

Station locations for CROCKS & HROCKS projects from R/V Atlantis AT15-44, AT15-59, AT15-68, AT18-10 in the Pacific, off Costa Rica and USA from 2009-2011 (Seep Carbonate Ecology CROCKS II project)

Website: <https://www.bco-dmo.org/dataset/3759>

Version:

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Project

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

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Dataset Description

Station locations for CROCKS & HROCKS studies

Methods & Sampling

Samples were taken at methane seeps on the Costa Rica Margin (8o 55.8 N 84o 18.7 W) and at Hydrate Ridge, Oregon Margin (44o 34'N, 125o 9 W).

field investigations (collections and experiments) were carried out using the submersible ALVIN on the RV Atlantis at methane seeps on the Costa Rica margin during 2009 (AT 15-44) and 2010 (AT 15-59 funded by OCE 0939557). To compliment the studies of carbonate ecosystems off Costa Rica, but in a lower-oxygen realm, we examined parallel ecosystems and conducted parallel colonization experiments at Hydrate Ridge methane seeps. AT 15-68 was conducted with ALVIN at the northern, southern and southeast summits of Hydrate Ridge from July 30-Aug. 9, 2010, and AT 18-10 was conducted with ROV Jason, to recover experiments placed at Hydrate Ridge in 2010.

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Data Files

File
seep_stations.csv (Comma Separated Values (.csv), 1.04 KB) MD5:01dfc90afa81e2262bae5e2e4aad1ea7
Primary data file for dataset ID 3759

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Parameters

Parameter	Description	Units
region	region of sampling	either Costa Rica or Oregon
area	area within region	text
station	station identification	text
lat	latitude; North is positive	decimal degrees
lon	longitude; East is positive	decimal degrees

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Deployments

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.

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.

AT15-68

Website	https://www.bco-dmo.org/deployment/58870
Platform	R/V Atlantis
Start Date	2010-07-31
End Date	2010-08-12
Description	Cruise information and original data are available from the NSF R2R data catalog.

AT18-10

Website	https://www.bco-dmo.org/deployment/58871
Platform	R/V Atlantis
Start Date	2011-08-31
End Date	2011-09-08
Description	Cruise information and original data are available from the NSF R2R data catalog.

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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.

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Funding

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

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