Particle number depth profiles along a transect from R/V Pelagia 64PE280 in the tropical and subtropical Atlantic from 2007-2008 (Basin-scale Protists project)

Website: https://www.bco-dmo.org/dataset/4077
Data Type: Cruise Results
Version: 1
Version Date: 2013-11-02

Project
» Basin-scale distribution and activity of deep-sea protists in the North Atlantic Ocean (Basin-scale Protists)

Program
» Integrated Marine Biogeochemistry and Ecosystem Research -US (IMBER-US)

Contributors	Affiliation	Role
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Abstract
Particle number depth profiles in (sub)tropical Atlantic transect from Brazil to West Africa, and to Cape Verde Islands.

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Coverage

Spatial Extent: **N**:12.148 **E**:-12.957 **S**:-2.569 **W**:-31.797
Temporal Extent: 2007-12-23 - 2008-01-10

Methods & Sampling

A black and white CCD video camera (Sentec) was mounted on a CTD frame which also held Niskin sample bottles, conductivity, temperature and oxygen probes and an optical backscatter sensor (Seapoint turbidity meter). The camera and digital video recorder were housed in a stainless steel cylinder with a 2.54 cm thick sapphire window as the optical port. Two high intensity LED lights were mounted in separate housings at approximately 45 degree angles at each side of the camera. The camera gain was set so that gelatinous zooplankton and the gelatinous matrix of marine snow particles were detectable but more opaque particles such as hard-bodied copepods were slightly overexposed. At a shutter speed of 1/1000 s, the camera recorded sharp images of particles at descent speeds of 1- 1.5 m s-1. The customized image analysis program (modified Avidemux on Ubuntu-Linux) was set to record particles larger than 6 contiguous pixels, which sets the lowest detectable particle sizes at approximately 500 microns. Absolute particle numbers per

volume cannot be determined with this video setup. Because of interference from ambient light, particles could in most cases only be enumerated below the euphotic zone.

Data Processing Description

A moving average with an unweighted 100 m window served as a low-pass filter for the particle data before they were matched with depths.

Related files and references:

Context data for this cruise are stored on the Centralized Oceanographic Data Information System (CODIS) of the Data Management Group at the Netherlands Institute of Sea Research (www.nioz.nl/portals-en). Cruise number: 64PE280.

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Data Files

File
particle_count.csv (Comma Separated Values (.csv), 5.11 MB) MD5:472a3e0b7ceae8823eb7fdeb2f20c17e Primary data file for dataset ID 4077

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Parameters

Parameter	Description	Units
cruise_id	cruise identification	unitless
date	date in the format YYYYMMDD	UTC
sta	station number	unitless
lat_sta	latitude; north is positive	decimal degrees
lon_sta	longitude; east is postive	decimal degrees
distance	distance from station 8	nautical miles
depth	corrected depth	meters
count	moving average of particle numbers per frame of video equal to or exceeding 6 pixels in size	particles
cruise_name	alternate cruise name	unitless

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Instruments

Dataset-specific Instrument Name	Camera
Generic Instrument Name	Camera
Dataset-specific Description	A black and white CCD video camera (Sentec) was mounted on a CTD frame which also held Niskin sample bottles, conductivity, temperature and oxygen probes and an optical backscatter sensor (Seapoint turbidity meter). The camera and digital video recorder were housed in a stainless steel cylinder with a 2.54 cm thick sapphire window as the optical port. Two high intensity LED lights were mounted in separate housings at approximately 45 degree angles at each side of the camera. The camera gain was set so that gelatinous zooplankton and the gelatinous matrix of marine snow particles were detectable but more opaque particles such as hard-bodied copepods were slightly overexposed. At a shutter speed of 1/1000 s, the camera recorded sharp images of particles at descent speeds of 1- 1.5 m s-1.
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

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Deployments

64PE280

Website	https://www.bco-dmo.org/deployment/59113
Platform	R/V Pelagia
Report	http://melia.nioz.nl/phptoweb/dmg/melia-codis.php?script=search/bycruise.inc
Start Date	2007-12-19
End Date	2008-01-16
Description	Transect over the subtropical and tropical Atlantic from Brazil to West Africa, and to Cape Verde Islands. The RVPelagia operates out of the Royal Netherlands of Sea Research (NIOZ)

