

Description of ROV samples collected from the Axial Seamount on the Juan de Fuca Ridge on R/V Thomas G. Thompson TN327 in August 2015.

Website: <https://www.bco-dmo.org/dataset/728425>

Data Type: Cruise Results

Version: 1

Version Date: 2018-03-01

Project

» [Event response to an eruption at Axial Seamount](#) (NeMO2015)

Program

» [Ocean Observatories Initiative](#) (OOI)

Contributors	Affiliation	Role
Butterfield, David A.	National Oceanic and Atmospheric Administration (NOAA-PMEL)	Principal Investigator
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Coverage

Spatial Extent: N:46.0986 E:-129.972 S:45.9174 W:-130.0272

Temporal Extent: 2015-08-17 - 2015-08-28

Dataset Description

Axial Seamount 2015 ROV sample metadata for TN327.

Fluid samples for water and gas chemistry were collected from the ROV Jason with titanium major samplers manufactured at WHOI, with UCSB-type titanium gas-tight samplers designed and manufactured by John Lupton and Conrad Young, and with the Hydrothermal Fluid and Particle Sampler (HFPS) designed by David Butterfield and manufactured at NOAA-PMEL. A subset of HFPS samples were filtered in-situ through acid-washed 0.4 micron polycarbonate membrane filters during sampling. In-situ filters with RNA preservative were collected with the HFPS. Samples for water chemistry are in custody of D. Butterfield. Extracted gas samples are in custody of J. Lupton and M. Lilley. RNA/DNA samples are in custody of J. Huber.

Samples collected in 2015 are registered with SESAR/IEDA, with IGSN numbers starting with EO100003L.

All sample metadata have been publicly available through the SESAR web site:

<https://app.geosamples.org/search.php>

The same metadata is publicly available through the cruise report on the PMEL web site:
<https://www.pmel.noaa.gov/eoi/axial/2015/Axial2015-Cruise-Report-with-logs-revised.pdf>

IGSN sample registration: <https://app.geosamples.org/search.php>

Use advanced search for cruise name TN327 to bring up all registered samples.

Sample collection methods are described in (Butterfield et al., 2004) & (Butterfield et al., 2011)

Data Processing Description

BCO-DMO processing notes:

-Changed parameter names to BCO-DMO naming conventions

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Data Files

File
728425.csv (Comma Separated Values (.csv), 49.33 KB) MD5:0c1ec7bf05b09a88a9339575cb6412ce Primary data file for dataset ID 728425

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Related Publications

Butterfield, D. A., Nakamura, K. -i., Takano, B., Lilley, M. D., Lupton, J. E., Resing, J. A., & Roe, K. K. (2011). High SO₂ flux, sulfur accumulation, and gas fractionation at an erupting submarine volcano. *Geology*, 39(9), 803–806. doi:10.1130/g31901.1 <https://doi.org/10.1130/G31901.1>
Methods

Butterfield, D. A., Roe, K. K., Lilley, M. D., Huber, J. A., Baross, J. A., Embley, R. W., & Massoth, G. J. (2004). Mixing, reaction and microbial activity in the sub-seafloor revealed by temporal and spatial variation in diffuse flow vents at axial volcano. *Geophysical Monograph Series*, 269–289. doi:10.1029/144gm17
<https://doi.org/10.1029/144GM17>
Methods

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Parameters

Parameter	Description	Units
IGSN	The assigned IGSN sample number.	no units
Sample_name	The cruise sample ID used to identify the sample (dive number-sample type-sequence number within the dive); sample types are GTB=gas-tight bottle; Major=titanium major sampler; HFS=sample collected with PMEL Hydrothermal Fluid and Particle Sampler; Geo=rock sample.	no units
Sample_type	Refers to IGSN sample type description.	no units
Material	The type of material collected: water, gas, rock, or biological matter.	no units
Description	A text description of the sample collected.	no units
Collection_method	Short description of the method used to collect the sample.	no units
Collection_method_descrip	Text description of the method used to collect the sample.	no units
Purpose	Type of analysis to be done with the sample.	no units
Release_date	The date when the IGSN sample numbers were assigned and put in the SESAR public database (yyyy-mm-dd).	no units
Latitude	Latitude of the sample site on the seafloor (decimal degrees, northern hemisphere).	decimal degrees
Longitude	Longitude of the sample site on the seafloor (decimal degrees, western hemisphere).	decimal degrees
Elevation	Depth of the sample relative to sea surface (negative elevation value, in meters).	meters
Elevation_unit	Elevation unit.	no units
Nav_type_name	USBL is ultrashort baseline acoustic navigation used to locate the ROV Jason on the seafloor.	no units
Physiographic_feature	Samples were collected on a submarine volcano or seamount.	no units
Physiographic_feature_name	All samples in this dataset are from Axial Seamount.	no units
Location_description	A more detailed text description of where the samples came from; NRZ refers to North Rift Zone, where most of the 2015 lava erupted.	no units
Cruise_ID	Cruise number (for T.G. Thompson).	no units
Platform_type	Platform type.	no units
Platform_name	Platform name.	no units
Launch_platform	Launch platform.	no units
Launch_platform_name	Launch platform name.	no units
Collector	The scientist who collected the individual sample or for whom the sample was intended.	no units
Collection_date_UTC	Date the sample was collected (yyyy-mm-dd).	no units
Current_archive_contact	Address and/or email of the person who should be contacted for information about or access to the sample.	no units
Current_registrant_name	Person who is currently associated with this sample in the IGSN registry.	no units
Original_registrant_name	Person who originally registered the sample to assign an IGSN.	no units
URL	Link to the online sample registry.	no units

