

# Ocean Observatories Initiative

OOI PI Team

OOIFB Town Hall

AGU Fall Meeting

December 9, 2019



# OOI Systems

- 7 interdisciplinary marine arrays at 3 scales:
  - Regional Cabled
  - Coastal Endurance & Pioneer
  - Global Irminger & Papa
  - Global Argentine & Southern (suspended '17 & '20)
- Cyberinfrastructure & Data Delivery
- Numbers:
  - ~75 platforms
  - ~770 science instruments
  - ~11 TB data delivered last quarter
- Mapping onto NSF's 10 Big Ideas:
  - Growing Convergence Research
  - Harnessing the Data Revolution
  - Navigating the New Arctic
  - Understanding the Rules of Life



# Selected Accomplishments & Plans

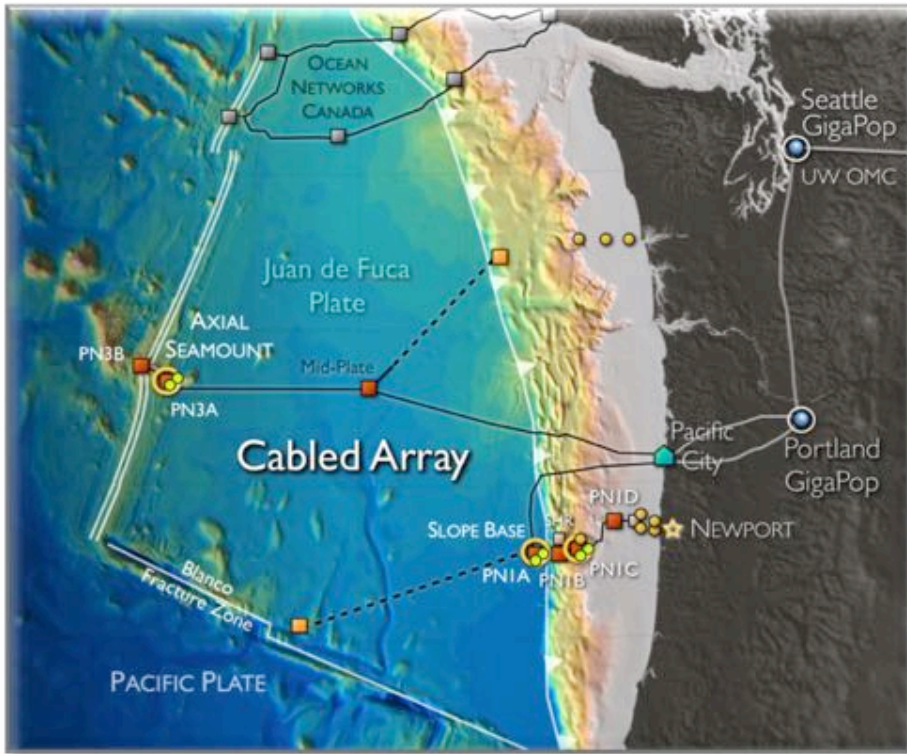
- **Program Year I (1 Oct 2018 thru 30 Sep 2019):**
  - ***Continuity***
    - 8 major deployment & recovery cruises totaling ~145 ship days
    - Data ingestion & delivery
  - ***Data QA/QC***
    - Program-wide metadata review (1000's of streams, 10,000's of coefficients, 2013-2019)
  - ***Planning***
    - Self-Evaluation of existing Cyberinfrastructure
    - Analysis of Alternatives for Cyberinfrastructure enhancement
- **Program Year II (1 Oct 2019 thru 30 Sep 2020):**
  - Enhancement of user interface
  - Website redesign
  - Continued implementation of QARTOD principles & standards





