

# N-15 uptake rate profile data from R/V Thomas G. Thompson TT043, TT045, TT049, TT053 cruises in the Arabian Sea in 1995 (U.S. JGOFS Arabian Sea project)

**Website:** <https://www.bco-dmo.org/dataset/2541>

**Version:** final

**Version Date:** 2002-04-09

## Project

» [U.S. JGOFS Arabian Sea](#) (Arabian Sea)

## Program

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

Contributors	Affiliation	Role
<a href="#">McCarthy, James J.</a>	Harvard University	Principal Investigator
<a href="#">Sambrotto, Raymond</a>	Lamont-Doherty Earth Observatory (LDEO)	Principal Investigator
<a href="#">Chandler, Cynthia L.</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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## Dataset Description

N-15 uptake rate profile data

## 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	
sta_std	Arabian Sea standard station identifier	
cast	cast number, from event log, consecutive within station	
TM_num	Trace metal (TM) clean rosette cast number	
depth	sample depth (corrected wire out)	meters
pNO2	N-15 uptake rate for NO2 labeled substrate	nanomoles N/kg/hr
pNO3	N-15 uptake rate for NO3 labeled substrate	nanomoles N/kg/hr
pNH4	N-15 uptake rate for NH4 labeled substrate	nanomoles N/kg/hr
bot	rosette bottle number	
depth_n	nominal depth	meters
NH4_orig	ammonium, as originally sent by PI	nanomoles/liter
NH4	ammonium, unit magnitude changed by US JGOFS Data Management Office	micromoles/liter
Urea	urea	micromoles N/liter
TPC	total particulate carbon	micromoles/liter
PON	particulate organic nitrogen	micromoles/liter
pUrea	urea uptake rate	micromoles N/liter/day

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## Instruments

<b>Dataset-specific Instrument Name</b>	Trace Metal Bottle
<b>Generic Instrument Name</b>	Trace Metal Bottle
<b>Dataset-specific Description</b>	Trace metal (TM) clean rosette bottles.
<b>Generic Instrument Description</b>	Trace metal (TM) clean rosette bottle used for collecting trace metal clean seawater samples.

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## Deployments

**TT043**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57704">https://www.bco-dmo.org/deployment/57704</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Report</b>	<a href="http://osprey.bcodmo.org/datasetDeployment.cfm?ddid=2580&amp;did=353&amp;flag=view">http://osprey.bcodmo.org/datasetDeployment.cfm?ddid=2580&amp;did=353&amp;flag=view</a>
<b>Start Date</b>	1995-01-08
<b>End Date</b>	1995-02-05
<b>Description</b>	<p>Purpose: Process Cruise #1 (Late NE Monsoon)</p> <p><b>Methods &amp; Sampling</b>  PI: James J. McCarthy of: Harvard University dataset: N-15 uptake rates, profile data, for substrates of NO2, NO3, NH4 dates: January 09, 1995 to January 31, 1995 location: N: 22.4835 S: 9.9986 W: 57.2999 E: 68.7499 project/cruise: Arabian Sea/TTN-043 - Process Cruise 1 (Late NE Monsoon) ship: Thomas Thompson Note from PI dated 6/30/97: Profile uptake rates contain computational corrections in several places (June 1997). Samples were obtained with the trace metal-clean rosette Documentation Revised 09/10/1999: Methodology: McCarthy, J.J., C. Garside, and J.L. Nevins. (1999) Nitrogen Dynamics during the Arabian Sea Northeast Monsoon. Deep-Sea Research II 46 (1999) 1623-1664. Due to the strong diel patterns in nitrogen uptake and the resulting possible misinterpretation of these profile data through simple integration and daily multipliers, the user community is directed to the areal summary data also reported for this cruise.</p>

#### TT045

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57706">https://www.bco-dmo.org/deployment/57706</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1995-03-14
<b>End Date</b>	1995-04-10

