

# The Ocean Observatories Initiative: Data Access and Visualization via the Data Portal



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## Background

The Ocean Observatories Initiative (OOI) is a broad-scale, multidisciplinary effort to transform oceanographic research by providing users with real-time access to long-term datasets from a variety of deployed physical, chemical, biological, and geological sensors.

OOI data are made available to user communities of oceanographers, scientists, educators, and to the public. The OOI infrastructure consists of seven arrays located in the Atlantic and Pacific Oceans (Fig. 1):

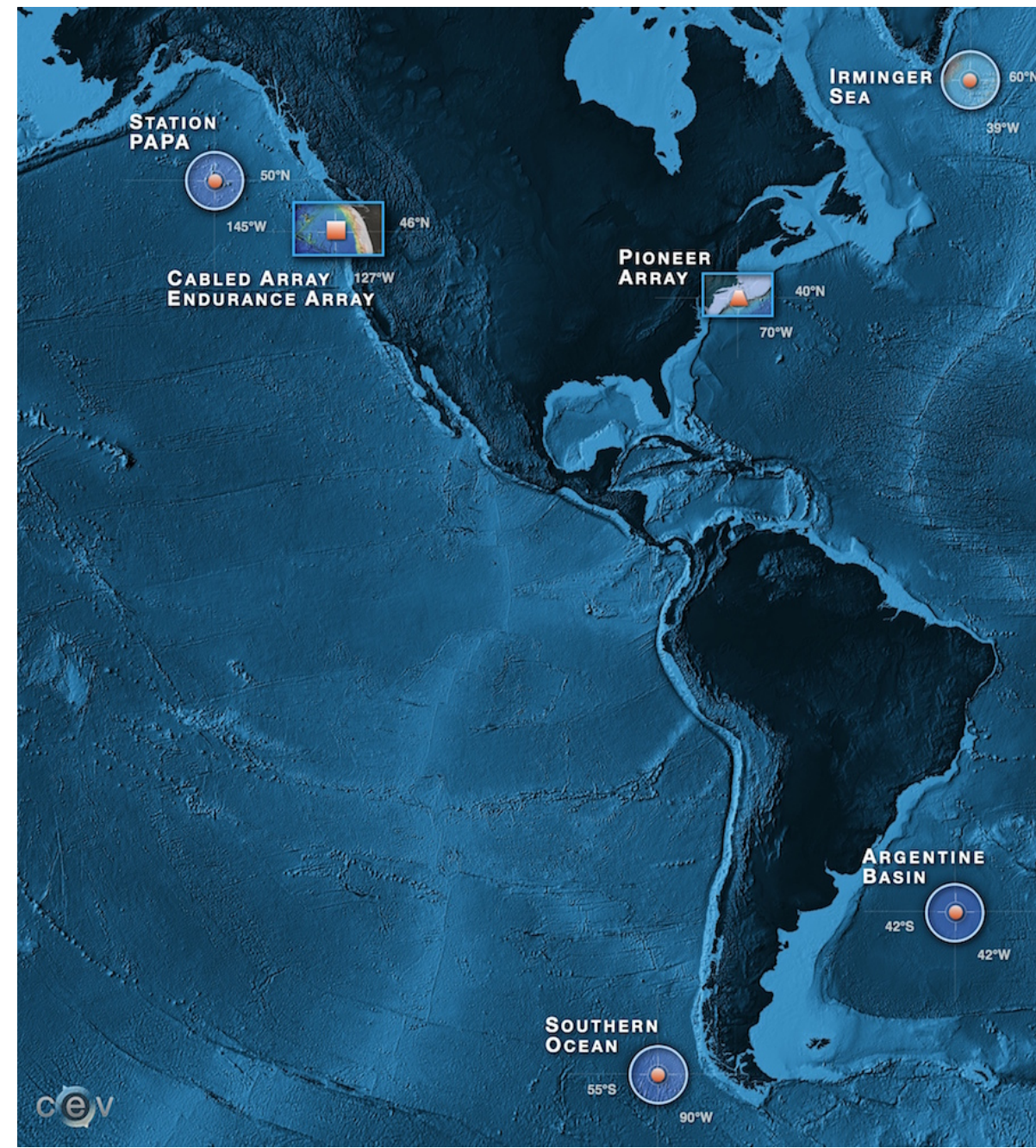


Figure 1. OOI array locations.