# Regional Cabled Array Status

*R/V Atlantis and ROV Jason AT42-12 May 30-July 12, 2019*



Dec 2019: 80%  
Operational

- Sixteen 48 ft trailers, six flatbed trucks moved 166 tons of RCA equipment from Seattle WA to Newport OR
- A record 20 *Jason* dives in five days; 58 total dives
- Installed 113 RCA Instruments & 8 PI Instruments
- Recovered 100 RCA Instruments
- Turned 2900 m-tall, two legged mooring; 6 science pods and 3 Deep Profiler vehicles
- 100% successful installation



# Regional Cabled Array Science

- **Proposals**

- >\$26M in funded projects excluding ship and ROV costs (NSF, ONR, NASA, Germany)
- 50 Awards, 23 PIs and 31 Co-PI's from 28 institutions
- 2 Industry Awards

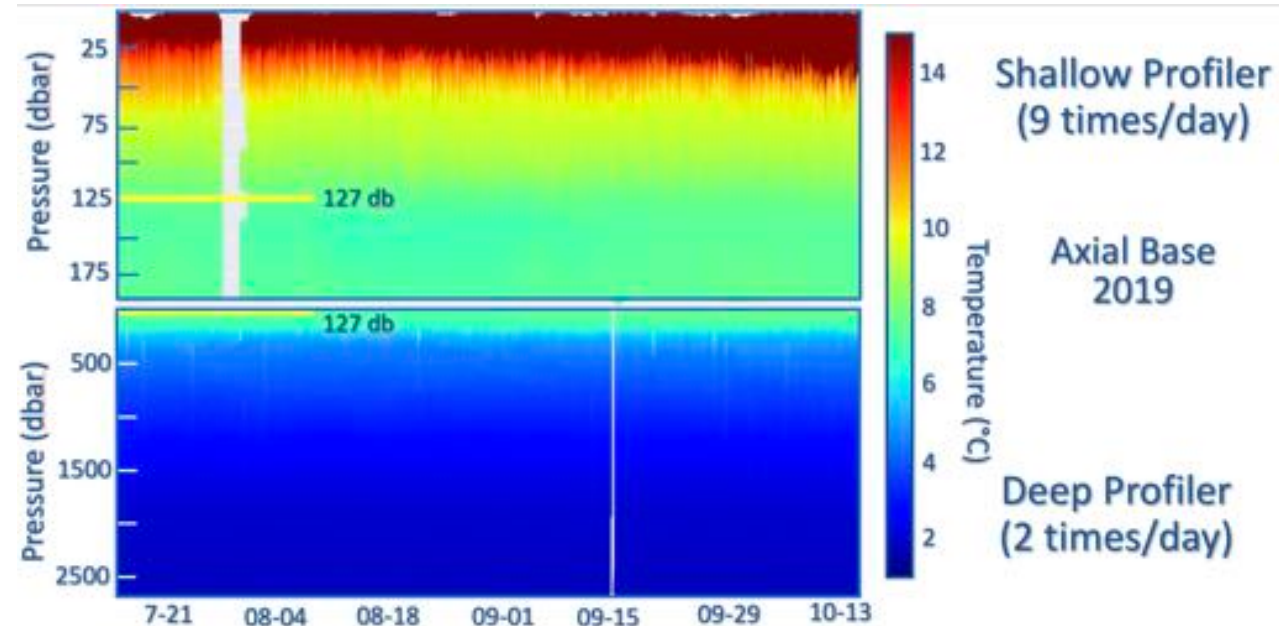
- **Papers**

- 39 RCA-related, 2014 to date; 438 citations

- **Highlights**

- Continuous full water column measurements at Axial
- Dramatic changes in Southern Hydrate Ridge
- Axial continues to inflate and be seismically active; projected eruption 2022-2024 (*Chadwick OS51B-1489 & Wilcock: OS51B-1482*)

