

# Nutrient data from RVIB Nathaniel B. Palmer cruises NBP0103, NBP0104, NBP0202, and NBP0204 in the Southern Ocean from 2001-2002 (SOGLOBEC project)

**Website:** <https://www.bco-dmo.org/dataset/2373>

**Data Type:** Cruise Results

**Version:** 1

**Version Date:** 2010-01-01

## Project

» [U.S. GLOBEC Southern Ocean](#) (SOGLOBEC)

## Program

» [U.S. GLOBal ocean ECosystems dynamics](#) (U.S. GLOBEC)

Contributors	Affiliation	Role
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<a href="#">Allison, Dicky</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Abstract

Nutrient data from RVIB Nathaniel B. Palmer cruises NBP0103, NBP0104, NBP0202, and NBP0204 in the Southern Ocean from 2001-2002 (SOGLOBEC project)

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## Coverage

**Spatial Extent:** N:-64.1347 E:-65.501 S:-70.633 W:-77.7745

**Temporal Extent:** 2001-04-29 - 2002-09-12

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## Dataset Description

## Nutrients from Bottle Casts

## Methods

Analytical methods used for silica, phosphate, nitrite, and nitrate follow the recommendations of Gordon et al. (1993) for the WOCE WHP project.

The analytical system we employ is a five-channel Technicon Autoanalyzer II upgraded with new heating baths, proportional pumps, colorimeters, improved optics, and an analog to digital conversion system (New Analyzer Program v. 2.40 by Labtronics, Inc.) This Technicon is designed for shipboard as well as laboratory use.

Silica is determined by forming the heteropoly acid of dissolved orthosilicic acid and ammonium molybdate, reducing it with stannous chloride, and then measuring its optical transmittance.

Phosphate is determined by creating the phosphomolybdate heteropoly acid in much the same way as with the silica method. However, its reducing agent is dihydrazine sulfate, after which its transmittance is also measured. A heating bath is required to maximize the color yield.

Nitrite is determined essentially by the Bendschneider and Robinson (1952) technique in which nitrite is reacted with sulfanilamide (SAN) to form a diazotized derivative that is then reacted with a substituted ethylenediamine compound (NED) to form a rose pink azo dye which is measured colorimetrically.

Nitrate is determined by difference after a separate aliquot of a sample is passed through a Cd reduction column to convert its nitrate to nitrite, followed by the measurement of the "augmented" nitrite concentration using the same method as in the nitrite analysis.

In the analytical ammonia method, ammonium reacts with alkaline phenol and hypochlorite to form indophenolblue. Sodium nitroferricyanide intensifies the blue color formed, which is then measured in a colorimeter of our nutrient-analyzer. Precipitation of calcium and magnesium hydroxides is eliminated by the addition of sodium citrate complexing reagent. A heating bath is required. Our version of this technique is based on modifications of published methods such as the article by F. Koroleff in Grasshoff (1976). These modifications were made at Alpkem (now Astoria-Pacific International, Inc.) and at L.Gordon's nutrient laboratory at Oregon State University.

## Data

Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.

## References

Gordon, L.I., J.C. Jennings, Jr., A.A. Ross, and J.M. Krest, A Suggested Protocol For Continuous Flow Automated Analysis of Seawater Nutrients, in WOCE Operation Manual, WHP Office Report 90-1, **WOCE Report 77 No. 68/91, 1-52, 1993.**

Grasshoff, K. 1976. **Methods of Seawater Analysis**, Verlag Chemie, Weinheim, Germany, and New York, NY, 317 pp.

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*Last updated January 13, 2006; gfh*

## Methods & Sampling

Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.

## Data Processing Description

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## Data Files

File
<b>fullnuts.csv</b> (Comma Separated Values (.csv), 522.30 KB) MD5:0fc164013311762b8a1413f9d1d17d09
Primary data file for dataset ID 2373

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## Parameters

Parameter	Description	Units
cruiseid	cruise identification	
year	year	
station_desc	standard station number	
station	station identification per event log	
cast	CTD rosette cast number	

lat	latitude, negative = South	DD.D
lon	longitude, negative = West	DDD.D
yday_gmt	year day GMT based on Julian calendar	YYY
day_gmt	day of month, GMT (01-31)	
month_gmt	month of year, GMT (01-12)	
depth	depth of sample	meters
bottle	bottle number	
NO3_NO2	nitrate + nitrite	micromoles/liter
NO2	nitrite	micromoles/liter
SiOH_4	silicate	micromoles/liter
NH4	ammonium	micromoles/liter
PO4	phosphate	micromoles/liter
NO3	nitrate	micromoles/liter
Comments	comments	

