



Ocean Observatories Initiative

Overview

Status

Community Engagement

Local science questions drive engineering design, deployment, and sampling approaches



Four high latitude sites

- Ocean Station Papa (NW Pacific)
- Irminger Sea (North Atlantic)
- Argentine Basin
- Southern Ocean

Two coastal ocean networks

- Endurance Array (Oregon & Washington)
- Pioneer Array (North Atlantic Bight)

Regional scale array

- Axial Seamount (Juan De Fuca Plate)
- Fixed Moorings and Mobile Platforms

Specifications:

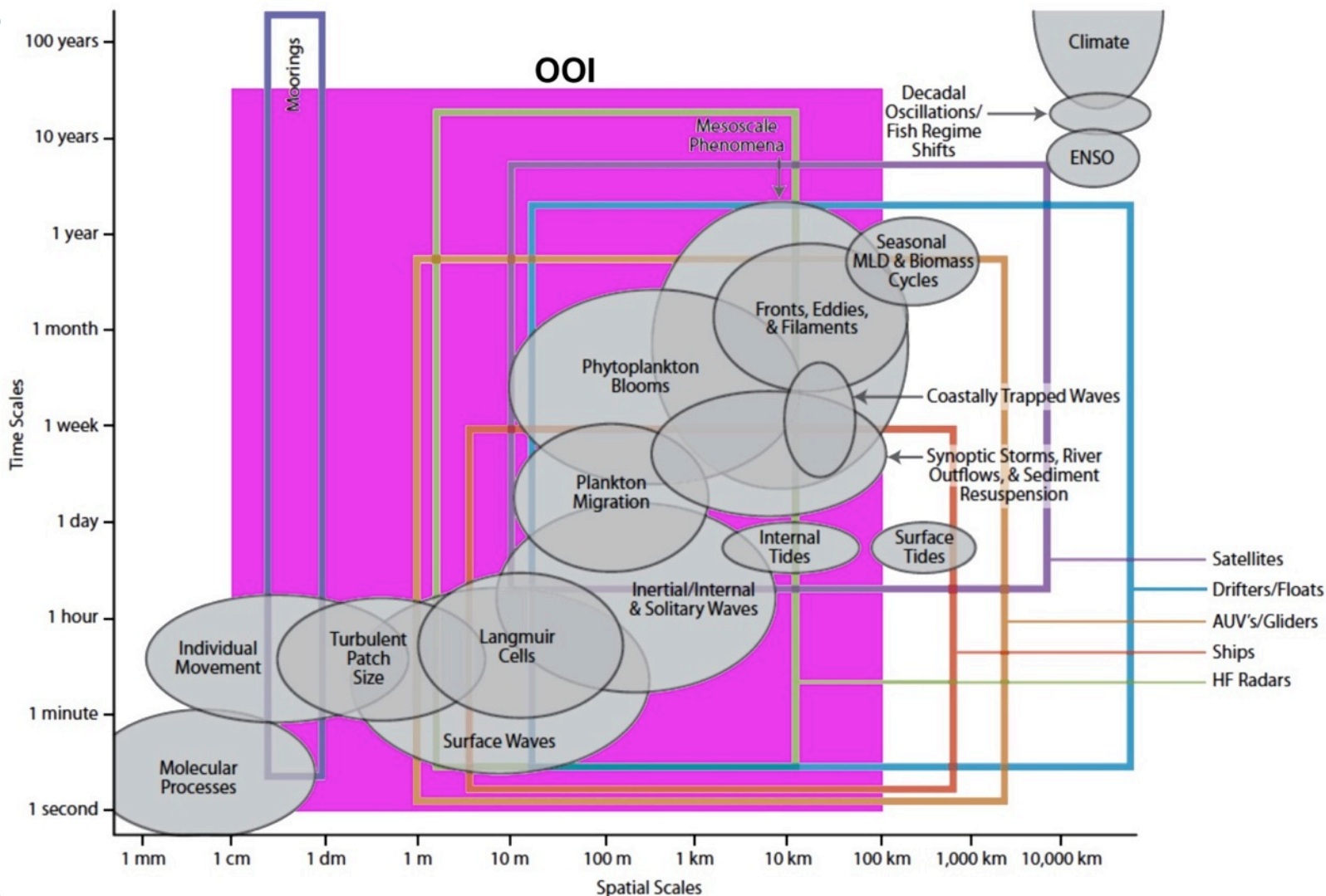
- 48 Instrument Types
- 764 Simultaneously Deployed Instruments
- 78 Data Products
- 25 Year Operation Starting In 2015

Science Themes developed through community input

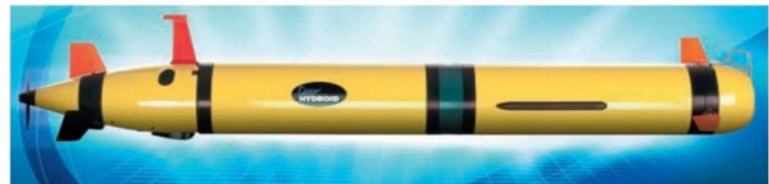
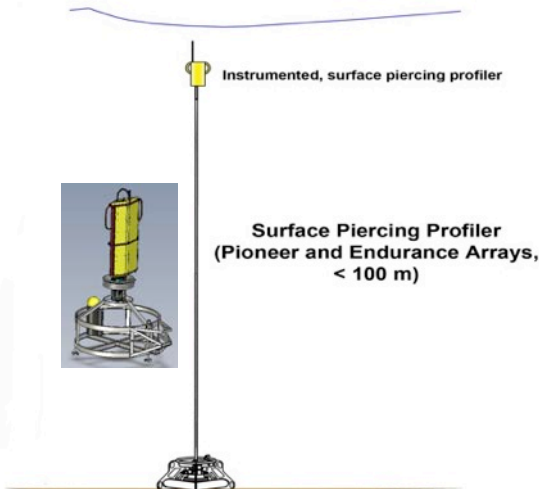
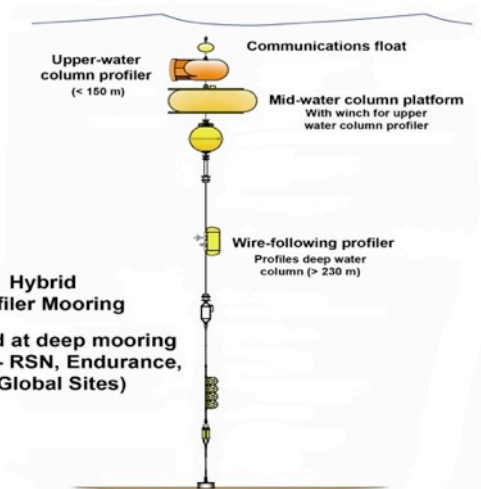
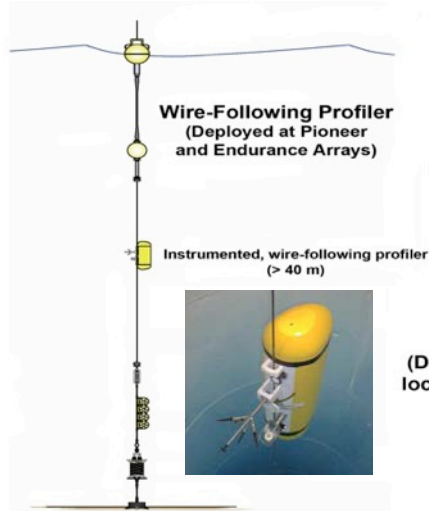


- Ocean-Atmosphere Exchange
- Climate Variability, Ocean Circulation, and Ecosystems
- Turbulent Mixing and Biophysical Interactions
- Coastal Ocean Dynamics and Ecosystems
- Fluid-Rock Interactions and the Sub-seafloor Biosphere
- Plate-Scale, Ocean Geodynamics

The OOI will cover broad temporal and spatial scales ...

