

GenBank Short Read Archive (SRA) sequence accession numbers metatranscriptomic data from the gills of *Alviniconcha* species from R/V Falkor in the Lau Basin from April to May 2016

Website: <https://www.bco-dmo.org/dataset/767265>

Data Type: Cruise Results

Version: 0

Version Date: 2019-05-10

Project

» [Collaborative Research: Ecosystem dynamics of Western Pacific hydrothermal vent communities associated with polymetallic sulfide deposits](#) (Eco Dyn W Pacific Vents)

Contributors	Affiliation	Role
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Coverage

Temporal Extent: 2016-04-13 - 2016-05-01

Dataset Description

GenBank Short Read Archive (SRA) sequence accession numbers metatranscriptomic data from the gills of *Alviniconcha* species

Methods & Sampling

Gill tissue pieces were quickly excised and homogenized in Trizol preservative using a Tissue-Tearor. Homogenates were stored at -80C until extraction with the Direct-zol RNA extraction kit (Zymo Research, Inc.). RNA was sequenced with Illumina NovaSeq using the RNAtag-Seq method with rRNA-depletion.

Data Processing Description

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- added lat and lon columns
- converted date from m/d/yy to yyyy-mm-dd ISO convention

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Parameters

Parameters for this dataset have not yet been identified

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Instruments

Dataset-specific Instrument Name	Illumina MiSeq.
Generic Instrument Name	Automated DNA Sequencer
Dataset-specific Description	16S rRNA genes were amplified from the extracted DNA with the 515F/926R primers (Walters et al., 2015) and PE 251bp reads were sequenced using Illumina MiSeq.
Generic Instrument Description	General term for a laboratory instrument used for deciphering the order of bases in a strand of DNA. Sanger sequencers detect fluorescence from different dyes that are used to identify the A, C, G, and T extension reactions. Contemporary or Pyrosequencer methods are based on detecting the activity of DNA polymerase (a DNA synthesizing enzyme) with another chemoluminescent enzyme. Essentially, the method allows sequencing of a single strand of DNA by synthesizing the complementary strand along it, one base pair at a time, and detecting which base was actually added at each step.

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Deployments

FK160407

Website	https://www.bco-dmo.org/deployment/740047
Platform	R/V Falkor
Start Date	2016-04-07
End Date	2016-05-05
Description	Chief Scientist: Leg 1 - Girguis, Peter, Harvard University Leg 2 - Fisher, Charles, Pennsylvania State University

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Project Information

Collaborative Research: Ecosystem dynamics of Western Pacific hydrothermal vent communities associated with polymetallic sulfide deposits (Eco Dyn W Pacific Vents)

Coverage: Lau basin (21S, 176W)

Description from NSF award abstract:

Hydrothermal vents are common in the Western Pacific, and are markedly different in many geological, geochemical, and biological aspects from the much better known hydrothermal vents on mid-ocean ridges. The processes that structure western Pacific vent communities, such as the extent to which physical and chemical conditions change over time, the dispersal of organisms among hydrothermal vent fields, and the physiological capacities of the symbionts and their animal host are poorly understood. And yet, large-scale industrial mining of polymetallic sulfide deposits at active hydrothermal vents is imminent in the Western Pacific. In 2005 and 2006, 19 long term study sites were established on the Eastern Lau Spreading Center by generating high resolution photomosaics of animal communities in both active and inactive flow areas and on both sulfide chimneys and on lavas, and mapping spatially discrete physical and chemical environmental measurements on to these photomosaics. Revisiting these study sites and acquiring data of comparable resolution in the coming year, combined with detailed studies of the physiology of key species, will significantly increase our understanding of the physiology of the fauna and how these communities respond to change. The resulting data will provide crucial information on the fauna and communities endemic to this region that is critical for predicting and mitigating the effects of mining activities on these ecosystems, and for informing plans for monitoring potential recovery post-mining. To ensure that Western Pacific Islanders are engaged throughout the duration of our program, local scientists will be included in the fieldwork, in-country presentations to students and the general public will be given in association with port stops, and findings will be communicated to local resource managers through the Geoscience Division of the Secretariat of the Pacific Community (SPC). The principal investigators are also proponents of fostering greater "open access and collaboration" among oceanographers, and telepresence will be used during this expedition to experiment on two different models of collaboration, which - along with the resulting scientific insights - will be published to disseminate the results of this effort. Finally, in collaboration with the Harvard Museum of Natural History (HMNH), an exhibit module and course curricula will be developed presenting the effects of both natural and anthropogenic disturbance on biodiversity. It will feature high-resolution imagery, animal and mineralogical samples, and deep-sea research technologies. Web-enabled kiosks will allow visitors to delve deeper into the subject material. The HMNH attracts 200,000 visitors each year, including 33,000 students (K-12) and their teachers, as well as visitors from around the world.

