Cruise track data from ship's underway data acquisition system from R/V Oceanus cruise OC454-02 in the Mediterranean Sea (Pickled Protists project)

Website: https://www.bco-dmo.org/dataset/3401
Version: 23 December 2010
Version Date: 2010-12-23

Project
» Pickled Protists or Community Uniquely Adapted to Hypersalinity? (Pickled Protists)

Contributors	Affiliation	Role
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Dataset Description

The cruise track data set for cruise OC454-02 was extracted from the daily underway .csv files by BCO-DMO using a custom perl script. The original .csv files generated from the R/V Oceanus shipboard underway data acquisition system were retrieved from the standard post-cruise data distribution.

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Data Files

File
cruiseTrack.csv (Comma Separated Values (.csv), 9.22 KB) MD5:01a8207856feceeb9427b7ea64239e0f Primary data file for dataset ID 3401

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Parameters

Parameter	Description	Units
cruise_ID	Cruise_ID	dimensionless
date	date (UTC) as YYYYMMDD	dimensionless
time	time (UTC) as HHMM	dimensionless
latitude	latitude (positive is North)	decimal degrees
longitude	longitude (positive is East)	decimal degrees
seafloor	depth of seafloor from 12 KHz Knudsen	meters

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Instruments

Dataset-specific Instrument Name	Echo sounder - single-beam
Generic Instrument Name	Echo sounder - single-beam
Generic Instrument Description	A single-beam echo sounder is an instrument that measures water depth at a single point below the platform by timing pulses of sound reflected on the seafloor. The echo sounder transmits and receives sound, accurately measuring the time it takes to leave the sounder, reach the bottom and return to the sounder. It then converts this information into digital or graphic representations of the bottom depth and relief. The average echo sounder consists of a transmission and reception unit that sends sound signals through the water, receives and decodes information and converts that information into either a graphic or visual form. Attached to the receiver is a transducer that acts as a microphone and a speaker under the water. Sound waves travel at approximately 1500 m/s through the water dependent on water temperature". more from LMS Technologies

Dataset-specific Instrument Name	Global Positioning System Receiver
Generic Instrument Name	Global Positioning System Receiver
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.

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Deployments

OC454-02

Website	https://www.bco-dmo.org/deployment/58164
Platform	R/V Oceanus
Report	http://data.bco-dmo.org/Protists_2009/OC454-02_cruise_report.pdf
Start Date	2009-07-28
End Date	2009-08-05
Description	This cruise aboard Oceanus from Piraievs, Greece did field work in the Mediterranean Sea for the NSF OCE funded project: "Pickled Protists or Community Uniquely Adapted to Hypersalinity?". The cruise dates are from the Final UNOLS schedule (ID #10808 Version #7 Date: 1/5/2010) and agree with the cruise dates specified in the UNOLS Post-Cruise Assessment Report filed by the Chief Scientist. The cruise dates, 7-25 - 8-05-2009, from the R2R cruise catalog include the previous transit cruise during which no sampling was done for this project. The original science objectives included collection of water column and sediment samples at 3 different hypersaline anoxic basins, L'Atalante, Discovery, and Urania. The plan was to collect Niskin samples and SID samples (a WHOI sampler that carries out in situ fixation) from above the halocline, within the halocline, and within the brine of each basin (3 depths, two types of samples per depth, Niskin and SID). Researchers also planned to collect multicores from the bottom sediments where the halocline impinged on the seafloor, a reference sample from above the halocline, and a sample within the brine (3 depths along a transect through the halocline) from two of the basins. Science activities conducted during the cruise included sampling in two of the three basins, Discovery and Urania Basin: (1) 11 CTD casts to various depths as needed to support sampling objectives as determined by the depth of the halocline (2) Water samples were collected from Niskin bottle from 3 designated depths from two basins (3) SID samples were collected from Discovery Basin, but the SID malfunctioned due to extreme depth before a complete sampling program could be completed in Urania Basin (4) Partially successful deployments of the multicorer at Discovery Basin yielded some multicores from within the brine and above the halocline, but attempts to collect a halocline sample were unsuccessful. A brine sediment sample was successfully collected at Urania Basin, but repeated attempts to collect multicores failed. Multicore sampling was negatively affected by several factors: the tubes failed to close properly, the multicorer didn't fire properly, and researchers had difficulty locating the halocline since neither the multicorer nor the CTD instrument package had a functioning camera system. Although the original cruise plan included sample collection in a third basin (L'Atalante Basin), only two basins were occupied. The cruise plan was adjusted when equipment malfunctions negatively impacted the success of the coring work. The decision was made that co-PI Bernhard should collect some sediment cores from the second basin, Urania Basin, on the last day of the cruise instead of conducting the water column sampling in the third basin. More information is included in the 4 August 2010 Cruise report prepared by K. Kormas, M. Pachiadaki and P. Sigala (cruise report PDF file). Funded by: NSF OCE-0849578 (see abstract from NSF site) Cruise information and original data are available from the NSF R2R data catalog

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Project Information

Pickled Protists or Community Uniquely Adapted to Hypersalinity? (Pickled Protists)

Coverage: Mediterranean Sea

Protists are an essential component of microbial food webs and play a central role in global biogeochemical cycles, and thus are key players in sustaining the healthy functioning of any ecosystem. Over the past few years a rich diversity of protists has been revealed in a range of extreme environments, indicating that the frontiers of eukaryotic life are still being explored. Only recently, one of the most extreme marine environments known to science was discovered in the eastern Mediterranean Sea at a depth of ~3500m, namely deep hypersaline anoxic basins (DHABs). These basins are characterized by extremely high salt concentrations (up to saturation) that have been considered anathema to life. Instead, highly diverse communities of bacteria exist

in the waters of these basins. With the exception of a preliminary study to this proposal that indicated a diverse and active assemblage of protists in the water column along the halocline and below the halocline, these DHABs remain largely unexplored regarding eukaryotic life forms. The sediments of the DHABs have not been explored for protists at all.

The investigators will collect water column and sediment samples on a short cruise to two basins with different brine chemistries. An exciting combination of molecular, cultivation-independent and culture-based approaches will be used to study the microbial communities of two basins. Investigators will use those approaches to determine adaptive strategies of marine protist communities to hypersaline, anoxic environments and the degree of their potential impact on biogeochemical cycling as a result of their predation activities, the degree to which the dominant protists maintain bacterial or archaeal symbionts, and the identity of those symbionts. The original research proposal identified Bannock and Discovery Basins as the field study areas, however the 2009 cruise collected samples at Discovery and Urania Basin. Methods to be employed include RNA-based sequence analysis of diversity based on 18S rDNA genes, statistical analyses of community composition and phylotype richness, geochemical documentation of the water column and sediments using classical and microelectrode approaches, expression profiling using 3'-UTR fragments of mRNAs, sequencing of complete gene transcripts for proteins appearing to confer adaptation to hypersalinity, analysis of the proteome signatures, FISH-SEM to characterize novel extremophiles, CARD-FISH to identify eukaryote prey and putative symbionts, and TEM to assess morphology and endobiont presence in common benthic morphotypes.

Hypersaline environments rank highly in the list of extreme systems that have attracted increasing notice in science as well as by the lay public. For example, considering predictions of increasing temperatures and drought in certain regions of our planet, the number of hypersaline habitats may increase dramatically causing this ecosystem to gain importance on a global scale. Thus, an understanding of the ecosystem in these habitats will help predict future ecosystem functioning due to global change. From a different perspective, revealing the mechanisms of adaptation to high salinity has become a major objective, both for biological science and for potential commercial exploitation of natural products associated with those adaptations.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0849578

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