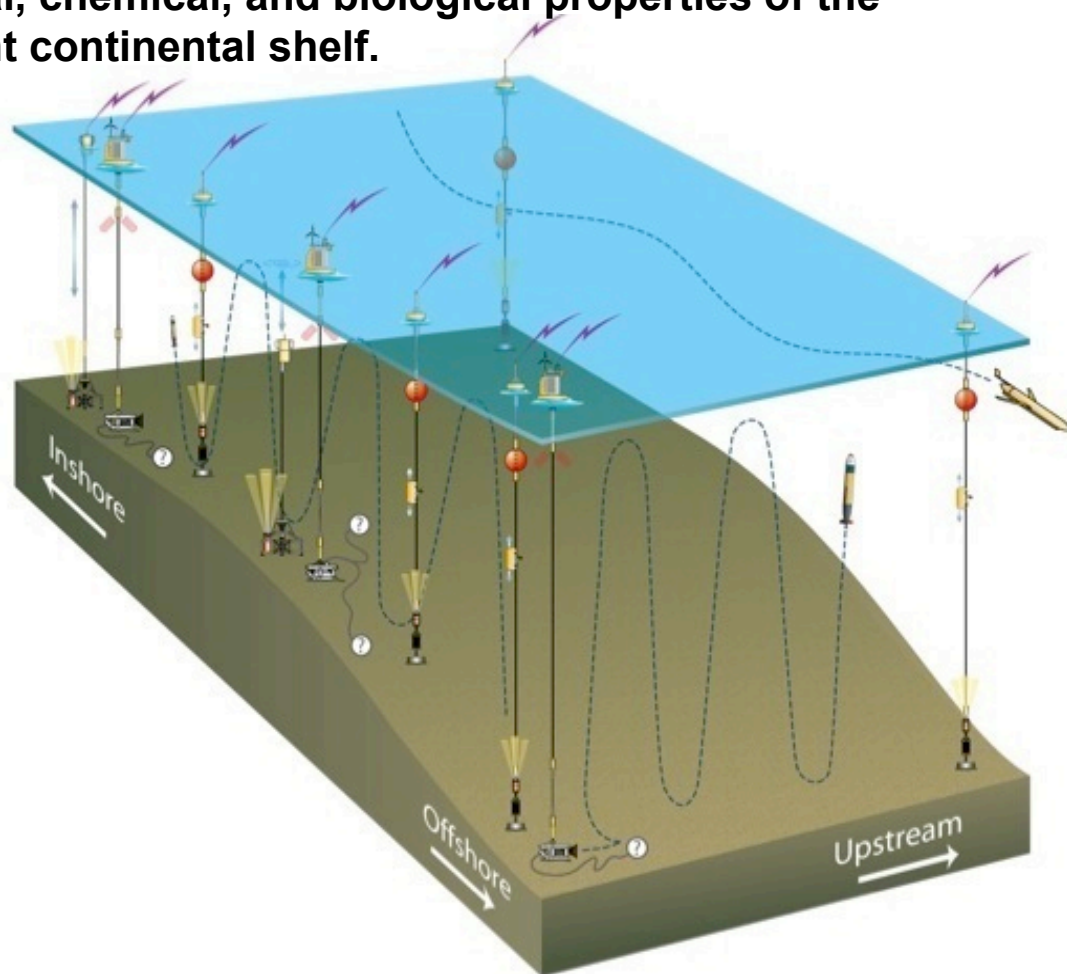
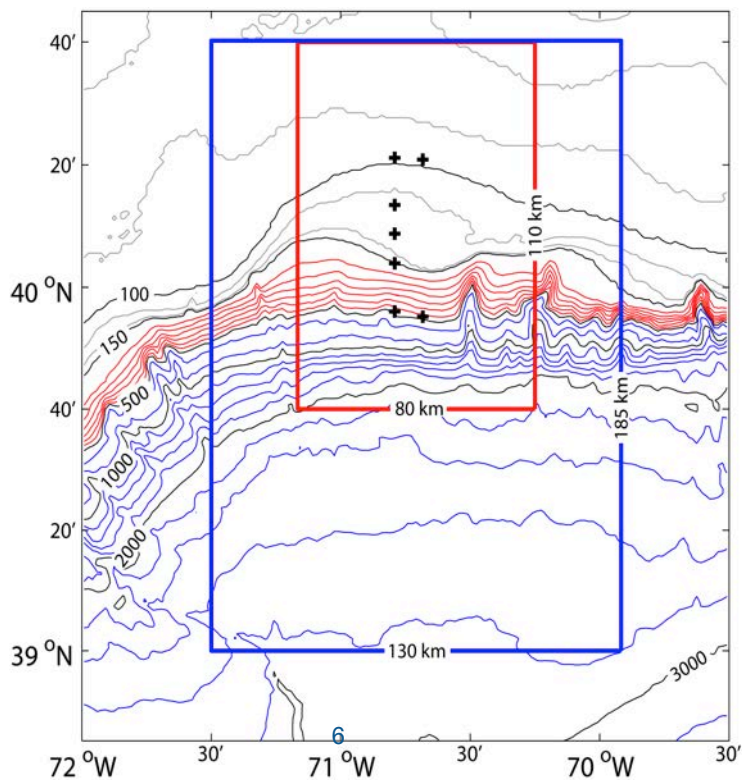
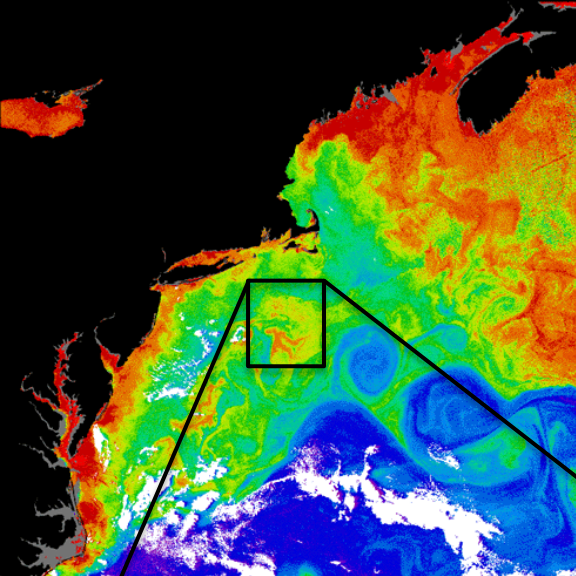


Mobile, instrumented platforms provide opportunities for adaptive sampling



Coastal Node: Pioneer Array

Primary Science Question: How exchanges between a broad shelf with the a deep ocean that is bounded by an energetic western boundary system structure the physical, chemical, and biological properties of the adjacent continental shelf.