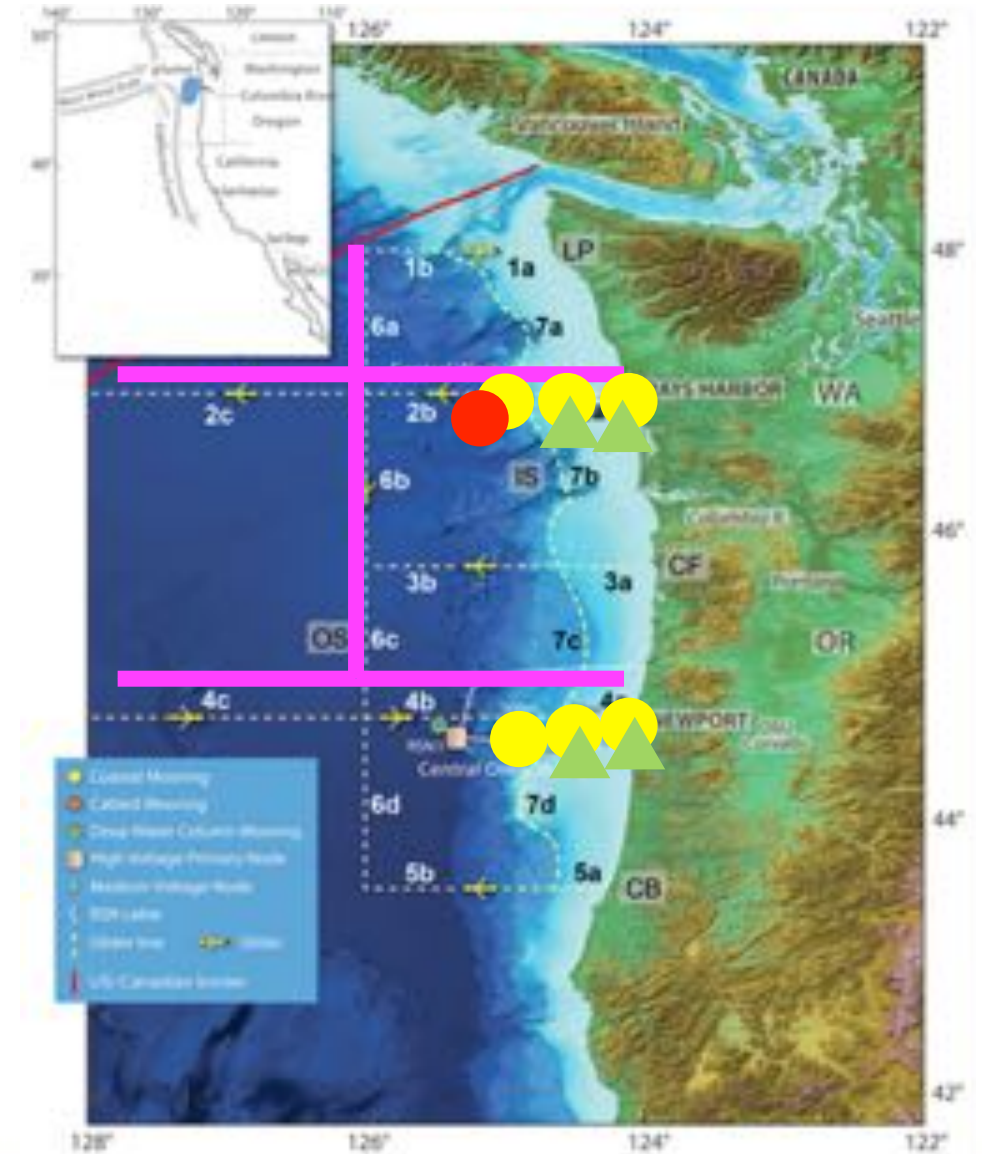
**Axial Base Shallow and Deep Profilers-  
spanning 2700 m – 5 m: full water column  
measurements, 24 instrument suite**





# EA Operational Summary for 2019

- >90% data return from fixed sensors on mooring deployments ●
- 2660 profiles at WA offshore profiler (4 trips per day) throughout 2019 ●
- 14 surface profiler deployments generating 303 days of profiles ▲
- 18 glider deployments spanning 2019. 943 glider days acquired. Glider lines along Newport and Grays Harbor lines prioritized. Also completed transects along 126 W. —
- Next turn cruise March 31 – April 15, 2020



