Particulate C, N and carbohydrates from floating sediment traps from cruises TT007, TT011 in the Equatorial Pacific in 1992 during the U.S. JGOFS Equatorial Pacific (EqPac) project

Website: https://www.bco-dmo.org/dataset/2639
Version: June, 1996
Version Date: 1996-06-01

Project
» U.S. JGOFS Equatorial Pacific (EqPac)

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

Contributors	Affiliation	Role
Hedges, John	University of Washington (UW)	Principal Investigator
Lee, Cindy	Stony Brook University (SUNY Stony Brook)	Co-Principal Investigator
Wakeham, Stuart	Skidaway Institute of Oceanography (SkIO)	Co-Principal Investigator
Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

Particulate C, N and carbohydrates from floating sediment traps

Methods & Sampling

See Platform deployments for cruise specific documentation

Data Processing Description

1. Analyses: Particle and sediment samples will be analyzed for a wide range of major biochemical properties: 1) lipids by extraction, fractionation, and gas chromatography and gas chromatography/mass spectrometry (Wakeham); 2) amino acids by hydrolysis and HPLC analysis of OPA fluorescent derivatives (Lee); 3) aldoses and cyclitols by acid hydrolysis and GC and GC/MS analysis of peracetate or TMS derivatives (Hedges); 4) elemental composition by CHN analysis (Hedges). We plan to provide aliquots of particle and trap samples to J. K. B. Bishop (elemental composition), J. R. Murray/J. Newton (pigments, elemental composition, radionuclides), and R. Bidigare (isotopic composition of pigments) if sample sizes are adequate.
2. QA/QC: An intercomparison of elemental compositions of samples will be made with other EqPac investigators. We also intend to archive large amounts of sediment for eventual use as organic geochemical ``reference materials." However, because the molecular organic measurements to be carried

out by our groups are practiced in a limited number of laboratories worldwide and because standard reference materials are not available, the corresponding QC strategies must be individualistic at this point pending the development of protocols and reference materials as suggested by the recent FRECLES Workshop.

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Data Files

File	
carbFST_TT007.csv	(Comma Separated Values (.csv), 1.00 KB) MD5:8a3cebe888e1b69c31d451335866c77a
version June, 1996 Peter Hernes (Hedges/Lee/Wakeham) Particulate C, N and carbohydrates from floating sediment traps along 140 West Equatorial Pacific, Thomas Thompson cruise TT007	
carbFST_TT011.csv	(Comma Separated Values (.csv), 1.04 KB) MD5:a0520723428b1e56cc68bea506d7a3a9
version June, 1996 Peter Hernes (Hedges/Lee/Wakeham) Particulate C, N and carbohydrates from floating sediment traps along 140 West Equatorial Pacific, Thomas Thompson cruise TT011	

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Parameters

Parameter	Description	Units
sta	station number from event log	
lat_n	nominal latitude of mooring in whole degrees (negative = south)	degrees
lon_n	nominal longitude of mooring in whole degrees (negative = west)	degrees
event	event/operation number from event log	
depth_t	depth of trap	meters
pm_f	total particulate mass flux; amount of sinking particulate matter passing through a depth level in the water column	mg/m^2/day
POC	organic carbon in total particulates determined by aqueous acidification (salt-corrected wt.)	weight percent
N_p_tot	total nitrogen in total particulates salt-corrected wt.)	weight percent

PIC	inorganic carbon in total determined by deducting POC from total particulate carbon (salt-corrected)	particulates
lyxose	lyxose monomer of total carbohydrates	weight percent
arabinose	arabinose monomer of total carbohydrates	weight percent
rhamnose	rhamnose monomer of total carbohydrates	weight percent
ribose	ribose monomer of total carbohydrates	weight percent
xylose	xylose monomer of total carbohydrates	weight percent
fucose	fucose monomer of total carbohydrates	weight percent
mannose	mannose monomer of total carbohydrates	weight percent
galactose	galactose monomer of total carbohydrates	weight percent
glucose	glucose monomer of total carbohydrates	weight percent
carb_tot_POC_ratio	weight ratio of mg total carbohydrates per 100mg organic carbon in particulate matter	mg per 100mg

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Instruments

Dataset-specific Instrument Name	Floating Sediment Trap
Generic Instrument Name	Sediment Trap - Floating
Generic Instrument Description	Floating sediment traps are specially designed sampling devices deployed to float in the water column (as opposed to being secured to a mooring at a fixed depth) for periods of time to collect particles from the water column that are falling toward the sea floor. In general a sediment trap has a container at the bottom to collect the sample and a broad funnel-shaped opening at the top with baffles to keep out very large objects and help prevent the funnel from clogging. The 'Sediment Trap -Floating' designation is used for a floating type of sediment trap about which no other design details are known.

