Mesopelagic microplankton abundances and carbon biomass from R/V Thomas G. Thompson TT043, TT045, TT050, TT054 cruises in the Arabian Sea in 1995 (U.S. JGOFS Arabian Sea project)

Website: https://www.bco-dmo.org/dataset/2954
Version: July 21, 2004
Version Date: 2004-07-21

Project
» U.S. JGOFS Arabian Sea (Arabian Sea)

Program
» U.S. Joint Global Ocean Flux Study (U.S. JGOFS)

Contributors	Affiliation	Role
Gowing, Marcia	University of California-Santa Cruz (UCSC)	Principal Investigator
Garrison, David L.	University of California-Santa Cruz (UCSC)	Co-Principal Investigator
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Dataset Description

Mesopelagic microplankton abundances and carbon biomass

Methods & Sampling

See Platform deployments for cruise specific documentation

Data Processing Description

PI: David Garrison and Marcia Gowing
dataset: Mesopelagic microplankton abundance and carbon biomass
project/cruise: Arabian Sea/TTN-050 - Process Cruise 5
ship: Thomas Thompson

Mesopelagic microplankton Methodology: 11 August 2004

Water samples were collected from 250 to 1000 or 1100 m depth. On cruises

TTN043 and TTN045 aliquots totaling 4-9 liters per depth were taken from two 10 liter Niskin bottles. On cruises TTN050 and TTN054, entire contents (42-59 liters) of six 10 liter Niskin bottles per depth were used. Organisms were then concentrated within ~ 225 ml by the reverse filtration technique (Dodson and Thomas 1978) with 20 micrometer pore sized NitexTM mesh. Concentrated samples were measured and preserved in glass jars with a solution of 20% paraformaldehyde in 5% sodium borate to give a final concentration of 2% paraformaldehyde. Entire samples were settled in the dark at 4 degrees °C in chambers to which a drop of a 1 mg per ml aqueous solution of DAPI (Coleman 1980) had been added. Entire chambers were examined at 150X using an epifluorescence microscope and a combination of tungsten and UV light. Microplankton (predominantly organisms 20-200 micrometers but sometimes larger) with a stained nucleus were counted and measured. Biomass was estimated by converting cell volumes to carbon using conversion factors for the various groups as described by Gowing et al. (2003).

References:

Coleman, A.W. 1980. Enhances staining of bacteria in natural environments by

fluorochrome staining of DNA. Limnol. Oceanogr. 25:948-951.

Dodson, A.N., W.H. Thomas. 1978. Reverse filtration. In: Sournia, A. (ed),

Phytoplankton Manual. UNESCO, Paris, pp. 104-122.

Gowing, M.M., D.L. Garrison, K.F. Wishner, C. Gelfman. 2003. Mesopelagic

microplankton of the Arabian Sea. Deep-Sea Res. I. 50:1205-1234.

PI note regarding multi-bottle sampling

Note: _gt20 in the parameter names indicates organisms predominantly

20-200 micrometers but sometimes larger in size.

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Parameters

Parameter	Description	Units
event	event number from event log	MMDDHHmm
sta_std	Arabian Sea standard station identifier	
sta	station number from event log	
cast	CTD cast number	
cast_type	CTD=CTD rosette; TM=TM rosette	
bot	CTD bottle number	
depth_n	nominal depth	meters
naup_gt20	Nauplius abundance; greater than 20 microns	organisms/liter
naup_gt20_C	Nauplius biomass; greater than 20 microns	nanograms/liter
sarc_gt20	Sarcodine abundance; greater than 20 microns	cells/liter
sarc_gt20_C	Sarcodine biomass; greater than 20 microns	nanograms/liter
ciliates_gt20	Ciliate abundance (loricate plus aloricate); greater than 20 microns	cells/liter
ciliates_gt20_C	Ciliate biomass (loricate plus aloricate); greater than 20 microns	nanograms/liter
dino_het_gt20	Heterotrophic dinoflagellate abundance; greater than 20 microns	cells/liter
dino_het_gt20_C	Heterotrophic dinoflagellate biomass; greater than 20 microns	nanograms/liter
dino_auto_gt20	Autotrophic dinoflagellate abundance; greater than 20 microns	cells/liter
dino_auto_gt20_C	Autotrophic dinoflagellate biomass; greater than 20 microns	nanograms/liter
diatom_gt20	Diatom abundance; greater than 20 microns	cells/liter
diatom_gt20_C	Diatom biomass; greater than 20 microns	nanograms/liter
proto_unid	Unidentified protozoan abundance	cells/liter
proto_unid_C	Unidentified protozoan biomass	nanograms/liter