- Cabled Array
- Coastal Arrays
  - Endurance
  - Pioneer
- Global Arrays
  - Station Papa
  - Irminger Sea
  - Southern Ocean
  - Argentine Basin

## The Global Arrays

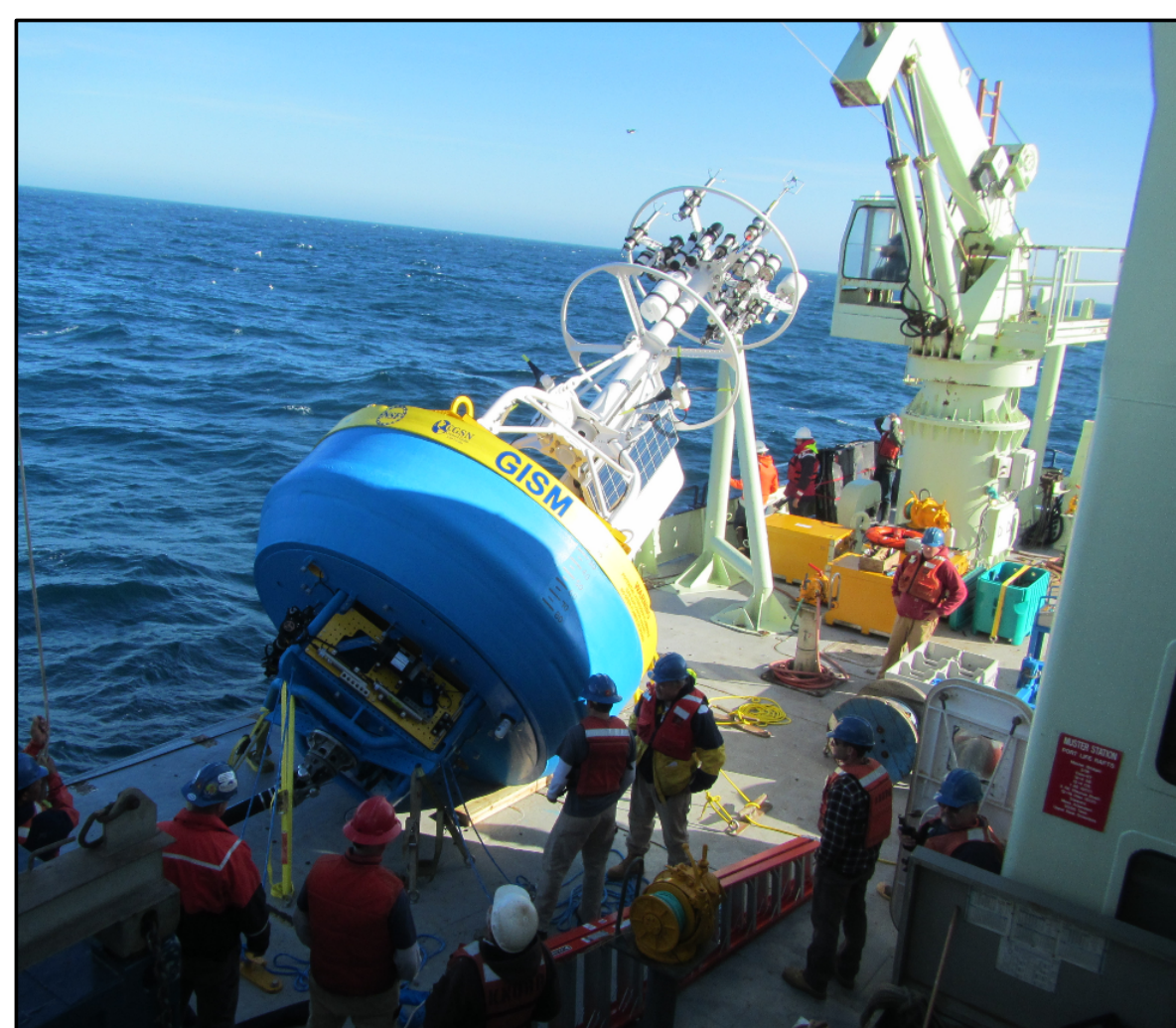


Figure 2. Imringer Surface Mooring being deployed in 2014.

- Located at four previously sparsely sampled, high-latitude regions critical to our understanding of climate and ocean circulation.
- Consist of moored platforms and mobile assets that provide a combination of time-series observations and mesoscale spatial sampling (Fig. 3).
- A Surface Mooring, subsurface Hybrid Profiler Mooring, and two Flanking Moorings form triangular arrays (see inserts in Fig. 5).

- Open Ocean Gliders sample within and around the triangular array.
- Profiling Gliders sample the upper water column near the Hybrid Profiler Mooring.

