Control point navigation from Rolling Deck to Repository (R2R) from R/V Roger Revelle cruise RR1211 in the Northeast Lau Basin in 2012 (Vent Mn-Fe Microbes project)

Website: https://www.bco-dmo.org/dataset/527777
Version: 09 Sept 2014
Version Date: 2014-09-09

Project
» Understanding microbial manganese-oxidizing communities and physiological mechanisms in metal oxide-rich hydrothermal sediments using a metagenomic and metatranscriptomic approach (Vent Mn-Fe Microbes)

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Table of Contents

Dataset Description

Control point navigation from Rolling Deck to Repository (R2R) for the RR1211 cruise (also called "SRoF-12").

Data Processing Description

BCO-DMO obtained the control point navigation from R2R on 09 September 2014. Original data available from: http://www.rvdata.us/catalog/RR1211

[table of contents | back to top]

Data Files

File
control_pt_nav.csv (Comma Separated Values (.csv), 6.38 KB) MD5:31e7c3c5769715ec32a86f382d529a24 Primary data file for dataset ID 527777

[table of contents | back to top]

Parameters

Parameter	Description	Units
ISO_DateTime_UTC	Date and time formatted to ISO 8601 standard (UTC).	YYYY-mm-ddTHH:MM:SSZ
lat	Latitude.	decimal degrees
lon	Longitude.	decimal degrees

[table of contents | back to top]

Deployments

RR1211

Website	https://www.bco-dmo.org/deployment/527560
Platform	R/V Roger Revelle
Report	http://dmoserv3.whoi.edu/data_docs/Vent_Mn-Fe_Microbes/SRoF12-cruisereport-final.pdf
Start Date	2012-09-09
End Date	2012-09-26
Description	2012 "Submarine Ring of Fire" (SRoF) cruise in the Northeast Lau Basin. More information is available on the NOAA Ocean Explorer website: http://oceanexplorer.noaa.gov/explorations/12fire/welcome.html This cruise is also affiliated with the project, "Understanding microbial manganese-oxidizing communities and physiological mechanisms in metal oxide-rich hydrothermal sediments using a metagenomic and metatranscriptomic approach". Original cruise data are available from the NSF R2R data catalog

[table of contents | back to top]

Project Information

Understanding microbial manganese-oxidizing communities and physiological mechanisms in metal oxide-rich hydrothermal sediments using a metagenomic and metatranscriptomic approach (Vent Mn-Fe Microbes)

Coverage: Northeast Lau Basin

Project description from the NSF award abstract:
Hydrothermal systems are important sources of dissolved Mn to the oceans. Upon oxidation of Mn(II), Mn(III,IV) oxides are deposited at the sea floor as crusts, nodules and sediments both near and far from the sources. Microbial activity has long been recognized as being important to the fate of Mn in these hydrothermal systems, yet we know very little about the organisms that catalyze Mn oxidation, the mechanisms by which Mn is oxidized or the physiological function that Mn oxidation serves. The overarching goals of this project are to reveal the organisms and mechanism(s) underlying Mn(II) oxidation, to evaluate whether hydrothermal Mn oxidizers may obtain energy from Mn oxidation, and test whether thermophilic Mn oxidizers exist. Specifically, the project will: 1) evaluate whether we can identify certain genomic sequences that correlate to the presence/concentration of Mn oxides (and hence Mn(II)- oxidizing bacteria) by comparing the metagenomes of ferromanganese (containing both Mn and Fe oxides) microbial mats with ferruginous (Fe oxide only) mats from Lau Basin and Loihi Seamount; 2) use peptide probes bound to magnetic particles for selectively binding and capturing Mn oxide particles and characterizing the particles using phylogenetic and functional gene (PCR and FISH) and transcriptomic analysis; 3) assess the main pathways of carbon fixation in ferromanganese microbial mats as compared to ferruginous mats as a possible indicator of Mn-based auto/mixotrophy using genomic

approaches and substrate stimulated (e.g., addition of Mn(II)) CO2 fixation measurements and stable isotope probing (SIP) genomic analysis; and 4) isolate and characterize Mn(II)-oxidizing bacteria and determine whether thermophilic Mn oxidizers exist.

The results of this research will increase our understanding of Mn(II) oxidation in hydrothermal sediments, identify microorganisms that are the environmentally relevant Mn oxidizers and begin to address the long standing question of whether Mn auto/mixotrophy exists using approaches not based on the biases associated with cultivation. Ultimately this information is critical to our understanding of biogeochemical cycles (Mn oxidation and Mn oxides impact many other elemental cycles, including carbon, sulfur, and heavy metals) and the natural attenuation of toxic metal and organic compounds; this may lead to improved technologies for environmental remediation. Because Mn oxides are believed to be an analog to the ancestral Mn centers in photosystem II, this research may also lend new insights into ancient biogeochemistry occurring before the Great Oxidation Event.

[table of contents | back to top]