Cruise track from the R/V Atlantis AT15-53 cruise in the Santa Monica Basin during 2009 (Viruses in Methanotrophic Marine Ecosystems project)

Website: https://www.bco-dmo.org/dataset/632992
Version: 19 January 2016
Version Date: 2016-01-19

Project
» Dimensions: The Role of Viruses in Structuring Biodiversity in Methanotrophic Marine Ecosystems (Viruses in Methanotrophic Marine Ecosystems)

Program
» Dimensions of Biodiversity (Dimensions of Biodiversity)

Contributors	Affiliation	Role
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Table of Contents

Dataset Description

AT15-53 Cruise track generated from R2R Archive file
Cruise Id, Date/Time UTC, Lat, Lon, SOG, COG
1 minute fixes

R2R File Creation Date: 2012-04-05T19:43:01Z

Methods & Sampling

Generated from R2R archive file by BCO-DMO staff

Data Processing Description

Generated from R2R archive file by BCO-DMO staff

[table of contents | back to top]

Data Files

File
CruiseTrack.csv (Comma Separated Values (.csv), 1.39 MB) MD5:97de6f890f77d3d0e9ed1d893f37b1d3 Primary data file for dataset ID 632992

[table of contents | back to top]

Parameters

Parameter	Description	Units
CruiseId	Official UNOLS cruise id	text
ISO_DateTime_UTC	ISO formatted UTC Date and Time	YYYY-MM-DDTHH:MM:SSZ
Latitude	Latitude Position (South is negative)	decimal degrees
Longitude	Longitude Position (West is negative)	decimal degrees
SOG	Instantaneous Speed-over-ground	meters/sec
COG	Instantaneous Course-over-ground [deg. clockwise from North]	decimal degrees

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	GPS
Generic Instrument Name	Global Positioning System Receiver
Dataset-specific Description	Navigation Equipment HEALY is outfitted with Sperry Marine's Voyage Management System (VMS). This system utilizes multiple heading, position, environmental, and navigation inputs to steer the ship along a desired course. Currently, HEALY has the following GPS receivers: GPS, DGPS, P-Code GPS, and 3-D GPS. Heading inputs include two gyrocompasses and the 3-D GPS heading information. The ship is also outfitted with an electronic magnetic compass. A Dynamic Positioning System (DPS) is available for station keeping and slow speed transits (towing, dredging). HEALY's DPS attempts to do with props and a bowthruster what smaller ships do with fore and aft thrusters, so it has limitations. It was designed and built by ALSTOM and integrates the use of propellers, rudders, and the bow thruster to accomplish ship movement. DPS Limitations: At best heading in openwater, in a 20 kt wind, seas with a significant wave height of 4.0 feet and a 1 knot currents, HEALY shall be capable of maintaining a position of +/- 150 feet or 3% of water depth (whichever is greater) from a point or trackline and maintain a heading of +/- 5 degrees. The seas and wind shall be from the same direction, with the current from less the 45 degrees off the wind. Antenna Layout Top View PDF
Generic Instrument Description	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

[table of contents | back to top]

Deployments

AT15-53

Website	https://www.bco-dmo.org/deployment/632876
Platform	R/V Atlantis
Start Date	2009-09-13
End Date	2009-09-29

[table of contents | back to top]

Project Information

Dimensions: The Role of Viruses in Structuring Biodiversity in Methanotrophic Marine Ecosystems (Viruses in Methanotrophic Marine Ecosystems)

Marine methanotrophic ecosystems are responsible for consuming around 75 Tg of methane annually, preventing this potent greenhouse gas from entering the atmosphere. These microbial ecosystems thus play a vital role in the global climate system. The nature of these communities depends on the presence or absence of oxygen: methanotrophy is a bacterial lifestyle in aerobic shallow sediments, but in deeper anaerobic sediments it is the exclusive province of archaea, in syntrophy with sulfate-reducing bacteria. It is known which phyla are most commonly found in methanotrophic environments. However, because of these environments' physical inaccessibility and because nearly all microbes from these systems have resisted cultivation, understanding of these communities lags far behind their importance. The cultivation-resistance of microbial hosts from these systems has additionally prevented the use of classical methods to study the viral community. Thus, to date science is largely unable to fill in the broad outlines of marine methanotrophic biodiversity, to fully describe the microbial communities or determine what shapes them.

This project seeks to define the importance of viruses in structuring functional, genetic, and taxonomic diversity in methanotrophic marine ecosystems. The underlying assertion is that viruses structure the diversity of archaeal and bacterial communities in these ecosystems by causing both mortality and horizontal gene transfer. To establish viral contributions to biodiversity of aerobic and anaerobic marine methanotrophic ecosystems, this project combines biogeochemical, genomic, and metagenomic approaches, in both field and laboratory settings.

The project first seeks to assess viral activity in situ by extending established stable isotope probing techniques to quantify rates of viral production at sea floor methane seeps. The same techniques will be used to track the flow of carbon from methane to microbes to viruses and to isolate genetic material from just those organisms that actively cycle methane-derived carbon, enabling the production of microbial and viral metagenomes that are anchored in ecosystem function. Comparisons among these metagenomes will reveal any functional sequences in transit between organisms, providing the basis for an evaluation of the relationships between functional and genetic diversity. At the same time, single-cell whole-genome amplification will pinpoint individual cells for comparison with the microbial and viral assemblages, permitting assessment of the relationships between taxonomic and genetic diversity. Last, the comparison of genomic and metagenomic data both within and across distinctive marine methanotrophic ecosystems will enable analysis of the relationship between functional and taxonomic diversity.

[table of contents | back to top]

Program Information

Dimensions of Biodiversity (Dimensions of Biodiversity)

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503446

Coverage: global

(adapted from the NSF Synopsis of Program)
Dimensions of Biodiversity is a program solicitation from the NSF Directorate for Biological Sciences. FY 2010 was year one of the program. [MORE from NSF]

The NSF Dimensions of Biodiversity program seeks to characterize biodiversity on Earth by using integrative, innovative approaches to fill rapidly the most substantial gaps in our understanding. The program will take a broad view of biodiversity, and in its initial phase will focus on the integration of genetic, taxonomic, and functional dimensions of biodiversity. Project investigators are encouraged to integrate these three dimensions to understand the interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, to understand the roles of biodiversity in critical ecological and evolutionary processes.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1046144

[table of contents | back to top]