# EA Accomplishments: Increasing OOI data visibility and use

- Pushing data to community data bases
  - NDBC – meteorological data, including wave and radiation data
    - Updated telemetry to 2 hours, NDBC review of metadata and data
  - NANOOS – meteorological and water column data
  - GOA-ON – water column data focusing on pCO<sub>2</sub>
  - Glider DAC – CTD data, now expanded to include fluorescence and O<sub>2</sub> data
- Development of additional software and scripts
  - Python and Matlab scripts for M2M download of OOI data
  - Tools for download, plotting, and quality assessment of profiler data.





# CGSN Operational Status

- **Irminger Sea**

- 6<sup>th</sup> deployment, >80% data expected, next cruise May 2020

- **Southern Ocean**

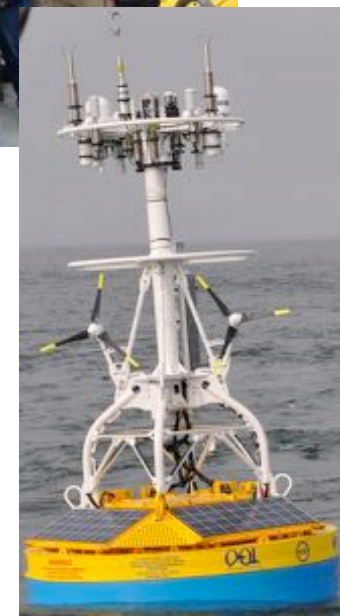
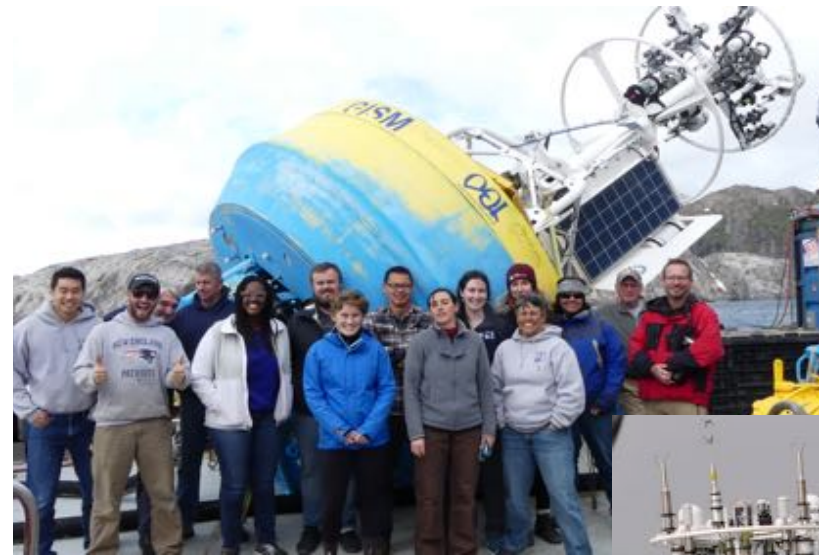
- 4<sup>th</sup> deployment, ~40% data expected, recover-only in Jan 2020