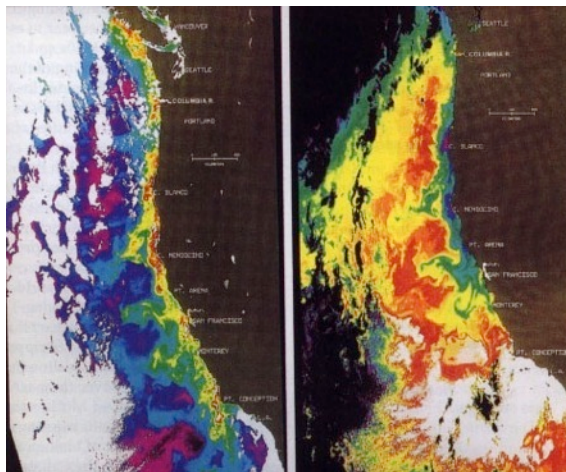
Coastal Node: Endurance Array

Primary Science Driver:

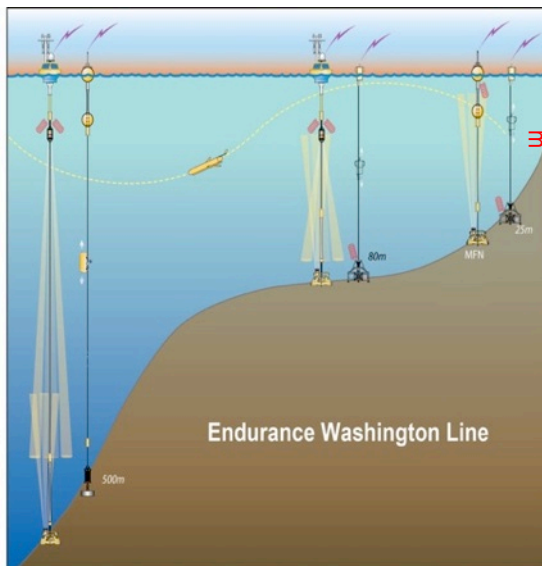
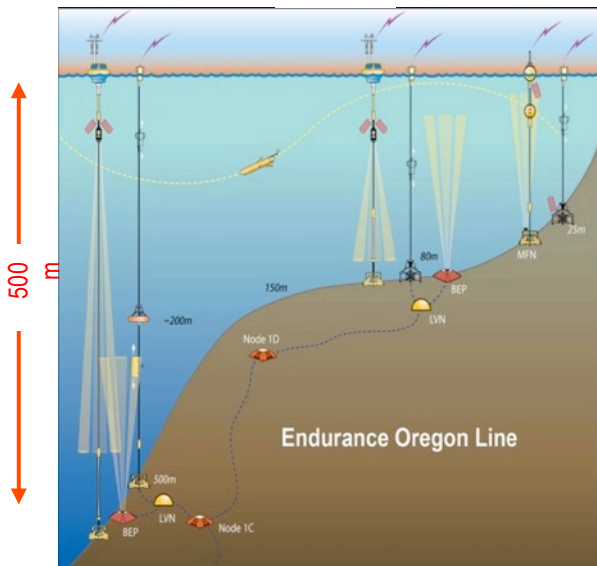
Physical, chemical and biological processes associated with a wind-driven, coastal upwelling system and buoyant flows associated with river discharge. Upwelling systems offer natural laboratories for investigating acidification.

Pigments

SST

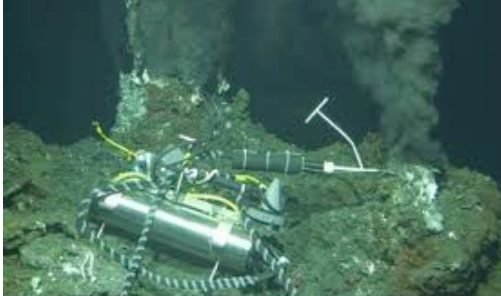
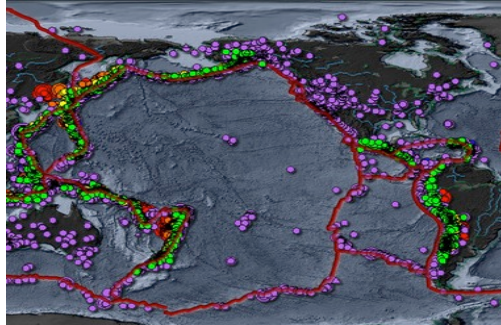


60 km



Regional Scale: Sampling Platforms

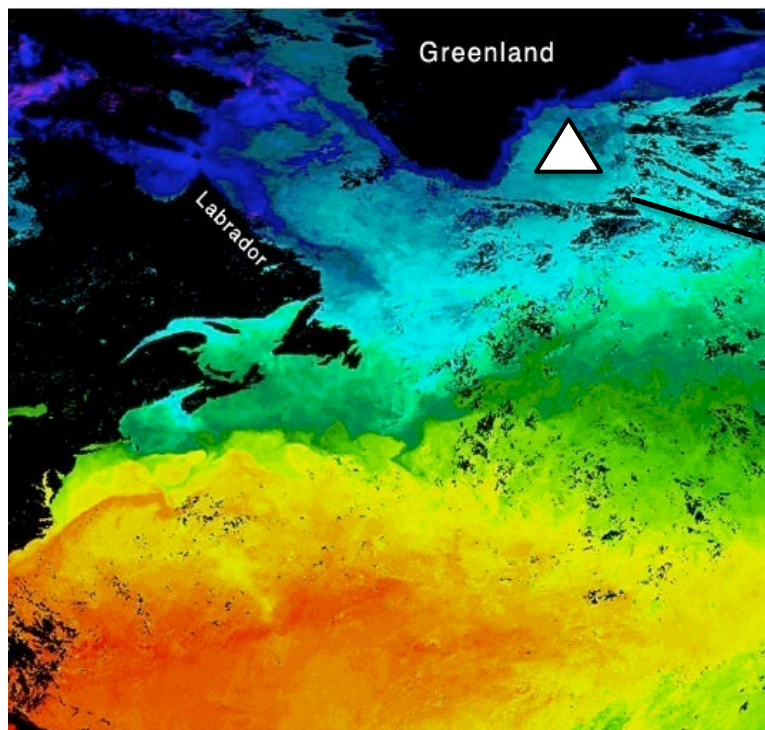
Primary science drivers: life in extreme environments, submarine earthquakes and plate deformation processes, vent fluid chemical processes and methane hydrate formation/dissolution.



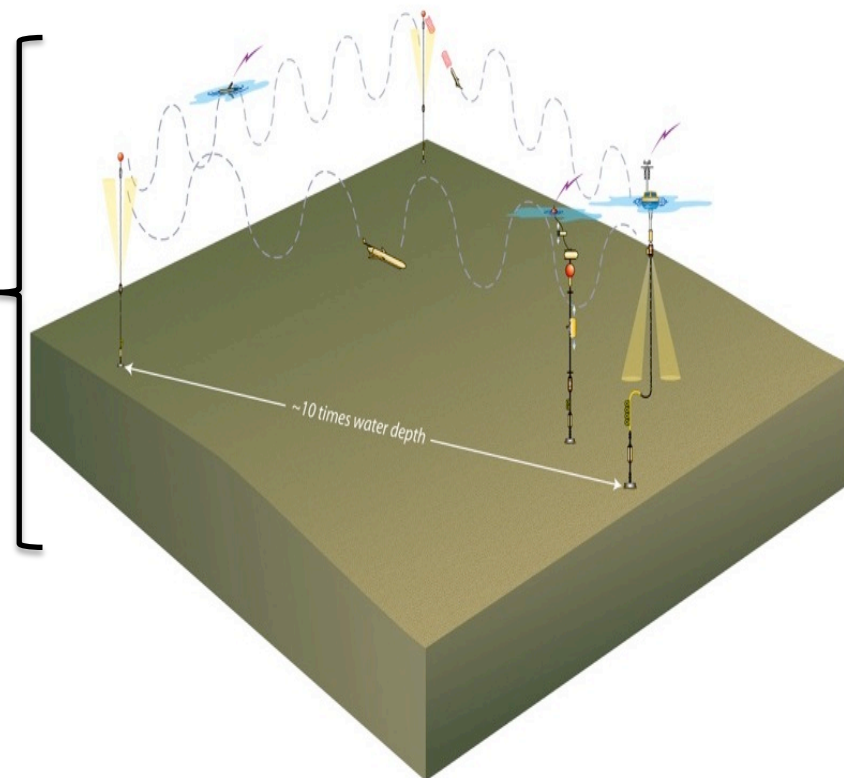
Global Mooring Arrays



Global arrays are designed to investigate a broad scope of temporal and spatial scale, interdisciplinary ocean features and processes associated with the deep pelagic ocean. Four locations are planned: North Atlantic (Irminger Sea), North Pacific (Ocean Station Papa), South Atlantic (Argentine Basin), and Southern Ocean (55°S, southwest from Chile).



