



## Cruise Report

OSU R/V Oceanus  
OC1405B

Cascadia Initiative Leg 2  
May 28 to June 1  
Newport, OR – Newport OR

Matt Fowler  
Chief Scientist

***Captain and Crew:  
R/V Oceanus:***

Captain: Jeff Crews  
Chief Engineer: Jonathan Peters  
1<sup>st</sup> Mate: Todd Dussault  
2<sup>nd</sup> Mate: Patrick Brushears  
Mate: John Wilder  
Engineer: Jay Jean-Bart  
Engineer: Chip Millard  
AB: Doug Beck  
AB: Marc Simpson  
Sr. Steward: Joy DeRosa  
Steward: Sean Guss

***Marine Tech:***

Erik Arnesen (OSU)  
Johna Winters(OSU)

***Science Party:***

***OSU/NOAA***

***Chief Scientist:*** Matt Fowler (OSU/NOAA)  
Alex Turpin (OSU/NOAA)  
William Hanshumaker (OSU)  
Pat Kight (OSU/SeaGrant)

***Scripps Institution of Oceanography OBS Team:***

Martin Rapa: Senior Engineer  
Ernest Aaron: Electrical Engineer  
Mark Gibaud: Engineer

***SAIC Observer:***

Mark Lockwood

***Apply to Sail Recipients:***

***Georgia Institute of Technology***

Amy Williamson

***Ohio University:***

Maxwell Tupper

## **Introduction**

Cruise OC1405B aboard the R/V Oceanus was the second cruise of the 2014 Spring/Summer cruise season. Purposed to recover a portion of the of Ocean Bottom Seismometers (OBS) array deployed in 2013 as part of the National Science Foundation funded Cascadia Initiative. This community-based experiment represents a combined onshore-offshore seismic and geodetic study of the Cascadia Margin. See the following website for details of the year 1, 2 and 3 science plan and for more information about the Cascadia Initiative <http://pages.uoregon.edu/drt/CIET> .

The objectives for this cruise were to recover 15 deep water OBSs built by Scripps Institution of Oceanography (SIO). All 15 OBSs were trawl protected Abalone type built with American Recovery and Reinvestment Act (ARRA) funds. The excellent weather permitted both the science party and the OBS team working a 24 hour schedule, to recover all the instruments as efficiently as possible.

For the majority of the 5 day cruise, winds and seas were calm. All recovery operations went very well.

Additional members of the science team included two graduate student observers, Amy Williamson – **Georgia Institute of Technology** and Maxwell Tupper - **Ohio University**, participating in the Apply to Sail program. This program is intended for graduate students and early career scientists interested in direct at sea experience, both in learning field techniques and OBS deployment, recovery and preliminary data processing.

Dr. William Hanshumaker provided public outreach – however, the poor internet connectivity proved problematic during an attempted Skype video conference with 3 high schools. It was replaced by at sea blogging, and supplemental post cruise video conferencing with the high schools via high speed internet.

## **Deployment Site Selection:**

Deployment sites were initially selected through a series of committee meetings. The Cascadia Initiative Expedition Team (CIET), and the Amphibious Array Steering committee (AASC) and the co-chief scientists made slight modifications to avoid strong currents, seafloor hazards and areas of active shrimp and fish trawling ( sites < 1000 m).

In siting the OBSs, the team relied heavily on input from local fishermen, and local fishing organizations in both Oregon and Washington. Native American tribes, Quileute and Quinault were both contacted to ensure the deployments did not impact their fishery rights.

Some sites were moved slightly to nearby no-trawl zones, specifically Essential Fish Habitats (EFHs) in Grays Canyon region and Nehalem Bank/Shale Pile, and others were moved near known “hangs” based on specific suggestions made by Scott McMullen of the Oregon Fisherman’s Cable Committee.

Recovery sites are shown in Figure 1 and are listed in Table 1 including list of data obtained at the end of this document.

