

Alvin dive log from off Costa Rica from R/V Atlantis AT15-59, AT15-44 in the Pacific Ocean off Costa Rica, Pacific, off Costa Rica from 2009-2010 (Seep Carbonate Ecology CROCKS II project)

Website: <https://www.bco-dmo.org/dataset/3603>

Version:

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Project

» [Short-term colonization processes at Costa Rica methane seeps](#) (Seep Carbonate Ecology CROCKS II)

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Table of Contents

- [Dataset Description](#)
 - [Methods & Sampling](#)
- [Data Files](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

Dataset Description

Atlantis/Alvin cruise off Costa Rica

The primary goal of the cruise was to recover biological experiments deployed at active and inactive seep areas during Feb./March 2009. We successfully recovered 23/24 experimental units deployed on Mound 12, Costa Rica. One was simply missing on the sea floor. By using a gear elevator each day to maximize sample collection (and reserve ALVIN basket space for experiments) we were able to recover our experiments rapidly. This left us time for exploration of unusual biological communities at Jaco Scar.

Methods & Sampling

Equipment used: standard Alvin tubecores; Ocean Instruments multicorer; Seabird CTD with O2 sensor.

Where indicated, sediment samples from tube cores were sectioned vertically and preserved in buffered formaldehyde (standard procedures) or frozen at -80°C.

Colonization substrates had macrofauna (>0.3 mm) and meiofauna (>0.42 microns) removed and preserved.

Representative individuals were frozen for subsequent stable isotope analyses.

[[table of contents](#) | [back to top](#)]

Data Files

File
dive_log.csv (Comma Separated Values (.csv), 28.09 KB) MD5:8424588330e732d9bf74d5f80a88f314 Primary data file for dataset ID 3603

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
dive	Alvin dive number	integer
station	location of sample	text
lat	latitude; North is positive	decimal degrees
lon	longitude; East is positive	decimal degrees
depth_w	water depth	meters
location	location at site	text
habitat	bottom habitat	text
seep_activity	degree of seep activity	text
sample_type	type of sample	text
replicate	replicate information	text
sample_id	sample number or info	text
photos	whether photographs were taken or not	text
comments	comments	text
fate	processing of sample	text
yrday_gmt	GMT day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon). In the case of drifter data, year day may be continuous over a multi year period. No time in this dataset so no decimal is added to the yearday.	1 to 365
year	year of sampling.	yyyy
month	month, GMT time.	1 to 12
day	day of sampling, GMT	1 to 31

[[table of contents](#) | [back to top](#)]

Instruments

Dataset-specific Instrument Name	Alvin tube core
Generic Instrument Name	Alvin tube core
Generic Instrument Description	A plastic tube, about 40 cm (16 inches) long, is pushed into the sediment by Alvin's manipulator arm to collect a sediment core.

Dataset-specific Instrument Name	CTD Sea-Bird
Generic Instrument Name	CTD Sea-Bird
Dataset-specific Description	Seabird CTD with oxygen sensor.
Generic Instrument Description	Conductivity, Temperature, Depth (CTD) sensor package from SeaBird Electronics, no specific unit identified. This instrument designation is used when specific make and model are not known. See also other SeaBird instruments listed under CTD. More information from Sea-Bird Electronics.

Dataset-specific Instrument Name	Multi Corer
Generic Instrument Name	Multi Corer
Dataset-specific Description	Ocean Instruments multicorer
Generic Instrument Description	The Multi Corer is a benthic coring device used to collect multiple, simultaneous, undisturbed sediment/water samples from the seafloor. Multiple coring tubes with varying sampling capacity depending on tube dimensions are mounted in a frame designed to sample the deep ocean seafloor. For more information, see Barnett et al. (1984) in Oceanologica Acta, 7, pp. 399-408.

[[table of contents](#) | [back to top](#)]

Deployments

AT15-59

Website	https://www.bco-dmo.org/deployment/58765
Platform	R/V Atlantis
Start Date	2010-01-06
End Date	2010-01-13
Description	Costa Rica seafloor methane seeps 8 deg 55 N 84 depth 990m. Included Alvin dives 4586-4591. The primary goal of the cruise was to recover biological experiments deployed at active and inactive seep areas during Feb./March 2009. We successfully recovered 23/24 experimental units deployed on Mound 12, Costa Rica. One was simply missing on the sea floor. By using a gear elevator each day to maximize sample collection (and reserve ALVIN basket space for experiments) we were able to recover our experiments rapidly. This left us time for exploration of unusual biological communities at Jaco Scar. Cruise information and original data are available from the NSF R2R data catalog. Cruise dates changed Feb 2015 to match WHOI ship schedule and R2R.

