

Elemental composition for 16S rRNA gene amplicon and metagenomic sequences collected on the R/V JOIDES Resolution (JRES-204) cruise in the Cascadia Continental Margin during 2002 (Methane-Hydrate Sediment Omics project)

Website: <https://www.bco-dmo.org/dataset/626741>

Version: 2015-12-02

Project

» [Functional gene diversity and expression in methane-hydrate bearing deep subsurface sediments](#) (Methane-Hydrate Sediment Omics)

Programs

» [Center for Dark Energy Biosphere Investigations](#) (C-DEBI)

» [International Ocean Discovery Program](#) (IODP)

Contributors	Affiliation	Role
Glass, Jennifer B.	Georgia Institute of Technology (GA Tech)	Principal Investigator
McManus, James	University of Akron (UAkron)	Scientist
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

This dataset was generated under a C-DEBI research grant.

Related References:

Tréhu, A.M, Bohrmann, G., Rack, F.R., Torres, M.E., et al., 2003. Proc. ODP, Init. Repts., 204: College Station, TX (Ocean Drilling Program).doi:10.2973/odp.proc.ir.204.2003

Shipboard Scientific Party, 2003. Site 1244. In Tréhu, A.M, Bohrmann, G., Rack, F.R., Torres, M.E., et al., Proc. ODP, Init. Repts., 204: College Station, TX (Ocean Drilling Program), 1–132. doi:10.2973/odp.proc.ir.204.103.2003

Tréhu, A.M., Bohrmann, G., Torres, M.E., and Colwell, F.S. (Eds.), 2006. Proc. ODP, Sci. Results, 204: College Station, TX (Ocean Drilling Program).doi:10.2973/odp.proc.sr.204.2006

Methods & Sampling

Analyses performed on “Mobio” IODP samples previously frozen at -80C. Reactive Fe and Mn were extracted using the citrate-dithionite method and measured on an ICP OES (Agilent Technologies 700 series axial). Analysis for TC, TN, and TS were determined using PE 2400 CN(S) analyzer. Analysis for TIC was determined

by CM5014 CO2 coulometer with a CM5130 Acidification module.

Data Processing Description

BCO-DMO Processing:

- Added cruise_id, lat and lon columns

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Data Files

File
geochemistry.csv (Comma Separated Values (.csv), 1002 bytes) MD5:64d9e0afd8cc758741c0f8cbd66aa0be Primary data file for dataset ID 626741

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Parameters

Parameter	Description	Units
cruise_id	cruise identification	unitless
site	site identification	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
core	core identification	unitless
type	type of sample: H = hole?	unitless
section	core section identification	unitless
depth	depth below seafloor	meters
comments	molecular biology samples frozen at -80C	unitless
TC_pcent	total carbon	percent

TN_pcent	total nitrogen	percent
TS_pcent	total sulfur	percent
TIC_pcent	total inorganic carbon	percent
TOC_pcent	total organic carbon	percent
C_N	carbon:nitrogen ratio	unitless
CaCO3_pcent	calcium carbonate	percent
Fe_pcent	percent reactive iron	percent
Fe_err	reactive iron standard deviation of duplicate extractions and analyses	percent
Fe_RSD_pcent	iron % relative standard deviation: ratio of standard deviation to mean multiplied by 100 to express as percentage	percent
Mn_pcent	percent reactive manganese	percent
Mn_err	standard deviation of duplicate extractions and analyses for reactive manganese	percent
Mn_RSD_pcent	manganese % relative standard deviation: ratio of standard deviation to mean multiplied by 100 to express as percentage	percent

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CO2 Coulometer
Dataset-specific Description	CM5014 CO2 coulometer with a CM5130 Acidification module.
Generic Instrument Description	A CO2 coulometer semi-automatically controls the sample handling and extraction of CO2 from seawater samples. Samples are acidified and the CO2 gas is bubbled into a titration cell where CO2 is converted to hydroxyethylcarbonic acid which is then automatically titrated with a coulometrically-generated base to a colorimetric endpoint.

Dataset-specific Instrument Name	
Generic Instrument Name	Elemental Analyzer
Dataset-specific Description	PE 2400 CN(S) analyzer
Generic Instrument Description	Instruments that quantify carbon, nitrogen and sometimes other elements by combusting the sample at very high temperature and assaying the resulting gaseous oxides. Usually used for samples including organic material.

