Porosity and pore water nutrient chemistries from sediment cores from R/V Thomas G. Thompson cruise TT013 in the Equatorial Pacific in 1992 during the U.S. JGOFS Equatorial Pacific (EqPac) project

Website: https://www.bco-dmo.org/dataset/2697
Version: January 2, 2002
Version Date: 2002-01-02

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

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

Contributors	Affiliation	Role
Berelson, William M.	University of Southern California (USC-HIMS)	Principal Investigator
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Dataset Description

Porosity and pore water nutrient chemistries, sediment cores

Methods & Sampling

PI: Will Berelson and Doug Hammond
of: University of Southern California
dataset: Porosity and pore water nutrient chemistries, sediment cores
dates: November 03, 1992 to December 04, 1992
location: N: 8.925 S: -12.0032 W: -140.15 E: -134.9483
project/cruise: EqPac/Cruise TT013 - Benthic survey
ship: R/V Thomas Thompson

Methodology:

McManus, J., D.E. Hammond, W.M. Berelson, T.E. Kilgore. D.J. DeMaster, O. G. Ragueneau, and R.W. Collier. 1995. Early diagenesis of biogenic opal: Dissolution rates, kinetics, and paleoceanographic implications. Deep Sea Research. 42, 871-903.

Hammond, D.E., J. McManus, W.M. Berelson, T.E. Kilgore, and R. Pope, 1996, Early diagenesis of organic material in Equatorial Pacific Sediments: Stoichiometry and Kinetics. Deep Sea Research II, 43, 1365-1412.

PI Notes:

1..Ammonia and Nitrate+Nitrite appear to be significantly influenced by artifacts related to core retrieval and centrifugation.
2..Measured silicic acid has been temperature corrected for warming during centrifugation.
3..Bottom water (BW) values are from (whole-core squeezing (WCS) cores, hydro data or landers).
4..Porosity is defined as the fraction of sediment volume occupied by pore water, so it is dimensionless. The prodecure used to measure it was to weigh sediment wet, dry the sediment at 60ï¿½ C until it reached a constant weight, and re-weigh. A density of solid phases D=2.6 g/cc, and a salinity S=35 psu were assumed. The porosity was calculated from the expression below, where Ww is wet weight and Wd is dry weight (both corrected for the tare weight of the empty container):

Porosity = Vpw/(Vpw+Vsed)
where Vpw = Ww/(0.99)
and Vsed = (Wd - (Ww-Wd)(S/990))/D
The factor 0.99 is grams H2O per cc sea water, and the factor 990 is grams H2O per kg sea water.

DMO Note:
1..Additional porosity/pore water data for this area are available from PACFLUX II, a JGOFS pilot project. See Berelson and Hammond's por_nut_chem_PF2 porosity and pore water nutrient chemistry data from the PACFLUX II cruise.

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Data Files

File
poros_nut_chem_pw.csv (Comma Separated Values (.csv), 12.77 KB) MD5:515d752753f1e084b18d0550e602d526
Primary data file for dataset ID 2697

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Parameters

Parameter	Description	Units
event	event number from event log	
sta	station number from event log	
sample	sample identification	
depth_begin	depth at which measurement/sample began	centimeters
depth_end	depth at which measurement/sample ended	centimeters
depth_core	depth in core, mid-point of interval sampled	centimeters
porosity	sediment porosity	
NH3_pw	ammonia conc. in sediment pore water	micromoles/liter
NO3_NO2_pw	nitrate plus nitrite conc. in sediment pore water	micromoles/liter
Si_acid_pw_t	silicic acid conc. in sedment pore water, temperature corrected for warming during centrifugation	micromoles/liter

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Deployments

TT013

Website	https://www.bco-dmo.org/deployment/57732
Platform	R/V Thomas G. Thompson
Start Date	1992-10-30
End Date	1992-12-13
Description	Purpose: Benthic Survey, 12°N-12°S at 140°W TT013 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.

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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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