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## Instruments

<b>Dataset-specific Instrument Name</b>	Conductivity, Temperature, Depth
<b>Generic Instrument Name</b>	CTD - profiler
<b>Dataset-specific Description</b>	CTD measurements taken, CTD unit unidentified.
<b>Generic Instrument Description</b>	The Conductivity, Temperature, Depth (CTD) unit is an integrated instrument package designed to measure the conductivity, temperature, and pressure (depth) of the water column. The instrument is lowered via cable through the water column. It permits scientists to observe the physical properties in real-time via a conducting cable, which is typically connected to a CTD to a deck unit and computer on a ship. The CTD is often configured with additional optional sensors including fluorometers, transmissometers and/or radiometers. It is often combined with a Rosette of water sampling bottles (e.g. Niskin, GO-FLO) for collecting discrete water samples during the cast. This term applies to profiling CTDs. For fixed CTDs, see <a href="https://www.bco-dmo.org/instrument/869934">https://www.bco-dmo.org/instrument/869934</a> .

<b>Dataset-specific Instrument Name</b>	Niskin Bottle
<b>Generic Instrument Name</b>	Niskin bottle
<b>Dataset-specific Description</b>	niskin bottle tripped from all hydrocasts on this cruise
<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.

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## Deployments

**NBP0103**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57636">https://www.bco-dmo.org/deployment/57636</a>
<b>Platform</b>	RVIB Nathaniel B. Palmer
<b>Report</b>	<a href="http://globec.who.edu/so-dir/reports/nbp0103/nbp0103.html">http://globec.who.edu/so-dir/reports/nbp0103/nbp0103.html</a>
<b>Start Date</b>	2001-04-24
<b>End Date</b>	2001-06-05
<b>Description</b>	<p><b>Methods &amp; Sampling</b> Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.</p> <p><b>Processing Description</b> Analytical methods used for silica, phosphate, nitrite, and nitrate follow the recommendations of Gordon et al. (1993) for the WOCE WHP project. The analytical system we employ is a five-channel Technicon Autoanalyzer II upgraded with new heating baths, proportional pumps, colorimeters, improved optics, and an analog to digital conversion system (New Analyzer Program v. 2.40 by Labtronics, Inc.) This Technicon is designed for shipboard as well as laboratory use. Silica is determined by forming the heteropoly acid of dissolved orthosilicic acid and ammonium molybdate, reducing it with stannous chloride, and then measuring its optical transmittance. Phosphate is determined by creating the phosphomolybdate heteropoly acid in much the same way as with the silica method. However, its reducing agent is dihydrazine sulfate, after which its transmittance is also measured. A heating bath is required to maximize the color yield. Nitrite is determined essentially by the Bendschneider and Robinson (1952) technique in which nitrite is reacted with sulfanilamide (SAN) to form a diazotized derivative that is then reacted with a substituted ethylenediamine compound (NED) to form a rose pink azo dye which is measured colorimetrically. Nitrate is determined by difference after a separate aliquot of a sample is passed through a Cd reduction column to convert its nitrate to nitrite, followed by the measurement of the "augmented" nitrite concentration using the same method as in the nitrite analysis. In the analytical ammonia method, ammonium reacts with alkaline phenol and hypochlorite to form indophenolblue. Sodium nitroferricyanide intensifies the blue color formed, which is then measured in a colorimeter of our nutrient-analyzer. Precipitation of calcium and magnesium hydroxides is eliminated by the addition of sodium citrate complexing reagent. A heating bath is required. Our version of this technique is based on modifications of published methods such as the article by F. Koroleff in Grasshoff (1976). These modifications were made at Alpkem (now Astoria-Pacific International, Inc.) and at L.Gordon's nutrient laboratory at Oregon State University.</p>

