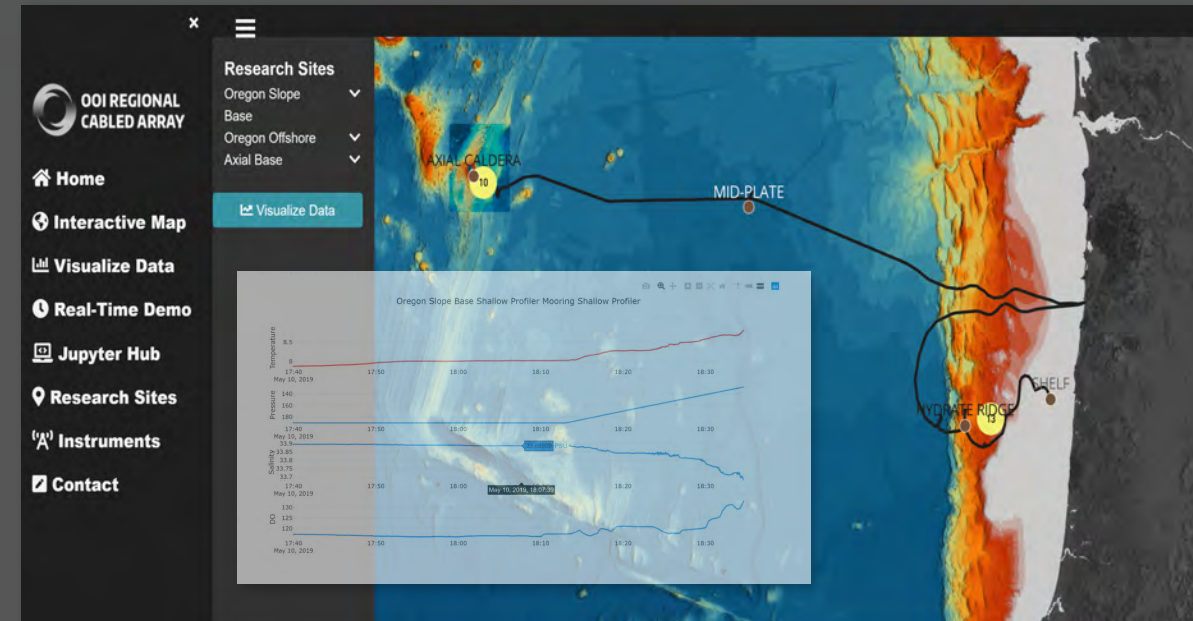


Regional Cabled Array Value-Added (CAVA) Program

Deborah Kelley, Rob Fatland, Wu-Jung Lee,
Amanda Tan, Don Setiawan, Dwina Solihin,
Michael Vardaro, Wendi Ruef, Katie Bigham,
Hunter Hadaway, Shawn Thomas, Orest Kawka

University of Washington



Project Goals

- Increase active use of RCA data by scientists and support educators and public exploration of data in the future
- Provide additional tools for scientists to discover, access, visualize, and use RCA data sets suitable for addressing specific science hypotheses
- Provide an intuitive, user-friendly data search and visualization interface, coupled with a convenient data downloading scheme
- Accelerate research output and engage a broader user base, as envisioned when OOI was funded



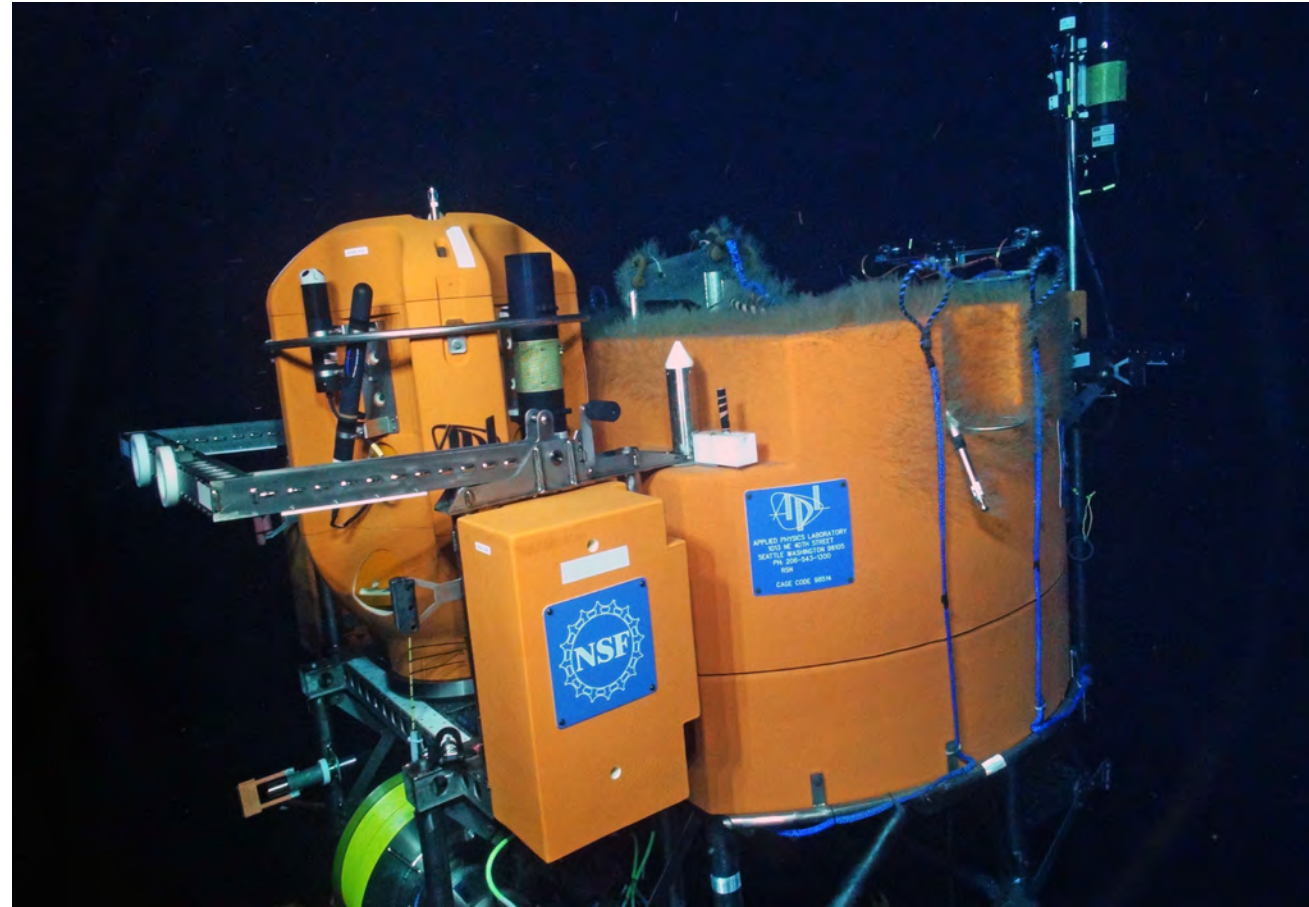
Project Development Outline (2018-19)

