

# Species abundance on carbonate rocks from active and inactive sites at methane seeps from R/V Atlantis AT15-44, AT15-68 in the Pacific, off Costa Rica and USA, 2009-2010 (CROCKS II project)

**Website:** <https://www.bco-dmo.org/dataset/3763>

**Version:**

**Version Date:** 2012-10-30

## Project

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

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|--------------------------------|---|---------------------------|
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## Dataset Description

Species abundance (per 200 cm<sup>2</sup>) on carbonate rocks collected with the submersible Alvin from active and inactive sites at methane seeps on the Costa Rica (AT 15-44) and Oregon (Hydrate Ridge AT 1568) margins

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## Data Files

| File   |
|--|
| <b>seep_species_abund.csv</b> (Comma Separated Values (.csv), 356.50 KB)<br>MD5:e4e52c3f1d15c8bb793e8912839ada22 |
| Primary data file for dataset ID 3763  |

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## Parameters

| Parameter         | Description                             | Units                          |
|-------------------|---|--------------------------------|
| cruise_id         | cruise identification; Atlantis         | alphanumeric                   |
| region            | Costa Rica or Oregon Margin             | text                           |
| site              | location within region                  | text                           |
| station           | station name                            | alphanumeric                   |
| lat               | latitude; West is negative              | decimal degrees                |
| lon               | longitude; North is positive            | decimal degrees                |
| activity          | whether methane seepage was observed    | text                           |
| taxon             | taxonomic name                          | text                           |
| sample_size       | sample size                             | integer                        |
| abundance_200sqcm | taxon abundance                         | number per 200 cm <sup>2</sup> |
| abund_stderr      | standard error of abundance value       | dimensionless                  |
| abund_pcent       | percent taxon abundance of total sample | percent                        |

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## Instruments

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

|   |   |
|---|---|
| <b>Dataset-specific Instrument Name</b> | Multi Corer   |
| <b>Generic Instrument Name</b>          | Multi Corer   |
| <b>Dataset-specific Description</b>     | Ocean Instruments MultiCorer  |
| <b>Generic Instrument Description</b>   | 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 <i>Oceanologica Acta</i> , 7, pp. 399-408. |

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## Deployments

**AT15-44**

|                    |   |
|--------------------|---|
| <b>Website</b>     | <a href="https://www.bco-dmo.org/deployment/58869">https://www.bco-dmo.org/deployment/58869</a>   |
| <b>Platform</b>    | R/V Atlantis  |
| <b>Start Date</b>  | 2009-02-21  |
| <b>End Date</b>    | 2009-03-08  |
| <b>Description</b> | 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 <sub>2</sub> , 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. |

#### AT15-68

|                    |   |
|--------------------|---|
| <b>Website</b>     | <a href="https://www.bco-dmo.org/deployment/58870">https://www.bco-dmo.org/deployment/58870</a> |
| <b>Platform</b>    | R/V Atlantis  |
| <b>Start Date</b>  | 2010-07-31  |
| <b>End Date</b>    | 2010-08-12  |
| <b>Description</b> | 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                       |
|--|-----------------------------|
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0825791</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0826254</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0939559</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0825436</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0939232</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-0939557</a> |

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