**NBP0104**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57638">https://www.bco-dmo.org/deployment/57638</a>
<b>Platform</b>	RVIB Nathaniel B. Palmer
<b>Report</b>	<a href="http://www.ccpo.odu.edu/Research/globec/cruises01/nbp0104_menu.html">http://www.ccpo.odu.edu/Research/globec/cruises01/nbp0104_menu.html</a>
<b>Start Date</b>	2001-07-22
<b>End Date</b>	2001-08-31
<b>Description</b>	<p><b>Methods &amp; Sampling</b> Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.</p> <p><b>Processing Description</b> Analytical methods used for silica, phosphate, nitrite, and nitrate follow the recommendations of Gordon et al. (1993) for the WOCE WHP project. The analytical system we employ is a five-channel Technicon Autoanalyzer II upgraded with new heating baths, proportional pumps, colorimeters, improved optics, and an analog to digital conversion system (New Analyzer Program v. 2.40 by Labtronics, Inc.) This Technicon is designed for shipboard as well as laboratory use. Silica is determined by forming the heteropoly acid of dissolved orthosilicic acid and ammonium molybdate, reducing it with stannous chloride, and then measuring its optical transmittance. Phosphate is determined by creating the phosphomolybdate heteropoly acid in much the same way as with the silica method. However, its reducing agent is dihydrazine sulfate, after which its transmittance is also measured. A heating bath is required to maximize the color yield. Nitrite is determined essentially by the Bendschneider and Robinson (1952) technique in which nitrite is reacted with sulfanilamide (SAN) to form a diazotized derivative that is then reacted with a substituted ethylenediamine compound (NED) to form a rose pink azo dye which is measured colorimetrically. Nitrate is determined by difference after a separate aliquot of a sample is passed through a Cd reduction column to convert its nitrate to nitrite, followed by the measurement of the "augmented" nitrite concentration using the same method as in the nitrite analysis. In the analytical ammonia method, ammonium reacts with alkaline phenol and hypochlorite to form indophenolblue. Sodium nitroferricyanide intensifies the blue color formed, which is then measured in a colorimeter of our nutrient-analyzer. Precipitation of calcium and magnesium hydroxides is eliminated by the addition of sodium citrate complexing reagent. A heating bath is required. Our version of this technique is based on modifications of published methods such as the article by F. Koroleff in Grasshoff (1976). These modifications were made at Alpkem (now Astoria-Pacific International, Inc.) and at L.Gordon's nutrient laboratory at Oregon State University.</p>

**NBP0202**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57641">https://www.bco-dmo.org/deployment/57641</a>
<b>Platform</b>	RVIB Nathaniel B. Palmer
<b>Report</b>	<a href="http://globec.who.edu/so-dir/reports/nbp0202/nbp0202b.html">http://globec.who.edu/so-dir/reports/nbp0202/nbp0202b.html</a>
<b>Start Date</b>	2002-04-09
<b>End Date</b>	2002-05-21
<b>Description</b>	<p><b>Methods &amp; Sampling</b> Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.</p> <p><b>Processing Description</b> Analytical methods used for silica, phosphate, nitrite, and nitrate follow the recommendations of Gordon et al. (1993) for the WOCE WHP project. The analytical system we employ is a five-channel Technicon Autoanalyzer II upgraded with new heating baths, proportional pumps, colorimeters, improved optics, and an analog to digital conversion system (New Analyzer Program v. 2.40 by Labtronics, Inc.) This Technicon is designed for shipboard as well as laboratory use. Silica is determined by forming the heteropoly acid of dissolved orthosilicic acid and ammonium molybdate, reducing it with stannous chloride, and then measuring its optical transmittance. Phosphate is determined by creating the phosphomolybdate heteropoly acid in much the same way as with the silica method. However, its reducing agent is dihydrazine sulfate, after which its transmittance is also measured. A heating bath is required to maximize the color yield. Nitrite is determined essentially by the Bendschneider and Robinson (1952) technique in which nitrite is reacted with sulfanilamide (SAN) to form a diazotized derivative that is then reacted with a substituted ethylenediamine compound (NED) to form a rose pink azo dye which is measured colorimetrically. Nitrate is determined by difference after a separate aliquot of a sample is passed through a Cd reduction column to convert its nitrate to nitrite, followed by the measurement of the "augmented" nitrite concentration using the same method as in the nitrite analysis. In the analytical ammonia method, ammonium reacts with alkaline phenol and hypochlorite to form indophenolblue. Sodium nitroferricyanide intensifies the blue color formed, which is then measured in a colorimeter of our nutrient-analyzer. Precipitation of calcium and magnesium hydroxides is eliminated by the addition of sodium citrate complexing reagent. A heating bath is required. Our version of this technique is based on modifications of published methods such as the article by F. Koroleff in Grasshoff (1976). These modifications were made at Alpkem (now Astoria-Pacific International, Inc.) and at L.Gordon's nutrient laboratory at Oregon State University.</p>

