OOI and IOOS Collaborative Efforts

Shelby Walker
National Science Foundation

IWGOO and ORRAP Ocean Observing
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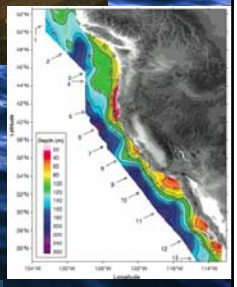
Ocean Observatories Initiative (OOI)

Launching an era of scientific discovery across and within the ocean basins, utilizing widely accessible, scalable, interactive telepresence

- Multi-disciplinary sensor suites
- Interactive sensors and fixed and mobile platforms
- Multi-scale infrastructure
- Relocatable assets
- Cutting-edge cyberinfrastructure
- Open data for all

OOI – Driven by research needs



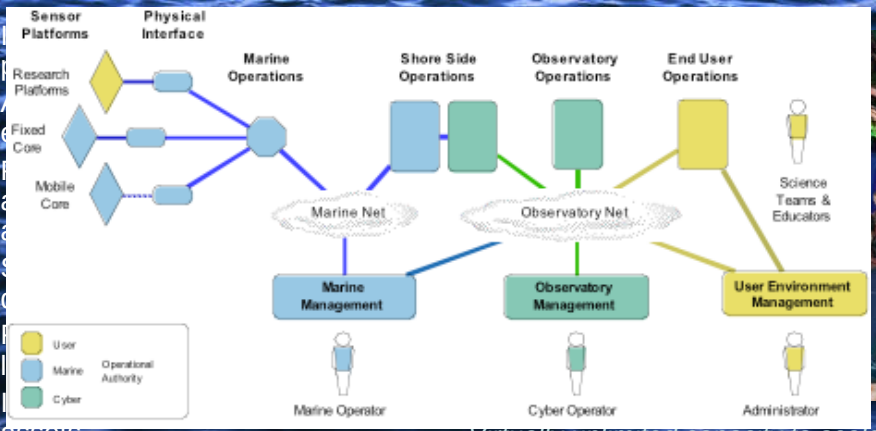
Ability to investigate: ocean circulation, water mass formation & mixing; air-sea exchange

Ability to examine: ocean acidification; ocean's role in global carbon cycle; climate change, human activity & coastal ecosystem health

Ability to assess: methane hydrate flux and connectivity to global carbon cycle; sub-seafloor fluid flow; earthquake formation, transmission & impacts

OOI - Cyberinfrastructure (CI)

Links and binds OOI marine assets into a coherent "system of systems"

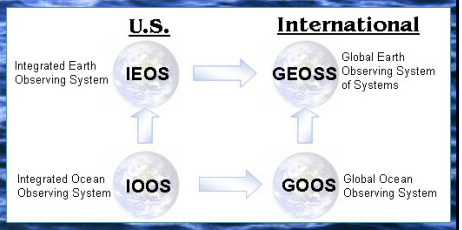


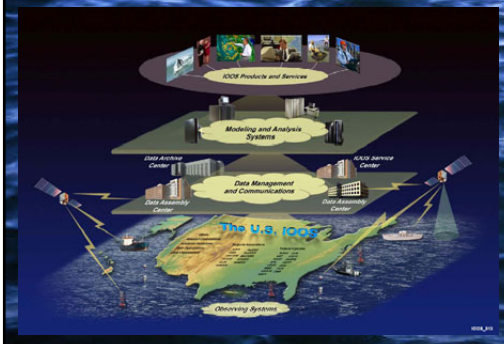
- assets
- Operation and management of integrated observatory infrastructure

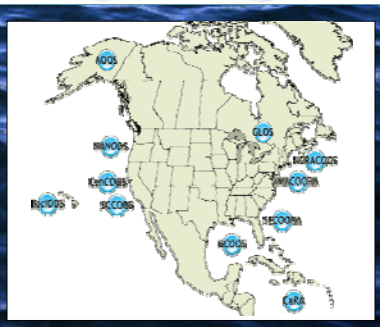
Virtually unlimited capacity to scale computing power and data storage to meet user demand

Integrated Ocean Observing System (IOOS)

IOOS® Development Plan defines:
1) **Global Component**
2) **Coastal Component**
   - **17 Federal Agencies**
   - **11 Regional Associations**