### Global Array Instrumentation

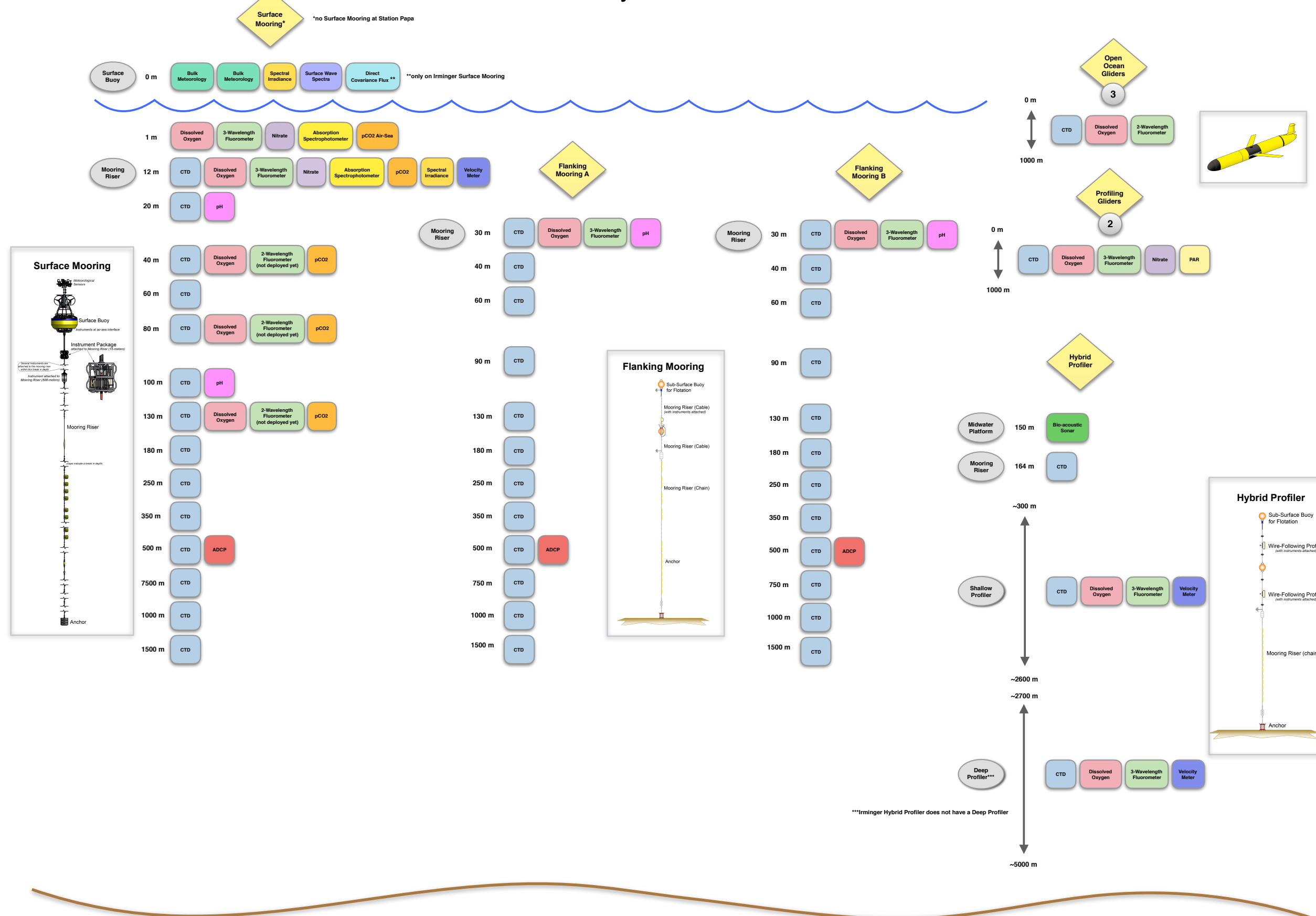


Figure 3. Schematic of instrumentation available at the global arrays, instrumentation varies slightly between arrays. Water depth at each array is: Argentine Basin ~ 5200 m, Irminger Sea ~ 2800 m, Southern Ocean ~ 4800 m, Station Papa ~ 4200 m.

## Data Access

- Data from all arrays are integrated through a common operation infrastructure (OOINet) and are available via the OOI Data Portal.
- Access to the Data Portal is available at [oceanobservatories.org](http://oceanobservatories.org) (Fig. 4).
- Supplementary material includes, but is not limited to:
  - Data product descriptions
  - Technical drawings
  - Cruise data
  - Quality control procedures

## OOI Data Portal

- To utilize the full functionality of the portal, users can register for an account on OOI Net through the Data Portal home page or use the CILogon option ([ooinet.oceanobservatories.org](http://ooinet.oceanobservatories.org)).
- Once registered, users can browse data via the interactive science map (Fig. 5) or through the data catalog (Fig. 6).
- Additional information in the interactive map includes:
  - Deployment dates
  - Instrumentation available
  - Platform location
  - Links to other pages (e.g., plotting, asset management)