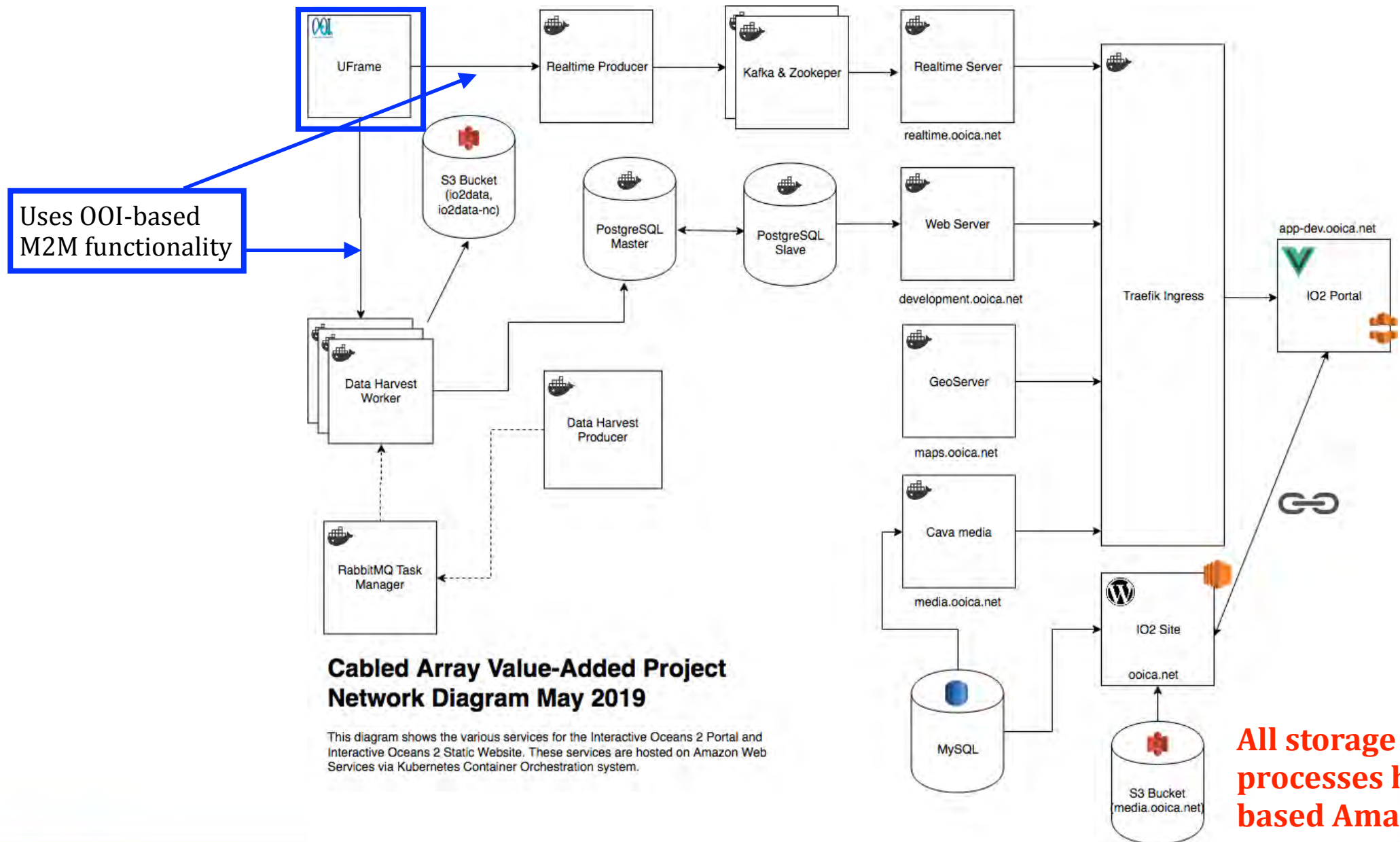
- Easy-to-use Application Programming Interface (API) for accessing and downloading OOI data (simpler syntax and request construction)
- Implementation of a proof-of-concept back-end and front-end for hosting and serving data from a **cloud-based system**
- Interactive Map interface highlighting RCA assets that serves as an entry point into the Data Visualization Portal
- Data Visualization Portal with enhanced data search and visualization capabilities
- A set of executable Jupyter notebooks that can be directly executed on the CAVA JupyterHub
- Educational and outreach tools including science stories and galleries of stunning photos and figures



