

Porosity and pore water nutrient chemistries from sediment cores collected during R/V John V. Vickers PacFlux II cruise 2 from the Equatorial Pacific

Website: <https://www.bco-dmo.org/dataset/3007>

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
Hammond, Douglas E.	University of Southern California (USC-HIMS)	Co-Principal Investigator
Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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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 from sediment cores
dates: December 11, 1991 to January 31, 1992
location: N: 0.000 S: 0.000 W: -139.93 E: -102.91
project/cruise: EqPac/PacFluxII
ship: Vickers

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 procedure used to measure it was to weigh sediment wet, dry the sediment at 60°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):

$$\text{Porosity} = \frac{V_{pw}}{V_{pw} + V_{sed}}$$

$$\text{where } V_{pw} = \frac{Ww}{0.99}$$

$$\text{and } V_{sed} = \frac{Wd - (Ww - Wd)(S/990)}{D}$$

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
por_nut_chem_PF2.csv (Comma Separated Values (.csv), 3.11 KB) MD5:7987d1a569515f6dde231ce747f45748
Primary data file for dataset ID 3007

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Parameters

Parameter	Description	Units
sta_name	station name	
lat	latitude; minus = South	decimal degrees
lon	longitude; minus = West	decimal degrees
sample	sample identification, BW indicates bottom water	
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 concentration in sediment pore water	micromoles/liter
NO3_NO2_pw	nitrate plus nitrite concentration in sediment pore water	micromoles/liter
Si_acid_pw_t	silicic acid concentration in sediment pore water; temperature corrected for warming during centrifugation	micromoles/liter

Instruments

Dataset-specific Instrument Name	Box Corer
Generic Instrument Name	Box Corer
Generic Instrument Description	<p>General description of a box corer: A box corer is a marine geological tool that recovers undisturbed soft surface sediments. It is designed for minimum disturbance of the sediment surface by bow wave effects. Traditionally, it consists of a weighted stem fitted to a square sampling box. The corer is lowered vertically until it impacts with the seabed. At this point the instrument is triggered by a trip as the main coring stem passes through its frame. While pulling the corer out of the sediment a spade swings underneath the sample to prevent loss. When hauled back on board, the spade is under the box. (definition from the SeaVox Device Catalog)</p> <p>Box corers are one of the simplest and most commonly used types of sediment corers. The stainless steel sampling box can contain a surface sediment block as large as 50cm x 50cm x 75cm with negligible disturbance. Once the sediment is recovered onboard, the sediment box can be detached from the frame and taken to a laboratory for subsampling and further analysis. The core sample size is controlled by the speed at which the corer is lowered into the ocean bottom. When the bottom is firm, a higher speed is required to obtain a complete sample. A depth pinger or other depth indicator is generally used to determine when the box is completely filled with sediment. Once the core box is filled with sediment, the sample is secured by moving the spade-closing lever arm to lower the cutting edge of the spade into the sediment, until the spade completely covers the bottom of the sediment box. (definition from Woods Hole Oceanographic Institution).</p>

Deployments

PacFlux_II_cruise_2

Website	https://www.bco-dmo.org/deployment/57954
Platform	R/V John V. Vickers
Start Date	1991-12-11
End Date	1992-01-31
Description	<p>PacFlux II/cruise 2, 12/11/91 to 1/31/92 The cruise track data were taken from the single data set contributed as ancillary JGOFS data. The University of Southern California research vessel (R/V) John V. Vickers transited westward along the equator from 103 to 139°W for PACFLUX II investigations of the Joint Global Ocean Flux Studies (JGOFS) program. A model T4 expendable bathythermograph (XBT), which recorded temperature at 728 sequential times or "counts" between the surface and 460 m, was launched at integral longitudes. The 103°W-XBT was launched on 27 December 1991 and the temperature profile at 139°W was recorded on 13 January 1992. The Vickers remained on station near 0°, 124°W for 6 days beginning 4 January. All XBT observations were intended to be transmitted on the Global Telecommunications System (GTS) and to be used in the NMC weekly hindcast. However, the XBT-to-GTS technique performed successfully only between 130° and 139°W or from 12-13 January. No Vickers' XBT data were assimilated between 130 and 103°W. Fortunately, the XBT recorder on the Vickers stored all the XBT data measured from 103 - 139°W. However, none of those data were contributed to the US JGOFS DMO.</p>

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 Baldrige 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.

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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