Suspended particle amino acid conc. from MULVFS pump samples from R/V Thomas G. Thompson 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/2646
Version: November 28, 2001
Version Date: 2001-11-28

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

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

Contributors	Affiliation	Role
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Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

Suspended particle amino acid conc., MULVFS pump samples

Methods & Sampling

See Platform deployments for cruise specific documentation

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Parameters

Parameter	Description	Units
event	event number from event log	
sta	station number from event log	
cast	MULVFS cast number	
lat_n	nominal latitude; minus = South	degrees
lon_n	nominal longitude; minus = West	degrees
depth_n	nominal depth	meters
Asp_lt53	aspartic acid in particulate form;	micrograms/liter
Glu_lt53	glutamic acid in particulate form;	micrograms/liter
His_lt53	histamine in particulate form;	micrograms/liter
Ser_lt53	serine in particulate form;	micrograms/liter
Gly_lt53	glycine in particulate form;	micrograms/liter
Arg_lt53	arginine in particulate form;	micrograms/liter
Thr_lt53	threonine in particulate form;	micrograms/liter
b_Ala_lt53	beta-alanine in particulate form;	micrograms/liter
Ala_lt53	alaine in particulate form;	micrograms/liter
Tyr_lt53	tyrosine in particulate form;	micrograms/liter
g_Aba_lt53	gamma-aminobutyric acid in particulate form;	micrograms/liter
Met_lt53	methionine in particulate form;	micrograms/liter
Val_lt53	valine in particulate form;	micrograms/liter
p_Ala_lt53	phenylalanine in particulate form;	micrograms/liter
Ile_lt53	isoleucine in particulate form;	micrograms/liter
Leu_lt53	leucine in particulate form;	micrograms/liter
Orn_lt53	ornithine in particulate form;	micrograms/liter
Lys_lt53	lysine in particulate form;	micrograms/liter
amino_tot_lt53	total amino acids in particulate form;	micrograms/liter

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Instruments

Dataset-specific Instrument Name	High Performance Liquid Chromatography
Generic Instrument Name	High-Performance Liquid Chromatograph
Dataset-specific Description	Fluorescence high performance liquid chromatography (HPLC) was used to measure particulate amino acids
Generic Instrument Description	A High-performance liquid chromatograph (HPLC) is a type of liquid chromatography used to separate compounds that are dissolved in solution. HPLC instruments consist of a reservoir of the mobile phase, a pump, an injector, a separation column, and a detector. Compounds are separated by high pressure pumping of the sample mixture onto a column packed with microspheres coated with the stationary phase. The different components in the mixture pass through the column at different rates due to differences in their partitioning behavior between the mobile liquid phase and the stationary phase.

Dataset-specific Instrument Name	Multi Unit Large Volume Filtration System
Generic Instrument Name	Multiple Unit Large Volume Filtration System
Generic Instrument Description	The Multiple Unit Large Volume Filtration System (MULVFS) was first described in Bishop et al., 1985 (doi: 10.1021/ba-1985-0209.ch009). The MULVFS consists of multiple (commonly 12) specialized particulate matter pumps, mounted in a frame and tethered to the ship by a cable (Bishop et al., 1985; Bishop and Wood, 2008). The MULVFS filters particulates from large volumes of seawater, although the exact protocols followed will vary for each project.

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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
	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: Cindy Lee of: State University of New York at Stony Brook dataset: Suspended particle amino acid conc., MULVFS pump samples dates: February 05, 1992 to March 07, 1992 location: N: 12.0383 S: -12.035 W: -140.9418 E: -135.0167 project/cruise: EqPac/TT007 - Spring Survey ship: Thomas Thompson MULVFS documentation Note: Zero concentrations indicate below level of detection. Methodology US JGOFS EqPac: Chloropigments and Amino Acid Concentrations in Sediment Cores and Traps Cindy Lee EqPac (cruise 13 for collection of