NASA ocean color image of the North Atlantic (red = high pigment concentration, blue = low concentration) with the general location for the Irminger Sea Global Mooring (white triangle).



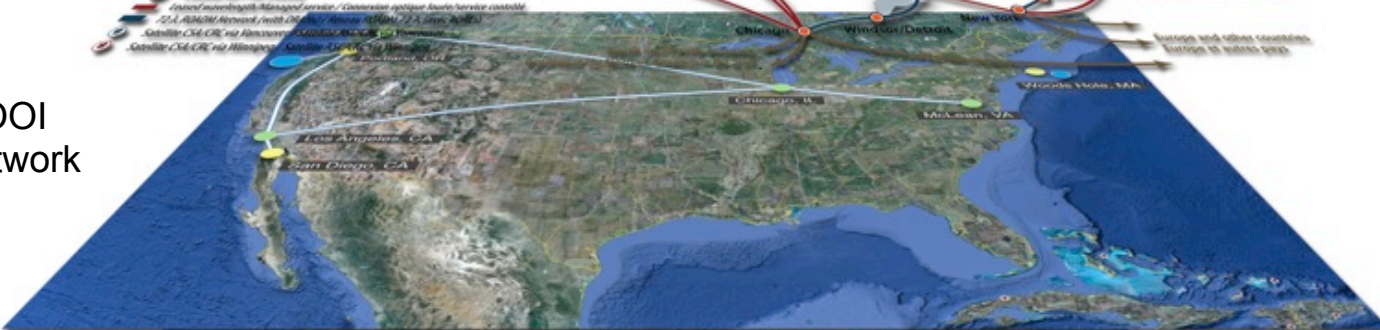
Final Global Mooring design

National & International CyberInfrastructure

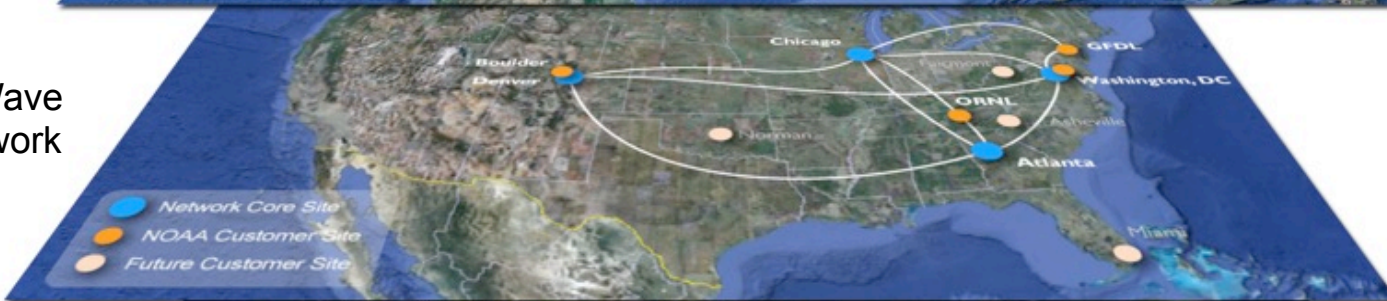
NEPTUNE
Canada



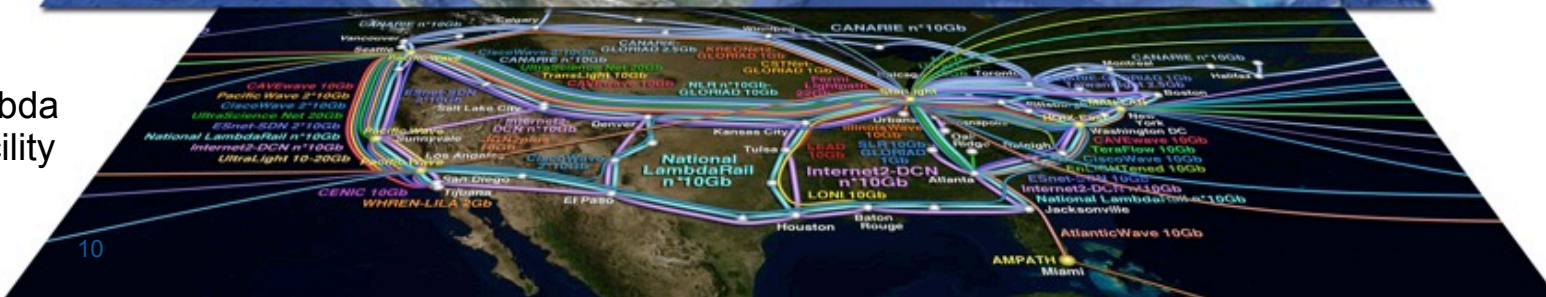
OOI
Network



NOAA N-Wave
Network



Global Lambda
Integrated Facility



Tools to facilitate educational outreach targeting educators, students, and civic groups.



Undergraduate Educators

Example: Educators using real-time observatory data in an undergraduate research course