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Deployments

TT007

Website	https://www.bco-dmo.org/deployment/57728
Platform	R/V Thomas G. Thompson
Start Date	1992-01-30
End Date	1992-03-13
Description	Purpose: Spring Survey Cruise; 12°N-12°S at 140°W TT007 was one of five cruises conducted in 1992 in support of the U.S. Equatorial Pacific (EqPac) Process Study. The five EqPac cruises aboard R/V Thomas G. Thompson included two repeat meridional sections (12°N - 12°S), 2 equatorial surveys, and a benthic survey (all at 140° W). The scientific objectives of this study were to observe the processes in the Equatorial Pacific controlling the fluxes of carbon and related elements between the atmosphere, euphotic zone, and deep ocean. As luck would have it, the survey window coincided with an El Nino event. A bonus for the research team. **Methods & Sampling** PI: John Hedges (Hedges/Lee/Wakeham) dataset: Particulate C, N and carbohydrates from floating sediment traps dates: February 04, 1992 to March 07, 1992 location: N: 11.9988 S: -12.0082 W: -140.0418 E: -134.9867 project/cruise: EQPAC/TT007 - Spring Survey ship: Thomas Thompson Sampling Protocols References: Sediment Trap Technology and Sampling in Surface Waters by Wilford Gardner (Texas A&M University), a report on the use of sediment traps in upper 200m of the water column originally written as minutes for the meeting on the subject at the First International JGOFS Symposium held in Villefranche-sur-Mer, France in May, 1995. Gardner, W. D., 2000. Sediment Trap Technology and Sampling in Surface Waters In: Hanson, R. B., Ducklow, H.W., and Field, J.G., The Changing Ocean Carbon Cycle: A midterm synthesis of the Joint Global Ocean Flux Study. pp 240-281. Cambridge University Press, U.S. JGOFS Contribution No. 362. A variety of particle samples will be collected in the water column, including: 1) large volume in-situ filtration samples in surface waters near the chlorophyll maximum at each survey station (coordinated with J. K. B. Bishop), 2) particulate matter sinking out of the euphotic zone (100 m depth) collected by floating sediment traps (coordinated with J. W. Murray and J. Newton), and 3) particles collected in moored sediment traps at about 1,000 m below the sea surface and 1,000 m off the bottom (coordinated with S. Honjo and J. Dymond). The large-volume filtration samples and floating sediment trap samples will be collected on both survey cruises, while the moored trap samples will be collected at stations located at 9ï¿½ and 5ï¿½N and at the equator (coordinated with M. Leinen). Bottom sediments will be collected from box cores at all sites of the benthic cruise. Depending on time available, we also hope to obtain vertical profiles of size-fractionated large-volume filtration samples at the three moored-trap sites (with J. K. B. Bishop). **Processing Description** Particle and sediment samples will be analyzed for a wide range of major biochemical properties: 1) lipids by extraction, fractionation, and gas chromatography and gas chromatography/mass spectrometry (Wakeham); 2) amino acids by hydrolysis and HPLC analysis of OPA fluorescent derivatives (Lee); 3) aldoses and cyclitols by acid hydrolysis and GC and GC/MS analysis of peracetate or TMS derivatives (Hedges); 4) elemental composition by CHN analysis (Hedges). We plan to provide aliquots of particle and trap samples to J. K. B. Bishop (elemental composition), J. R. Murray/J. Newton (pigments, elemental composition, radionuclides), and R. Bidigare (isotopic composition of pigments) if sample sizes are adequate.

