The NE Pacific Cabled Array Observatory

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DESSC
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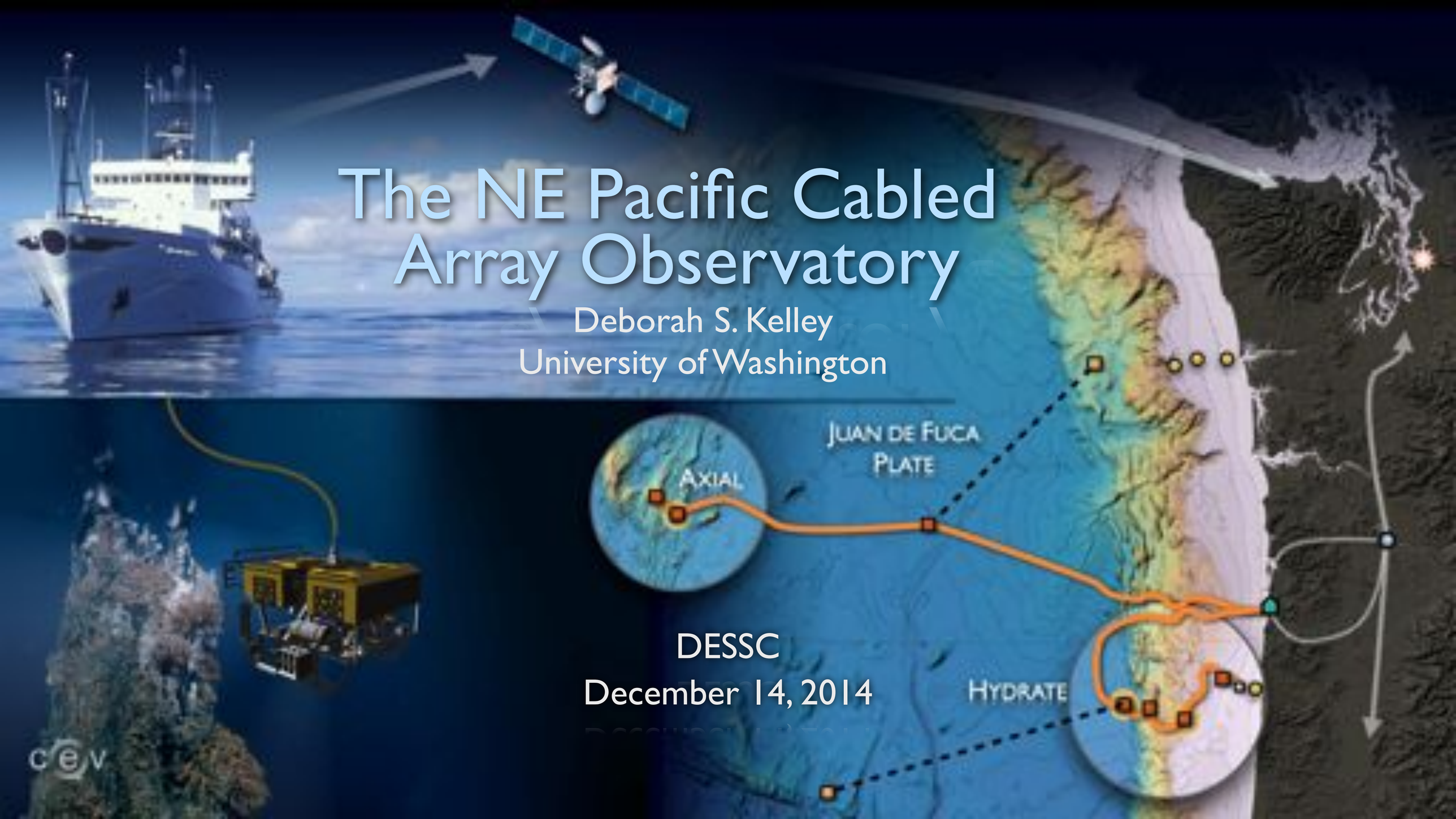
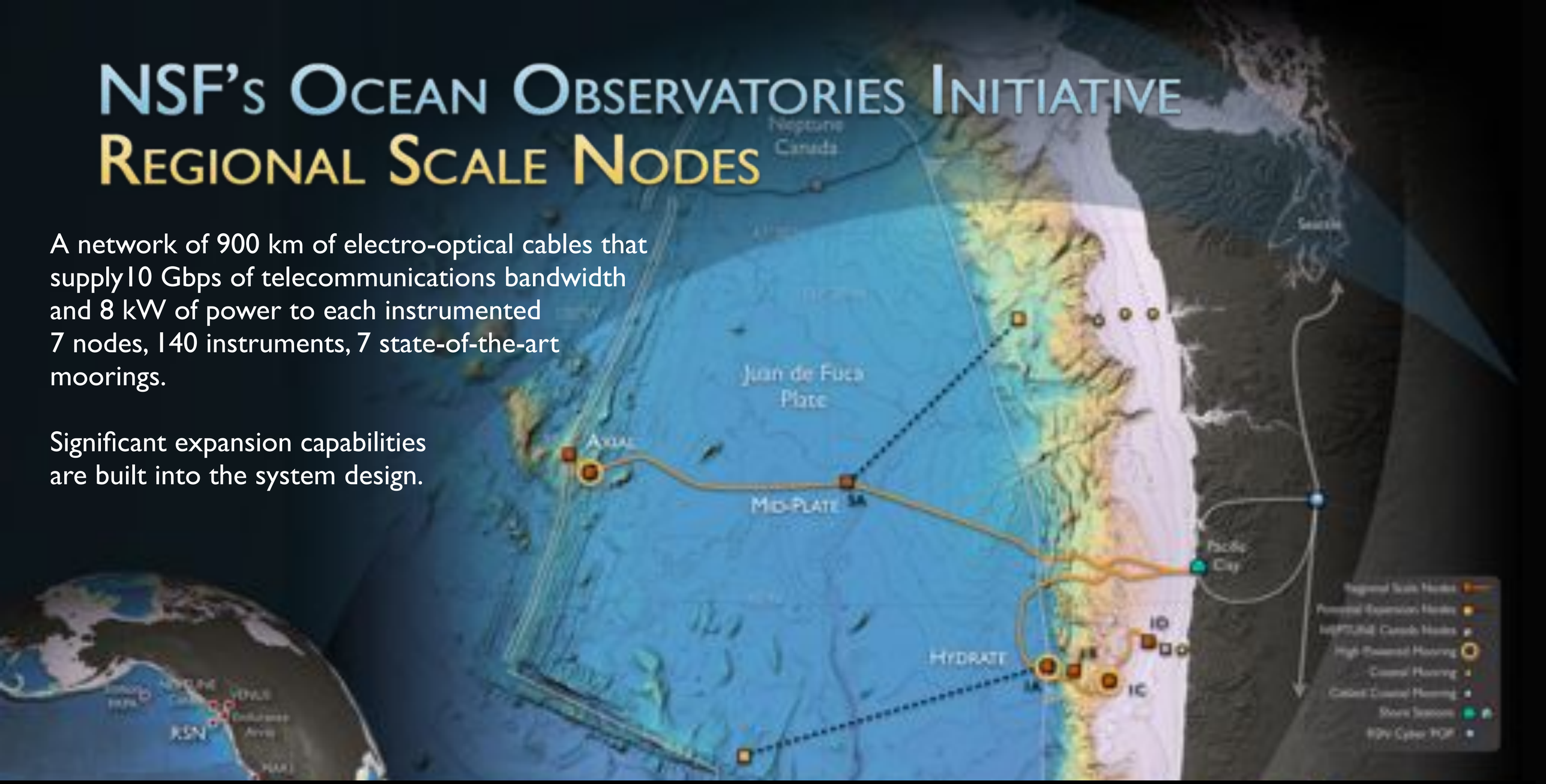