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Instruments

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Niskin bottles on the CTD Rosette
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

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Deployments

TT050

Website	https://www.bco-dmo.org/deployment/57711
Platform	R/V Thomas G. Thompson
Start Date	1995-08-18
End Date	1995-09-15
Description	**Methods & Sampling** PI: David Garrison and Marcia Gowing of:, University of California, Santa Cruz dataset: Mesopelagic microplankton abundance and carbon biomass dates: January 12, 1995 to January 29, 1995 location: N: 19.1021 S: 10.0025 W: 58.0247 E: 68.7495 project/cruise: Arabian Sea/TTN-050 - Process Cruise 5, Late SW Monsoon ship: Thomas Thompson **Processing Description** PI: David Garrison and Marcia Gowing dataset: Mesopelagic microplankton abundance and carbon biomass project/cruise: Arabian Sea/TTN-050 - Process Cruise 5 ship: Thomas Thompson Mesopelagic microplankton Methodology: 11 August 2004 Water samples were collected from 250 to 1000 or 1100 m depth. On cruises TTN043 and TTN045 aliquots totaling 4-9 liters per depth were taken from two 10 liter Niskin bottles. On cruises TTN050 and TTN054, entire contents (42-59 liters) of six 10 liter Niskin bottles per depth were used. Organisms were then concentrated within ~ 225 ml by the reverse filtration technique (Dodson and Thomas 1978) with 20 micrometer pore sized NitexTM mesh. Concentrated samples were measured and preserved in glass jars with a solution of 20% paraformaldehyde in 5% sodium borate to give a final concentration of 2% paraformaldehyde. Entire samples were settled in the dark at 4 degrees °C in chambers to which a drop of a 1 mg per ml aqueous solution of DAPI (Coleman 1980) had been added. Entire chambers were examined at 150X using an epifluorescence microscope and a combination of tungsten and UV light. Microplankton (predominantly organisms 20-200 micrometers but sometimes larger) with a stained nucleus were counted and measured. Biomass was estimated by converting cell volumes to carbon using conversion factors for the various groups as described by Gowing et al. (2003). References: Coleman, A.W. 1980. Enhances staining of bacteria in natural environments by fluorochrome staining of DNA. Limnol. Oceanogr. 25:948-951. Dodson, A.N., W.H. Thomas. 1978. Reverse filtration. In: Sournia, A. (ed), Phytoplankton Manual. UNESCO, Paris, pp. 104-122. Gowing, M.M., D.L. Garrison, K.F. Wishner, C. Gelfman. 2003. Mesopelagic microplankton of the Arabian Sea. Deep-Sea Res. I. 50:1205-1234. PI note regarding multi-bottle sampling Note: _gt20 in the parameter names indicates organisms predominantly 20-200 micrometers but sometimes larger in size.

TT054

Website	https://www.bco-dmo.org/deployment/57715
Platform	R/V Thomas G. Thompson
Start Date	1995-11-30
End Date	1995-12-28
Description	**Methods & Sampling** PI: David Garrison and Marcia Gowing of:, University of California, Santa Cruz dataset: Mesopelagic microplankton abundance and carbon biomass dates: January 12, 1995 to January 29, 1995 location: N: 19.1021 S: 10.0025 W: 58.0247 E: 68.7495 project/cruise: Arabian Sea/TTN-054 - Process Cruise 7, Early NE Monsoon ship: Thomas Thompson **Processing Description** PI: David Garrison and Marcia Gowing dataset: Mesopelagic microplankton abundance and carbon biomass project/cruise: Arabian Sea/TTN-054 - Process Cruise 7 ship: Thomas Thompson Mesopelagic microplankton Methodology: 11 August 2004 Water samples were collected from 250 to 1000 or 1100 m depth. On cruises TTN043 and TTN045 aliquots totaling 4-9 liters per depth were taken from two 10 liter Niskin bottles. On cruises TTN050 and TTN054, entire contents (42-59 liters) of six 10 liter Niskin bottles per depth were used. Organisms were then concentrated within ~ 225 ml by the reverse filtration technique (Dodson and Thomas 1978) with 20 micrometer pore sized NitexTM mesh. Concentrated samples were measured and preserved in glass jars with a solution of 20% paraformaldehyde in 5% sodium borate to give a final concentration of 2% paraformaldehyde. Entire samples were settled in the dark at 4 degrees °C in chambers to which a drop of a 1 mg per ml aqueous solution of DAPI (Coleman 1980) had been added. Entire chambers were examined at 150X using an epifluorescence microscope and a combination of tungsten and UV light. Microplankton (predominantly organisms 20-200 micrometers but sometimes larger) with a stained nucleus were counted and measured. Biomass was estimated by converting cell volumes to carbon using conversion factors for the various groups as described by Gowing et al. (2003). References: Coleman, A.W. 1980. Enhances staining of bacteria in natural environments by fluorochrome staining of DNA. Limnol. Oceanogr. 25:948-951. Dodson, A.N., W.H. Thomas. 1978. Reverse filtration. In: Sournia, A. (ed), Phytoplankton Manual. UNESCO, Paris, pp. 104-122. Gowing, M.M., D.L. Garrison, K.F. Wishner, C. Gelfman. 2003. Mesopelagic microplankton of the Arabian Sea. Deep-Sea Res. I. 50:1205-1234. PI note regarding multi-bottle sampling Note: _gt20 in the parameter names indicates organisms predominantly 20-200 micrometers but sometimes larger in size.