<b>Description</b>	<p><b>Methods &amp; Sampling</b></p> <p>PI: Raymond Sambrotto of: Lamont-Doherty Earth Observatory dataset: N-15 uptake rates for nitrate, ammonium and urea; Concentration of ammonium, urea and particulate C and N dates: March 14, 1995 to April 07, 1995 location: N: 22.4825 S: 10.0057 W: 57.3032 E: 68.739 project/cruise: Arabian Sea/TTN-045 - Process Cruise 2 (Spring Intermonsoon) ship: Thomas Thompson Note from R. Sambrotto: The data served as of August 12, 1997 have been modified in the following ways from the data served prior to this date: 1) More particulate nitrogen, particulate carbon and nanomolar ammonium data have been added that were not included with the initial data release. 2) The uptake rates for nitrate, ammonium and urea needed to be recomputed using the correct 15N isotope addition concentrations.</p> <p>Methodology: 1. Ammonium - nanomolar ammonium concentrations, as measured by a spectrophotometric procedure based on the Berthelot reaction followed by an extraction step to concentrate the indophenol. References: a) Brzezinski, M.A. (1987) Colorimetric Determination of nanomolar concentrations of ammonium in seawater using solvent extraction. <i>Marine Chemistry</i>, 20, 277-288. b) Selmer, J.S. and F. Sorensson (1986) New Procedure for extraction of ammonium from natural waters for 15N isotopic ratio determinations. <i>Applied Environmental Microbiology</i>, 52, 577-579. 2. Urea - urea concentration as measured by a spectrophotometric procedure based on the diacetylmonoxime reaction. Reference: Whitley, T.E., S.C. Malloy, et al. (1981) Automated nutrient analysis in seawater. Department of Energy and Environment, Brookhaven National Laboratory, Upton, NY. 3. N-15 uptake - A. Uptake rates for nitrate and urea were measured by incubation experiments to follow the incorporation of trace additions of N-15 labeled substrate into particulate material collected by Whatman GF/F filters. Reference: Sambrotto, R.N., J.H. Martin, et al. (1993) Nitrate utilization in surface waters of the Iceland Basin during spring and summer of 1989. <i>Deep-Sea Research II</i>. Vol. 40, No.1/2, 441-457. B. Methodology for ammonium rates was similar to that for nitrate and urea, except that modified isotope dilution model was used to calculate uptake. Reference: Glibert, P. M., F. Lipschultz, et al. (1982). Isotope dilution models of uptake and remineralization of ammonium by phytoplankton. <i>Limnology and Oceanography</i> 27: 639-650. 4. Particulate carbon and nitrogen - the concentration of either particulate carbon or nitrogen as measured by collection on Whatman GF/F filters, followed by Dumas combustion, cryogenic separation and manometric analysis.</p>
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**TT049**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57710">https://www.bco-dmo.org/deployment/57710</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1995-07-17
<b>End Date</b>	1995-08-15
<b>Description</b>	<p><b>Methods &amp; Sampling</b>  PI: Raymond Sambrotto of: Lamont-Doherty Earth Observatory dataset: N-15 uptake rates for nitrate, ammonium and urea; Concentration of ammonium, urea and particulate C and N dates: July 18, 1995 to August 11, 1995 location: N: 22.5346 S: 9.9258 W: 57.3012 E: 68.75 project/cruise: Arabian Sea/TTN-049 - Process Cruise 4 (Middle SW Monsoon) ship: Thomas Thompson Note from R. Sambrotto: The data served as of August 12, 1997 have been modified in the following ways from the data served prior to this date: 1) More particulate nitrogen, particulate carbon and nanomolar ammonium data have been added that were not included with the initial data release. 2) The uptake rates for nitrate, ammonium and urea needed to be recomputed using the correct 15N isotope addition concentrations.  Methodology: 1. Ammonium - nanomolar ammonium concentrations, as measured by a spectrophotometric procedure based on the Berthelot reaction followed by an extraction step to concentrate the indophenol. References: a) Brzezinski, M.A. (1987) Colorimetric Determination of nanomolar concentrations of ammonium in seawater using solvent extraction. <i>Marine Chemistry</i>, 20, 277-288. b) Selmer, J.S. and F. Sorensson (1986) New Procedure for extraction of ammonium from natural waters for 15N isotopic ratio determinations. <i>Applied Environmental Microbiology</i>, 52, 577-579. 2. Urea - urea concentration as measured by a spectrophotometric procedure based on the diacetylmonoxime reaction. Reference: Whitledge, T.E., S.C. Malloy, et al. (1981) Automated nutrient analysis in seawater. Department of Energy and Environment, Brookhaven National Laboratory, Upton, NY. 3. N-15 uptake - A. Uptake rates for nitrate and urea were measured by incubation experiments to follow the incorporation of trace additions of N-15 labeled substrate into particulate material collected by Whatman GF/F filters. Reference: Sambrotto, R.N., J.H. Martin, et al. (1993) Nitrate utilization in surface waters of the Iceland Basin during spring and summer of 1989. <i>Deep-Sea Research II</i>. Vol. 40, No.1/2, 441-457. B. Methodology for ammonium rates was similar to that for nitrate and urea, except that modified isotope dilution model was used to calculate uptake. Reference: Glibert, P. M., F. Lipschultz, et al. (1982). Isotope dilution models of uptake and remineralization of ammonium by phytoplankton. <i>Limnology and Oceanography</i> 27: 639-650. 4. Particulate carbon and nitrogen - the concentration of either particulate carbon or nitrogen as measured by collection on Whatman GF/F filters, followed by Dumas combustion, cryogenic separation and manometric analysis.</p>