The funded interlinked studies of holobiont (symbionts and their animal host) physiology and distribution, community structure and change over time, genetic connectivity, and holobiont ecosystem engineering will significantly increase our understanding of the processes structuring hydrothermal vent ecosystems in general, and those of the Western Pacific in particular. Vent fields in the proposed study area within the Lau Basin are located in relative proximity to one another with no known barriers to biological dispersal and span a pronounced regional gradient in both geological setting and physico-chemical conditions. This natural laboratory, that is home to a significant diversity of vent fauna and where long-term study sites were established a decade ago, presents an opportunity to gain broad new insights into the ecological and physiological characteristics of the vent fauna and the processes that structure these communities. Accordingly, the project will A) determine the rates and patterns of natural physical, chemical, and biological changes at vents in the Lau Basin over a decadal time period by acquiring new high-resolution, co-registered geological, chemical and biological maps and comparing these with data of comparable resolution acquired in 2005, 2006, and 2009; B) evaluate the role of symbiont physiology -in particular their use of key energy sources not previously measured- in the realized distribution of the holobionts by coupling genetic characterization of host and symbionts with shipboard physiological measurements and gene expression studies, and physico-chemical microhabitat characterization; C) quantify the effects of different holobionts on the surrounding environment by coupling repeated spatially integrated measurements of physico-chemical conditions to all collections and; D) assess the influence of genetic connectivity of populations in the Lau Basin on the distribution of holobionts across regional gradients in geology and geochemistry. They will provide new and generally applicable insights on the role of multiple symbionts in both the distribution of their animal hosts and in structuring associated communities. These efforts will also constrain the roles of genetic connectivity, environmental chemistry, and holobiont capabilities in structuring communities along this spreading center. Moreover, through co-registered animal collections and in situ geochemical measurements, the investigators will develop first-order estimates of the extent to which holobiont aggregations affect geochemical flux from diffuse flows, which accounts for ~50% of all vent geochemical flux. Ultimately, this effort will provide critical and robust data on the dynamics of vent fields and communities in the western Pacific biogeographic province, as well as on the underlying physiological and ecological factors governing these patterns.

Datasets at the Marine Geoscience Data System (MGDS):

1. Processed ship-based multibeam data files: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24306
2. Raw ROV-based multibeam data files: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24317
3. CTD data from ROV: Conductivity, Temperature and Depth records from the ROV dives:

http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24206

4. ROPOS event logs: Event logs from the ROV dives: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24146

5. ROPOS navigation: Navigation records from the ROV dives: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24165

6. Geo-referenced photo mosaics of the study sites: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24031

7. Low-resolution photo mosaics of the study sites: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24046

8. IRLS photos: This includes 3,534 sea floor images taken from the ROV with a Nikon D700 digital camera in a pressure housing: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24151

9. Highlight photographs from the expedition: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24047

10. Links to the ship based navigation data held at the Rolling Deck to Repository Website (R2R): http://www.marine-geo.org/tools/search/Files.php?data_set_uid=23926

11. Links to the raw ship-based multibeam held at NOAA: http://www.marine-geo.org/tools/search/DataSets.php?data_set_uids=23951,23952

12. The final GIS products linking the photomosaics to the chem/temp data: http://www.marine-geo.org/tools/search/Files.php?data_set_uid=24502

Due to PI transfer award OCE-1819530 was added to this project in March 2019

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1536331

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