Sites & Instruments Prioritized

- Starting with diverse suite of instruments hosted on the Shallow Profiler Moorings:
 - Slope Base (>125 km west of Newport)
 - Endurance Offshore (~80 km west of Newport)
 - Base of Axial Seamount (>500 km offshore)
- Priority instrument suite:
 - Conductivity-Temperature-Depth (CTD) + Dissolved Oxygen (O₂)
 - Carbon Dioxide (CO₂)
 - Acidity (pH)
 - Nitrate (NO₃)
 - Fluorometer (ChlA, CDOM, backscatter)
 - Photosynthetically Active Radiation (PAR)



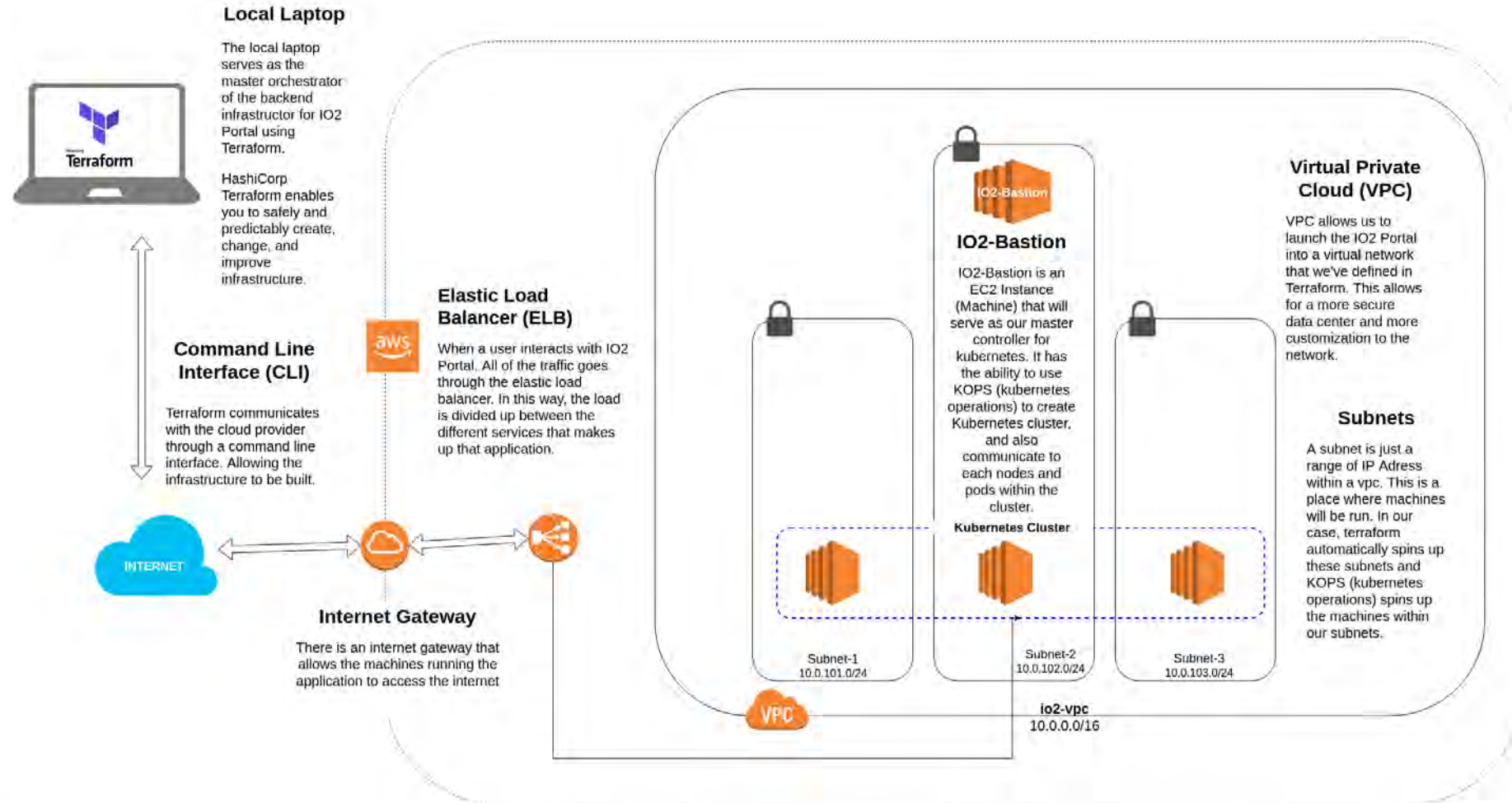


Cabled Array Value-Added Project Network Diagram May 2019

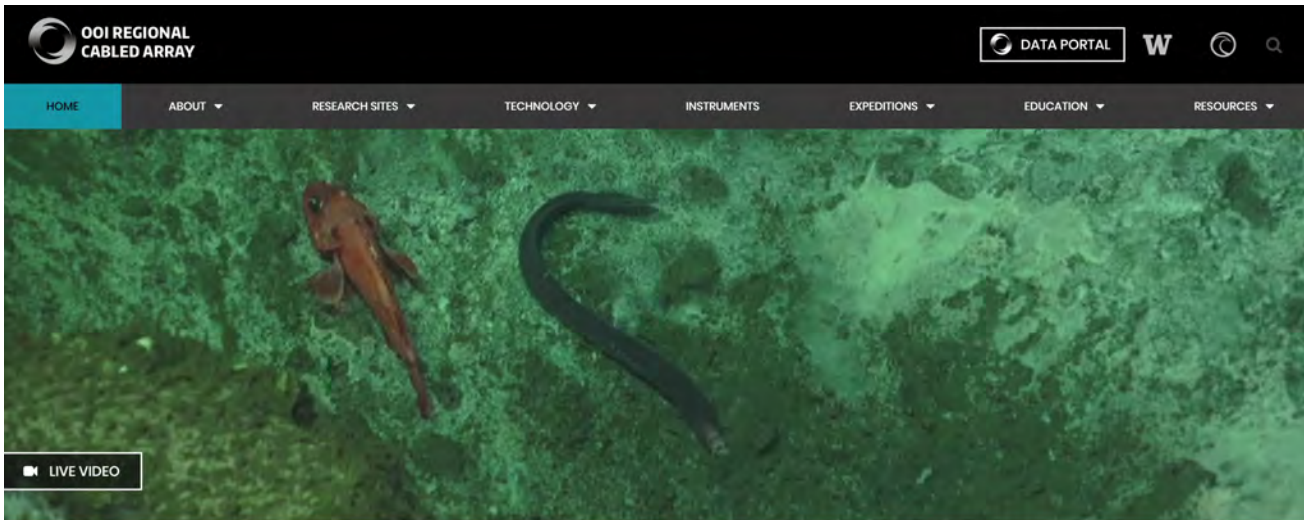
This diagram shows the various services for the Interactive Oceans 2 Portal and Interactive Oceans 2 Static Website. These services are hosted on Amazon Web Services via Kubernetes Container Orchestration system.