- **Station Papa**

- 7<sup>th</sup> deployment, >80% data expected, next cruise May 2020

- **Pioneer Array**

- 13<sup>th</sup> deployment (2x/yr), >90% data expected, next cruise Apr 2020





# CGSN Science

- **Proposals**

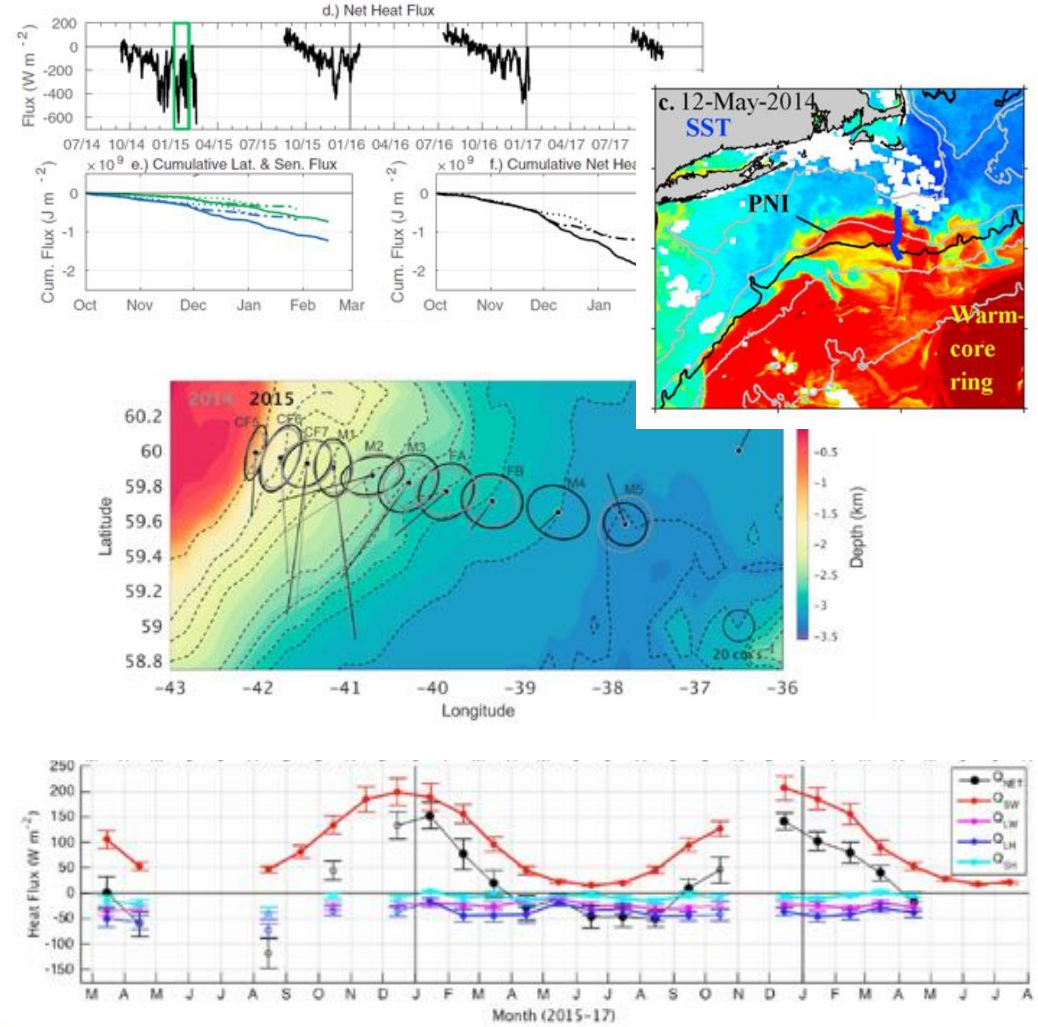
- >\$29M in NSF funded projects
- 31 Awards, 23 PIs from 16 institutions
- Also: NASA, NOAA, ONR

- **Papers**

- 42 GGSN-related, inception to date

- **Highlights**

- Pioneer exchange processes
- Irminger forcing, mixing and transport
- Southern Ocean episodic heat loss