AT15-44

Website	https://www.bco-dmo.org/deployment/58869
Platform	R/V Atlantis
Start Date	2009-02-21
End Date	2009-03-08
Description	Cruise Objective: We will conduct research in exposed carbonate ecosystems on the Costa Rica margin (700-1,400 m), to test hypotheses about the influence of active seepage on carbonate rock animal communities and their successional phases, on microbial activity including anaerobic methane oxidation and sulfide oxidation, on carbon isotopic composition of shelled organisms, and on phylogenetic affinities of animals. To test hypotheses we will sample existing authigenic carbonates from 3 levels of seepage activity: highly active, weak and inactive. Activity level will be defined by presence of /or proximity to bubbles/shimmering water, microbial mat development and megafauna, as well as previous fluid flow and composition measurements made at the Costa Rica study sites. We will sample 5 to 8 locations with each activity level in each study region, controlling for rock size and carbonate configuration when possible. ALVIN: During 3 dives at each of 4 study sites we will conduct bottom surveys and video transects, measure S, T, O ₂ , select 4 to 8 highly active, weakly active and inactive sites, photograph organisms and classify rocks in situ, collect rocks of varying sizes with organisms, and sample nearby sediments and biotic substrata (mussels, tube worms) for taxonomic comparisons. The remaining 2 dives at Costa Rica seeps will be used to conduct follow-up survey and sampling of the most promising locations, based on shipboard sample observations. Nighttime operations will consist of CTD casts (a minimum of one each at Mound 11, Mound 13, Jaco Scarp and Mound Quepos), multicoring (adjacent to mounds and at 400 m and 600 m sites in the OMZ), and pre-dive seabeam surveys. Cruise information and original data are available from the NSF R2R data catalog.

[[table of contents](#) | [back to top](#)]

Project Information

Short-term colonization processes at Costa Rica methane seeps (Seep Carbonate Ecology CROCKS II)

Coverage: Costa Rica seafloor methane seeps 8 deg 55 N 84 deg 18 W depth 990m

This RAPID project will conduct 5 submersible or ROV dives to collect a series of colonization experiments deployed in March 2009 on Mound 12 off Costa Rica (997 m). These experiments were deployed opportunistically, and to optimize the information that could be obtained, the PIs needed to recover them

within a 12 month time frame. Early colonization of rock, wood, shell and tube substrates will be studied. The microbes, foraminiferans and metazoans present after 6-12 mo will be compared to those colonizing similar experiments to be deployed at Hydrate Ridge, where seeps occur within an oxygen minimum zone. The overall project goal is to integrate physical, geological, chemical and biological data to develop a holistic view of the influence of seep-generated carbonate hard-ground ecosystems on margins.

The objectives of the research are to (a) Compare colonizers at seeps off Costa Rica and Hydrate Ridge to assess the importance of different oxygen regimes in the development of anaerobic methane oxidation, sulfide oxidizers and other microbial metabolisms on hard substrates, and to evaluate their roles in driving protozoan and metazoan succession at methane seeps. (b) Deploy a suite of biotic and abiotic substrates to distinguish the specific roles of carbonate substrate from those of other hard substrates (wood, clam and mussel shells, worm tubes) available. (c) Explore the similarity of vent and seep colonization processes by comparing colonization at the Costa Rica seeps, where vent species are common, to the Hydrate Ridge seeps, where they are not. (d) Determine whether there are diagnosable biogeographic isotope or other biomarker signatures from newly recruited Costa Rica microbial, foraminiferal and animal populations at active vs. inactive seeps, and whether these differ from those at Hydrate Ridge.

This research will involve international participation from Costa Rican scientists at the Univ. of Costa Rica.

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
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NSF Division of Ocean Sciences (NSF OCE)	OCE-0939232
NSF Division of Ocean Sciences (NSF OCE)	OCE-0939557

[[table of contents](#) | [back to top](#)]