Costa Rica Margin Subseafloor Microbial Community Analysis

Website: https://www.bco-dmo.org/dataset/836477
Data Type: Cruise Results
Version: 1
Version Date: 2017-10-17

Project
» Working around drilling contamination in deep cores: Costa Rica Margin (Costa Rica Margin Microbes)

Program
» Center for Dark Energy Biosphere Investigations (C-DEBI)

Contributors	Affiliation	Role
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Abstract
GenBank accessions from marine sediment samples from the Costa Rica Margin

Table of Contents

Methods & Sampling

To be added.

Data Processing Description

To be added.

[table of contents | back to top]

Parameters

Parameters for this dataset have not yet been identified

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Illumina HiSeq 1000 system
Generic Instrument Name	Automated DNA Sequencer
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.

[table of contents | back to top]

Project Information

Working around drilling contamination in deep cores: Costa Rica Margin (Costa Rica Margin Microbes)

Website: http://www.darkenergybiosphere.org/?s=Working%20around%20drilling%20contamination%20in%20deep%20cores%3A%20Costa%20Rica%20Margin

Coverage: Costa Rica

Most microbiology work in marine subsurface sediments has been focused in the upper 100-200 meters of sediment, partially because the switchover from Advanced Piston Coring (APC) to Extended Core Barrel (XCB) coring generally occurs around this depth, which leads to large increases in drilling-induced contamination. Molecular studies in deeper samples may be greatly hindered by the potential interferences from these contaminating microbes. This project provides an extensive next-generation sequencing based study coupling the analysis of microbial community composition to great depth in the Costa Rica Margin subseafloor to the analysis of the drilling fluid used in the process of obtaining those samples. In nearly all samples examined, the influence of drilling-fluid in molecular analysis of the sediment samples was very low, even in several samples taken with XCB coring. One sample from 496 mbsf was shown to contain a high proportion of sequences potentially originated from drillingfluid, however, which suggests that it is still important to routinely include comparison to drilling fluid as a control in molecular analyses. This study also provides a first and extensive look at the microbial community composition of the Costa Rica Margin subseafloor from 2 sites on the upper plate of the erosive subduction zone between the Cocos and Caribbean plates. These 2 sites, while in close proximity and sharing many physical and chemical properties, showed distinction in terms of the relative abundances of microbial groups, particularly in the proportion of archaea to bacteria. Additionally, correlations assessed between microbial taxa and geochemistry variables suggest directions for future research into the metabolic capabilities of some uncharacterized subseafloor microbial lineages.

[table of contents | back to top]

Program Information

Center for Dark Energy Biosphere Investigations (C-DEBI)

Website: http://www.darkenergybiosphere.org

Coverage: Global

The mission of the Center for Dark Energy Biosphere Investigations (C-DEBI) is to explore life beneath the seafloor and make transformative discoveries that advance science, benefit society, and inspire people of all ages and origins.

C-DEBI provides a framework for a large, multi-disciplinary group of scientists to pursue fundamental questions about life deep in the sub-surface environment of Earth. The fundamental science questions of C-DEBI involve exploration and discovery, uncovering the processes that constrain the sub-surface biosphere below the oceans, and implications to the Earth system. What type of life exists in this deep biosphere, how much, and how is it distributed and dispersed? What are the physical-chemical conditions that promote or limit life? What are the important oxidation-reduction processes and are they unique or important to humankind? How does this biosphere influence global energy and material cycles, particularly the carbon cycle? Finally, can we discern how such life evolved in geological settings beneath the ocean floor, and how this might relate to ideas about the origin of life on our planet?

C-DEBI's scientific goals are pursued with a combination of approaches:
(1) coordinate, integrate, support, and extend the research associated with four major programs—Juan de Fuca Ridge flank (JdF), South Pacific Gyre (SPG), North Pond (NP), and Dorado Outcrop (DO)—and other field sites;
(2) make substantial investments of resources to support field, laboratory, analytical, and modeling studies of the deep subseafloor ecosystems;
(3) facilitate and encourage synthesis and thematic understanding of submarine microbiological processes, through funding of scientific and technical activities, coordination and hosting of meetings and workshops, and support of (mostly junior) researchers and graduate students; and
(4) entrain, educate, inspire, and mentor an interdisciplinary community of researchers and educators, with an emphasis on undergraduate and graduate students and early-career scientists.

Note: Katrina Edwards was a former PI of C-DEBI; James Cowen is a former co-PI.

Data Management:
C-DEBI is committed to ensuring all the data generated are publically available and deposited in a data repository for long-term storage as stated in their Data Management Plan (PDF) and in compliance with the NSF Ocean Sciences Sample and Data Policy. The data types and products resulting from C-DEBI-supported research include a wide variety of geophysical, geological, geochemical, and biological information, in addition to education and outreach materials, technical documents, and samples. All data and information generated by C-DEBI-supported research projects are required to be made publically available either following publication of research results or within two (2) years of data generation.

To ensure preservation and dissemination of the diverse data-types generated, C-DEBI researchers are working with BCO-DMO Data Managers make data publicly available online. The partnership with BCO-DMO helps ensure that the C-DEBI data are discoverable and available for reuse. Some C-DEBI data is better served by specialized repositories (NCBI's GenBank for sequence data, for example) and, in those cases, BCO-DMO provides dataset documentation (metadata) that includes links to those external repositories.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0939564

[table of contents | back to top]