All storage and downstream processes hosted on cloud-based Amazon Web Services

CAVA Back End Infrastructure



CAVA Front End



Eyes on the Ocean



Regional Cabled Array

The Regional Cabled Array (RCA) provides unprecedented power (10 kV, 8 kW), bandwidth (10 GbE), and two-way communication to scientific sensor arrays on the seafloor.



Video Gallery

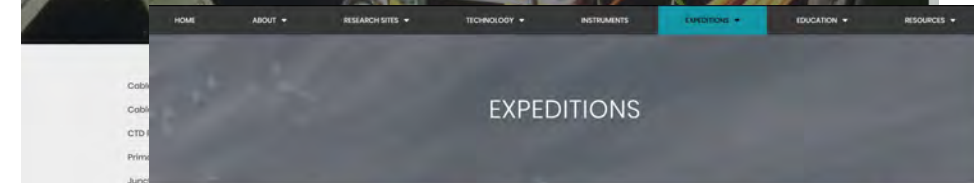
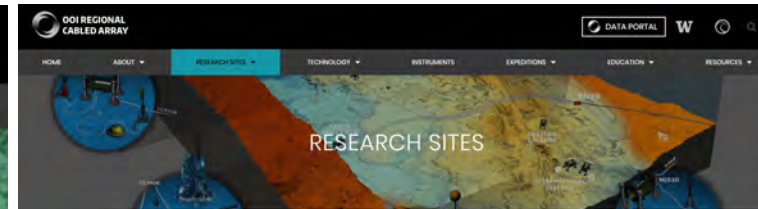
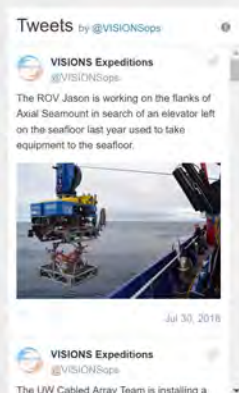
Video clips illustrating the technology used, biology encountered, and geological features explored during OOI Cabled Array cruises from 2010 to present.

[READ MORE](#)

