

ICoMM Global Protistan Survey (GPS) vent-related samples from R/V Atlantis cruises AT11-04 and AT15-25 in the East Pacific Rise, North Pacific, Guaymas Basin, and Gulf of California from 2003 to 2007 (PROTISTS project)

Website: <https://www.bco-dmo.org/dataset/3412>

Version: 19 January 2011

Version Date: 2011-01-19

Project

» [Protistan Abundance, Diversity and Activity in the Deep-Sea and at Hydrothermal Vents](#) (PROTISTS)

Contributors	Affiliation	Role
Cary, Stephen Craig	University of Delaware	Principal Investigator, Contact
Caron, David	University of Southern California (USC-HIMS)	Co-Principal Investigator
Countway, Peter	Bigelow Laboratory for Ocean Sciences	Co-Principal Investigator
Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

- [Dataset Description](#)
 - [Methods & Sampling](#)
 - [Data Processing Description](#)
- [Data Files](#)
- [Parameters](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

Dataset Description

A list of and metadata for sequences of ICoMM GPS (Global Protistan Survey) Vent-related samples archived in the ICoMM database

These vent-related samples include 3 from off-axis at EPR and one from vent plume water at 2495 m at EPR. They also include 3 samples from the 2007 cruise at Guaymas: control sediment, orange mat, and near-bottom CTD.

[Link to VAMPS Archive at MBL](#)

Follow the instructions below to access the site
login as: user: guest, passwd: guest

In the left panel select: "trimmed fasta sequences"

Select project: "ICM_GPS_Ev9 Global Protist Survey"

Select: "All reads"

Select "Eukarya"

Select: "GPS_0010" (through to GPS_0016) as per the list in the data

You will be able to download thousands of sequence - these are trimmed and Q/C'd sequences.

Methods & Sampling

Collection

Samples were collected from within a deep-sea hydrothermal plume using a standard CTD/Niskin rosette deployed from the R/V Atlantis. Microbial mats growing in warm (above ambient temperature) locations and cold 'control' sediments were sampled directly on the seafloor via DSRV Alvin using 'push core' sampling devices.

Plume sampling was accomplished by 'tow-yo' casting of the CTD/Niskin rosette directly over a hydrothermal vent feature to within approximately 10 m above the seafloor. Anomalies in both temperature and beam transmission signaled a high probability that the sampling device was within a hydrothermal plume at which point the position of R/V Atlantis was fixed and Niskin bottles were fired within the hydrographic feature.

Plume samples were confirmed at the surface by their strong sulfurous odor indicating the presence of reduced sulfur compounds. Sites for core sampling were generally selected where there were sharp gradients between warm hydrothermally-influenced sediments harboring dense microbial mats (largely Beggiatoa) and adjacent cold sediments without overlying microbial mats.

Data Processing Description

Filtration

Water samples were pre-screened through 200 µm Nitex mesh followed by 80 µm Nitex mesh (to reduce microbial metazoa e.g., larval stages, copepods, etc.) directly from Niskin sampling bottles. Microbial biomass in the < 80 µm size-fraction was collected onto GF/F filters at low vacuum pressure (< 10 mm Hg) and stored with 2 ml of lysis buffer (as in Countway et al., 2005) at -80°C until extraction. Sediments were retrieved from the seafloor cores, sectioned on board ship at one centimeter intervals, and stored at -80°C until processing in our home laboratories. Samples from microbial mats were not pre-screened prior to freezing at -80°C.

Molecular processing

High molecular weight DNA was extracted from sediment samples using the MoBio power soil kit (MoBio, Carlsbad, CA, USA). DNA from water samples collected on GF/Fs was extracted using a standard Phenol:Chloroform:Isoamyl alcohol method and precipitated with 95% ethanol. All extracted samples were quantified on a Nanodrop 1000 (University of Delaware) or by fluorometry (University of Southern California) using PicoGreen (Invitrogen). DNA samples for eukaryote 'pyrotag sequencing' were sent to the MBL in Woods Hole, MA for amplification by PCR and subsequent library preparation as described in Amaral-Zettler et al. (2009). Preliminary taxonomic assignments were made for all pyrotag sequences using the 'GAST' approach described in the previous reference.

Amaral-Zettler, L.A., McCliment, E.A., Ducklow, H.W., and Huse, S.M. (2009) A Method for Studying Protistan Diversity Using Massively Parallel Sequencing of V9 Hypervariable Regions of Small-Subunit Ribosomal RNA Genes. PLoS ONE 4: e6372. doi:6310.1371/journal.pone.0006372.

Countway, P.D., Gast, R.J., Savai, P., and Caron, D.A. (2005) Protistan diversity estimates based on 18S rDNA from seawater incubations in the western North Atlantic. Journal of Eukaryotic Microbiology 52: 95-106.