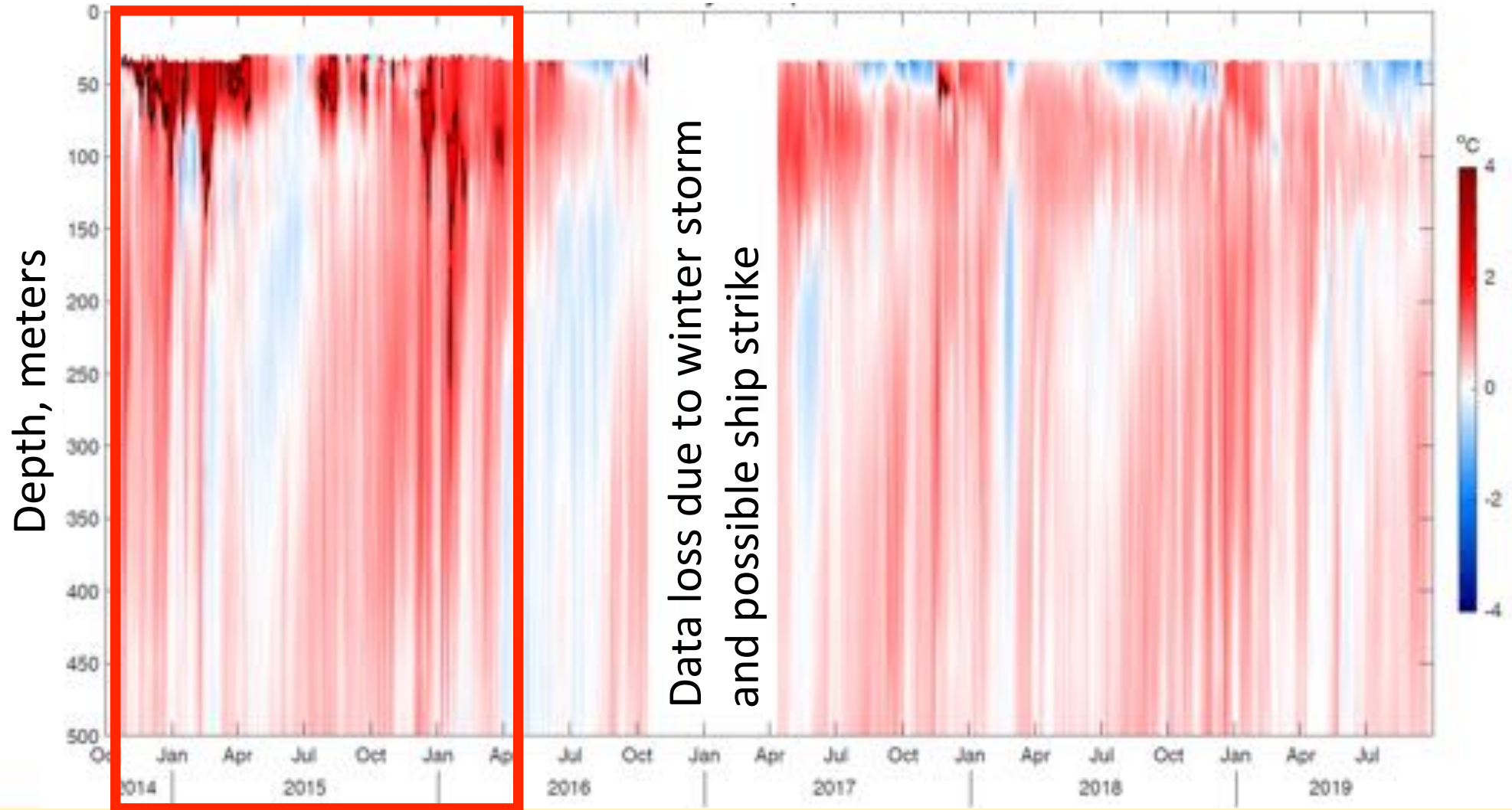
Questions?