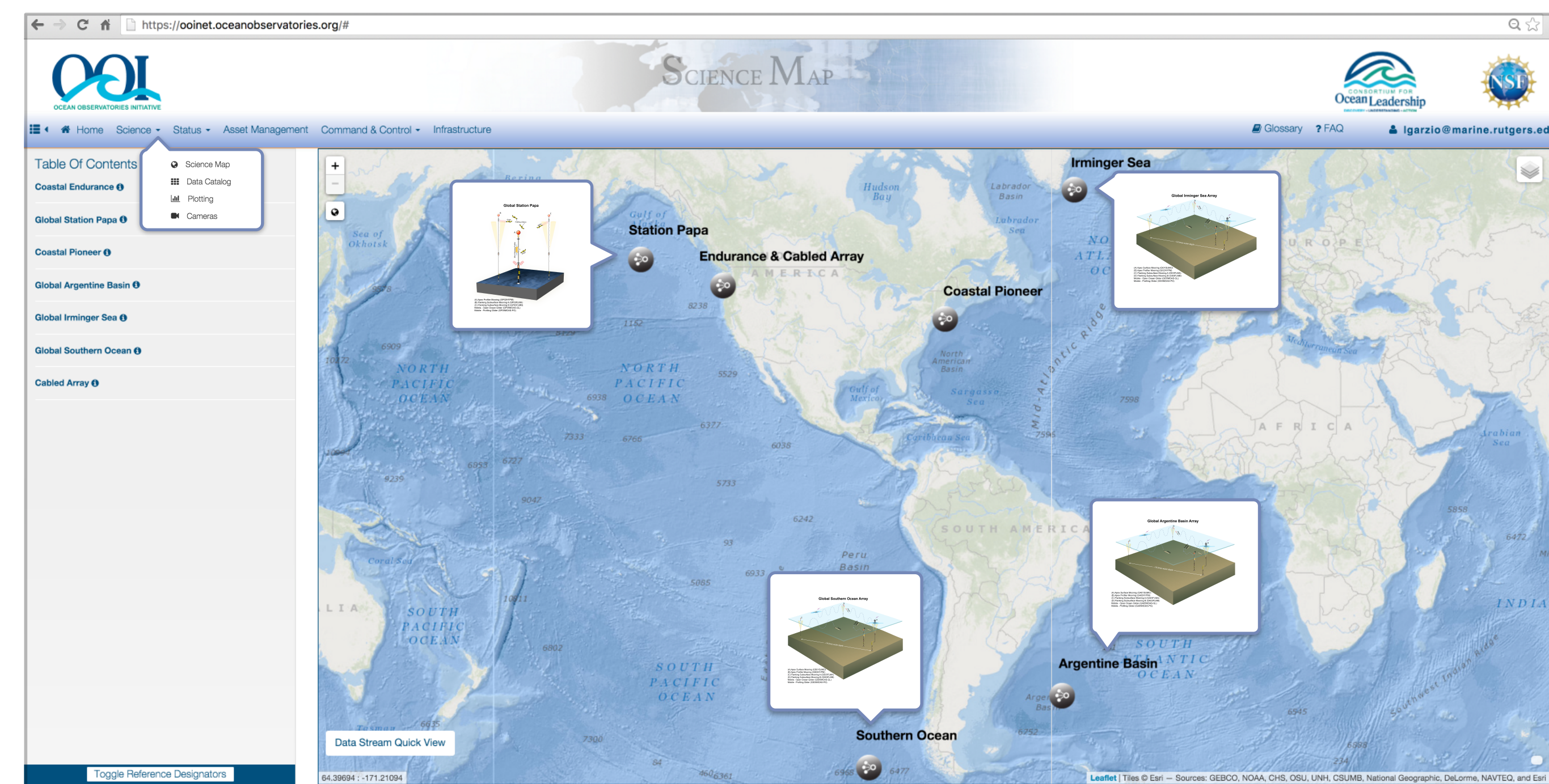


Figure 5. Home page of the OOI Data Portal featuring the interactive Science Map, with Global Arrays highlighted.