Free Choice Content Developers

Example: real-time data use in an after-school 4-H club program

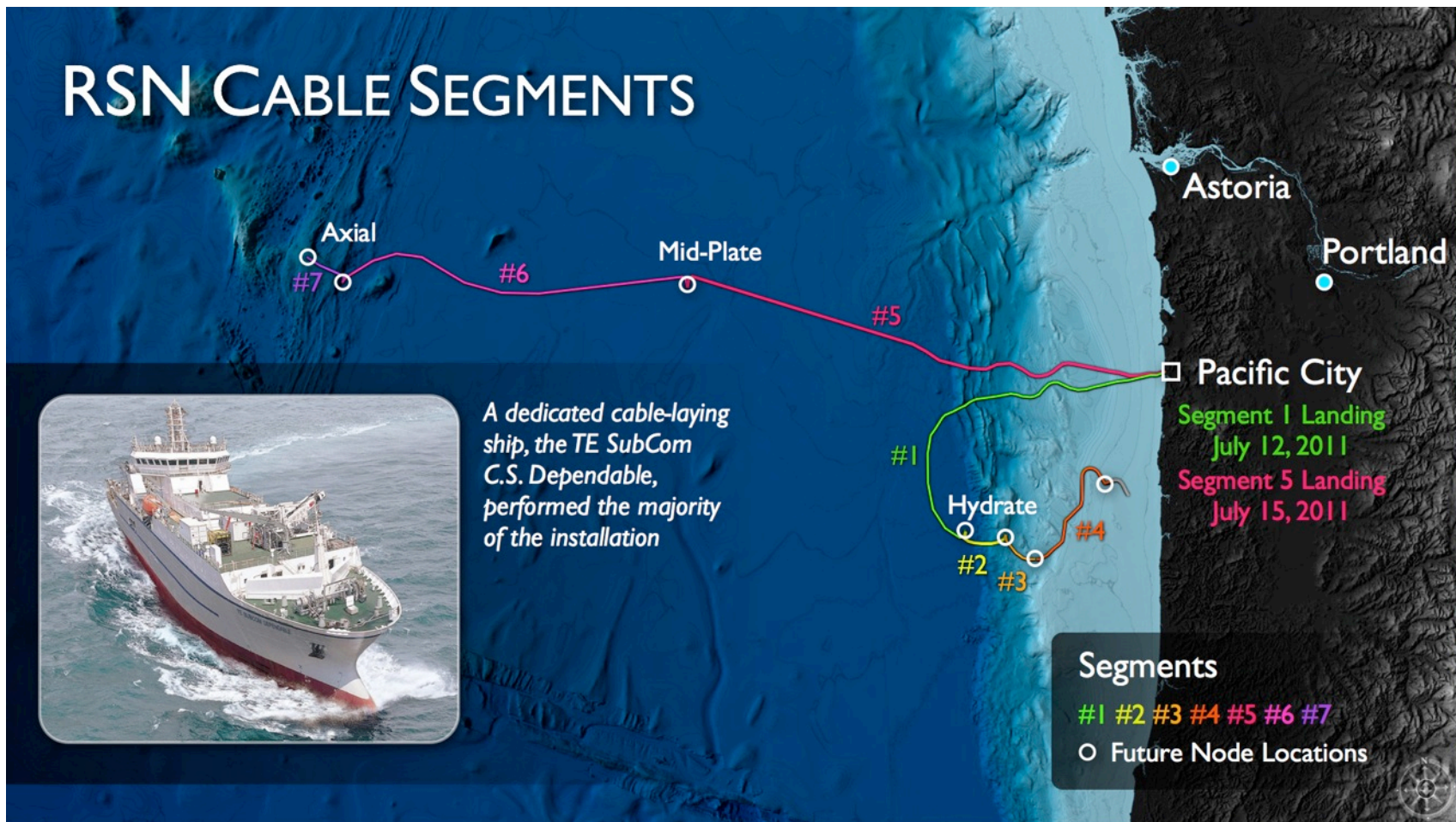
Recent Accomplishment: Seafloor Power & Communications Cable Installed



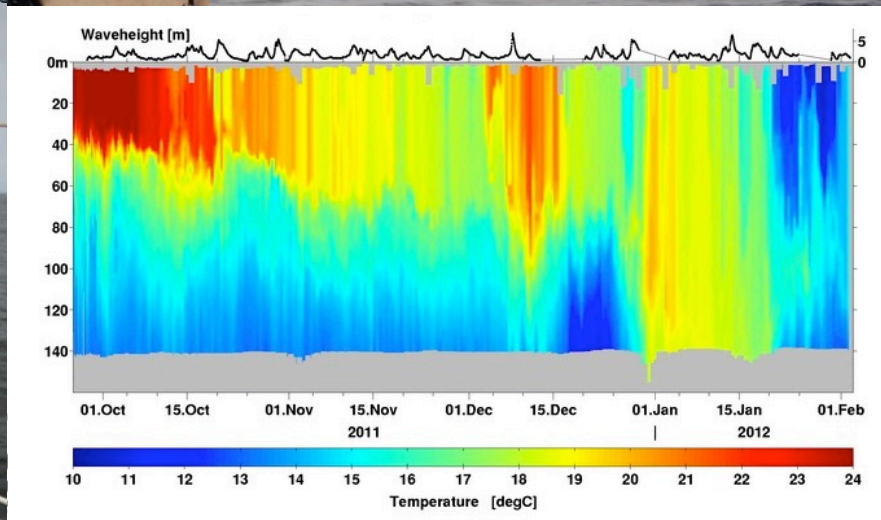
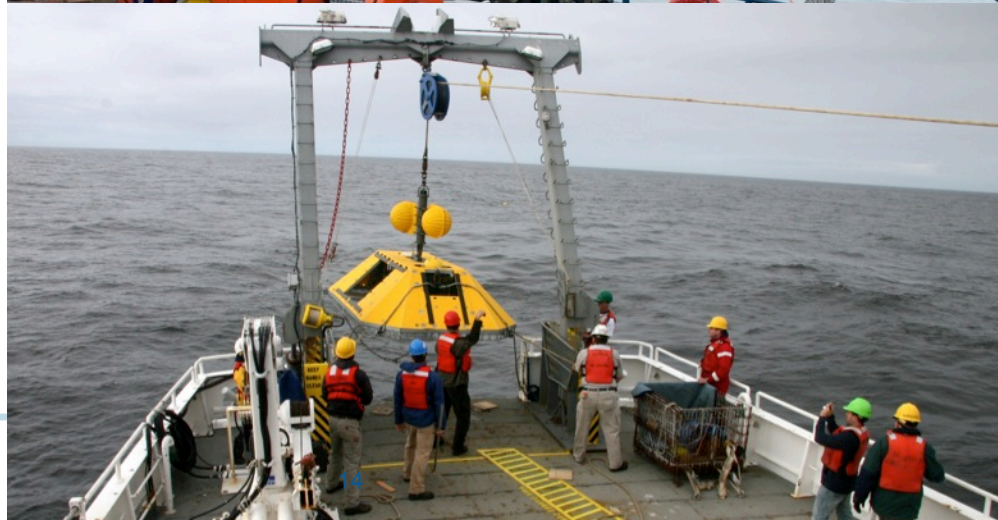
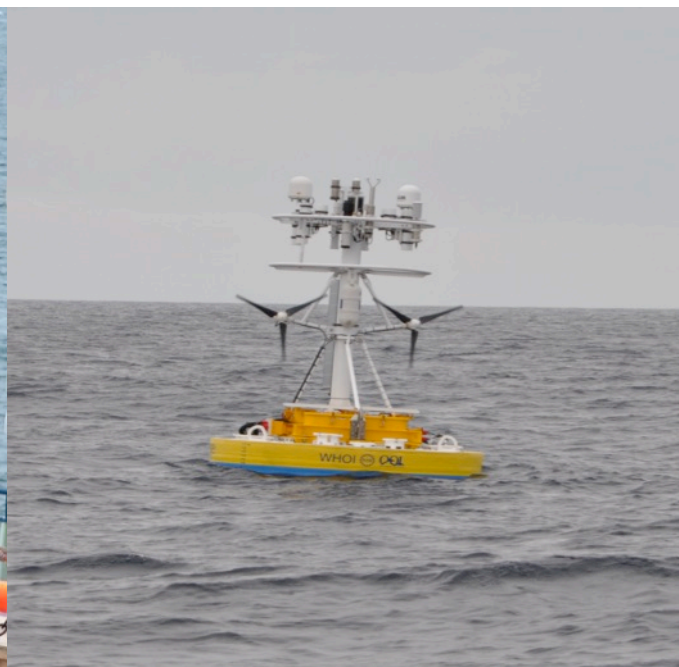
In July 2011 the seafloor power and communications cable off the NW coast was deployed by a commercial cable ship, the *TE Subcom Dependable*. The cable was pulled ashore through a previously installed conduit and “landed” at Pacific City, Ore., where it was connected to a shore station located one mile north of the landing site.

Preparing for Primary Nodes in 2012

RSN CABLE SEGMENTS



Recent Accomplishment: Mooring Component Tests



Early Data

(Available through the OOI web site: www.oceanobservatories.org)

Disclaimer: These data were collected by the Ocean Observatory Initiative (OOI) project purely for internal system development purposes during the construction phase of the project and are offered for release to the public with no assurance of data quality, consistency, or additional support. The OOI Program assumes no liability resulting from the use of these data.