3 subsystems: Observing, Data Management and Communication, Modeling and Analysis;
2 cross cuts: Research and Development: Education

IOOS-Driven by societal needs

Societal Challenges	Information Needs	IOOS Variables	NOAA Decision Tools
• The global climate is not well understood	• Characterize the state of the global climate system and its variability	**Temperature** **Salinity** **Sea Level** **Surface currents** **Ocean color** Bathymetry **Surface waves** Ice distribution Contaminants Dissolved nutrients Fish species Fish abundance Zooplankton species Optical properties Heat flux Bottom character Pathogens Dissolved O_2 Phytoplankton species Zooplankton abundance **Winds***	**Hurricane Intensity Model**
• Coastal populations are at risk from weather, climate & natural hazards	• Improved models (e.g., hurricane intensity, coastal inundation, and harmful algal bloom model)		**Coastal Inundation Model**
• Our ocean, coastal and Great Lakes ecosystems are complex; many are at risk	• Improved ecosystem assessments		**Harmful Algal Bloom Model**
• Expanding the Marine Transportation System	• Updated management approaches • Improved access to data, and scientific information		**Integrated Ecosystem Assessment**

Integration
Long-term data series, coordinated in space and time

Data Integration Framework (DIF)

Formalize a standards-based common data sharing infrastructure to facilitate and improve integration of ocean variables

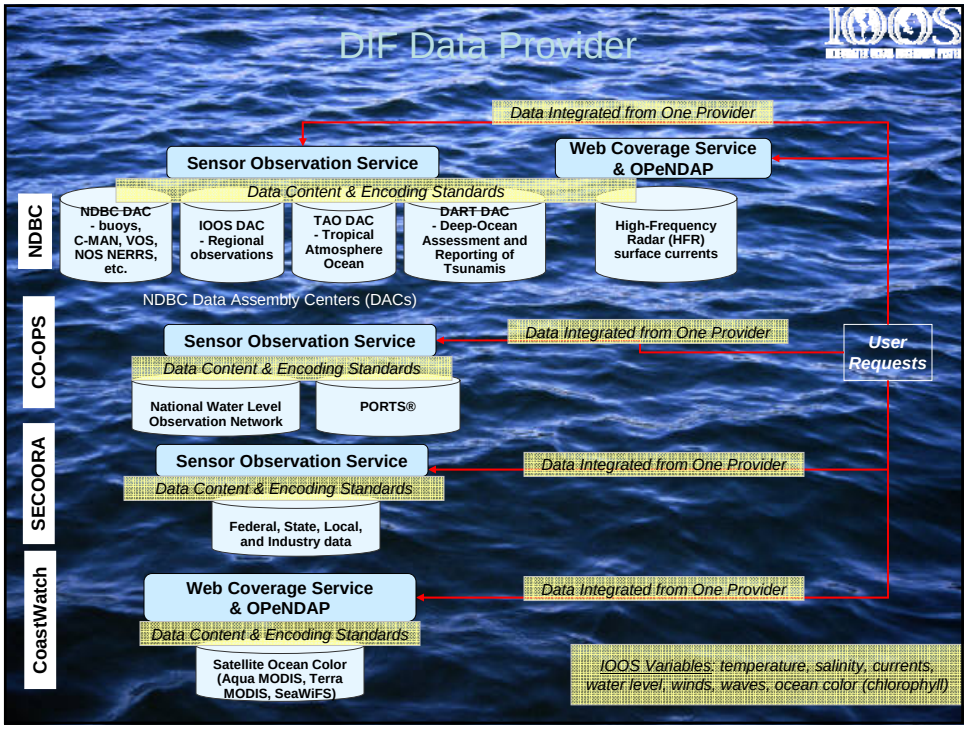
- First spiral of IOOS development-limited scope proof-of-concept - evaluate in 2010
- Standardize small number of services and encodings (e.g., Sensor Observation Service, OPeNDAP)
- Implement at selected provider and customer sites
- Start with several core variables

  Currents; Temperature; Salinity;

  Water level; Winds; Waves;

  Ocean Color (chlorophyll)

DIF Data Provider



OOI and IOOS - Synergies

OOI

- NSF
- Supports basic research
- Structure defined by science requirements
- Adaptive sensing capability
- Relocatable nodes
- Primary stakeholder is the basic research community