- In the data catalog, users can:
  - Search for specific arrays, platforms or instruments
  - Browse data via the Table of Contents
  - Filter on generic science data products
- Additional information in the data catalog includes:
  - Data stream names and Reference Designators
  - Stream type (recovered, telemetered, or streamed - Cabled only)
  - The 'End Time' (last timestamp available)
  - Links to plot or download data (CSV, NetCDF, JSON)

Array	Site Name	Platform Name	Node	Instrument	Stream Identifier	Stream Type	Depth	Lat / Lon	Start Time	End Time	Reference Designator
RIS	Download	OR Offshore Cabled Shallow Profiler Mooring	Shallow Profiler	3-Wavelength Fluorometer	streamed_scp_01	data record	NAN		November 3rd 2014, 10:08:04 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-3A-FLUOR010A
RIS	Download	Slope Base Shallow Profiler Mooring	Slope Profiler	Single Point Velocity Meter	streamed_scp_02	velocity data			October 8th 2014, 11:02:02 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-4B-VELPT0102
RIS	Download	Slope Base Shallow Profiler Mooring	Slope Base	Medium Power J-box	streamed_scp_03	optical sample			September 12th 2014, 11:17:41 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-5A-CTDP0103
RIS	Download	Axial Base Shallow Profiler Mooring	Axial Base Shallow Profiler	Shallow Profiler	CTD Profiler	CTD Profiler			October 7th 2014, 8:02:02 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-6A-CTDP0102
RIS	Download	Axial Base Shallow Profiler Mooring	Axial Base Shallow Profiler	Shallow Profiler	CTD Profiler	CTD Profiler			October 6th 2014, 10:05:23 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-7A-CTDP0102
RIS	Download	OR Shelf Cabled Benthic Experiment Package	OR Shelf Cabled Benthic Experiment Package	Low Power J-box	CTD Pumped	streamed_scp_04			September 25th 2014, 6:17:08 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-8A-CTDP0108
RIS	Download	Slope Base Shallow Profiler Mooring	Slope Base Shallow Profiler	Platform Interlock Controller	streamed_scp_05	data record			October 2nd 2014, 5:27:11 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-9A-FLUOR0103
RIS	Download	OR Offshore Cabled Shallow Profiler Mooring	OR Offshore Cabled Shallow Profiler Mooring	Platform Interlock Controller	CTD Profiler	optical sample			October 8th 2014, 7:01:08 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-4A-CTDP0103
RIS	Download	Southern Hydrate Ridge Survey 1	Southern Hydrate Ridge Survey 1	Low Power J-box	3-D Single Point Velocity Meter	streamed_scp_06			September 18th 2014, 8:02:02 pm	February 12th 2015, 2:56:55 pm	REDSMPS-SP010A-12-VEL-SDR0104

Figure 6. The OOI Data Catalog.