NSF's Ocean Observatories Initiative
Regional Scale Nodes

A network of 900 km of electro-optical cables that supply10 Gbps of telecommunications bandwidth and 8 kW of power to each instrumented
7 nodes, 140 instruments, 7 state-of-the-art moorings.

Significant expansion capabilities are built into the system design.



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Primary Infrastructure

Shallow Water Node
PN1B

Primary Nodes

7 Installed; 1 with BIA only

- Each Primary Node -10 GbE, 8 kW
  - 5 Science Ports (1 GbE, 375 V)
    - ROV Wet mate Connectors
  - 2 High Bandwidth Science Ports (10GbE, 375V)
    - ROV Wet mate Connectors
  - 2 Backbone Expansion Ports (10kV)
- Pulse per Second Timing
- Science Interface Assembly removable by ROV

900 km of cable now installed on the seafloor, provides power and communication to extension cables, moorings, and sensors

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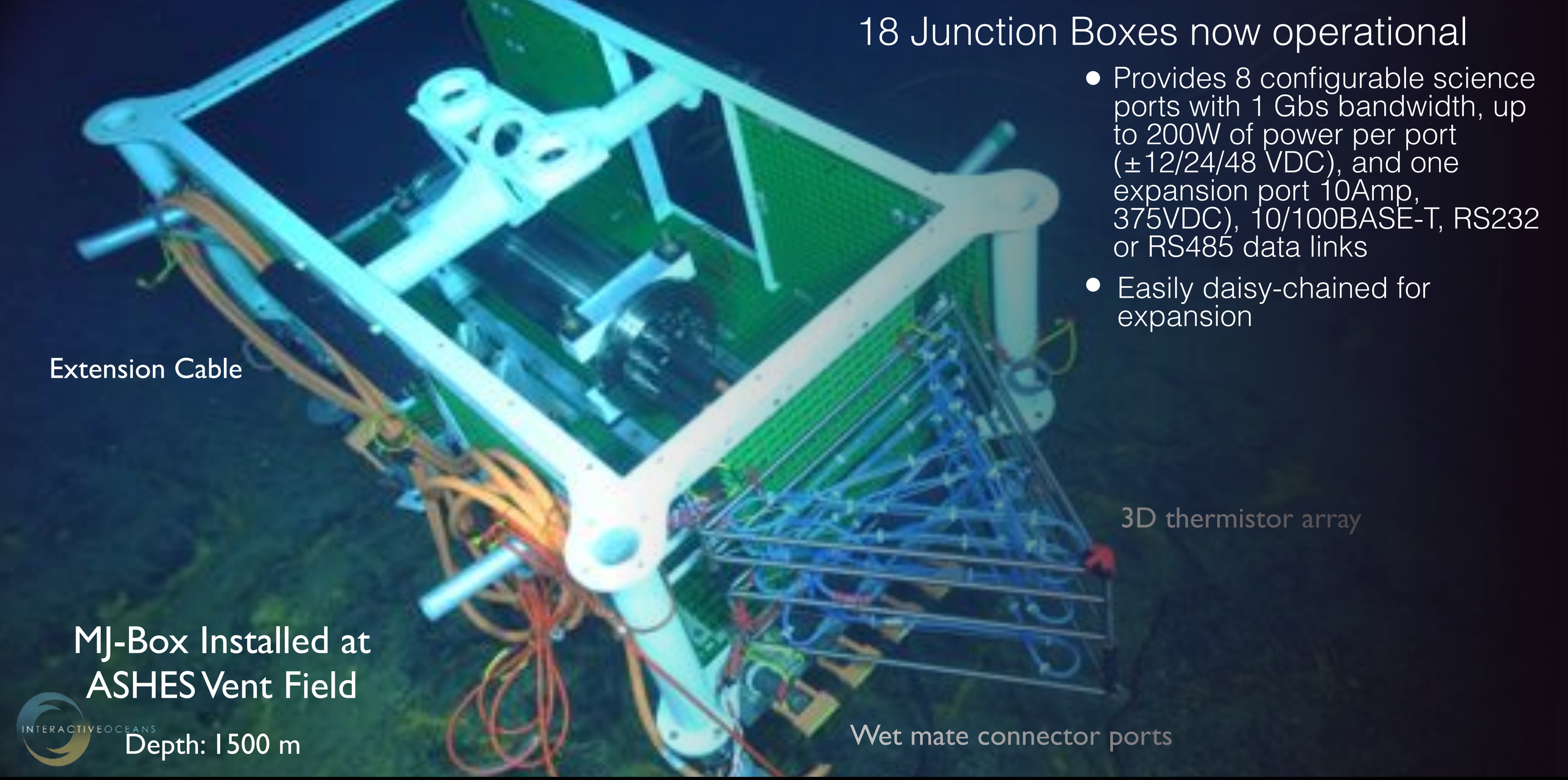

