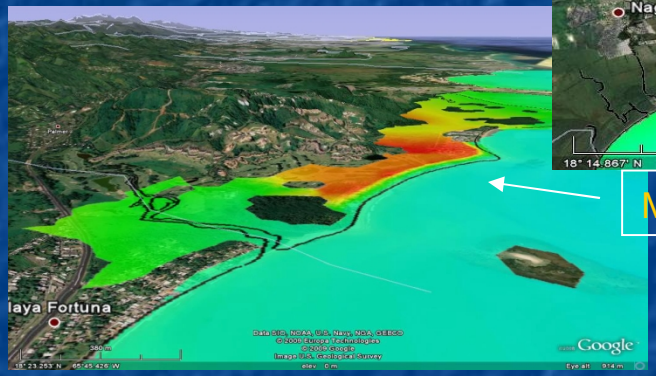
Note “CAPECO” incident plume 10/23/2009

USF – IMARS MODIS True color

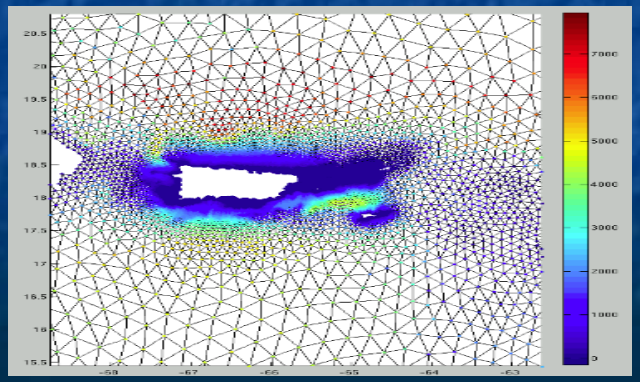
CaRA CarICOOS Modeling Assets

CaRA and UPRM have jointly established the Alliance for Numerical Modeling and Coastal Forecast. The PR State DENR has contracted the Alliance to perform Coastal Zone inundation modeling using ADCIRC and SWAN.