[[table of contents](#) | [back to top](#)]

Data Files

File
Protists.csv (Comma Separated Values (.csv), 997 bytes) MD5:0aa407c4a35c2ef795d059b18ecb258a
Primary data file for dataset ID 3412

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
IcoMM_sample_number	IcoMM sample number	text
ICoMM_Dataset_Name	ICoMM Dataset Name	text
SITE	SITE	text
depth	depth	meters
lon	longitude (West is negative)	decimal degrees
lat	latitude (South is negative)	decimal degrees
Sample_Description	Sample Description	text
total_number_pyrotag_sequences	Total number pyrotag sequences	integer
number_Euk_pyrotags	Number Eukpyro tags	integer

[[table of contents](#) | [back to top](#)]

Deployments

AT11-04

Website	https://www.bco-dmo.org/deployment/58637
Platform	R/V Atlantis
Report	http://www.marine.who.edu/at_synop.nsf/c2546b63c9e7f67985256291004e52e9/4eb3b295d2bbfd7285256db2004fc28f?OpenDocument
Start Date	2003-11-29
End Date	2003-12-21
Description	Collection of Alvinellid worms from characterized habitats. Characterization of the thermal and chemical environments of the Pompeii worm. Discrete collection of young sulfide features from a variety of habitats. Collection of large volumes of water from a variety of vent environments. Large educational/outreach effort - Extreme 2003 - will take place during the leg. Cruise information and original data are available from the NSF R2R data catalog.

AT15-25

Website	https://www.bco-dmo.org/deployment/58638
Platform	R/V Atlantis
Report	http://www.marine.who.edu/at_synop.nsf/c2546b63c9e7f67985256291004e52e9/f1905102d814d37705257328005fc2c5?OpenDocument
Start Date	2007-10-18
End Date	2007-11-08
Description	Our primary research objective, centers on understanding the diversity and distribution of protists associated with hydrothermal vent systems. As primary grazers of the bacteria in marine systems we hope to discover if they play a major role in structuring vent microbial communities. This will entail deploying and recovering many small protist collectors (proto-traps) in and around the vent system both in Guaymas and at 9N. We will also be collecting small water samples associated with each of the units for geochemical analysis. In addition we will be collecting large volumes of water for protist, bacteria and viral studies with our free vehicle system (LVWS) and with the ships CTD. We will also be making discrete collections of Guaymas sediments, bivalves and Alvinellid worms. Cruise information and original data are available from the NSF R2R data catalog.

[[table of contents](#) | [back to top](#)]

Project Information

Protistan Abundance, Diversity and Activity in the Deep-Sea and at Hydrothermal Vents (PROTISTS)

Coverage: East Pacific Rise, N. Pacific, Guaymas Basin, Gulf of California

Protistan assemblages are essential components of food webs in the vast majority of aquatic ecosystems that have been examined to date. Despite the pivotal roles that these organisms play in carbon fixation, energy utilization and elemental cycling in marine ecosystems, little information exists on the presence, abundance and activities of these species in the deep ocean in general, and in particular at and around hydrothermal vents. The latter environments should be particularly conducive to the growth of phagotrophic protists in the deep ocean because biomass is greatly elevated at these sites and organic carbon availability in these regions is largely mediated by archaeal and bacterial assemblages. This research project will address fundamental questions regarding the species diversity, abundances of specific taxa, and trophic activities of protists within the deep ocean including hydrothermal vent areas. Specifically, the PIs will determine whether deep-sea communities harbor endemic assemblages of protists, establish the identity of the protists associated with these environments that are trophically active, and document the protistan taxa that dominate these assemblages in situ. They will examine the diversity of the protistan assemblages in the deep-sea away from the vents and in the overlying water column, and in microenvironments in and around hydrothermal vents and associated with dominant macrofauna of vents. Traditional (microscopy) and molecular biological (18S rDNA) approaches will be used to characterize abundance and diversity. Observations of the ingestion of fluorescently labeled prey will be used to establish trophically active protists in situ. They will also employ 18S rDNA clone libraries, cultures and microscopy-based observations to target specific taxa for the application of fluorescent in situ hybridization (FISH) to link morphological identity to commonly occurring (and trophically active) phylogenotypes. A culture collection of deep-sea protists will be established to further characterize protistan diversity and also to provide specimens for baseline physiological measurements in the laboratory. Growth rates will be examined in the laboratory using cultured protists grown under temperatures, pressures and water chemistries representative of deep-sea environments. Hydrothermal vent research is an excellent vehicle for incorporation into education at all levels ranging from elementary through graduate level. The information resulting from this research will be incorporated into undergraduate and graduate courses by the PIs, and will be featured on the Caron Lab Homepage. The PIs and the postdoctoral investigator supported by this project will participate directly in an ongoing teacher education program (Centers for Ocean Science Education Excellence; COSEE-West) that will reach middle and high school students, most of whom are Hispanic, African-American or other ethnic minorities and most of whom are economically disadvantaged. This will be accomplished through existing teacher enhancement and student enrichment activities that will incorporate this research into a learning experience that will enhance student awareness of environmental science, microbiology and the natural world. This work will be the center feature for the internationally acclaimed Extreme 2000 outreach program for secondary schools which has, over the last 5 years, directly engaged over 180,000 students throughout the US and 9 foreign countries. Contributions from this project will educate the public at every level about the deepsea, and the importance of microbes in forming and maintaining the biosphere.

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0550491

[[table of contents](#) | [back to top](#)]