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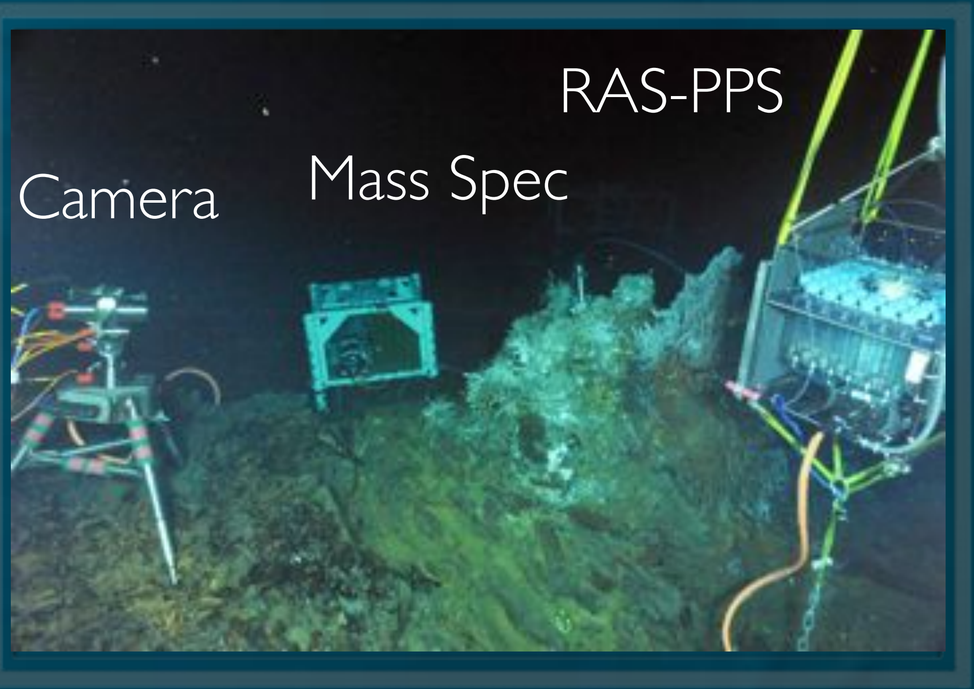
communication to instruments and platforms - easily daisy-chained for future expansion