Areas of Integration

- New sensing technology
- Improved data management (discovery, distribution, integration)
- Improved forecast models
- Ocean climatology
- Enhanced scalability and extensibility of information systems
- Atmospheric forcing functions

IOOS

- Consortium of Federal and State agencies, Academia, industry, and NGOs
- Supports societal needs
- Structure defined by product requirements
- Designed for operational, long-term, sustained observations
- Stakeholders include management, policy, and industry

Management and Collaborations

- Federal level

  - JSOST-"Facilitate coordination of disciplinary and interdisciplinary ocean research, ocean technology and infrastructure development, and **national ocean observation programs**"
  - IWGOO-"covers an end-to-end concept of ocean observations that includes: development of plans, strategies, tools, techniques, and systems to observe the ocean both *in situ* and remotely, for **both research and practical applications**"
  - IWGOO-recent assumption of Ocean.US responsibilities including management of DMAC
- Regional collaborations - Regional associations
  - Institutional
  - PI

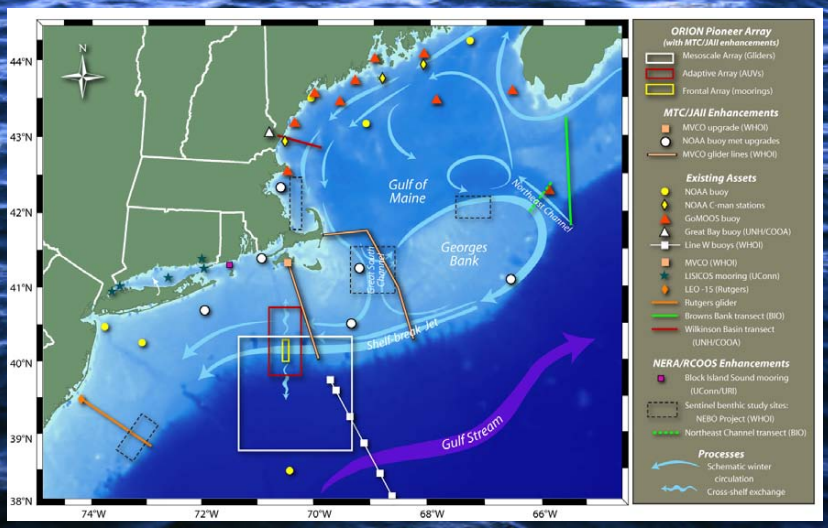
Coordinated Planning

- Data Management and Communications (DMAC): Committed to the identification of appropriate standards-based, best available practices and technical solutions for interoperable interfaces within a service component architecture
- DMAC-Steering Team
  - Purpose:
    - **Provide a community forum** for relevant NOPP agencies and other stakeholder groups and organizations;
    - Provide technical expertise and leadership;
    - Provide a mechanism for broad stakeholder involvement;
    - Liaise with other IOOS elements and other organizations;
    - Determine and document the interoperability infrastructure required to realize the seven IOOS societal goals
  - Current tasking: guiding the adoption of the standards, protocols and best practices needed to make IOOS DMAC a reality
  - Current membership: NOAA, OOI CI, USGS, USACE, Academia, UCAR, EPA, MMS, USN, NASA

Coordinated Activities

- Data Access Integration effort
  - Goal: Provide an operational prototype of a resilient, high performance, national scale, data exchange environment
    - Based on existing community-accepted OPeNDAP protocol and associated technologies
    - Combined with OOI scalable, self-healing cloud computing network infrastructure
    - To be provided for a select set of modeling communities to assess the viability of the OOI data distribution and application deployment models as the basis of the IOOS-OOI integration strategy
  - Executed by SIO, supported by NOAA
  - Stakeholders: IOOS, UCAR, SCCOOS, CORDC, OOI CI, NOAA Fisheries (SFSC), USGS
  - Status
    - Data Distribution Network (DDN) released for multi-month community test
    - Prototype available on Amazon's Elastic Computing Cloud (http://regapp.ooici.net)

Connectivity: Mid-Atlantic Bight



Ocean Observatories Initiative

http://www.oceanleadership.org/ocean_observing

Integrated Ocean Observing System

http://ioos.noaa.gov/