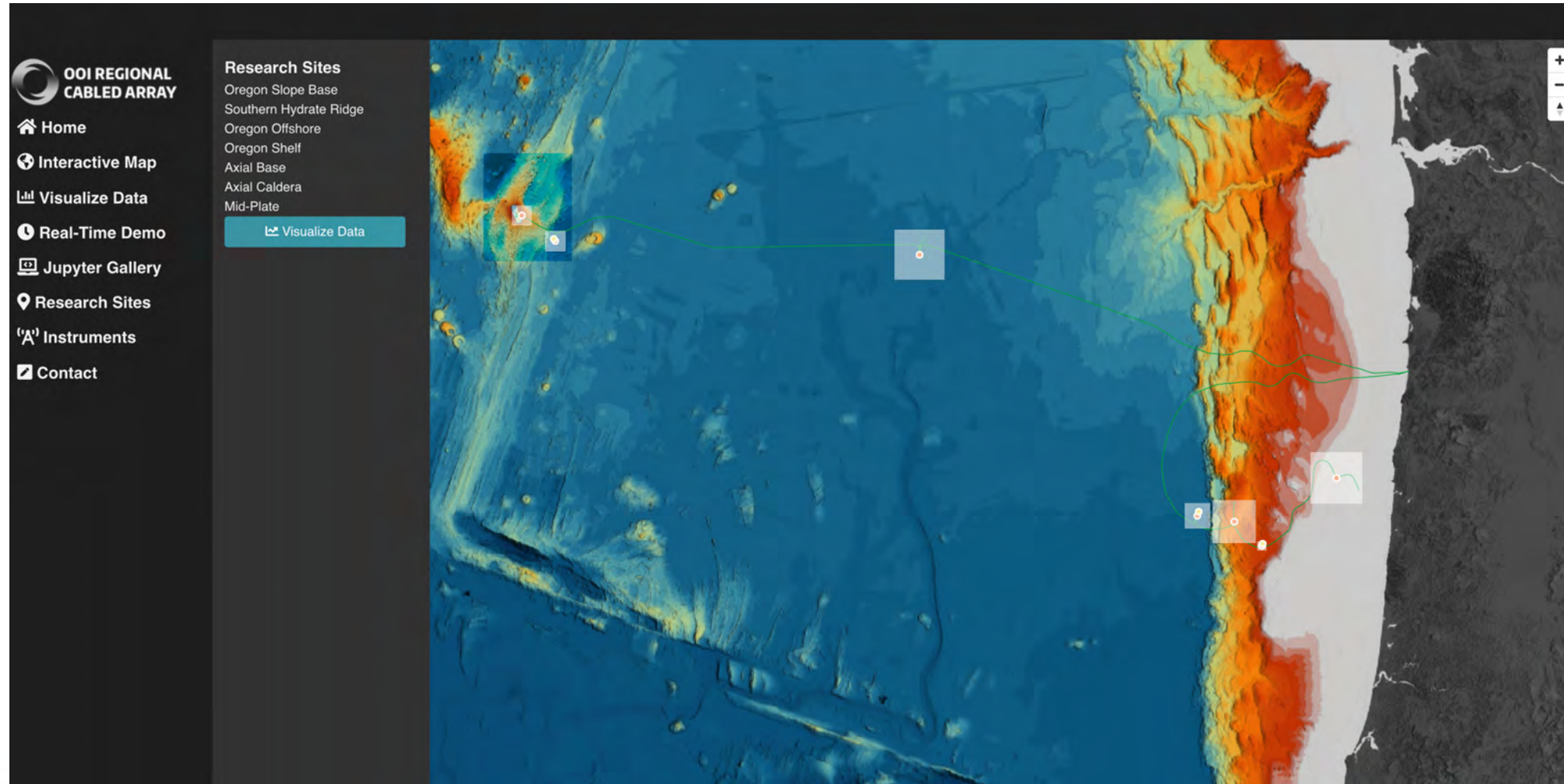


Please Join Us On Our Expedition

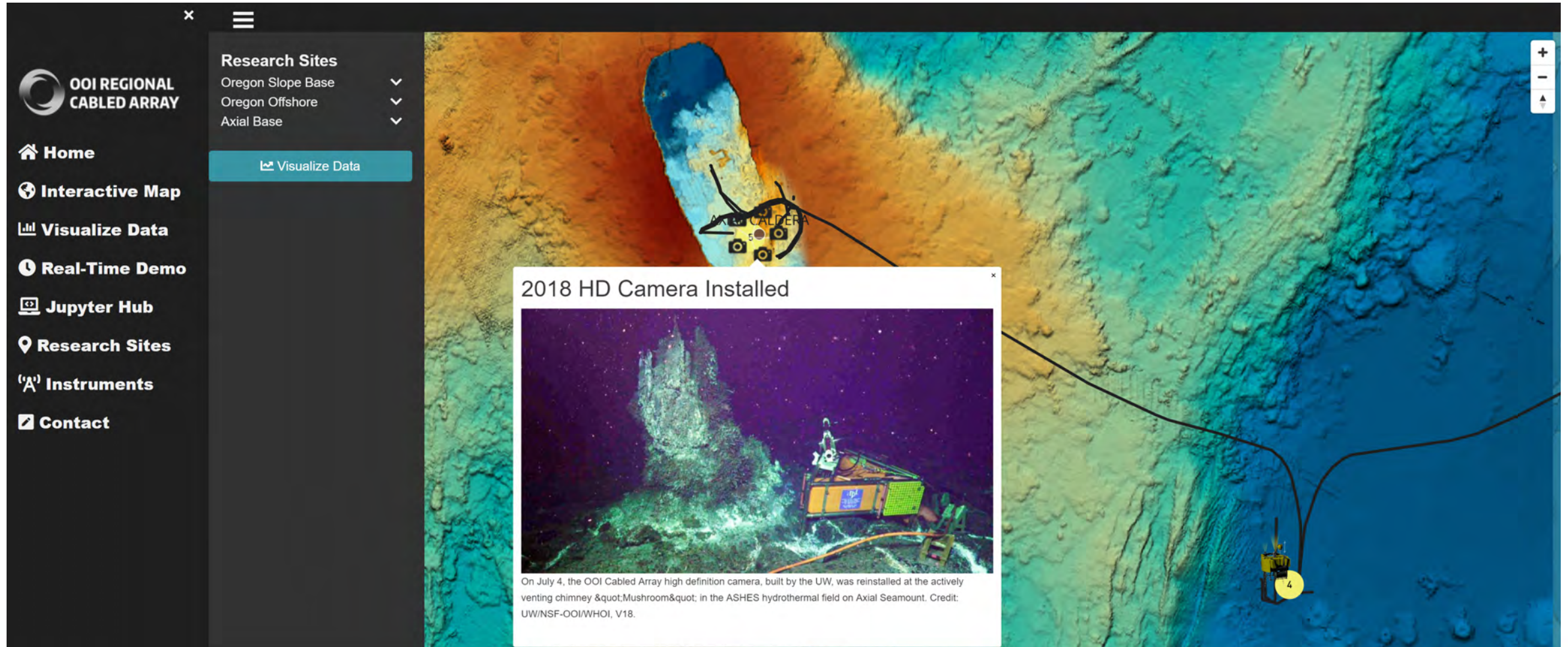
The UW Cabled Array team from the School of Oceanography and the Applied Physics Laboratory will once again have an exciting summer in the Northeast.