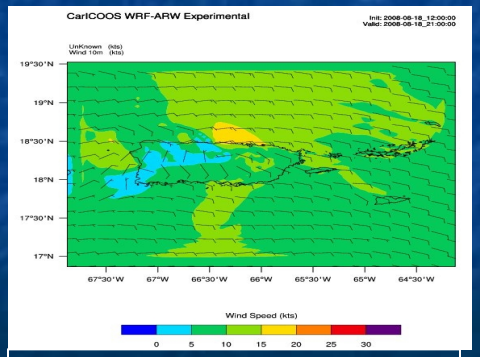




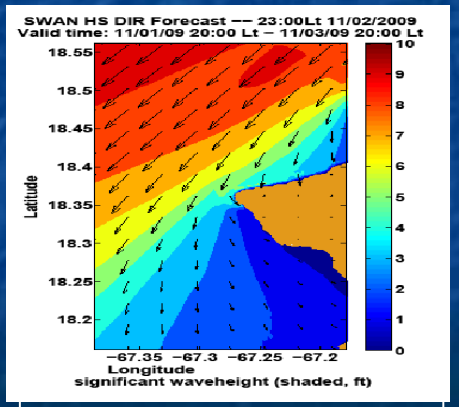
Modeled inundation hotspots



Coastal Currents, ADCIRC

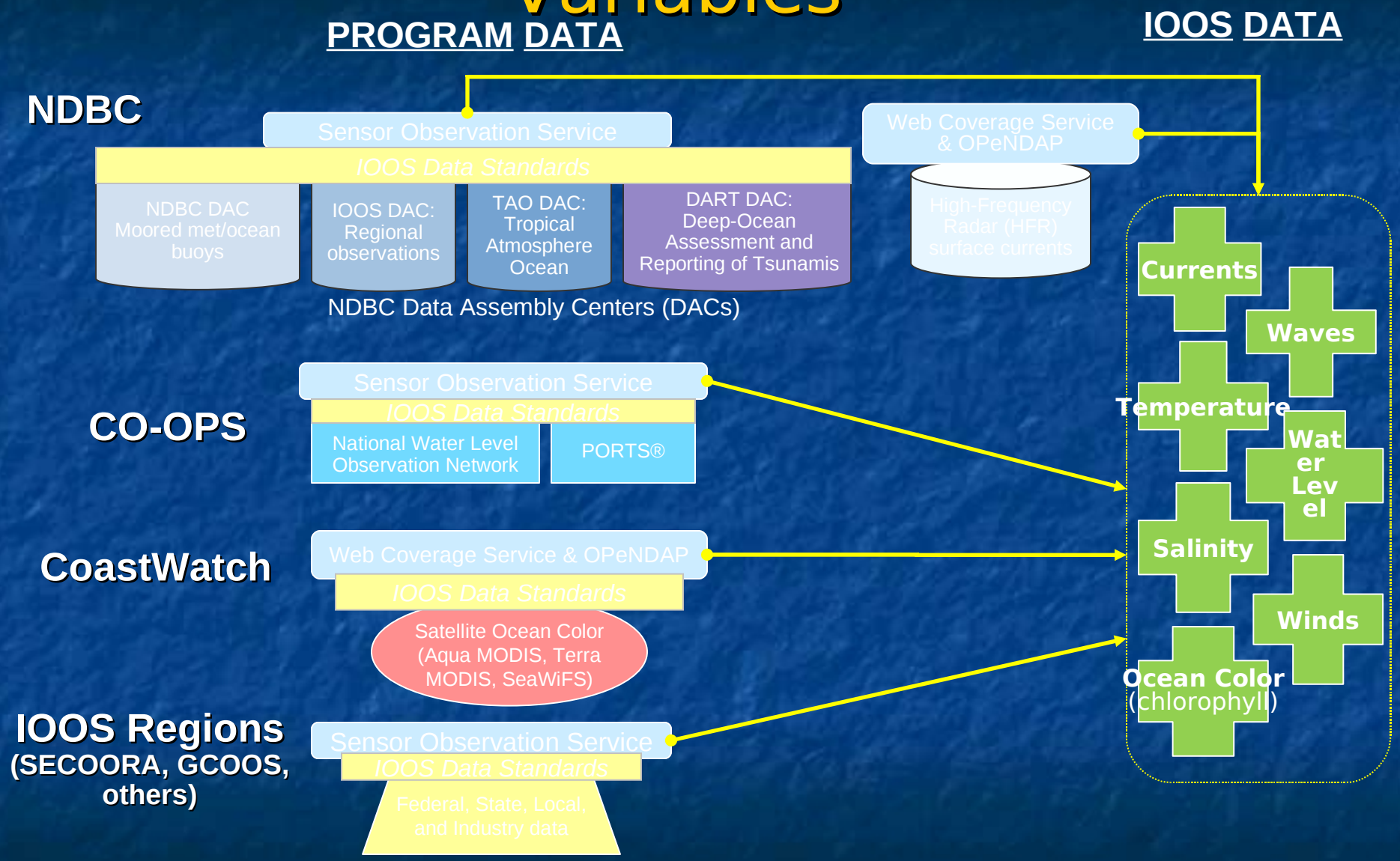


Coastal Winds, WRF



Coastal Waves, SWAN

Integration of Data Variables



GOOS Regional Alliance for the South Pacific (GRASP)

- *GRASP has laid out the following program goals:*
  - To regionally coordinate and optimize a suitable use of resources;
  - To study systems of coastal currents of the East Pacific and form a regional perspective;
  - Exchange data and make data available for users;
  - To accentuate the field of operational oceanography as an important part of operational meteorology;
  - To gain better access to international investigation projects (such as Argo);
  - To facilitate access to information about the investigation of the coast of the region; and
  - To study the ocean variability on a 20-40 day scale