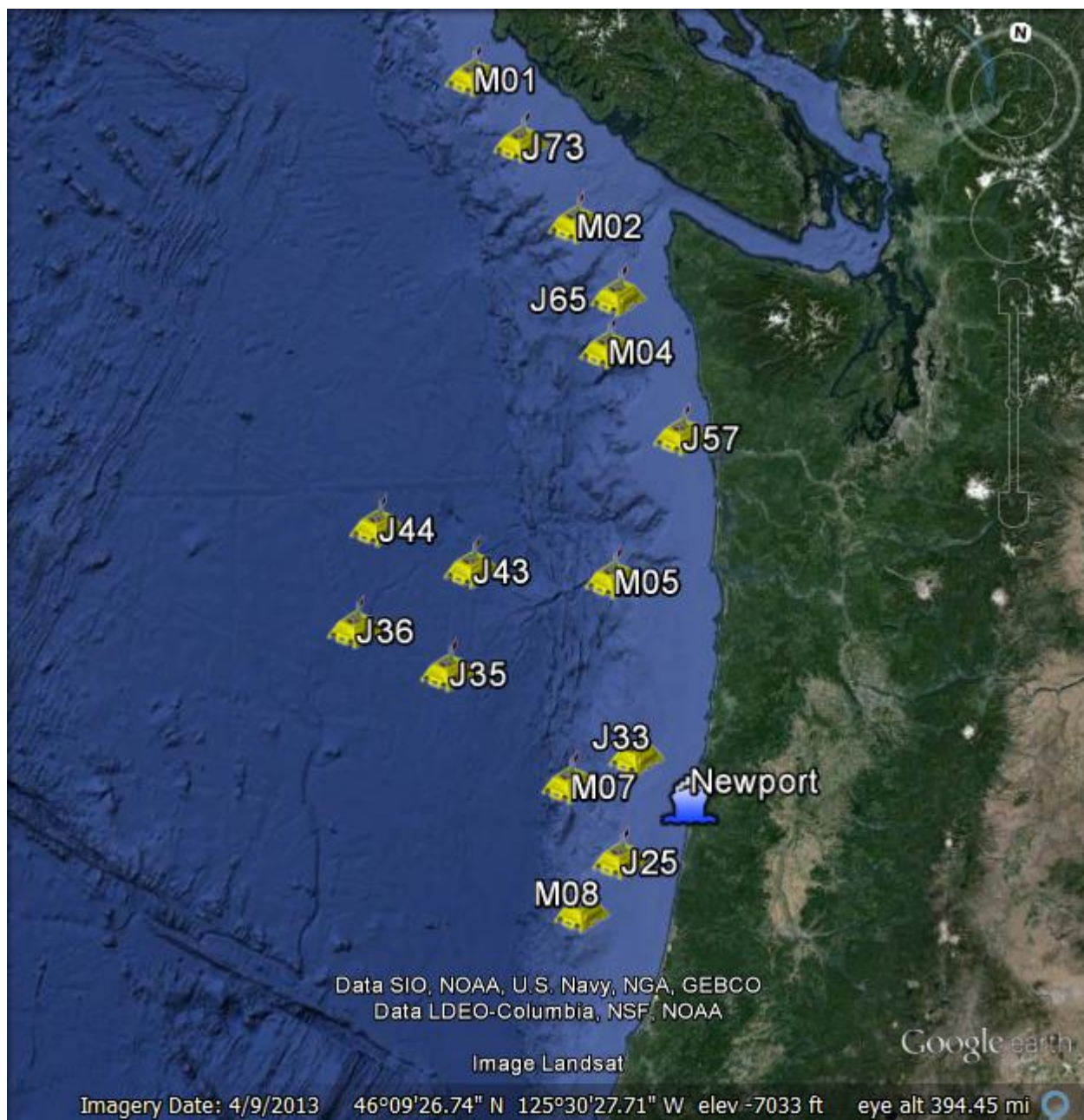


Figure 1. OBS stations 2013-2014 deployment.

#### OBS Description and Recovery Summary

The Fifteen “Abalone” OBSs Built by SIO (Fig 2) Have a trawl-resistant mount. Each Instrument has a beacon and flag that are designed to be “break-away” so as to minimize disturbance by trawlers or damage to trawling equipment.

The Abalone instrument package includes a three-axis broadband Trillium Compact OBS (3-channels, each with 24-bit resolution) and a dynamic pressure gauge (24-bit resolution). All four channels are sampled continuously at 50 Hz. All fifteen OBS were successfully



recovered; thirteen instruments recorded three-component seismic and Dynamic Pressure Gauge (DPG) data for the entire deployment period, one OBS (M07) did not collect any data due to failure to level after deployment. It is presumed to have been resting on a hard bottom with enough relief to allow the instrument to “rock” back and forth. This resulted in the otherwise functional instrument failing to initialize and log data. A second instrument (M02), had a connector failure that prevented it from logging the Z component of the three axis Trillium sensor. All fifteen instruments fit on the fantail of the *R/V Oceanus* without stacking, and only required minor shuffling to organize the instruments on the fantail. Data from all instruments recovered was sequestered by the SAIC representative, Mark Lockwood. Data will be reviewed and held by the Navy using established NSF-Navy protocols.

All of the instruments are designed to operate autonomously; they are battery powered, with ~ 1-year longevity. They were drop-deployed and were brought to the surface using an acoustically triggered anchor release. Floatation is provided by a syntactic foam pack, formed inside of the roto-molded trawl protective housing. Each has a radio beacon, flasher and flag to aid in locating them on the sea surface. When the Abalone OBS were deployed in 2013 their position on the seafloor was determined using the ship’s hull-mounted transducer, which circled the drop site at a radius of 0.5 times the local water depth. Final locations were derived from the recorded acoustic ranges using the M-Cal software package (<http://www.seanav.com>).

