Metagenomes from Delaware estuarine riverbank sediments obtained by push corer in July 2012

Website: https://www.bco-dmo.org/dataset/628253
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Project
» Metagenomic analysis of microbial CpG methylation in Delaware estuarine riverbank sediment (Microbial CpG Methylation)

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

Contributors	Affiliation	Role
Biddle, Jennifer F.	University of Delaware	Principal Investigator
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Dataset Description

Metagenomes from Delaware estuarine riverbank sediment.

Methods & Sampling

Sample collection and storage: A riverbank sediment core was extracted from the Oyster Rocks site of the Broadkill River in Milton, Delaware in July 2012, accessed on foot. Extraction was performed with a polycarbonate push core. Samples were taken in 3 cm slices along the depth of the core and frozen at -80 degrees C until DNA extractions were performed.

DNA digestion and Illumina sequencing: DNA was extracted using a MoBio Powersoil DNA kit. Extracted DNA was digested with HpaII restriction endonuclease. Illumina library preparation and 150-cycle single-read sequencing was performed on an Illumina Hi-Seq 2500 at the University of Delaware Sequencing and Genotyping Center (Delaware Biotechnology Institute).

Raw reads are publicly available through the European Nucleotide Archive at http://www.ebi.ac.uk/ena/data/view/ERP013107

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Data Files

File
OysterRocks_metagenomes.csv (Comma Separated Values (.csv), 212 bytes) MD5:53b329776f88f57a303e1e28d314b803 Primary data file for dataset ID 628253

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Parameters

Parameter	Description	Units
site	Description/name of site.	dimensionless
lat	Latitude of sampling site.	decimal degrees
lon	Longitude of sampling site. (Negative = West)	decimal degrees
description	Brief description of the data.	dimensionless
ENA_ID	Project ID number in the European Nucleotide Archive.	dimensionless
ENA_URL	Hyperlink to European Nucleotide Archive for this project ID.	dimensionless

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Instruments

Dataset-specific Instrument Name	polycarbonate push core
Generic Instrument Name	Push Corer
Dataset-specific Description	A riverbank sediment core was extracted from the Oyster Rocks site of the Broadkill River in Milton, Delaware in July 2012. Extraction was performed with a polycarbonate push core.
Generic Instrument Description	Capable of being performed in numerous environments, push coring is just as it sounds. Push coring is simply pushing the core barrel (often an aluminum or polycarbonate tube) into the sediment by hand. A push core is useful in that it causes very little disturbance to the more delicate upper layers of a sub-aqueous sediment. Description obtained from: http://web.whoi.edu/coastal-group/about/how-we-work/field-methods/coring/

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Project Information

Metagenomic analysis of microbial CpG methylation in Delaware estuarine riverbank sediment (Microbial CpG Methylation)

Coverage: Delaware River estuary

Marine sediments harbor a vast amount of Earth's microbial biomass, yet little is understood regarding how cells subsist in these low-energy environments without forming endospores. DNA methylation, a reversible process that involves the addition of a methyl group to a nucleotide base via a methyltransferase, exists as a possible epigenetic mechanism for non-sporulated cells in low-energy sediment environments to regulate gene

expression and potentially lower cellular activity. To investigate the presence and scope of this phenomenon in estuarine sediment microbial communities, we sequenced three metagenomic and 16S rRNA gene amplicon libraries extracted from a sediment core collected from the banks of the Oyster Rocks site of the Broadkill River, Milton, Delaware, USA. We targeted 5-methylcytosine at CpG sites by digesting metagenomic libraries with the methylation-sensitive restriction endonuclease HpaII. By quantitatively distinguishing "mixed" methylation states for populations of CpG site copies, we identified dynamic, non-binary shifts in CpG methylation for community taxa and function.

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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.

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Funding

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

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