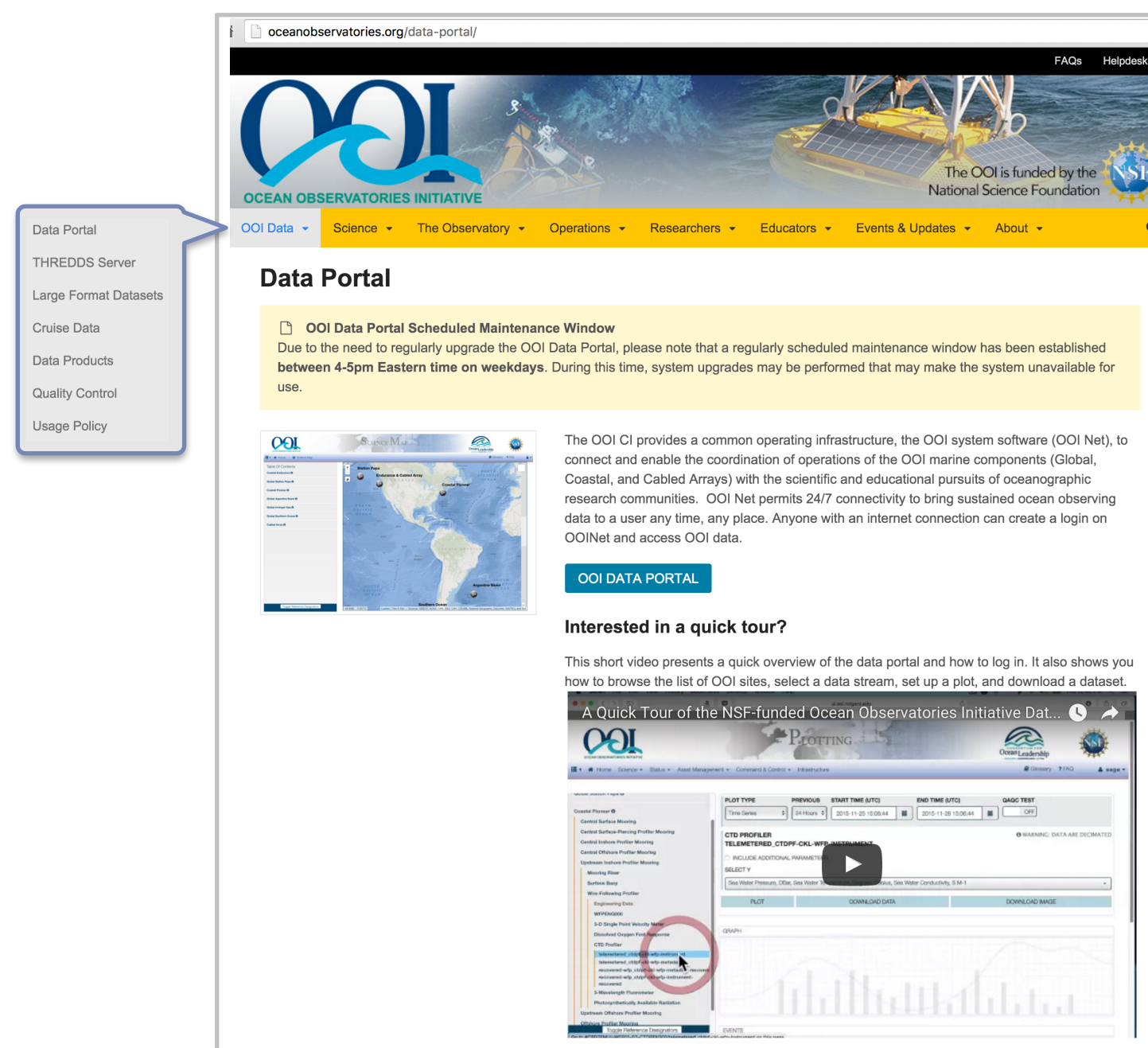


Figure 4. Access to the OOI Data Portal via [oceanobservatories.org](http://oceanobservatories.org).

## Data Status Tools

Users can view the status of data available in OOI Net at the platform or instrument level, via an interactive timeline (Fig. 7). In addition to this timeline, other useful community developed tools can be found at [oceanobservatories.org/community-developed-tools/](http://oceanobservatories.org/community-developed-tools/)

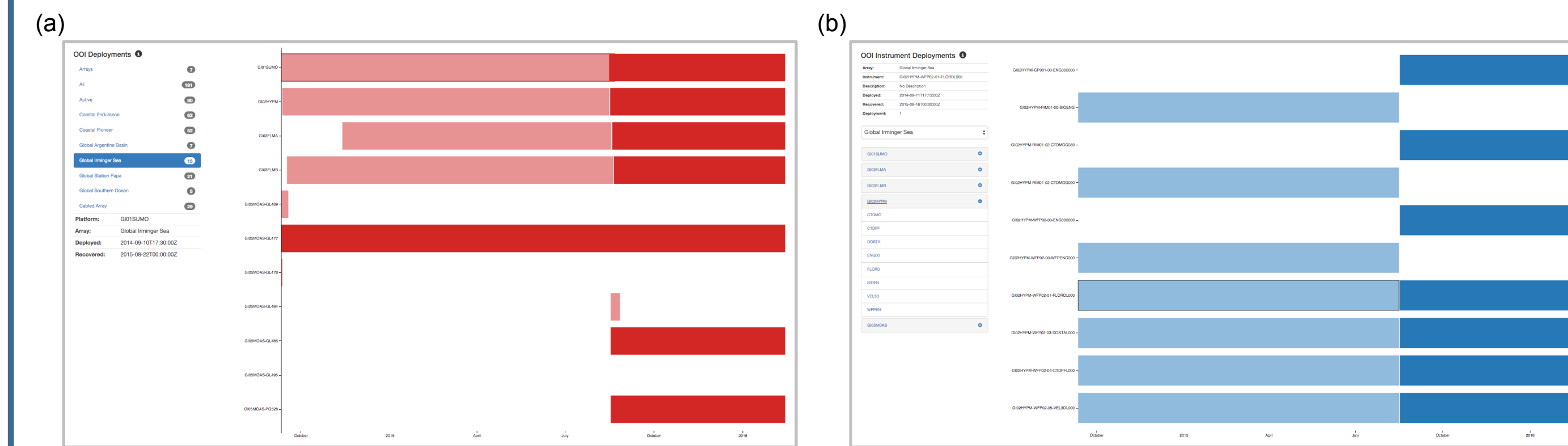


Figure 7. Interactive tool for visualization of data availability at the (a) platform and (b) instrument deployment level. The length of each bar represents the length of deployment, and deployment information is displayed when hovering over a colored bar.

