

# Total carbon dioxide and total alkalinity from R/V Thomas G. Thompson cruises TT007, TT008, TT011, TT012 in the Equatorial Pacific in 1992 during the U.S. JGOFS Equatorial Pacific (EqPac) project

**Website:** <https://www.bco-dmo.org/dataset/2625>

**Version:** final

**Version Date:** 2002-09-05

## Project

» [U.S. JGOFS Equatorial Pacific](#) (EqPac)

## Program

» [U.S. Joint Global Ocean Flux Study](#) (U.S. JGOFS)

Contributors	Affiliation	Role
<a href="#">Archer, David</a>	University of Chicago	Principal Investigator
<a href="#">Goyet, Catherine</a>	Universite de Perpignan	Principal Investigator
<a href="#">Chandler, Cynthia L.</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Table of Contents

- [Dataset Description](#)
  - [Methods & Sampling](#)
- [Data Files](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Program Information](#)

## Dataset Description

Total carbon dioxide and total alkalinity

## Methods & Sampling

See Platform deployments for cruise specific documentation

[ [table of contents](#) | [back to top](#) ]

## Data Files

## File

**tco2\_TT007.csv**(Comma Separated Values (.csv), 36.55 KB)  
MD5:2fcb13d3cdee47f88f882fcd9cc97da1

version June 25, 2002  
(previous version March 30, 1994)  
Lamont-Doherty Geological Observatory of Columbia University  
David Archer, Taro Takahashi Group  
Thomas Thompson cruise TT007

**tco2\_TT008.csv**(Comma Separated Values (.csv), 24.81 KB)  
MD5:e9e7bed11d0321043463165dcb15ef4d

version September 5, 2002  
(original version September, 1996)  
Catherine Goyet  
Total Carbon Dioxide and Total Alkalinity  
Eqpac  
Thomas Thompson Cruise TT008

**tco2\_TT011.csv**(Comma Separated Values (.csv), 46.22 KB)  
MD5:2474780ea5ede5b8e621d0f2801212a8

version June 25, 2002  
(previous version May 27, 1994)  
Lamont-Doherty Geological Observatory of Columbia University  
David Archer, Taro Takahashi Group  
Total CO2 and total alkalinity  
Thomas Thompson cruise TT011

**tco2\_TT012.csv**(Comma Separated Values (.csv), 13.77 KB)  
MD5:70dc0dfe1682e232d61b78de6e7c9113

version September, 1996  
Catherine Goyet  
Total carbon dioxide and total alkalinity  
Eqpac  
Thomas Thompson cruise TT012

[ [table of contents](#) | [back to top](#) ]

---

## Parameters

Parameter	Description	Units
event	event number from event log, composed of date, time decoded as MMDDHHmm (month, day, hours, minutes)	
sta	station number from event log	
cast	CTD cast number from event log	
bot	CTD rosette bottle number	
press	depth of sample reported as pressure	decibars
TCO2	total carbon dioxide	micromoles/kilogram
TALK	total alkalinity	micromoles/kilogram
pCO2_20	partial pressure of CO2 at 20 degrees C	microatmospheres
pCO2_is	in situ partial pressure of CO2 calc. from pco2-20	microatmospheres
depth	depth of sample	meters

[ [table of contents](#) | [back to top](#) ]

---

## Instruments

<b>Dataset-specific Instrument Name</b>	Niskin Bottle
<b>Generic Instrument Name</b>	Niskin bottle
<b>Dataset-specific Description</b>	CTD clean rosette (Niskin) bottles were used to collect water samples.
<b>Generic Instrument Description</b>	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.

[ [table of contents](#) | [back to top](#) ]

---

## Deployments

### TT007

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57728">https://www.bco-dmo.org/deployment/57728</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1992-01-30
<b>End Date</b>	1992-03-13
<b>Description</b>	<p>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.</p> <p><b>Methods &amp; Sampling</b> PI: David Archer of: University of Chicago dataset: Total carbon dioxide and alkalinity dates: February 03, 1992 to March 09, 1992 location: N: 12.0284 S: -12.2083 W: -140.7452 E: -134.5151 project/cruise: EQPAC/TT007 - Spring Survey ship: R/V Thomas Thompson Methodology: David Archer and Taro Takahashi (1993). Protocols for Measurement of pCO<sub>2</sub>, Total CO<sub>2</sub>, and Alkalinity on the Equatorial Pacific JGOFS Survey Cruises U.S. Joint Global Ocean Flux Study - Equatorial Pacific Protocols, 1993, section 3.</p>

### TT008

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57729">https://www.bco-dmo.org/deployment/57729</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1992-03-19
<b>End Date</b>	1992-04-15
<b>Description</b>	<p>Purpose: Spring Time Series; Equator, 140°W TT008 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.</p> <p><b>Methods &amp; Sampling</b> PI: Catherine Goyet of: Woods Hole Oceanographic Institution dataset: Total carbon dioxide and total alkalinity dates: March 21, 1992 to April 14, 1992 location: N: 9.0905 S: -2.0202 W: -140.1278 E: -139.8528 project/cruise: EQPAC/TT008 - Spring Time Series ship: Thomas Thompson Methodology: U.S. JGOFS Equatorial Pacific Process Study Sampling and Analytical Protocols (section 3) EqPac bottle quality review summary from DMO</p>

### TT011

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57730">https://www.bco-dmo.org/deployment/57730</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1992-08-05
<b>End Date</b>	1992-09-18
<b>Description</b>	<p>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.</p> <p><b>Methods &amp; Sampling</b>  PI: David Archer of: University of Chicago dataset: Total carbon dioxide &amp; alkalinity dates: August 10, 1992 to September 15, 1992 location: N: 12.025 S: -11.9767 W: -141.4433 E: -134.9117 project/cruise: EQPAC/TT011 - Fall Survey ship: R/V Thomas Thompson  Methodology: David Archer and Taro Takahashi (1993). Protocols for Measurement of pCO<sub>2</sub>, Total CO<sub>2</sub>, and Alkalinity on the Equatorial Pacific JGOFS Survey Cruises U.S. Joint Global Ocean Flux Study - Equatorial Pacific Protocols, 1993, section 3. EqPac bottle quality review summary from DMO</p>

## TT012

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57731">https://www.bco-dmo.org/deployment/57731</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1992-09-24
<b>End Date</b>	1992-10-21
<b>Description</b>	<p>Purpose: Fall Time Series; Equator, 140°W TT012 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.</p> <p><b>Methods &amp; Sampling</b>  PI: Catherine Goyet of: Woods Hole Oceanographic Institution dataset: Total carbon dioxide and total alkalinity dates: September 25, 1992 to October 21, 1992 location: N: 0.0537 S: -12 W: -145.489 E: -139.8587 project/cruise: EQPAC/TT012 - Fall Time Series ship: Thomas Thompson Methodology: U.S. JGOFS Equatorial Pacific Process Study Sampling and Analytical Protocols (section 3)</p>

[ [table of contents](#) | [back to top](#) ]

## 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.

[ [table of contents](#) | [back to top](#) ]

---

## **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).

[ [table of contents](#) | [back to top](#) ]