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	ROV Jason
Generic Instrument Description	The Remotely Operated Vehicle (ROV) Jason is operated by the Deep Submergence Laboratory (DSL) at Woods Hole Oceanographic Institution (WHOI). WHOI engineers and scientists designed and built the ROV Jason to give scientists access to the seafloor that didn't require them leaving the deck of the ship. Jason is a two-body ROV system. A 10-kilometer (6-mile) fiber-optic cable delivers electrical power and commands from the ship through Medea and down to Jason, which then returns data and live video imagery. Medea serves as a shock absorber, buffering Jason from the movements of the ship, while providing lighting and a bird's eye view of the ROV during seafloor operations. During each dive (deployment of the ROV), Jason pilots and scientists work from a control room on the ship to monitor Jason's instruments and video while maneuvering the vehicle and optionally performing a variety of sampling activities. Jason is equipped with sonar imagers, water samplers, video and still cameras, and lighting gear. Jason's manipulator arms collect samples of rock, sediment, or marine life and place them in the vehicle's basket or on "elevator" platforms that float heavier loads to the surface. More information is available from the operator site at URL.

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Deployments

TN327

Website	https://www.bco-dmo.org/deployment/664100
Platform	R/V Thomas G. Thompson
Start Date	2015-08-14
End Date	2015-08-29
Description	NOAA New Millennium Observatory (NeMO) 2015/Rapid Response to an Eruption

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Project Information

Event response to an eruption at Axial Seamount (NeMO2015)

Website: <http://axial2015.blogspot.com>

Coverage: Axial Seamount, Juan de Fuca Ridge, northeastern Pacific Ocean (46.06°N 130.00°W)

On 24 April 2015, the NSF-funded Ocean Observatories Initiative's (OOI) Cabled Array detected the onset of a probable eruption at Axial Seamount, heralded by a swarm of >8000 small earthquakes and a rapid subsidence of the seafloor by >2.4 meters at the center of the caldera. Evidence that lava was erupted in or near the summit caldera includes a dramatic temperature rise recorded by instruments on the OOI Cabled Array-- up to 0.6-0.7°C above ambient sustained for weeks after the event. This eruption is likely to have significantly perturbed the hydrothermal and biological systems in and around the summit caldera, and provides the rare opportunity to address time-critical scientific questions that can only be investigated with the near-term seafloor investigations. A currently scheduled NSF and NOAA funded cruise to Axial Seamount on R/V Thompson with ROV Jason and AUV Sentry in August 2015 provides an excellent opportunity for such a response. This study adds 3 days onto this cruise to facilitate time-critical event response science.

Detailed seafloor mapping with shipboard multi-beam sonar and near-bottom Sentry surveys will cover areas of the caldera and adjacent rift zones that are expected eruption site(s). Fresh rock, if located, will be sampled and dated using the ^{210}Po - ^{210}Pb technique. Hydrothermal plumes will be discerned with CTD casts and sensor tows. A mooring will be deployed with Miniature Autonomous Plume Recorders to measure temperature, light attenuation, and redox potential. The at-sea team plans to make samples and data available to the broader science community for targeted research on seafloor processes.

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Program Information

Ocean Observatories Initiative (OOI)

Website: <http://oceanobservatories.org/>

The Ocean Observatories Initiative (OOI) is a science-driven ocean observing network that delivers real-time data to address critical science questions regarding the world's oceans. Funded by the National Science Foundation to encourage scientific investigation, OOI data are freely available online to anyone with an Internet connection. OOI was designed as a long-term project to collect ocean data for up to 30 years. This longevity makes it possible to measure and directly observe both short-lived episodic events and longer-term changes occurring in the ocean. Such data make it possible to better understand ocean processes and how the ocean is changing.

The OOI has five active research arrays that comprise the three major observatory elements linked together by instrument, infrastructure, and information management systems. Global Ocean Arrays consist of moored arrays and autonomous vehicles that provide time-series observations and mesoscale spatial sampling at sparsely sampled, high-latitude regions critical to our understanding of climate, the carbon cycle, and ocean circulation. The Regional Cabled Array consists of fiber-optic cables off the Oregon coast that provide unprecedented power, bandwidth, and communication to seafloor instrumentation and profiler moorings, enabling monitoring of volcanic and hydrothermal activity, methane seeps, earthquakes, and myriad ocean processes in coastal and blue water environments. Coastal Arrays consist of cross-shelf moored arrays and autonomous vehicles that observe the dynamic coastal environment, enabling examination of upwelling, shelf break fronts, and cross-shelf exchanges.

These marine arrays are outfitted with more than 900 instruments — of 45 different types — measuring more than 200 different parameters. These instruments gather physical, chemical, geological, and biological data — from the air-sea interface to the seafloor. The data collected are transmitted through a cyberinfrastructure, an information management system that allows users to access real- to near real-time data from suites of sensors. The OOI provides annotations and automated quality control for data streams and is working to meet the IOOS Quality Assurance of Real Time Ocean Data (QARTOD) standards.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1546695

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