Entire Cabled Network is now installed and sending data to shore



91 ROV ROPOS Dives

>30,000 m of extension cables installed with ROPOS - all are working

18 junction boxes

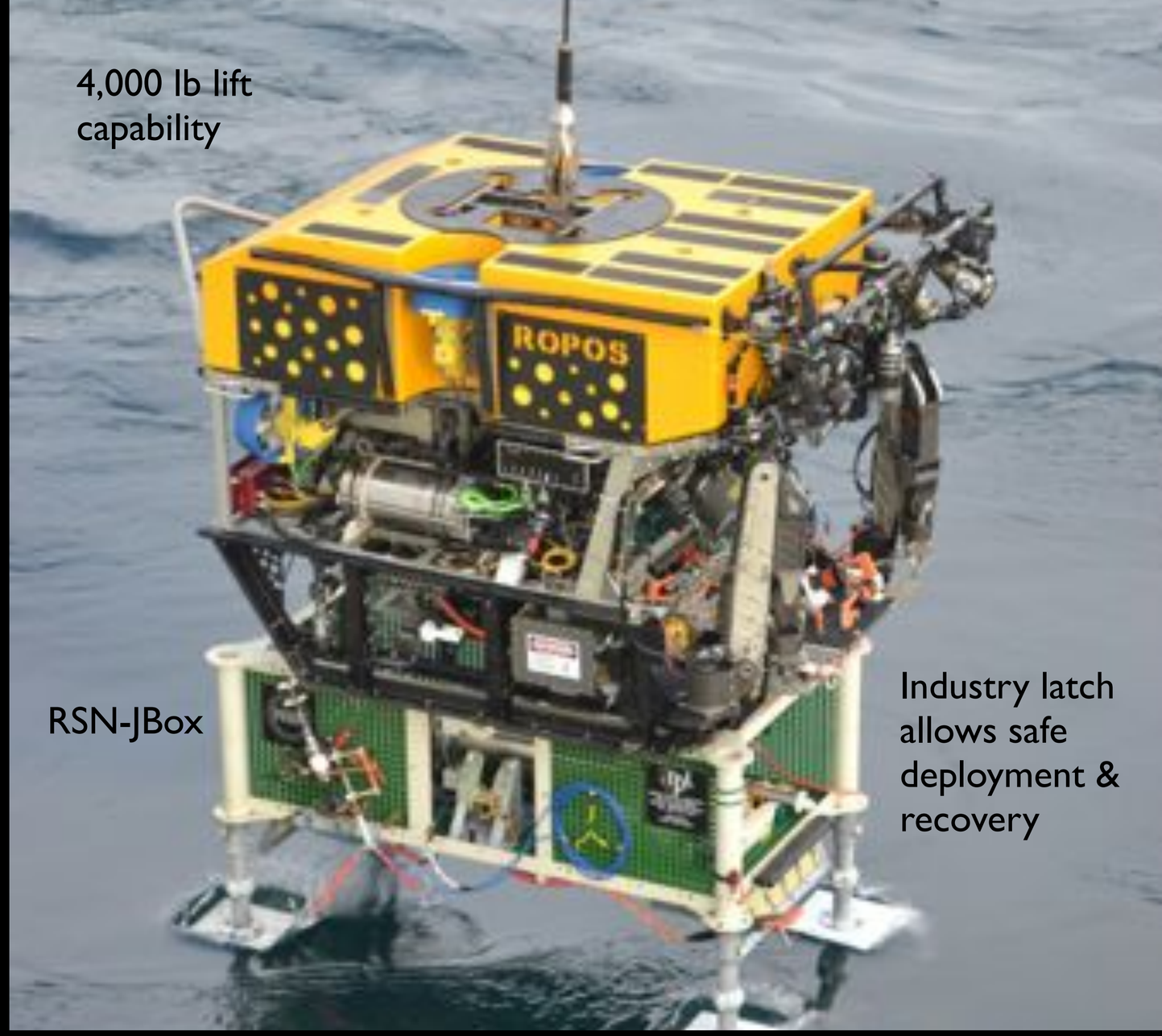
140 instruments, >30 different types

3 State-of-the-art Shallow Profiler moorings (up to ~2900 m)

1 Deep Profiler mooring

1 Surface Piercing Profiler

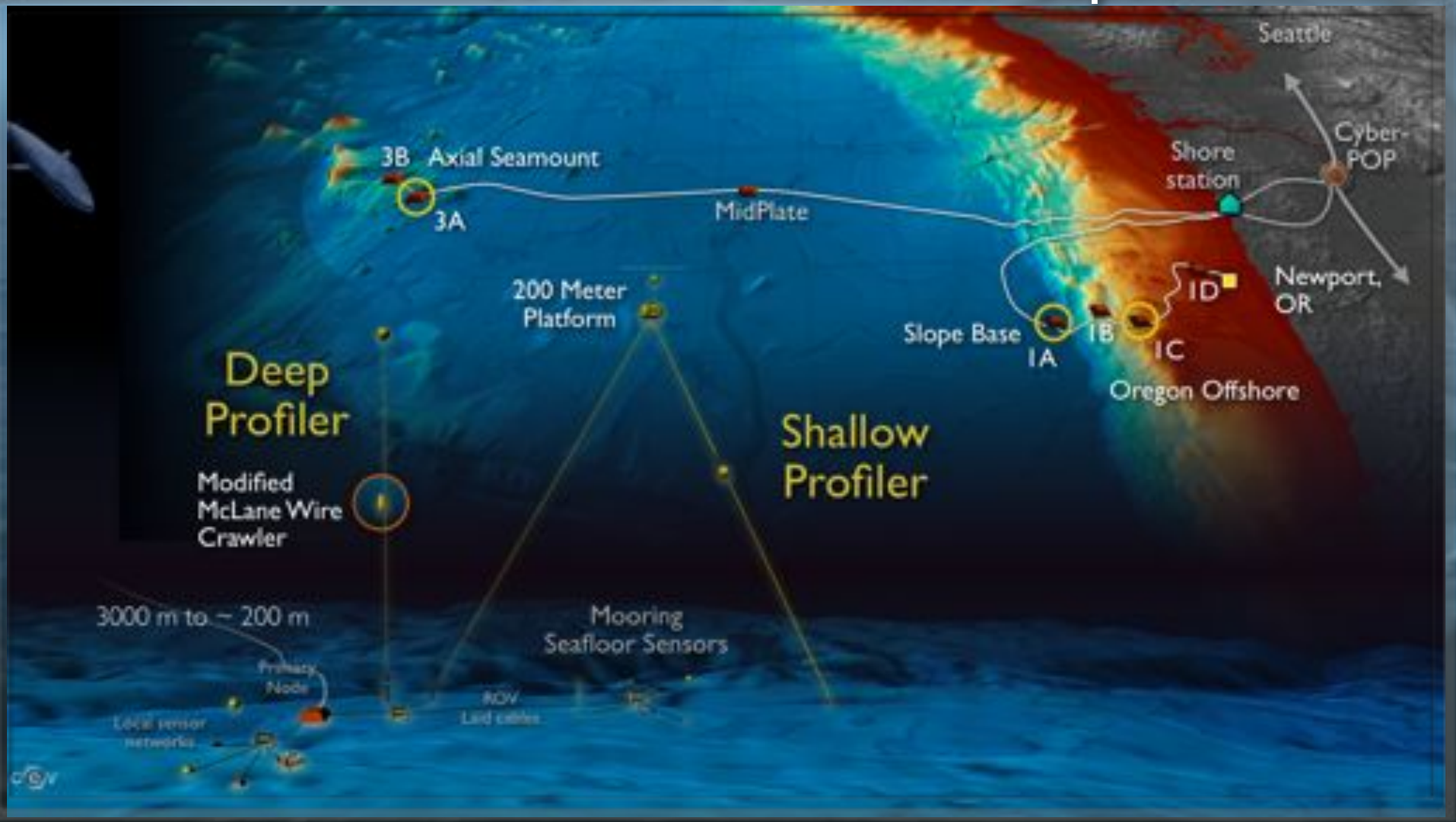
2 Benthic Experiment Platforms



ROV ROPOS: During 84 day cruise, ~ 60 days on station days, 91 dives, 2-3 dives/day, 2-4 hr turn arounds, 4000 lbs through haul lift