TT043

Website	https://www.bco-dmo.org/deployment/57704
Platform	R/V Thomas G. Thompson
Report	http://osprey.bcodmo.org/datasetDeployment.cfm?ddid=2580&did=353&flag=view
Start Date	1995-01-08
End Date	1995-02-05
Description	Purpose: Process Cruise #1 (Late NE Monsoon) **Methods & Sampling** PI: David Garrison and Marcia Gowing of:, University of California, Santa Cruz dataset: Mesopelagic microplankton abundance and carbon biomass dates: January 12, 1995 to January 29, 1995 location: N: 19.1021 S: 10.0025 W: 58.0247 E: 68.7495 project/cruise: Arabian Sea/TTN-043 - Process Cruise 1, Winter monsoon ship: Thomas Thompson **Processing Description** PI: David Garrison and Marcia Gowing dataset: Mesopelagic microplankton abundance and carbon biomass project/cruise: Arabian Sea/TTN-043 - Process Cruise 1 ship: Thomas Thompson Mesopelagic microplankton Methodology: 11 August 2004 Water samples were collected from 250 to 1000 or 1100 m depth. On cruises TTN043 and TTN045 aliquots totaling 4-9 liters per depth were taken from two 10 liter Niskin bottles. On cruises TTN050 and TTN054, entire contents (42-59 liters) of six 10 liter Niskin bottles per depth were used. Organisms were then concentrated within ~ 225 ml by the reverse filtration technique (Dodson and Thomas 1978) with 20 micrometer pore sized NitexTM mesh. Concentrated samples were measured and preserved in glass jars with a solution of 20% paraformaldehyde in 5% sodium borate to give a final concentration of 2% paraformaldehyde. Entire samples were settled in the dark at 4 degrees °C in chambers to which a drop of a 1 mg per ml aqueous solution of DAPI (Coleman 1980) had been added. Entire chambers were examined at 150X using an epifluorescence microscope and a combination of tungsten and UV light. Microplankton (predominantly organisms 20-200 micrometers but sometimes larger) with a stained nucleus were counted and measured. Biomass was estimated by converting cell volumes to carbon using conversion factors for the various groups as described by Gowing et al. (2003). References: Coleman, A.W. 1980. Enhances staining of bacteria in natural environments by fluorochrome staining of DNA. Limnol. Oceanogr. 25:948-951. Dodson, A.N., W.H. Thomas. 1978. Reverse filtration. In: Sournia, A. (ed), Phytoplankton Manual. UNESCO, Paris, pp. 104-122. Gowing, M.M., D.L. Garrison, K.F. Wishner, C. Gelfman. 2003. Mesopelagic microplankton of the Arabian Sea. Deep-Sea Res. I. 50:1205-1234. PI note regarding multi-bottle sampling Note: _gt20 in the parameter names indicates organisms predominantly 20-200 micrometers but sometimes larger in size.