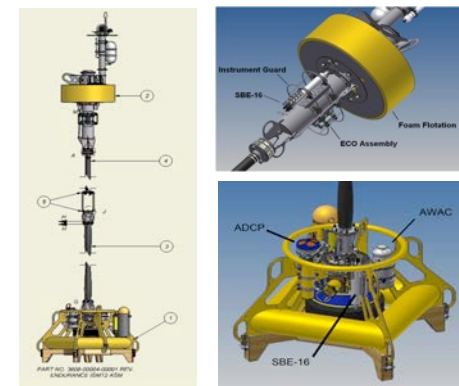
Inshore Test Mooring (ISTM); Coming Soon!

Purpose: Test mooring design and mechanical connections.

Deployment Period: March 19 – August 6, 2011

Location: 44°39'29.9" N, 124°05'44.1" W; approximately 1nm SW of Yaquina Head, OR. Water depth: 25m.

Data Types: CTD, ADCP, bb, chlorophyll



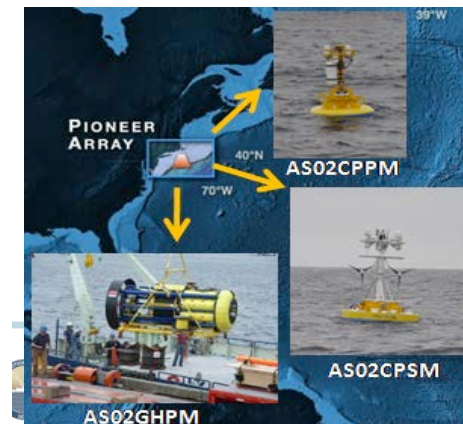
At Sea Test 2 (AST2)

Purpose: Test mooring, hybrid profiler and solar/wind power designs.

Deployment Period: September 24, 2011 – present

Location: 39.12°N, 70.79°W and 39.91°N 70.80°W

Data Types: CTD, ADCP, DO, Chlorophyll, PAR, acoustic current meter, bb, air temp., wind velocity, solar radiation, relative humidity, barometric pressure, precipitation, aspirated air temp.



Cyberinfrastructure: Integrated Observatory Network (ION) Releases

- **Release 1 (2011)**
 - End-to-end data distribution network
 - Metadata visible for any data source
 - Data discovery and sorting capabilities

- **Release 2 (2012)**
 - End-to-end control of instrument operation
 - Control of mobile platform operation
 - Data history and provenance information
 - Data visualization tools

- **Release 3 (2013)**
 - On-demand data processing
 - On-demand system control supporting event-driven, adaptive operations

- **Release 4 (2014)**
 - Control of integrated ocean models driven by the data collection
 - Use of models and other information to control instrument/platform operation



Cyber-Infrastructure

SEARCH

RESOURCES

- All Resources
- Data Products
- Observatories
- Platforms
- Instruments

Welcome to Release 2 of the Ocean Observatories Initiative Observatory (OOI). You already have access to many OOI features and real-time data. Just click on something that looks interesting on this page to start using the OOI as our Guest.

For personalized services, such as setting up notifications and preserving settings for your next visit, create a free account by clicking on "Create Account" at the top of the page.

National Science Foundation working with Consortium for Ocean Leadership

Funding for the Ocean Observatories Initiative is provided by the National Science Foundation through a Cooperative Agreement with the Consortium for Ocean Leadership. The OOI Program Implementing Organizations are funded through sub-awards from the Consortium for Ocean Leadership.

Location

CURRENT LOCATION

DATA LEGEND

- Temperature
- Salinity
- Oxygen
- Density
- Currents
- Sea Surface Height (SSH)
- Chlorophyll
- Turbidity
- pH
- Seismology
- Other

RECENT

RECENT UPDATES

NAME	DATE	TYPE	EVENT	DESCRIPTION	NOTE
01 m Oregon Coast North Salinity	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
01 m California South 100m pH	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
01 m California South salinity	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
03 m Oregon North Turbidity	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
05 m Oregon South Temperature	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
20 m Oregon Coast Currents	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
01 h California South Seismology	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
01 h Oregon Coast South 1000m O ₂	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
02 h California Coast Seismology	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here
04 h California North Seismology	2012-01-10 23:55:55	Type	Event	Description goes here	Note goes here

PAGEFACE RELATED COMPOSITE STATUS

Dashboard

RECENT IMAGES

- Glider
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24
- Gorgonian Coral
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24
- Acoustic Release
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24

POPULAR RESOURCES

- SeaBird CDT
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24
- Marine caption
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24
- Surface Buoy
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24

UNUSUAL EVENTS

- Oregon Coast Wave Height
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24
- Water Surface Elevation
 - Last Modified: 2011-06-15
 - Last Viewed: 2011-12-15
 - Last Updated: 2011-12-30, 13:24

User Interface

in development

Landing screen to be configurable to individual user interests
 Information filtered based on privileges and subscriptions
 Automatic, user-defined updates about resources and events
 Access to any registered data source



Observatory: CISON In Use Uptime: 56 days Open Tickets: 0

MY SMART SEARCHES

- This Month
- NW Pacific, Endurance
- Weather Instruments

OOI RESOURCES

- All Resources
- Data
- Observatories
- Facilities
- Platforms
- Instruments

MY RESOURCES

- Notifications 23
- Publications 15

MY COLLECTIONS

- Monitored Instruments 54
- Undeployed Instruments 02
- abc instrument
- def instrument

Available Policies 02

- My Class 0101
- Policy 034956

Information

IDENTIFICATION

Sea-Bird Mircocat

ID: SBE37SP 5685
 TYPE: CTD001
 MODEL NAME: 37SP 7000m
 MANUFACTURER: Sea-Bird Electronics
 MANU DATE: 2010-12-12
 SERIAL: UI01789

LOCATION

Endurance Line, NE Pacific

LATITUDE: 47°58.4849'
 LONGITUDE: -129°05.2523'
 DEPTH(m): -2018.0
 DRIFT TOL: 1.5 mile radius
 REPORTED: 2010-12-12 12:12:12

DESCRIPTION

This CTD (Conductivity, Temperature and Depth) instrument is one of three deployed on the same mooring at different depths. Each CTD is paired with an ADCP, at the same depth to identify and track circulation changes in the water column...

PROVENANCE

OWNER: Owner Name
 EMAIL: name_owner@gmail.com
 PHONE: +44 123456789
 PI: Name of PI
 EMAIL: name_pi@gmail.com
 PHONE: +44 123456789

Data

LATEST READINGS

Salinity 32.86 psi 2012-01-10 24:00Z
 Temperature 7.92 C 2012-01-10 24:00Z
 Conductivity 3.42 S/M 2012-01-10 24:00Z
 Source Velocity 1481.10 m/s 2012-01-10 24:00Z
 Density 1026.00 kg/m3 2012-01-10 24:00Z
 Pressure 96.44 decibar 2012-01-10 24:00Z

DATA INFORMATION

Protocol: Net CDF
 Processing: OOI Algorithm
 QA: QC

Administration

QUICK PLOT

Sensor: Temperature
 Plot type: Line
 Data range: Last Day
 From: 2012-01-10 24:00Z
 To: 2012-01-10 24:00Z

Recent Events | **Planned Events** | **Science Sensors** | **Engineering Sensors**

All Lifecycle Status Poles Command Settings Checkbox Testing FILTER

DATE	TYPE	EVENT	DESCRIPTION	INITIATED BY	NOTES
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here
2012-01-10 23:55:55	Type	Event	Description	Name	Note goes here

User-defined instrument/data monitors

Graphical display of selected products

User-defined metadata associated with any registered data source

Drop-down panels that allow data access and download

Array Structure & Instruments

The OOI website now provides considerable detail about the structure of sensing arrays and associated instruments:

<http://www.oceanobservatories.org>

Here are some screen shots....