## THREDDS Data Server

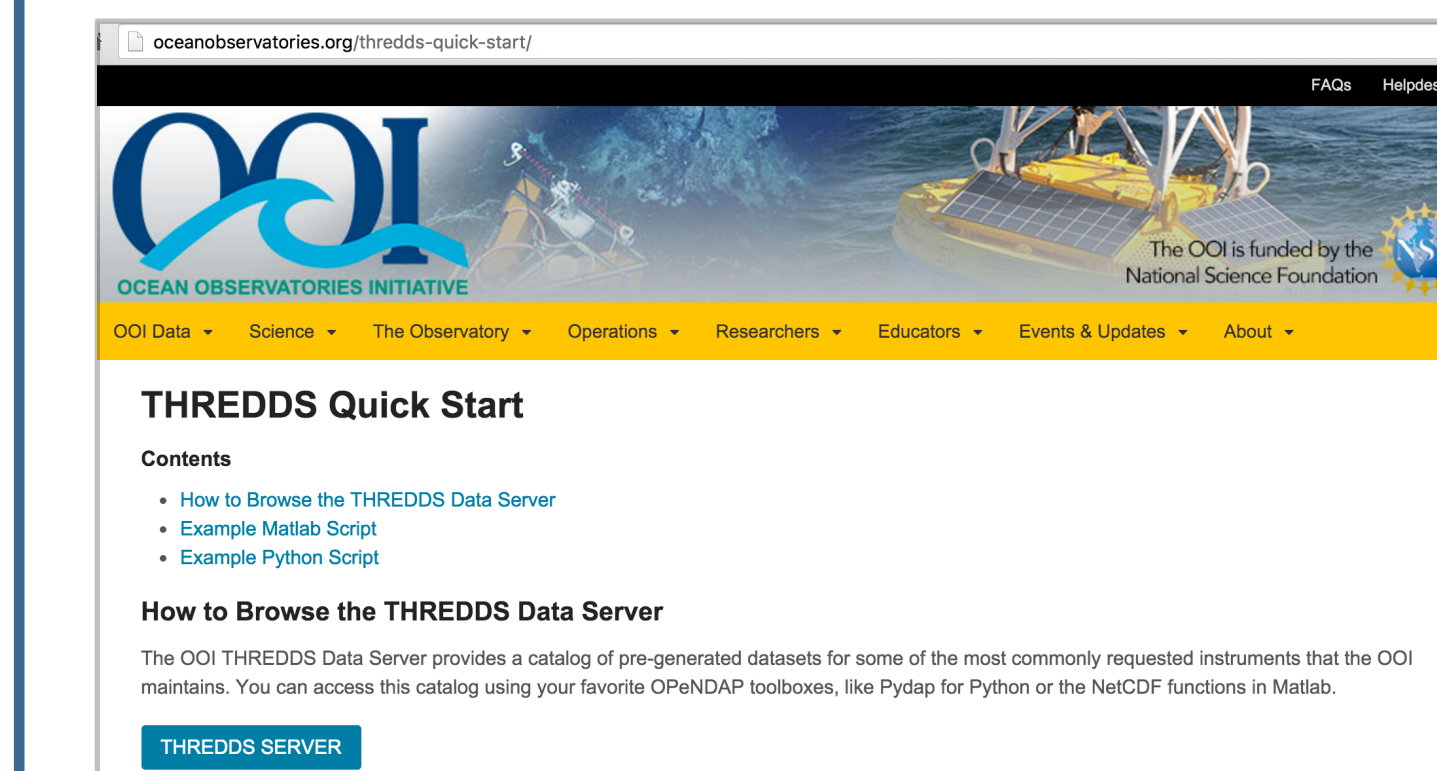


Figure 8. THREDDS Quick Start guide at [oceanobservatories.org/thredds-quick-start/](http://oceanobservatories.org/thredds-quick-start/)

- A subset of pre-generated datasets can be accessed via the OOI THREDDS Data Server [oceanobservatories.org/thredds-server/](http://oceanobservatories.org/thredds-server/)
- A Quick Start guide:
  - Describes the catalog structure
  - Provides interpretations of file names
  - Provides example tools for interacting with and plotting datasets (Fig. 8).

## Data Visualization

- Data products can be visualized in the Data Portal (Fig. 9)
- Plotting functions include:
  - Time series
  - T-S diagram
  - Quiver
  - Rose
  - 3-D scatter
  - Stacked time series
  - Interpolated
- Plots are decimated (up to 1,000 points shown) to maximize performance.
- Users can view the events log (e.g., deployment dates)