CAVA Map Interface

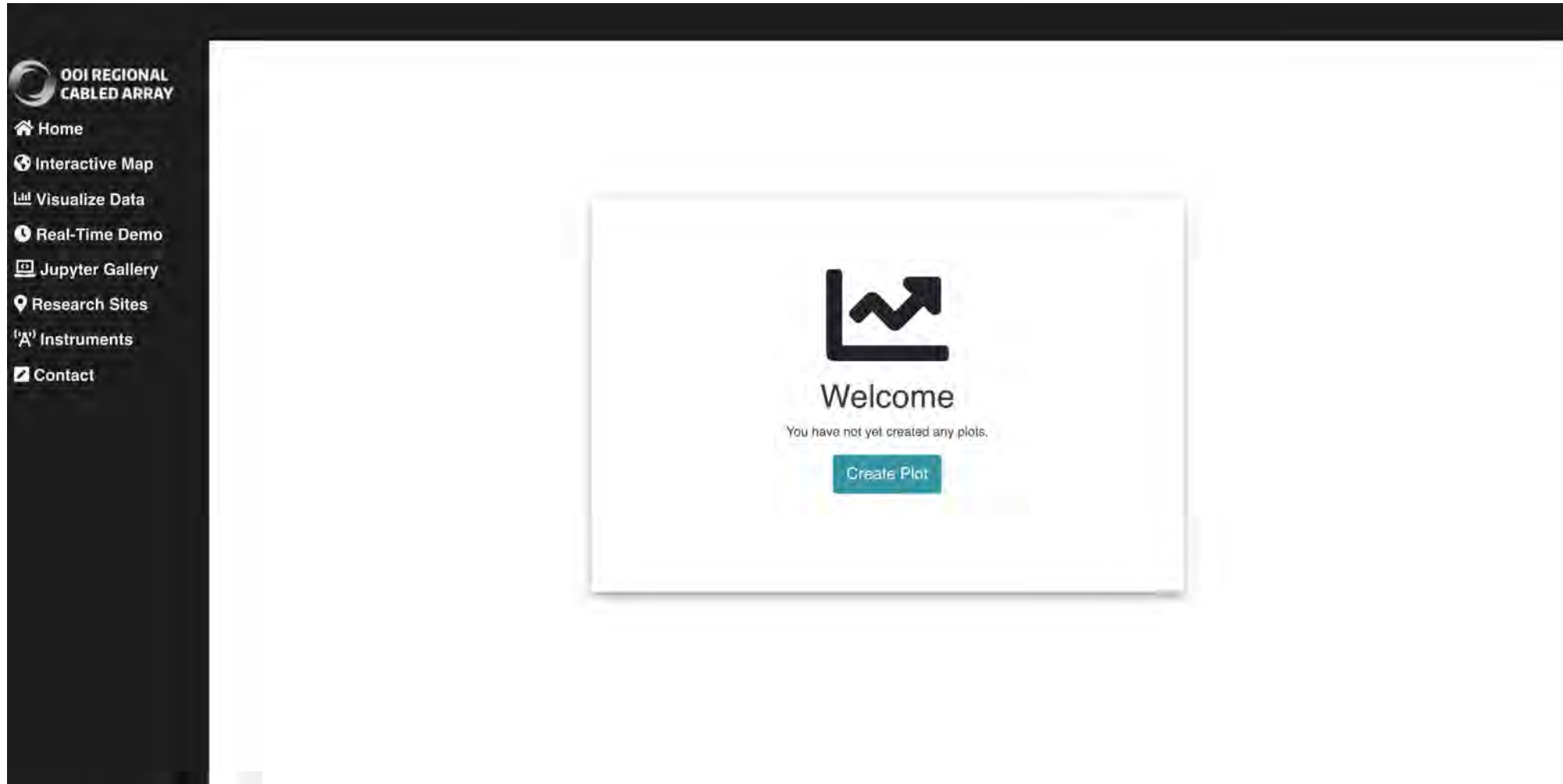


CAVA Map Interface: Featured Images

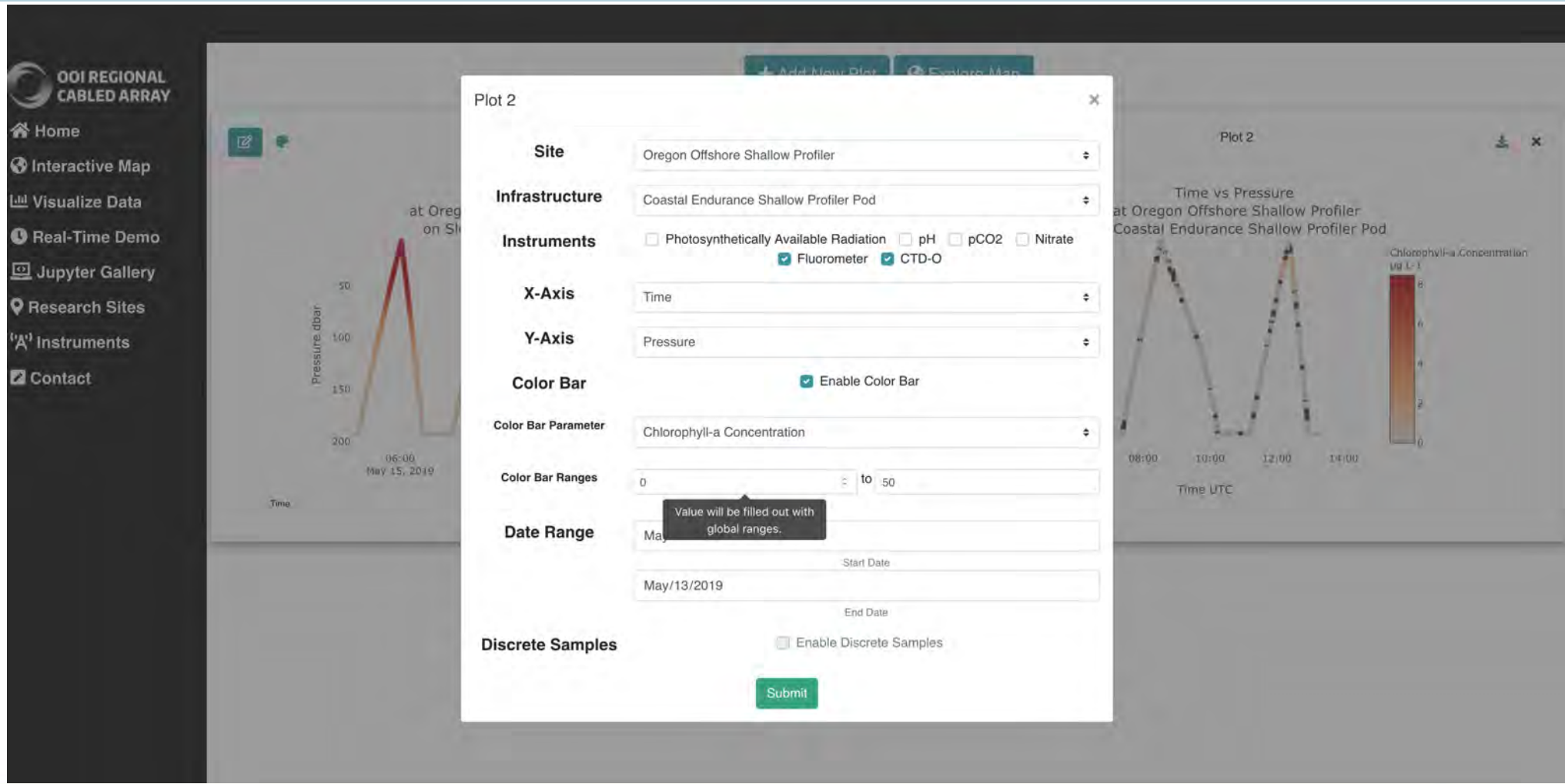


The screenshot displays the CAVA Map Interface. On the left is a dark sidebar with the OOI Regional Cabled Array logo and navigation links: Home, Interactive Map, Visualize Data, Real-Time Demo, Jupyter Hub, Research Sites, Instruments, and Contact. The 'Research Sites' section is expanded, showing 'Oregon Slope Base', 'Oregon Offshore', and 'Axial Base', with a 'Visualize Data' button. The main area shows a bathymetric map of the seafloor. A research site is highlighted with a yellow circle and labeled 'AXIAL CALDERA'. An inset image titled '2018 HD Camera Installed' shows a submersible installing a camera on a hydrothermal vent chimney. The text below the inset reads: 'On July 4, the OOI Cabled Array high definition camera, built by the UW, was reinstalled at the actively venting chimney "Mushroom" in the ASHES hydrothermal field on Axial Seamount. Credit: UW/NSF-OOI/WHOI, V18.'