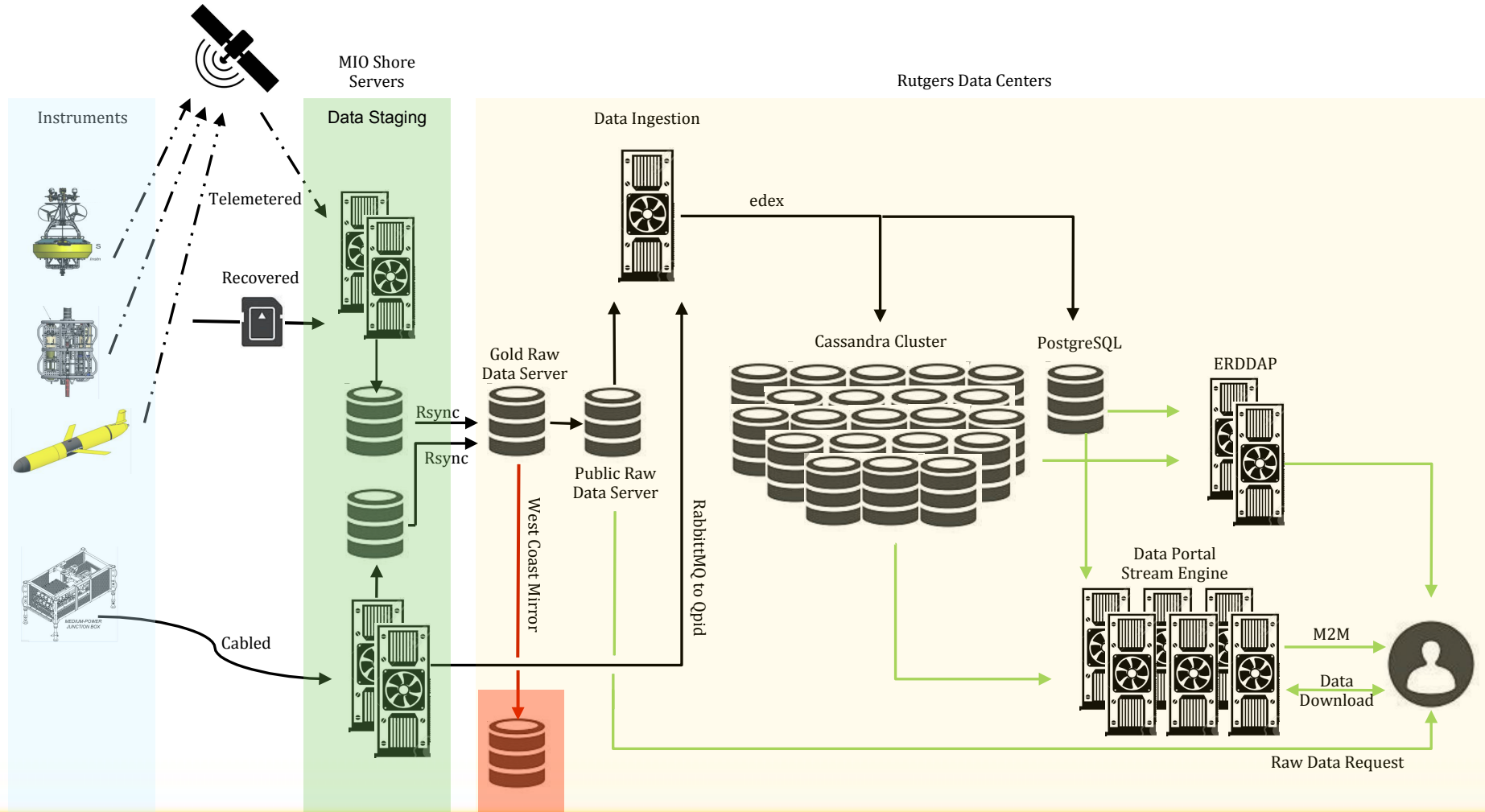
Long term data provide insights into marine heat waves:

2014-2019 EA Washington offshore profiling mooring temperature anomalies

“The blob”



# OOI 2.0 CI System Architecture





# OOI Cyberinfrastructure Overview

OOI-CI at a glance:

Two datacenters, interconnected via Internet-2

113 servers – 2144 cores, 17 TB RAM

Compute / storage / core network – Dell EMC	Edge network – Cisco Systems
Security appliances – Palo Alto Networks	Virtualization – VMWare