**NBP0204**



<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57643">https://www.bco-dmo.org/deployment/57643</a>
<b>Platform</b>	RVIB Nathaniel B. Palmer
<b>Report</b>	<a href="http://globec.whoi.edu/so-dir/reports/nbp0204/nbp0204b.html">http://globec.whoi.edu/so-dir/reports/nbp0204/nbp0204b.html</a>
<b>Start Date</b>	2002-07-31
<b>End Date</b>	2002-09-18
<b>Description</b>	<p>Also see NBP0204 Cruise Data Report</p> <p><b>Methods &amp; Sampling</b> Nitrate, nitrite, phosphate, ammonia, and silica were measured from every niskin bottle tripped from all hydrocasts on this cruise. All concentrations are reported in micromoles per liter.</p> <p><b>Processing Description</b> Analytical methods used for silica, phosphate, nitrite, and nitrate follow the recommendations of Gordon et al. (1993) for the WOCE WHP project. The analytical system we employ is a five-channel Technicon Autoanalyzer II upgraded with new heating baths, proportional pumps, colorimeters, improved optics, and an analog to digital conversion system (New Analyzer Program v. 2.40 by Labtronics, Inc.) This Technicon is designed for shipboard as well as laboratory use. Silica is determined by forming the heteropoly acid of dissolved orthosilicic acid and ammonium molybdate, reducing it with stannous chloride, and then measuring its optical transmittance. Phosphate is determined by creating the phosphomolybdate heteropoly acid in much the same way as with the silica method. However, its reducing agent is dihydrazine sulfate, after which its transmittance is also measured. A heating bath is required to maximize the color yield. Nitrite is determined essentially by the Bendschneider and Robinson (1952) technique in which nitrite is reacted with sulfanilamide (SAN) to form a diazotized derivative that is then reacted with a substituted ethylenediamine compound (NED) to form a rose pink azo dye which is measured colorimetrically. Nitrate is determined by difference after a separate aliquot of a sample is passed through a Cd reduction column to convert its nitrate to nitrite, followed by the measurement of the "augmented" nitrite concentration using the same method as in the nitrite analysis. In the analytical ammonia method, ammonium reacts with alkaline phenol and hypochlorite to form indophenolblue. Sodium nitroferricyanide intensifies the blue color formed, which is then measured in a colorimeter of our nutrient-analyzer. Precipitation of calcium and magnesium hydroxides is eliminated by the addition of sodium citrate complexing reagent. A heating bath is required. Our version of this technique is based on modifications of published methods such as the article by F. Koroleff in Grasshoff (1976). These modifications were made at Alpkem (now Astoria-Pacific International, Inc.) and at L.Gordon's nutrient laboratory at Oregon State University.</p>

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## Project Information

### U.S. GLOBEC Southern Ocean (SOGLOBEC)

**Website:** [http://www.ccpo.odu.edu/Research/globec\\_menu.html](http://www.ccpo.odu.edu/Research/globec_menu.html)

**Coverage:** Southern Ocean

The fundamental objectives of United States Global Ocean Ecosystems Dynamics (U.S. GLOBEC) Program are dependent upon the cooperation of scientists from several disciplines. Physicists, biologists, and chemists must make use of data collected during U.S. GLOBEC field programs to further our understanding of the interplay of physics, biology, and chemistry. Our objectives require quantitative analysis of interdisciplinary data sets and, therefore, data must be exchanged between researchers. To extract the full scientific value, data must be made available to the scientific community on a timely basis.

## Program Information

### U.S. GLOBal ocean ECosystems dynamics (U.S. GLOBEC)

**Website:** <http://www.usglobec.org/>

**Coverage:** Global

U.S. GLOBEC (GLOBal ocean ECosystems dynamics) is a research program organized by oceanographers and fisheries scientists to address the question of how global climate change may affect the abundance and production of animals in the sea.

The U.S. GLOBEC Program currently had major research efforts underway in the Georges Bank / Northwest Atlantic Region, and the Northeast Pacific (with components in the California Current and in the Coastal Gulf of Alaska). U.S. GLOBEC was a major contributor to International GLOBEC efforts in the Southern Ocean and Western Antarctic Peninsula (WAP).

## Funding

Funding Source	Award
NSF Antarctic Sciences (NSF ANT)	<a href="#">unknown SOGLOBEC NSF ANT</a>