OCEAN OBSERVATORIES INITIATIVE (OOI)

Transforming Our Understanding of How the Ocean Works

The OOI is a long-term, NSF-funded program to provide 25–30 years of sustained ocean measurements to study climate variability, ocean circulation and ecosystem dynamics, air–sea exchange, seafloor processes, and plate–scale geodynamics. The OOI will enable powerful new scientific approaches for exploring the complexities of Earth–ocean–atmosphere interactions, thereby accelerating progress toward the goal of understanding, predicting, and managing our ocean environment. The OOI can foster new discoveries that will, in turn, move research in unforeseen directions. To learn more, [click here](#).



Station Map & Instrument Table Portal



You are here: [Home](#) » [Infrastructure](#) » [OOI Station Map and Instrument Table Portal](#)

OOI Station Map and Instrument Table Portal

Click on any highlighted region on the map below for more information and to enter that regions Instrument Table Portal

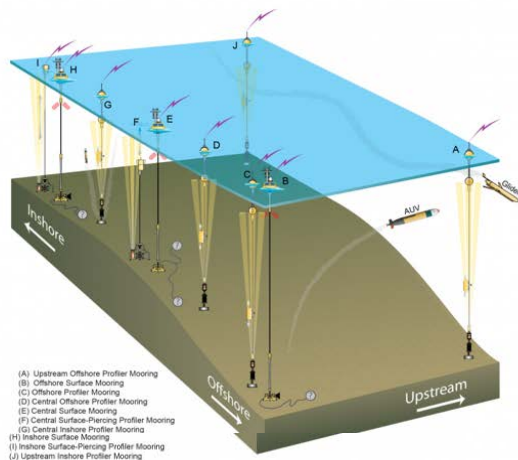
For more information on the Instrument Table Portal [click here](#).

Note: [Regional Scale Nodes](#) & [Endurance Array](#) are in the same region. Click on the text for whichever you would like more information about.



You are here: Home » Infrastructure » OOI Station Map and Instrument Table Portal » Pioneer Array

Pioneer Array



Description

Disclaimer: All data are subject to revision without notice; exact locations of mooring sites are not yet finalized; exact depths of sensors will be determined at the time of deployment.

Note: Click the below fields for more information about the Pioneer Array.

- ▼ Location and Sampling
- ▼ Platform Types
- ▼ Description of Infrastructure
- ▼ Station Summary

Detailed Infrastructure Tables

» [Click to download a PDF of all Infrastructure Tables.](#)

- ▼ Central Inshore Profiler Mooring
- ▼ Central Offshore Profiler Mooring
- ▼ Central Surface Mooring
- ▼ Central Surface-Piercing Profiler Mooring
- ▼ Inshore Surface Mooring
- ▼ Inshore Surface-Piercing Profiler Mooring
- ▼ Mobile Assets - AUV's
- ▼ Mobile Assets - Glider's
- ▼ Offshore Profiler Mooring
- ▼ Offshore Surface Mooring
- ▼ Upstream Inshore Profiler Mooring
- ▼ Upstream Offshore Profiler Mooring

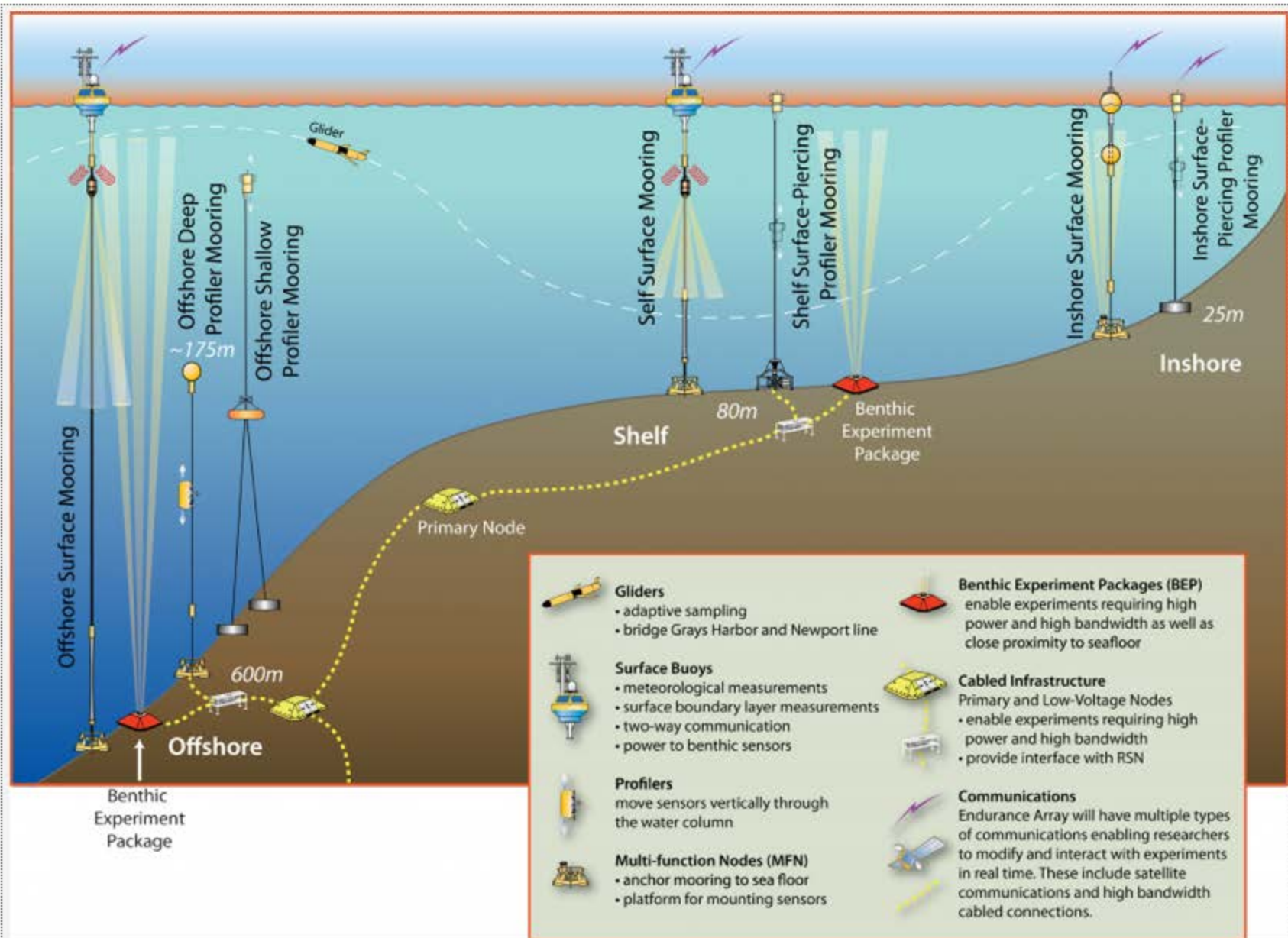


Pioneer Array Inshore Surface Mooring

Approximate Depth of Water Column: 95 m

Instrument Name/Description	Data Products	Relative Depth* (m)
Seawater pH sensor	pH	5 below sea surface; 2 above bottom
Spectrophotometer for optical attenuation and absorption measurements	Optical attenuation, Optical absorption, Optical backscatter	5 below sea surface; 2 above bottom
Downwelling spectral irradiance sensor	Downwelling spectral irradiance	5 below sea surface
Dissolved oxygen sensor	Oxygen concentration	5 below sea surface; 2 above bottom
Optical nitrate sensor (fast response)	Nitrate concentration	5 below sea surface
Velocity sensor measuring mean 2-D (U,V) velocity at a single point	Mean point water velocity, Orientation (pitch, roll, heading)	5 below sea surface; 2 above bottom
CTD with a pump	Conductivity, Temperature, Pressure (Depth), Salinity, Density	5 below sea surface; 2 above bottom
3-wavelength fluorometer for measurement of Chl-a fluorescence, CDOM fluorescence, optical backscatter	Chlorophyll-a fluorescence (695 nm excited by 470 nm), CDOM fluorescence(460 nm excited by 370 nm), Optical backscatter (red wavelengths), Chlorophyll-a concentration, CDOM concentration	5 below sea surface
Seawater CO ₂ partial pressure sensor	Partial pressure of CO ₂ in seawater	2 above bottom
Pressure sensor on the seafloor	Pressure, Temperature	2 above bottom
Velocity profiler (200 m range)	Velocity profiles, Acoustic backscatter, Orientation (pitch, roll, heading)	Bottom mount measures up to surface
Bio-acoustic sonar - coastal	Multi-frequency acoustic backscatter	Mounted 2 above bottom measures up to surface