TT011

Website	https://www.bco-dmo.org/deployment/57730
Platform	R/V Thomas G. Thompson
Start Date	1992-08-05
End Date	1992-09-18
Description	Purpose: Fall Survey; 12°N-12°S at 140°W TT011 was one of five cruises conducted in 1992 in support of the U.S. Equatorial Pacific (EqPac) Process Study. The five EqPac cruises aboard R/V Thomas G. Thompson included two repeat meridional sections (12°N - 12°S), 2 equatorial surveys, and a benthic survey (all at 140° W). The scientific objectives of this study were to observe the processes in the Equatorial Pacific controlling the fluxes of carbon and related elements between the atmosphere, euphotic zone, and deep ocean. As luck would have it, the survey window coincided with an El Nino event. A bonus for the research team. **Methods & Sampling** PI: John Hedges (Hedges/Lee/Wakeham) dataset: Particulate C, N and carbohydrates from floating sediment traps dates: August 10, 1992 to September 12, 1992 location: N: 12.0133 S: -12.0016 W: -140.0498 E: -134.9744 project/cruise: EQPAC/TT011 - Fall Survey ship: Thomas Thompson Sampling Protocols References: Sediment Trap Technology and Sampling in Surface Waters by Wilford Gardner (Texas A&M University), a report on the use of sediment traps in upper 200m of the water column originally written as minutes for the meeting on the subject at the First International JGOFS Symposium held in Villefranche-sur-Mer, France in May, 1995. Gardner, W. D., 2000. Sediment Trap Technology and Sampling in Surface Waters In: Hanson, R. B., Ducklow, H.W., and Field, J.G., The Changing Ocean Carbon Cycle: A midterm synthesis of the Joint Global Ocean Flux Study. pp 240-281. Cambridge University Press, U.S. JGOFS Contribution No. 362. A variety of particle samples will be collected in the water column, including: 1) large volume in-situ filtration samples in surface waters near the chlorophyll maximum at each survey station (coordinated with J. K. B. Bishop), 2) particulate matter sinking out of the euphotic zone (100 m depth) collected by floating sediment traps (coordinated with J. W. Murray and J. Newton), and 3) particles collected in moored sediment traps at about 1,000 m below the sea surface and 1,000 m off the bottom (coordinated with S. Honjo and J. Dymond). The large-volume filtration samples and floating sediment trap samples will be collected on both survey cruises, while the moored trap samples will be collected at stations located at 9ï¿½ and 5ï¿½N and at the equator (coordinated with M. Leinen). Bottom sediments will be collected from box cores at all sites of the benthic cruise. Depending on time available, we also hope to obtain vertical profiles of size-fractionated large-volume filtration samples at the three moored-trap sites (with J. K. B. Bishop). **Processing Description** Analyses: Particle and sediment samples will be analyzed for a wide range of major biochemical properties: 1) lipids by extraction, fractionation, and gas chromatography and gas chromatography/mass spectrometry (Wakeham); 2) amino acids by hydrolysis and HPLC analysis of OPA fluorescent derivatives (Lee); 3) aldoses and cyclitols by acid hydrolysis and GC and GC/MS analysis of peracetate or TMS derivatives (Hedges); 4) elemental composition by CHN analysis (Hedges). We plan to provide aliquots of particle and trap samples to J. K. B. Bishop (elemental composition), J. R. Murray/J. Newton (pigments, elemental composition, radionuclides), and R. Bidigare (isotopic composition of pigments) if sample sizes are adequate. QA/QC: An intercomparison of elemental compositions of samples will be made with other EqPac investigators. We also intend to archive large amounts of sediment for eventual use as organic geochemical ``reference materials.'' However, because the molecular organic measurements to be carried out by our groups are practiced in a limited number of laboratories worldwide and because standard reference materials are not available, the corresponding QC strategies must be individualistic at this point pending the development of protocols and reference materials as suggested by the recent FRECLES Workshop.

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Project Information

U.S. JGOFS Equatorial Pacific (EqPac)

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

Coverage: Equatorial Pacific

The U.S. EqPac process study consisted of repeat meridional sections (12°N -12°S) across the equator in the central and eastern equatorial Pacific from 95°W to 170°W during 1992. The major scientific program was focused at 140° W consisting of two meridional surveys, two equatorial surveys, and a benthic survey aboard the R/V Thomas Thompson. Long-term deployments of current meter and sediment trap arrays augmented the survey cruises. NOAA conducted boreal spring and fall sections east and west of 140°W from the R/V Baldridge and R/V Discoverer. Meteorological and sea surface observations were obtained from NOAA's in place TOGA-TAO buoy network.

The scientific objectives of this study were to determine the fluxes of carbon and related elements, and the processes controlling these fluxes between the Equatorial Pacific euphotic zone and the atmosphere and deep ocean. A broad overview of the program at the 140°W site is given by Murray et al. (Oceanography, 5: 134-142, 1992). A full description of the Equatorial Pacific Process Study, including the international context and the scientific results, appears in a series of Deep-Sea Research Part II special volumes:

Topical Studies in Oceanography, A U.S. JGOFS Process Study in the Equatorial Pacific (1995), Deep-Sea Research Part II, Volume 42, No. 2/3.

Topical Studies in Oceanography, A U.S. JGOFS Process Study in the Equatorial Pacific. Part 2 (1996), Deep-Sea Research Part II, Volume 43, No. 4/6.

Topical Studies in Oceanography, A U.S. JGOFS Process Study in the Equatorial Pacific (1997), Deep-Sea Research Part II, Volume 44, No. 9/10.

Topical Studies in Oceanography, The Equatorial Pacific JGOFS Synthesis (2002), Deep-Sea Research Part II, Volume 49, Nos. 13/14.

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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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