R/V Thompson - Deck Space at a Premium

Cabled high power (3000 watt) state of the art moorings
600 - 2900 m water depth



Two Types of Moorings

Deep Profiler

- Single cable hosting modified Mclane wire crawling profilers

Shallow Profiler

- 2-legged 200 m platform
- 2 science assemblies

Platform at 200 m

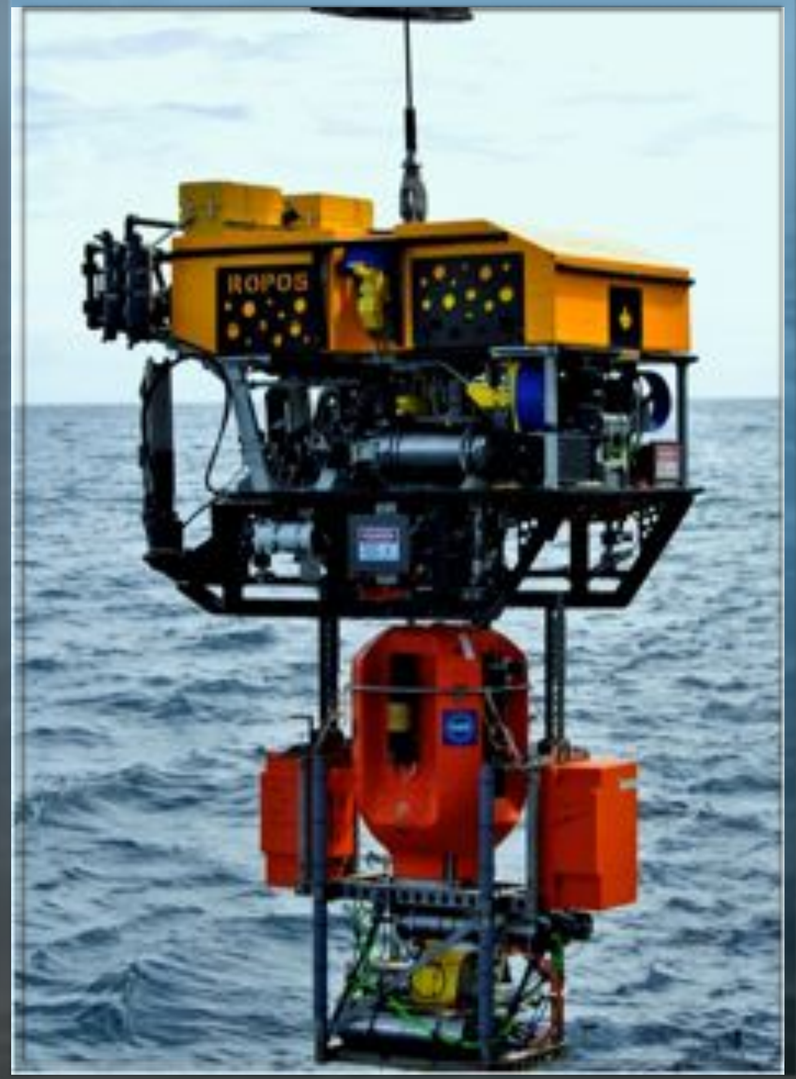
Shallow Profiler Mooring - 3 installed

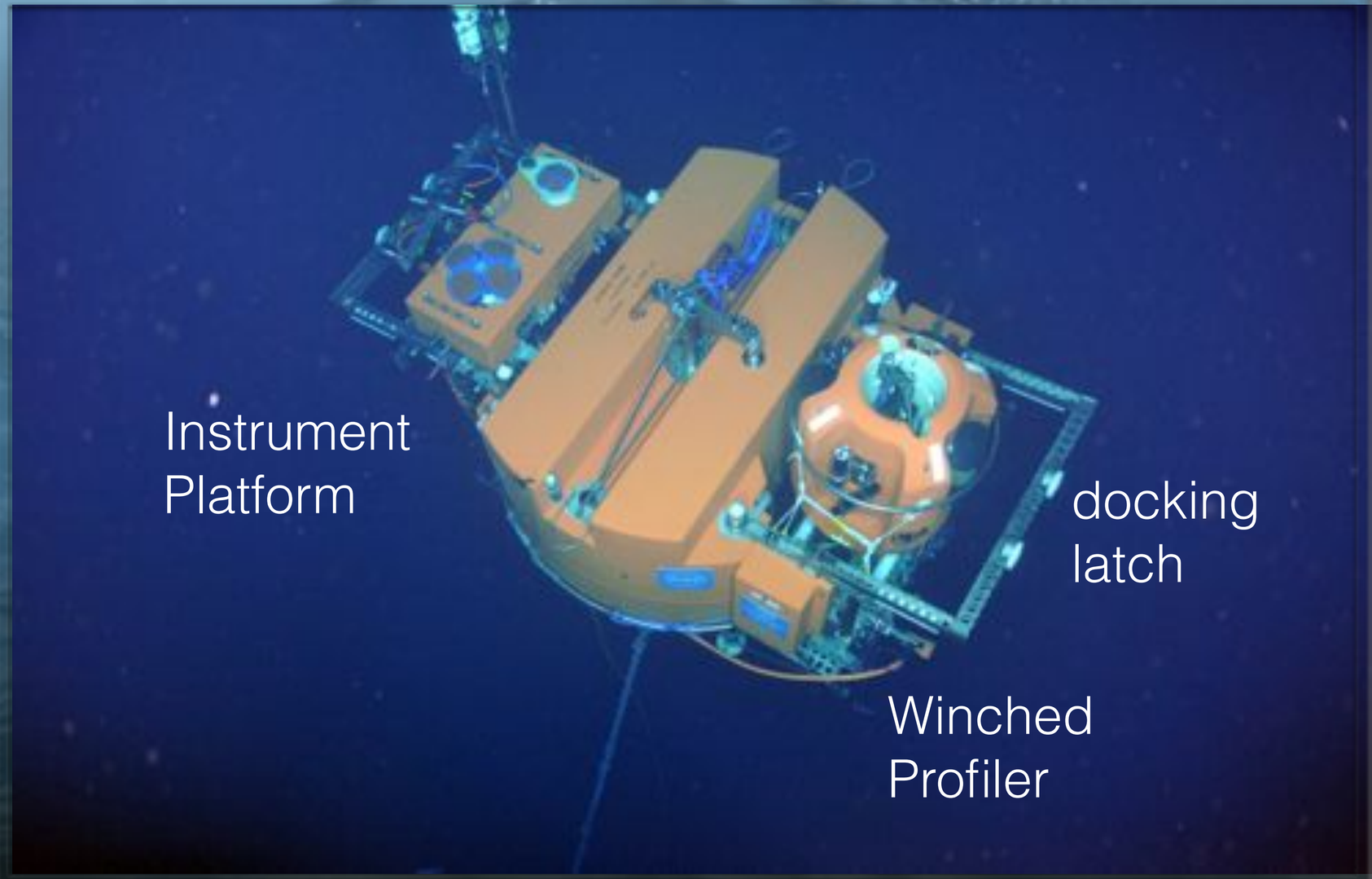
7 ton, 12 ft across platform @ ~200 m

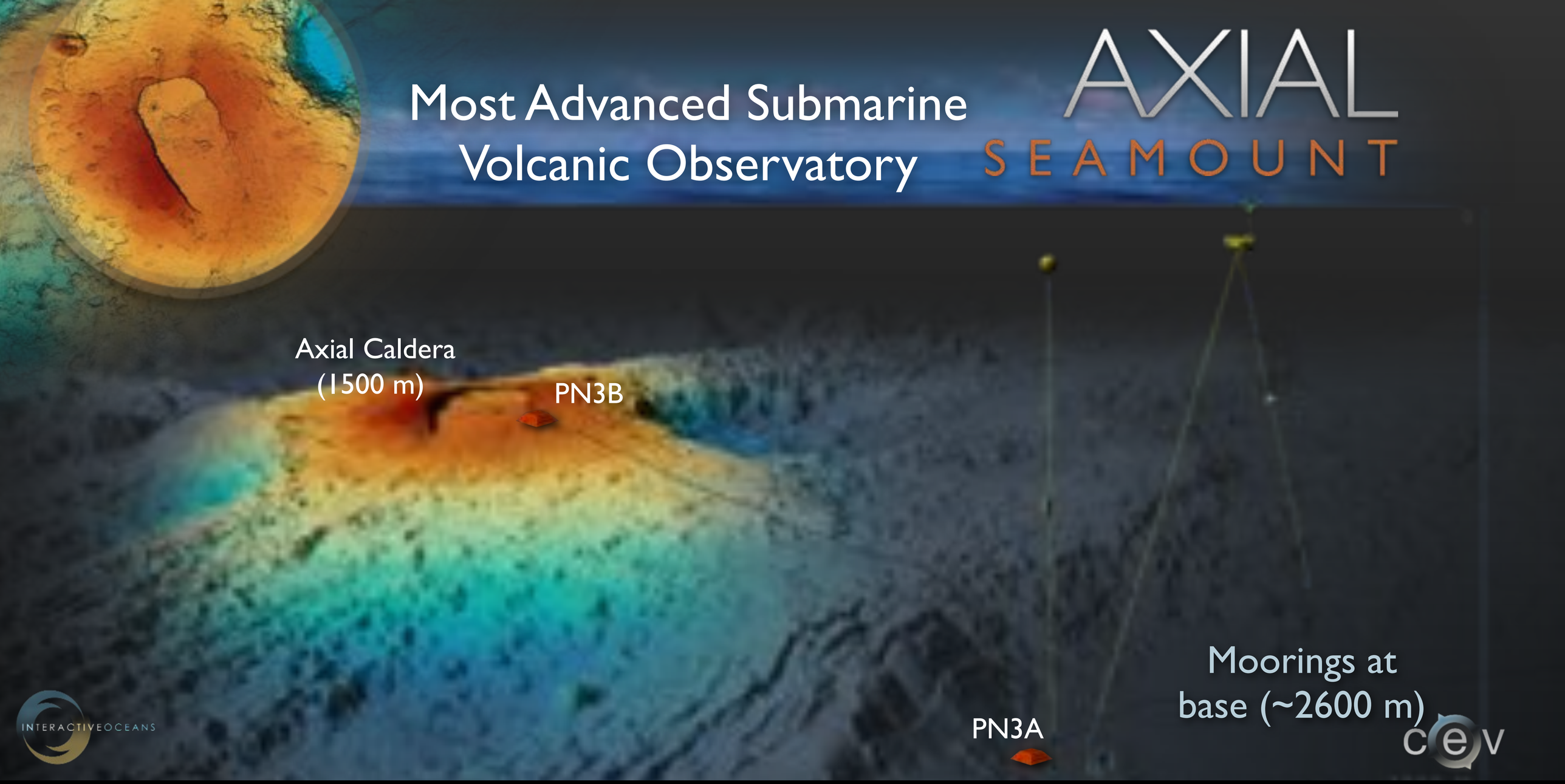
Two major modules

- Platform Instrument Assembly (PIA)
- Winched shallow profiler & Science Pod (SciP)