Oregon (Newport) Line



Disclaimer: Graphics are conceptual designs and are not yet finalized. All data are subject to revision without notice.

Oregon Shelf Surface Mooring

Depth of Water Column: 80 m

Instrument Name/Description	Data Products	Relative Depth* (m)
Bulk meteorological instrument package	Air temperature, Relative humidity, Barometric pressure, Mean wind velocity, Precipitation, Downwelling shortwave irradiance, Downwelling longwave irradiance, Sea surface temperature, Sea surface conductivity, Specific humidity	~3 above sea surface
Direct covariance flux instrument package	Wind velocity in 3 dimensions, Air temperature, Moisture, Platform direction and tilt (3 axes), Direct covariance fluxes of heat, moisture, and momentum	~3 above sea surface
Air-sea interface CO ₂ partial pressure	Optical absorption of IR by CO ₂ , Partial pressure of CO ₂ in air, Flux of CO ₂ across air water interface	Sea Surface
Surface Wave Spectra	Platform motion, Significant wave height, Mean period, Mean direction, Spectral width (directional spreading), Period of spectral peak, Direction of spectral peak, Average wave period, Spectral energy density (non-directional) and Directional spectra for multiple frequency bands	Sea Surface
Single point current meter	Mean water velocity over a defined volume	1 below sea surface; 5 below sea surface
Dissolved oxygen	Oxygen concentration	5 below sea surface
Seawater pH	pH	5 below sea surface
CTD with a pump	Conductivity, Temperature, Pressure (Depth), Salinity, Density	5 below sea surface
Velocity profiler (short range**)	Water velocity profiles, Acoustic backscatter	Mounted at 5, down-looking
Spectrophotometer	Optical attenuation, Optical absorption, Optical backscatter	5 below sea surface
Optical nitrate	Nitrate concentration	5 below sea surface
Downwelling spectral irradiance	Downwelling spectral irradiance, Diffuse attenuation	5 below sea surface
3-wavelength fluorometer	Chlorophyll-a fluorescence (695 nm excited by 470 nm), CDOM fluorescence(460 nm excited by 370 nm), Optical backscatter (red wavelength)	5 below sea surface



Opportunities for Community Involvement

Activity	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
- OSM Informational Meetings: Feb. 21 - 23	█										
- Pioneer Sampling Plan Focus Group			█								
- Pioneer Sampling Plan Webinar				█							
- QC Water Column Workshop: Jun. 6 - 8					█						
- QC Water Column Webinar: Jun. 27						█					
- Endurance Sampling Plan Focus Group											
- Endurance Sampling Plan Webinar											
- RSN Sampling Plan Focus Group											
- RSN Sampling Plan Webinar											
- Global Sampling Plan Focus Group											
- Global Sampling Plan Webinar											

TBD

Interested? Go to the OOI web site and express your interest in participating:

URL (<http://www.oceanobservatories.org/questions/>)

Workshops Around Science Themes

NSF supported two external workshops in 2011

Science around Shelf Break Fronts using Pioneer as a model
(February 2011)

Science around submarine volcanos using Axial Seamount
as a model (October 2011)

Do you have a science topic to explore that could benefit from a focused discussion around sustained global-scale observations? Other topics?

Propose a workshop to the NSF!

Another engagement opportunity: Assist with Planned Data Products

- What and Why
 - To enhance and improve our delivery of data and services, the OOI program requests information on numerical methods (algorithms) to produce various ocean and meteorological products from OOI core instruments.
 - OOI desires to utilize the best publicly available techniques to produce these products and feels the broad oceanographic community is the best source. In addition to the algorithm “science”, the techniques can include: automated quality control steps, error flag definition and “hardening” for an operational, automated environment.
- How to Participate
 - Contact: Dr. Sarah Webster at: swebster@oceanleadership.org
 - Details on the desired information and guidelines to be available soon at www.oceanobservatories.org

Planned Deployment Schedule

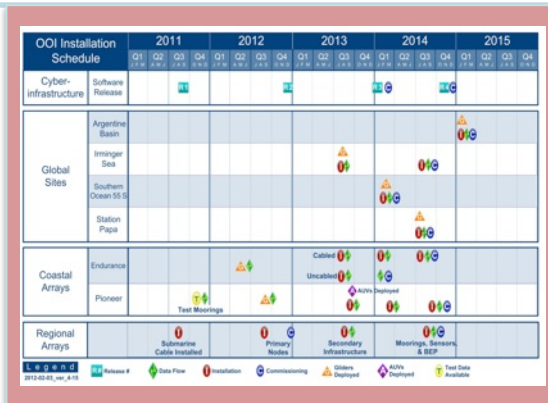
OOI Installation Schedule		2011				2012				2013				2014				2015			
		Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D
Cyber- infrastructure	Software Release			R1				R2					R3 C			R4 C					
Global Sites	Argentine Basin																G I C				
	Irminger Sea										G I						I C				
	Southern Ocean 55 S												G I C								
	Station Papa														G I C						
Coastal Arrays	Endurance						G						Cabled I				I C				
	Pioneer												Uncabled I								
Regional Arrays																					

Construction to Operations – 2015 and beyond

- Global Arrays on a 12-month maintenance cycle
- Coastal Arrays on a 6-month maintenance cycle
- Cabled assets on a 12-month maintenance cycle
- Gliders will be rotated every 2-3 months – initially

Construction

Operations



Initial Break-In Period

- Communications
- System Control
- O&M Schedule
- CI Software
- Data QA/QC

Enhanced Researcher Control

- Hardware Insertion
- Instrument Control
- Adaptive Sampling
- Ocean Models
- Data Assimilation

2010

2015

2016 – 2017
(notional)

2040

Procedures/Protocols to resolve in the Transition to Operations:

- Requesting and authorizing changes in sampling
- Resolving conflicting requests
- Assessing compatibility of proposed researcher-supplied equipment
- System support (automated and human-in-the-loop)

OOI Data Policy

- Data will be rapidly disseminated, open, and freely available.
- Near-real-time with latencies as small as technical feasibility allows.
- PI sensor data shall be publicly available.*
 - * PI may request exclusive access (up to 1 year)
 - * Case by case basis
 - * Exclusivity expires, all data becomes public

Questions/Comments?

- How much will it cost researchers to use the OOI?
- There is concern with the research community that the OOI will have to pull back from planned capability. Is this true?
- What is the target Operations and Maintenance budget?
- When will engineering documents be released?
- How does a researcher coordinate the installation of their instrument?
- Can users specify data format?
- What is the process for Pioneer relocation and who pays for it?