### TT053

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57714">https://www.bco-dmo.org/deployment/57714</a>
<b>Platform</b>	R/V Thomas G. Thompson
<b>Start Date</b>	1995-10-29
<b>End Date</b>	1995-11-26
<b>Description</b>	<p><b>Methods &amp; Sampling</b>  PI: James J. McCarthy of: Harvard University dataset: N-15 uptake rates, profile data, for substrates of NO<sub>2</sub>, NO<sub>3</sub>, NH<sub>4</sub> dates: October 30, 1995 to November 23, 1995 location: N: 23.9123 S: 10.0848 W: 56.4858 E: 67.1666 project/cruise: Arabian Sea/TTN-053 - Process Cruise 6 (bio-optics) ship: Thomas Thompson Note from PI dated 6/30/97: Profile uptake rates contain computational corrections in several places (June 1997). Documentation Revised 09/10/1999: Methodology: McCarthy, J.J., C. Garside, and J.L. Nevins. (1999) Nitrogen Dynamics during the Arabian Sea Northeast Monsoon. <i>Deep-Sea Research II</i> 46 (1999) 1623-1664. Due to the strong diel patterns in nitrogen uptake and the resulting possible misinterpretation of these profile data through simple integration and daily multipliers, the user community is directed to the areal summary data also reported for this cruise.</p>

## Project Information

### U.S. JGOFS Arabian Sea (Arabian Sea)

**Website:** <http://usjgofs.whoi.edu/research/arabian.html>

**Coverage:** Arabian Sea

The U.S. Arabian Sea Expedition which began in September 1994 and ended in January 1996, had three major components: a U.S. JGOFS Process Study, supported by the National Science Foundation (NSF); Forced Upper Ocean Dynamics, an Office of Naval Research (ONR) initiative; and shipboard and aircraft measurements supported by the National Aeronautics and Space Administration (NASA). The Expedition consisted of 17 cruises aboard the R/V Thomas Thompson, year-long moored deployments of five instrumented surface buoys and five sediment-trap arrays, aircraft overflights and satellite observations. Of the seventeen ship cruises, six were allocated to repeat process survey cruises, four to SeaSoar mapping cruises, six to mooring and benthic work, and a single calibration cruise which was essentially conducted in transit to the Arabian Sea.

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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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## Funding

Funding Source	Award
National Science Foundation (NSF)	<a href="#">unknown Arabian Sea NSF</a>

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