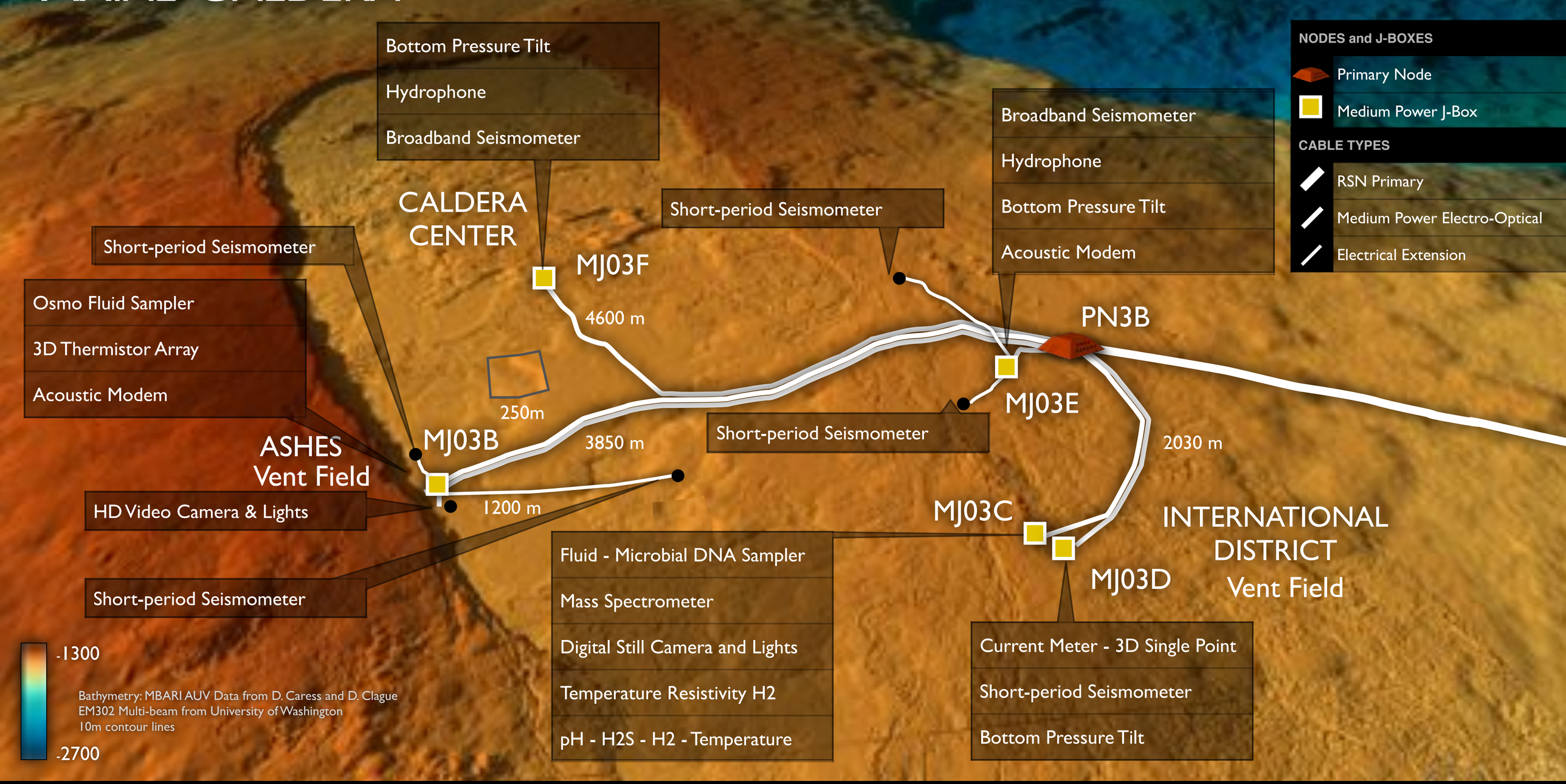
200 m Shallow Profiler and Platform Instrument Assembly







A Located 1.5 days steam from Seattle, Axial is the most magmatically active volcano on the Juan de Fuca Ridge, having erupted in 1998 and 2011.