Dataset-specific Instrument Name	
Generic Instrument Name	Spectrometer
Dataset-specific Description	ICP OES (Agilent Technologies 700 series axial)
Generic Instrument Description	A spectrometer is an optical instrument used to measure properties of light over a specific portion of the electromagnetic spectrum.

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Deployments

JRES-204

Website	https://www.bco-dmo.org/deployment/626215
Platform	R/V JOIDES Resolution
Report	http://dmoserv3.whoi.edu/data_docs/C-DEBI/cruise_reports/204PREL.PDF
Start Date	2002-07-07
End Date	2002-09-02
Description	Leg 204 Drilling Gas Hydrates on Hydrate Ridge, Cascadia Continental Margin Sites 1244-1252 7 July-2 September 2002 Cruise report obtained from http://www-odp.tamu.edu/publications/pubs.htm

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Project Information

Functional gene diversity and expression in methane-hydrate bearing deep subsurface sediments (Methane-Hydrate Sediment Omics)

Coverage: Hydrate Ridge, North Pacific, offshore Oregon

Methane is a critical component of the deep subsurface. In shallow marine sediments, anaerobic oxidation of methane (AOM) is coupled to sulfate reduction. However, relatively little is known about which microbial metabolisms are active in deeply buried sediment containing methane hydrates, particularly with regard to

alternative electron acceptors that could fuel deep AOM. We propose to determine which microbial population(s) and functional genes are active in the deep biosphere beneath Hydrate Ridge offshore Oregon by sequencing metagenomes and metatranscriptomes from samples drilled on ODP Leg 204 and archived for future molecular analysis. We will analyze gene diversity and expression in six geochemically distinct zones from 2 to 139 meters below the seafloor with the goal of evaluating the relationship between geochemical conditions (i.e. sulfate, iron and manganese availability) and microbial metabolic activity.

Related References:

Tréhu, A.M, Bohrmann, G., Rack, F.R., Torres, M.E., et al., 2003. Proc. ODP, Init. Repts., 204: College Station, TX (Ocean Drilling Program). [doi:10.2973/odp.proc.ir.204.2003](https://doi.org/10.2973/odp.proc.ir.204.2003)

Shipboard Scientific Party, 2003. Site 1244. In Tréhu, A.M, Bohrmann, G., Rack, F.R., Torres, M.E., et al., Proc. ODP, Init. Repts., 204: College Station, TX (Ocean Drilling Program), 1–132. [doi:10.2973/odp.proc.ir.204.103.2003](https://doi.org/10.2973/odp.proc.ir.204.103.2003)

Tréhu, A.M., Bohrmann, G., Torres, M.E., and Colwell, F.S. (Eds.), 2006. Proc. ODP, Sci. Results, 204: College Station, TX (Ocean Drilling Program). [doi:10.2973/odp.proc.sr.204.2006](https://doi.org/10.2973/odp.proc.sr.204.2006)

This work was supported by a C-DEBI Research Grant.

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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.

International Ocean Discovery Program (IODP)

Website: <http://www.iodp.org/index.php>

Coverage: Global

The International Ocean Discovery Program (IODP) is an international marine research collaboration that explores Earth's history and dynamics using ocean-going research platforms to recover data recorded in seafloor sediments and rocks and to monitor subseafloor environments. IODP depends on facilities funded by three platform providers with financial contributions from five additional partner agencies. Together, these entities represent 26 nations whose scientists are selected to staff IODP research expeditions conducted throughout the world's oceans.

IODP expeditions are developed from hypothesis-driven science proposals aligned with the program's [science plan](#) *Illuminating Earth's Past, Present, and Future*. The science plan identifies 14 challenge questions in the four areas of climate change, deep life, planetary dynamics, and geohazards.

IODP's three platform providers include:

- The U.S. National Science Foundation ([NSF](#))
- Japan's Ministry of Education, Culture, Sports, Science and Technology ([MEXT](#))
- The European Consortium for Ocean Research Drilling ([ECORD](#))

More information on IODP, including the Science Plan and Policies/Procedures, can be found on their website at <http://www.iodp.org/program-documents>.

A summary table with links to IODP datasets currently hosted on Zenodo (<https://zenodo.org/communities/iodp>) can be accessed using the following link: <https://iodp.tamu.edu/database/zenodo.html>

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Funding

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

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