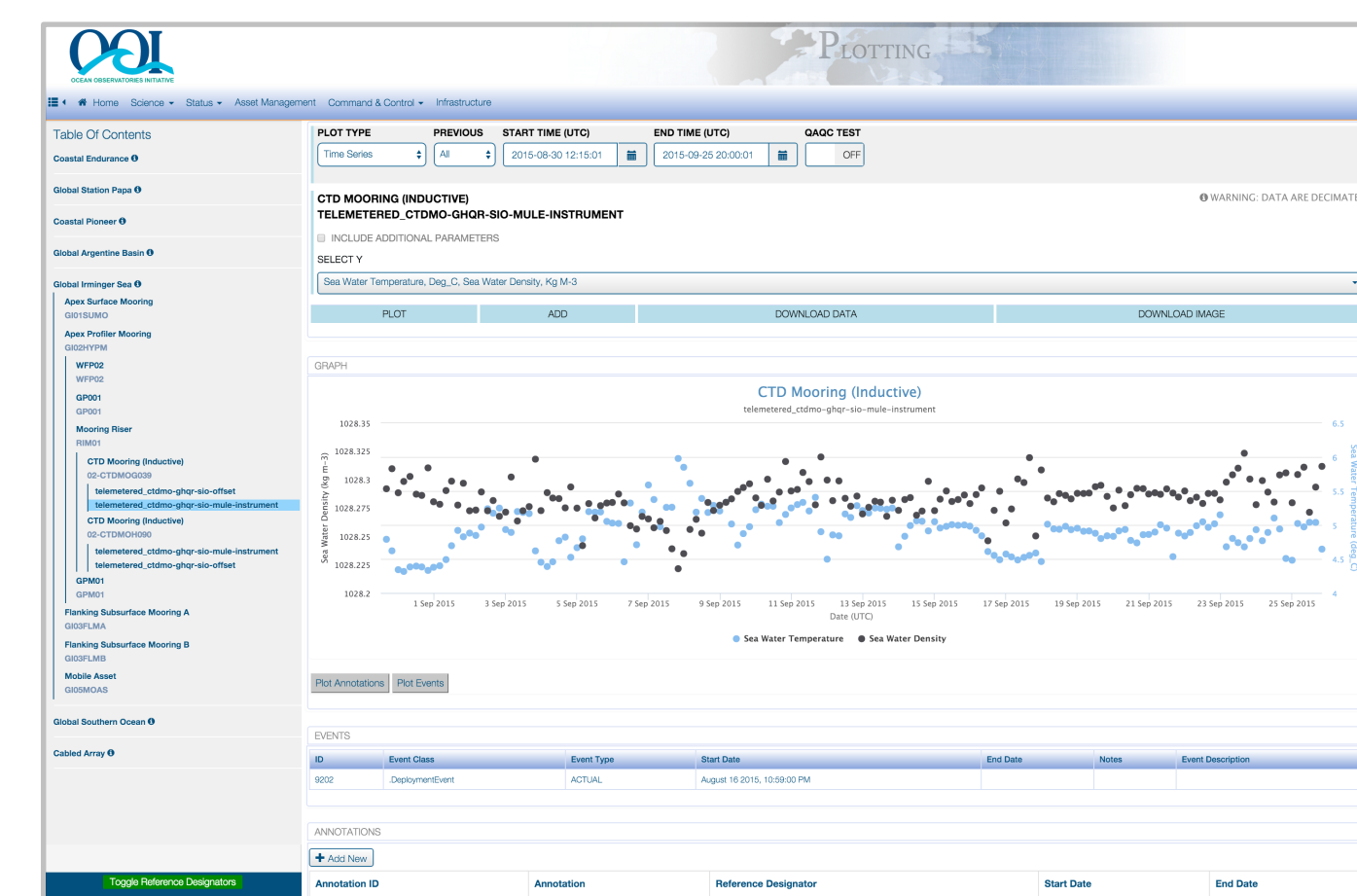


Figure 9. Example time-series plot of data from the CTD located on the Irminger Sea Hybrid Profiler Mooring at ~150m depth.

- Plotting options include:
  - Select time range
  - Apply QA/QC tests
  - Plot multiple instruments using the "ADD" button
  - View annotations that identify data issues (e.g., instrument failure)
  - Downloadable image
  - Data downloaded via the plotting page can be further analyzed or visualized using external tools (Fig. 10).

Figure 10. Example cross-section plot of Pioneer Glider 388 using Python tools outlined in the THREDDS Quick Start tutorial on [oceanobservatories.org/thredds-quick-start/](http://oceanobservatories.org/thredds-quick-start/)

The OOI website, data portal, and associated tools provide users with a variety of methods to access and visualize data. These datasets provide an unprecedented opportunity to transform oceanographic research and education, and are readily accessible to the general public via the data portal.



[oceanobservatories.org](http://oceanobservatories.org)

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OOI Official Website

[oceanobservatories.org](http://oceanobservatories.org)

Questions or Comments?

email [help@oceanobservatories.org](mailto:help@oceanobservatories.org)

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