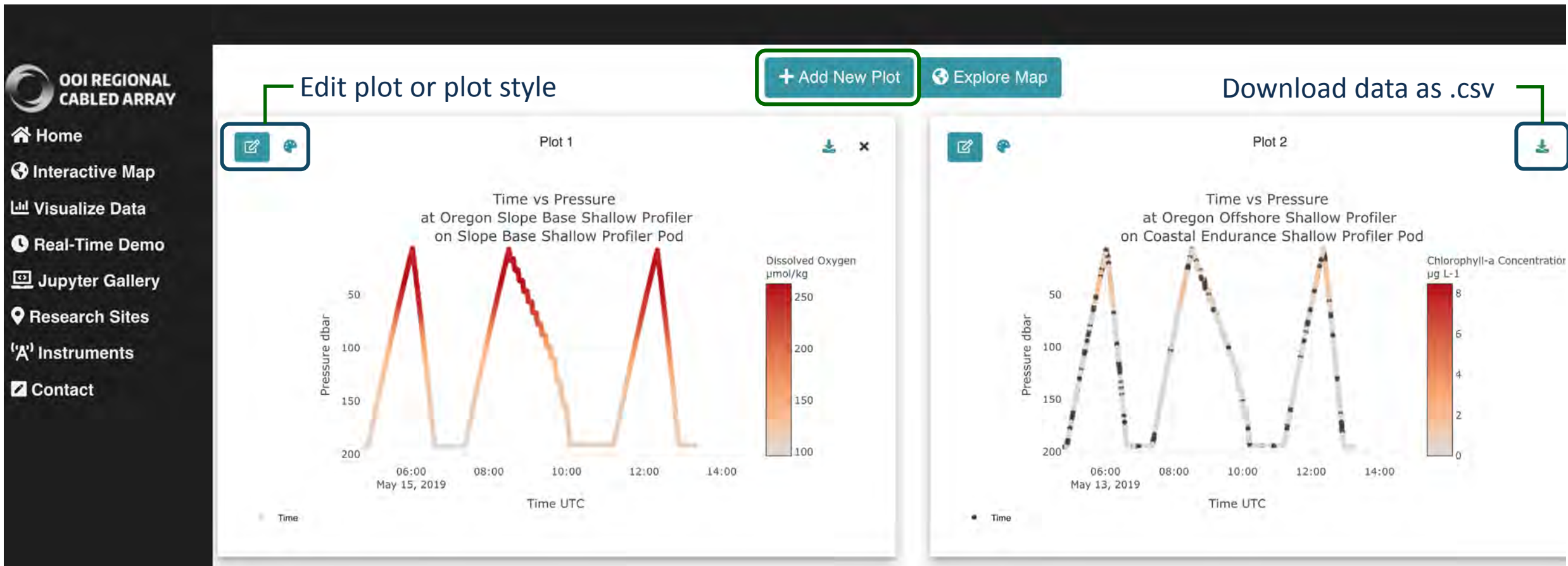
CAVA Data Portal



CAVA Data Portal: Multi-Instrument Plotting



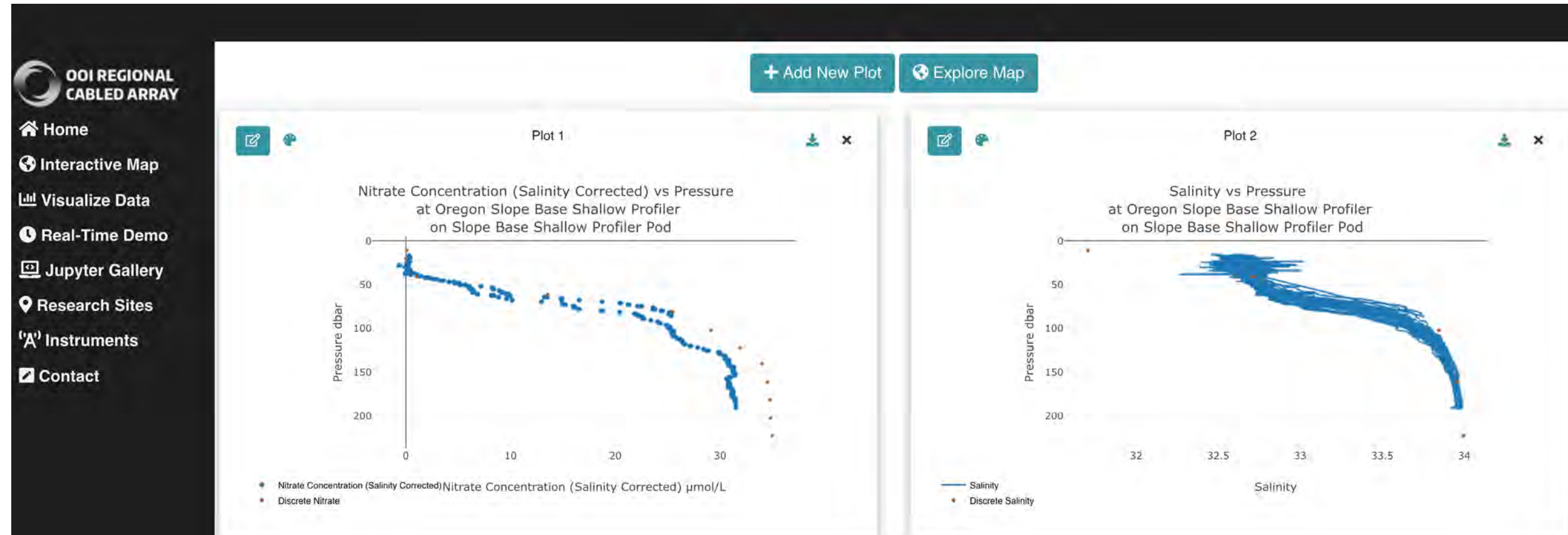
CAVA Data Portal: Multi-Plot Functionality



Create up to four plots per window, download plot images, or download data

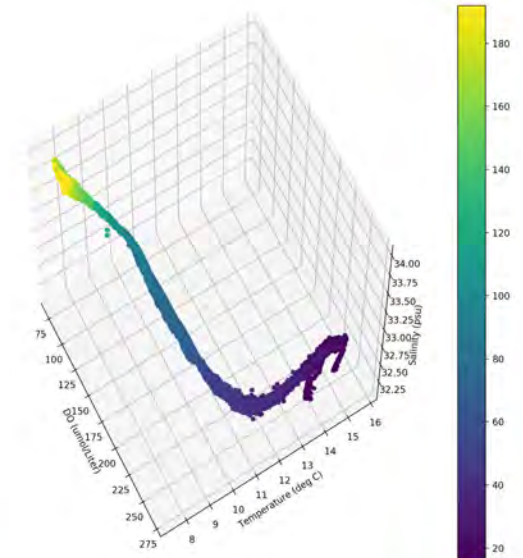
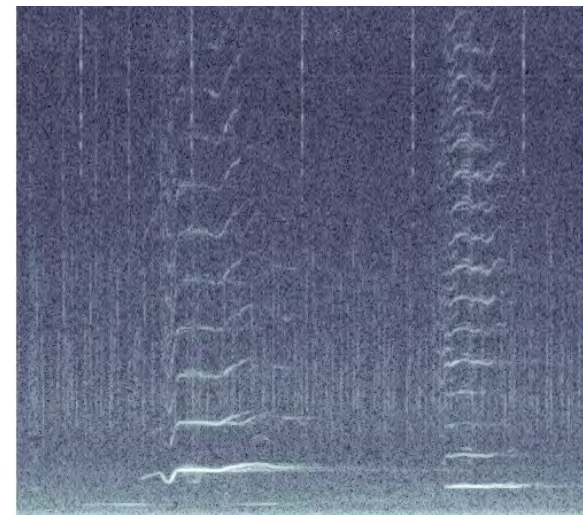
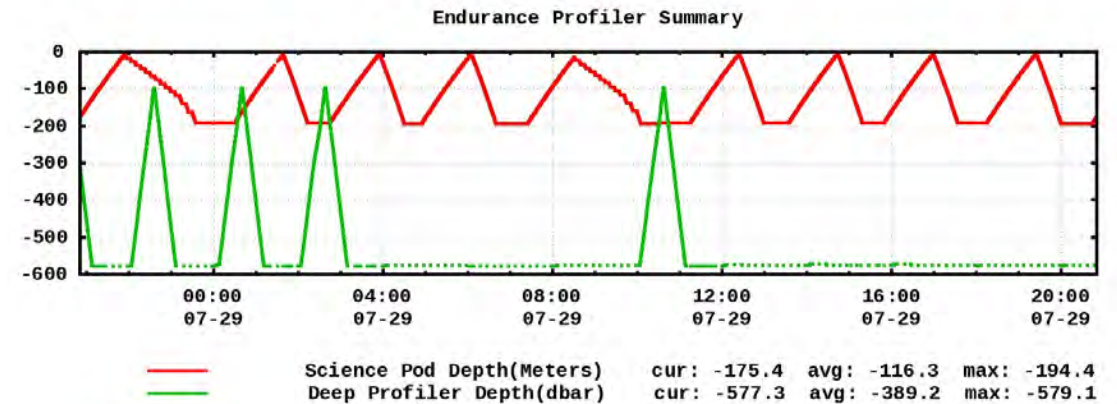


CAVA Data Portal: Discrete Sample Plotting



Python Notebooks & Education

- Enable community to share Jupyter notebooks that access and process data and produce visualizations shown on the data portal
- Can also demonstrate other visualization tools that are not part of the main website
- JupyterHub is scalable and provides a set of open-source tools that democratize data access and processing in a reproducible way
- Using GitHub to host notebooks



Next Steps

- Add all Cabled Array platforms and instruments
- Instrument status and data availability on map page
- Improved search function
- Real-time plotting, QC results
- Incorporate model/shipboard data in plotting interface
- Additional plotting/visualization (e.g. sonar, hydrophone)
- Additional Python notebooks