TT045

Website	https://www.bco-dmo.org/deployment/57706
Platform	R/V Thomas G. Thompson
Start Date	1995-03-14
End Date	1995-04-10
Description	**Methods & Sampling** PI: David Garrison and Marcia Gowing of:, University of California, Santa Cruz dataset: Mesopelagic microplankton abundance and carbon biomass dates: January 12, 1995 to January 29, 1995 location: N: 19.1021 S: 10.0025 W: 58.0247 E: 68.7495 project/cruise: Arabian Sea/TTN-045 - Process Cruise 2, Spring Intermonsoon ship: Thomas Thompson **Processing Description** PI: David Garrison and Marcia Gowing dataset: Mesopelagic microplankton abundance and carbon biomass project/cruise: Arabian Sea/TTN-045 - Process Cruise 2 ship: Thomas Thompson Mesopelagic microplankton Methodology: 11 August 2004 Water samples were collected from 250 to 1000 or 1100 m depth. On cruises TTN043 and TTN045 aliquots totaling 4-9 liters per depth were taken from two 10 liter Niskin bottles. On cruises TTN050 and TTN054, entire contents (42-59 liters) of six 10 liter Niskin bottles per depth were used. Organisms were then concentrated within ~ 225 ml by the reverse filtration technique (Dodson and Thomas 1978) with 20 micrometer pore sized NitexTM mesh. Concentrated samples were measured and preserved in glass jars with a solution of 20% paraformaldehyde in 5% sodium borate to give a final concentration of 2% paraformaldehyde. Entire samples were settled in the dark at 4 degrees °C in chambers to which a drop of a 1 mg per ml aqueous solution of DAPI (Coleman 1980) had been added. Entire chambers were examined at 150X using an epifluorescence microscope and a combination of tungsten and UV light. Microplankton (predominantly organisms 20-200 micrometers but sometimes larger) with a stained nucleus were counted and measured. Biomass was estimated by converting cell volumes to carbon using conversion factors for the various groups as described by Gowing et al. (2003). References: Coleman, A.W. 1980. Enhances staining of bacteria in natural environments by fluorochrome staining of DNA. Limnol. Oceanogr. 25:948-951. Dodson, A.N., W.H. Thomas. 1978. Reverse filtration. In: Sournia, A. (ed), Phytoplankton Manual. UNESCO, Paris, pp. 104-122. Gowing, M.M., D.L. Garrison, K.F. Wishner, C. Gelfman. 2003. Mesopelagic microplankton of the Arabian Sea. Deep-Sea Res. I. 50:1205-1234. PI note regarding multi-bottle sampling Note: _gt20 in the parameter names indicates organisms predominantly 20-200 micrometers but sometimes larger in size.

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Project Information

U.S. JGOFS Arabian Sea (Arabian Sea)

Website: http://usjgofs.whoi.edu/research/arabian.html

Coverage: Arabian Sea

The U.S. Arabian Sea Expedition which began in September 1994 and ended in January 1996, had three major components: a U.S. JGOFS Process Study, supported by the National Science Foundation (NSF); Forced Upper Ocean Dynamics, an Office of Naval Research (ONR) initiative; and shipboard and aircraft measurements supported by the National Aeronautics and Space Administration (NASA). The Expedition consisted of 17 cruises aboard the R/V Thomas Thompson, year-long moored deployments of five instrumented surface buoys and five sediment-trap arrays, aircraft overflights and satellite observations. Of the seventeen ship cruises, six were allocated to repeat process survey cruises, four to SeaSoar mapping cruises, six to mooring and benthic work, and a single calibration cruise which was essentially conducted in transit to the Arabian Sea.

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Program Information

U.S. Joint Global Ocean Flux Study (U.S. JGOFS)

Website: http://usjgofs.whoi.edu/

Coverage: Global

The United States Joint Global Ocean Flux Study was a national component of international JGOFS and an integral part of global climate change research.

The U.S. launched the Joint Global Ocean Flux Study (JGOFS) in the late 1980s to study the ocean carbon cycle. An ambitious goal was set to understand the controls on the concentrations and fluxes of carbon and associated nutrients in the ocean. A new field of ocean biogeochemistry emerged with an emphasis on quality measurements of carbon system parameters and interdisciplinary field studies of the biological, chemical and physical process which control the ocean carbon cycle. As we studied ocean biogeochemistry, we learned that our simple views of carbon uptake and transport were severely limited, and a new "wave" of ocean science was born. U.S. JGOFS has been supported primarily by the U.S. National Science Foundation in collaboration with the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, the Department of Energy and the Office of Naval Research. U.S. JGOFS, ended in 2005 with the conclusion of the Synthesis and Modeling Project (SMP).

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