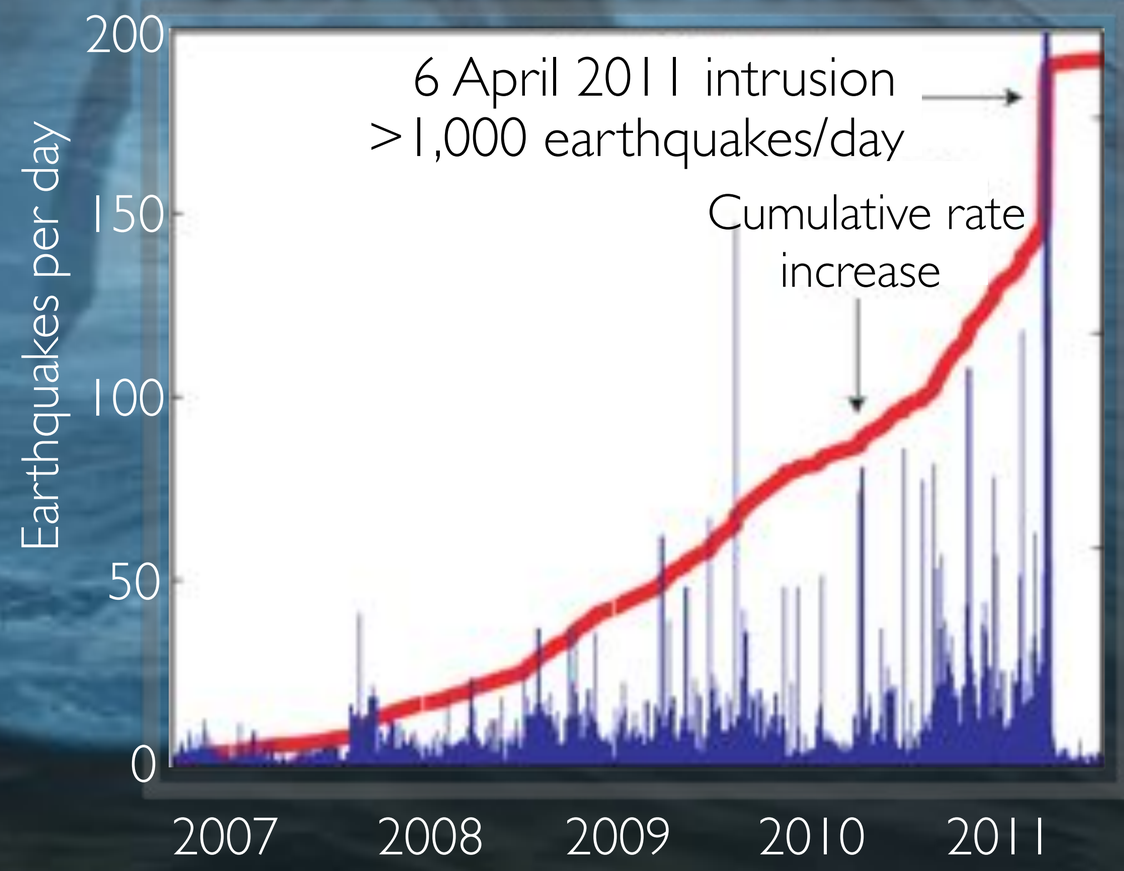


A Cabled instruments allow co-measure earthquakes, changes in vent fluid temperature-chemistry, seafloor inflation and deflation, and microbial and macrofauna communities

Short-period Seismometers

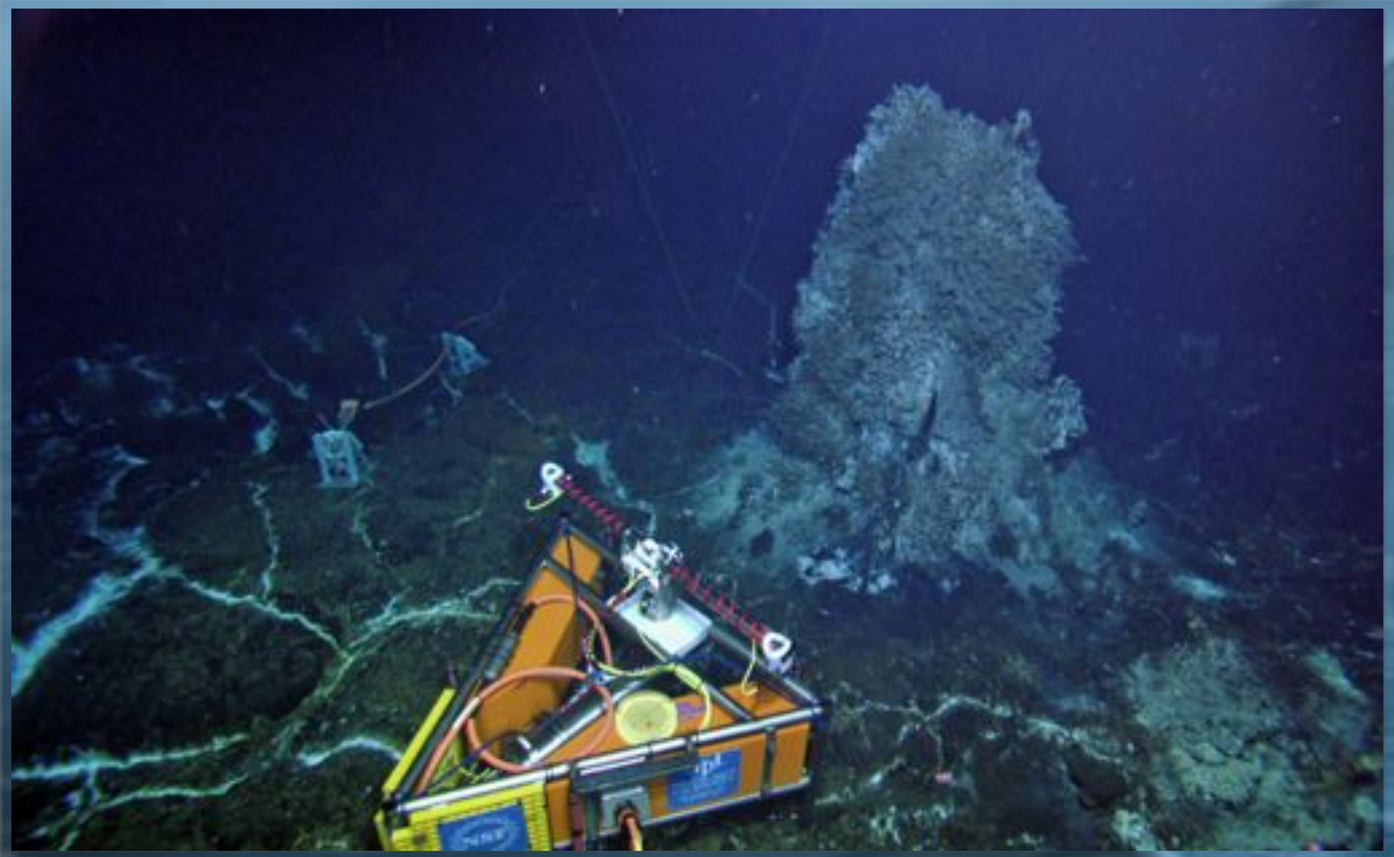
6 short-period and 3 broadband seismometers now streaming data live from Axial Seamount to IRIS - data available December 17

Measuring the heart-beat of Axial Volcano



Dziak et al., Nature Geoscience 2012

HD Imagery



HD Camera at the Mushroom Hydrothermal Chimney - Axial Seamount

Life driven by energy from within the Earth & hydrothermal flow

Applied Physics Lab, University of Washington

Mushroom

HD camera built by UW Applied Physics Laboratory

INTERACTIVE OCEANS

TRAINING THE NEXT GENERATION: On the VISIONS'14 expedition

45 students worked side by side scientists and engineers.