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Project Information

Basin-scale distribution and activity of deep-sea protists in the North Atlantic Ocean (Basin-scale Protists)

Coverage: Tropical and subtropical Atlantic

ABSTRACT

Little is known about the distribution and ecology of eukaryotic microbes of the deep sea water column. Most of these microbes are small heterotrophic flagellates that feed on bacteria, where biomass in turn is fueled by the input of dissolved and particulate organic material from the surface. This study seeks to understand the distribution of eukaryotic microbes (i.e., protists) in the context of large, basin scale variations in hydrographic and chemical properties. The main hypothesis is that the abundance and taxonomic composition of protists serve as sensitive indicators of the strength and type (particulate or dissolved) of input of organic carbon into the deep ocean system. Samples in vertical profiles targeting major water masses across the North Atlantic will be collected. In addition, deep sea samples will be retrieved under pressure and incubated at in situ pressure and temperature in four newly designed chemostat systems. These cultures will be sub-sampled under pressure and examined for nutrient concentration, as well as for the purpose of monitoring the abundance of both prokaryotes and protists in the chambers. Using the same pressure samplers in short-term incubations, the investigators will explore the activity of deep sea protists by investigating the proportion of actively feeding organisms on fluorescently labeled bacteria. They will enumerate deep sea protists using a combination of fluorescence in situ hybridization and traditional staining methods, and will support taxonomic classifications using electron microscopy. Semi-automated epifluorescence microscopy with image analysis capabilities will be used to scan major filter areas and probe for rare microbes that normally fall below detection limits of other methods. In laboratory experiments, the investigators will use the newly built culture system to study pressure effects of eukaryotic protists while simulating temperature and pressure changes that sinking particles are exposed to when they sink to the abyss.

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Program Information

Integrated Marine Biogeochemistry and Ecosystem Research -US (IMBER-US)

Website: http://www.imber.info/

Coverage: global

The BCO-DMO database includes data from IMBER endorsed projects lead by US funded investigators. There is no dedicated US IMBER project or data management office. Those functions are provided by US-OCB and BCO-DMO respectively.

The information in this program description pertains to the Internationally coordinated IMBER research program. The projects contributing data to the BCO-DMO database are those funded by US NSF only. The full IMBER data catalog is hosted at the Global Change Master Directory (GCMD).

IMBER Data Portal: The IMBER project has chosen to create a metadata portal hosted by the NASA's Global Change Master Directory (GCMD). The GCMD IMBER data catalog provides an overview of all IMBER endorsed and related projects and links to datasets, and can be found at URL http://gcmd.nasa.gov/portals/imber/.

IMBER research will seek to identify the mechanisms by which marine life influences marine biogeochemical cycles, and how these, in turn, influence marine ecosystems. Central to the IMBER goal is the development of a predictive understanding of how marine biogeochemical cycles and ecosystems respond to complex forcings, such as large-scale climatic variations, changing physical dynamics, carbon cycle chemistry and nutrient fluxes, and the impacts of marine harvesting. Changes in marine biogeochemical cycles and ecosystems due to global change will also have consequences for the broader Earth System. An even greater challenge will be drawing together the natural and social science communities to study some of the key impacts and feedbacks between the marine and human systems.

To address the IMBER goal, four scientific themes, each including several issues, have been identified for the IMBER project: Theme 1 - Interactions between Biogeochemical Cycles and Marine Food Webs; Theme 2 - Sensitivity to Global Change: How will key marine biogeochemical cycles, ecosystems and their interactions, respond to global change?; Theme 3 - Feedback to the Earth System: What are the roles of the ocean biogeochemistry and ecosystems in regulating climate?; and Theme 4 - Responses of Society: What are the relationships between marine biogeochemical cycles, ecosystems, and the human system?

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0826659
NSF Division of Ocean Sciences (NSF OCE)	OCE-1235169

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