Description	sediment cores) Chloropigments and Amino Acid Concentrations in Sediment Cores and Traps 2.2. Analytical methods For more detail on this data set, see: Lee, C; Wakeham,S.G.; Hedges, J.I., 2000. Composition and flux of particulate amino acids and chloropigments in equatorial Pacific seawater and sediments. Deep-Sea Research, I, 47 (8), 1535-1568. Deep sediment traps were also deployed between January 1992, and January 1993, on moorings (Honjo et al., 1995) at 9°N, 5°N and 0°. Both IRS-valved traps and valveless (NVC no-valve control) traps collected samples from about 1000 m below the sea surface, while NVC traps collected samples from ~1000 m above the sea floor (mab). Traps were poisoned with mercuric chloride, and retention of poison was verified by salinity measurements. Particulate material collected was split and filtered as for free- drifting traps Sediment cores were collected during November-December, 1992, from seven stations along the N-S transect using a multiple corer (Barnett et al., 1984). These stations were at 9, 5, 2°N, the equator, and 2, 5 and 12°S. Cores were sectioned aboard ship; similar sediment depth intervals from several cores taken simultaneously were composited and homogenized. Particulate amino acids were measured by fluorescence high performance liquid chromatography (HPLC) after acid hydrolysis (Lee and Cronin, 1982; 1984). Thawed filters and sediments were hydrolyzed under N2 at 110degC for 19 h with 6 N HCl to release THAA, total hydrolyzable amino acids in peptide bonds (proteins and peptides) or adsorbed onto particles. Hydrolyzates were dried in vacuo, taken up in water, and the resulting free amino acids were analyzed by HPLC using a modification of the Mopper and Lindroth (1982) o-phthaldialdehyde derivative technique. Only one sample was usually available from each site and depth for hydrolysis because of the splitting scheme. Duplicate analyses of the same hydrolyzate agreed within 10-15% except for lysine (~40%). We report here results only for chlorophyll-a and some of its immediate degradation products. Chloropigments were extracted from thawed filters into 100% acetone and analyzed by HPLC with fluorescence detection (Mantoura and Llewellyn, 1983; Bidigare et al., 1985). Samples were covered with Al foil as much as possible during handling and analysis to exclude light. Details of our analytical methods appear in Sun and Sun. Here we report data on chlorophyll-a (Chl), pheophytin-a (Phytin), pheophorbide-a (Phide) and pyropheophorbide-a (Pyrophide) fluxes and composition. Monovinyl and divinyl chlorophylls (Bidigare and Ondrusek, 1997) were not separated. Only one sample was usually available from each site and depth for extraction because of the splitting scheme. Duplicate analyses of the same extract agreed within 10%. Barnett, R.P.O., Watson, J., Connelly, D. 1984. A multiple corer for taking virtually undisturbed samples form shelf, bathyal and abyssal sediments. Oceanologica Acta 7, 399-408. Bidigare, R.R., Kennicutt, M.C., Brookes, J.M. 1985. Rapid determination of chlorophylls and their degradation products by high performance chromatography. Limnology and Oceanography 30, 432-435. Bidigare, R.R., Ondrusek, M.E. 1996. Spatial and temporal variability of phytoplankton pigment distributions in the central equatorial Pacific Ocean. Deep-Sea Research II 43, 809-833. Honjo S., Dymond, J., Collier, R. and Manganini, S.J., 1995. Export production of particles to the interior of the equatorial Pacific Ocean during the 1992 EqPac experiment. Deep-Sea Research II 42, pp. 831ï¿½870. Lee, C., Cronin, C. 1982. The vertical flux of particulate organic nitrogen in the sea: decomposition of amino acids in the Peru upwelling area and the equatorial Atlantic, Journal of Marine Research 40, 227-251. Lee, C., Cronin, C. 1984. Particulate amino acids in the sea: Effects of primary productivity and biological decomposition. Journal of Marine Research 42, 1075-1097. Mantoura,R.F.C., Llewellyn, C.A. 1983. The rapid determination of algal chlorophyll and carotenoid pigments and their breakdown products in natural waters by reverse-phase high-performance liquid chromatography. Analytica Chimica Acta 151, 297-314. Mopper, K., Lindroth, P. 1982. Diel and depth variations in dissolved free amino acids and ammonium in the Baltic Sea determined by shipboard HPLC analyses. Limnology and Oceanography 27, 336-347

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
	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

Description	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: Cindy Lee of: State University of New York at Stony Brook dataset: Suspended particle amino acid conc., MULVFS pump samples dates: August 11, 1992 to September 14, 1992 location: N: 12.01 S: -11.8483 W: -141.3483 E: -134.9533 project/cruise: EqPac/TT011- Fall survey ship: R/V Thomas Thompson MULVFS documentation Note: Zero concentrations indicate below level of detection. Methodology US JGOFS EqPac: Chloropigments and Amino Acid Concentrations in Sediment Cores and Traps Cindy Lee EqPac (cruise 13 for collection of sediment cores) Chloropigments and Amino Acid Concentrations in Sediment Cores and Traps 2.2. Analytical methods For more detail on this data set, see: Lee, C; Wakeham,S.G.; Hedges, J.I., 2000. Composition and flux of particulate amino acids and chloropigments in equatorial Pacific seawater and sediments. Deep-Sea Research, I, 47 (8), 1535-1568. Deep sediment traps were also deployed between January 1992, and January 1993, on moorings (Honjo et al., 1995) at 9°N, 5°N and 0°. Both IRS-valved traps and valveless (NVC no-valve control) traps collected samples from about 1000 m below the sea surface, while NVC traps collected samples from ~1000 m above the sea floor (mab). Traps were poisoned with mercuric chloride, and retention of poison was verified by salinity measurements. 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Hydrolyzates were dried in vacuo, taken up in water, and the resulting free amino acids were analyzed by HPLC using a modification of the Mopper and Lindroth (1982) o-phthaldialdehyde derivative technique. Only one sample was usually available from each site and depth for hydrolysis because of the splitting scheme. Duplicate analyses of the same hydrolyzate agreed within 10-15% except for lysine (~40%). We report here results only for chlorophyll-a and some of its immediate degradation products. Chloropigments were extracted from thawed filters into 100% acetone and analyzed by HPLC with fluorescence detection (Mantoura and Llewellyn, 1983; Bidigare et al., 1985). Samples were covered with Al foil as much as possible during handling and analysis to exclude light. Details of our analytical methods appear in Sun and Sun. Here we report data on chlorophyll-a (Chl), pheophytin-a (Phytin), pheophorbide-a (Phide) and pyropheophorbide-a (Pyrophide) fluxes and composition. 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Deep-Sea Research II 42, pp. 831ï¿½870. Lee, C., Cronin, C. 1982. The vertical flux of particulate organic nitrogen in the sea: decomposition of amino acids in the Peru upwelling area and the equatorial Atlantic, Journal of Marine Research 40, 227-251. Lee, C., Cronin, C. 1984. Particulate amino acids in the sea: Effects of primary productivity and biological decomposition. Journal of Marine Research 42, 1075-1097. Mantoura,R.F.C., Llewellyn, C.A. 1983. The rapid determination of algal chlorophyll and carotenoid pigments and their breakdown products in natural waters by reverse-phase high-performance liquid chromatography. Analytica Chimica Acta 151, 297-314. Mopper, K., Lindroth, P. 1982. Diel and depth variations in dissolved free amino acids and ammonium in the Baltic Sea determined by shipboard HPLC analyses. Limnology and Oceanography 27, 336-347

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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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