For the majority of the five-day duration of the cruise, swells were 4-6 Feet and wind waves 2-4 feet.



Figure 2. Abalone trawl protected OBS, secured on deck of R/V Oceanus. Recovered after one year deployment.

## **CRUISE NARRATIVE:**

### **Day 1 Wednesday May 28:**

We departed Newport at 20:00 (GMT) after conducting sea tests of ship's propulsion. Fire and lifeboat drill soon followed.

First recovery location is at site J33C ~36NM from Newport.

Arrived at: 45°06.397N 124°34.247W, J33C at 23:15 followed by the anchor release from 349m. The instrument was aboard, secured, and we were underway at 00:10.

### **Day 2 Thursday May 29:**

Arrival at: 46°10.409N 124°56.069W, M05C at 11:30 followed by the anchor release from 828m. The instrument was aboard, secured and we were underway at 12:45

Arrived at: 47°33.505N 125°11.538W, M04C at 19:55 followed by the anchor release from 563m. The instrument was aboard, secured and we were underway at 20:45

Arrival at: 47°53.478N 125°08.388W, J65C at 22:45 followed by the anchor release from 165m. The instrument was aboard, secured, and we were underway by 23:25.

### **Day 3 Friday May 30:**

Arrival at: 47°53.305N 126°06.275W, M03C at 02:59 followed by the anchor release from 1839m. The instrument was aboard, secured and we were underway by 04:24

Arrival at: 48°18.414N 125°36.074W, M02C at 07:21 followed by anchor release from 139m. The instrument was aboard, secured and we were underway by 07:46.

Arrival at: 48°46.075N 126°11.556W, J73C at 11:24 followed by anchor release from 143m. The instrument was aboard, secured and we were underway by 11:49.

Arrival at: 49°09.023N 126°43.333W, M01C at 19:12 followed by anchor release from 133m. The instrument was aboard, secured and we were underway by 19:37.

### **Day 4 Saturday May 31:**

Arrival at: 48°28.863N 127°49.760W, J68C at 00:34 followed by anchor release from 2587m. The instrument was aboard, secured and we were underway by 02:09.

Arrival at: 47°52.367N 128°11.831W, J61C at 05:29 followed by anchor release from 2673m. The instrument was aboard, secured and we were underway by 07:04.

Arrival at: 47°09.859N 127°55.338W, J53C at 11:03 followed by anchor release from 2717m. The instrument was aboard, secured and we were underway by 12:43.

Arrival at: 46°59.521N 127°00.949W, J52C at 15:50 followed by anchor release from 2640m. The instrument was aboard, secured and we were underway by 17:25.

**Day 5 Sunday June 1:**

Arrival at: 44°53.925N 125°07.005W, M07C at 08:59 followed by anchor release from 1356m. The instrument was aboard, secured and we were underway by 09:59.

Arrival at: 44°07.112N 124°53.721W, M08C at 14:32 followed by anchor release from 126m. The instrument was aboard, secured and we were underway by 14:57.

Arrival at: 44°28.381N 124°37.299W, J25C at 17:12 followed by anchor release from 143m. The instrument was aboard, secured and we were heading to Newport by 17:47.

Arrived Newport OR, tied up dockside by 20:10. Demobilization completed by early afternoon Monday June 2.

Station Name	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Depth (m)	Data Logged
Newport,OR	44	38.200	N	124	3.200	W		
J33C	45	6.397	N	124	34.247	W	349	XYZ - DGP
M05C	46	10.409	N	124	56.069	W	828	XYZ - DGP
M04C	47	33.505	N	125	11.538	W	563	XYZ - DGP
J65C	47	53.478	N	125	8.388	W	165	XYZ - DGP
M03C	47	53.305	N	126	6.275	W	1839	XYZ - DGP
M02C	48	18.414	N	125	36.074	W	139	No Z Data
J73C	48	46.075	N	126	11.556	W	143	XYZ - DGP
M01C	49	9.023	N	126	43.333	W	133	XYZ - DGP
J68C	48	28.863	N	127	49.760	W	2587	XYZ - DGP
J61C	47	52.367	N	128	11.831	W	2673	XYZ - DGP
J53C	47	9.859	N	127	55.338	W	2717	XYZ - DGP
J52C	46	59.521	N	127	0.949	W	2640	XYZ - DGP
M07C	44	53.925	N	125	7.005	W	1356	No data
M08C	44	7.112	N	124	53.721	W	126	XYZ - DGP
J25C	44	28.381	N	124	37.299	W	143	XYZ - DGP

Table 1. Location, depth, and data recovered from the Abalone OBS platforms.