

# Scientific sampling event log from R/V Knorr cruise KN204-01 in the Subtropical northern Atlantic Ocean in 2011 (U.S. GEOTRACES NAT project)

Website: <https://www.bco-dmo.org/dataset/3842>

Data Type: Cruise Results

Version: 1

Version Date: 2013-01-25

## Project

» [U.S. GEOTRACES North Atlantic Transect](#) (U.S. GEOTRACES NAT)

## Program

» [U.S. GEOTRACES](#) (U.S. GEOTRACES)

Contributors	Affiliation	Role
<a href="#">Boyle, Edward A.</a>	Massachusetts Institute of Technology (MIT-EAPS)	Chief Scientist
<a href="#">Cutter, Gregory</a>	Old Dominion University (ODU)	Co-Chief Scientist
<a href="#">Rauch, Shannon</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Abstract

Scientific sampling event log from R/V Knorr cruise KN204-01 in the Subtropical northern Atlantic Ocean in 2011 (U.S. GEOTRACES NAT project).

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## Coverage

**Spatial Extent: N:40.18 E:-24.5 S:17.4 W:-70.15**

**Temporal Extent: 2011-11-06 - 2011-12-10**

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## **Dataset Description**

Log of sampling events from the 2011 GEOTRACES cruise (GT11 / KN204-01), includes description of events at each station, lat/lon, date/time, and sample numbers.

## **Acquisition Description**

Spreadsheet of events generated aboard vessel by the science party. The following code lists were used.

### **Event Description Codes:**

nd = unknown/not entered

GT-C = GEOTRACES carousel

30-ODF = 30L Niskin Rosette

Stn-GeoF = GeoFish Station sampling; misc samples

GeoF = GeoFish TM dissolved; Nuts; As

mid-GeoF = GeoFish TM diss/uf; Nuts; nanoNuts; As; Alk Phosphatase

Super-GeoF = GeoFishTM diss/uf; Nuts; NanoNuts; As; Alk Phos; Se; WML; A. Shiller

RaPUW = Radium UW pump

MITv2 = MIT-vane

UAFv = UAF-vane

KnoR = Knorr rosette

MastUp = NASA solar reference mast UP

MastDown = NASA solar reference mast DOWN

McL-Ros = McLane pump rosette

McL-Prof = McLane pump profile

Aeros = Aerosol sampler

AOP = Apparent Optical Properties cast

NASAsurf = NASA surface pump water sample

NEMO = NEMO Float Deployment

Ra/Th/Pig = Ra/Th/Pigment Niskin Cast

Surf Ra bag = Surface Ra bag

Rain = Rain sample

### **Sample Codes:**

nd = unknown/not recorded

diss = dissolved samples

diss+part = dissolved and particulate samples

unfilt = unfiltered seawater

filter = filter for particulates

none = none

## Processing Description

BCO-DMO made the following modifications to the formatting of the data:

- Blank cells were replaced with 'nd' to indicate 'no data'.
- Parameter names were modified to conform with BCO-DMO naming conventions.
- lat and lon were converted from degrees and decimal minutes to decimal degrees.
- time\_start and time\_end were reformatted from HH:MM to HHMM.
- Commas in text fields were replaced with semi-colons.
- Original date fields separated into year, month, and day.

Additional corrections made by BCO-DMO:

- Corrected lat value of event #3034 from 32.67 to 38.67 based on GTC castsheet.
- Added station number to event #3112 (had been missing). Confirmed by GTC castsheet.
- Changed sample number for event #3123 from 'nd' to 7245. Confirmed by aerosol data from C. Lamborg and W. Landing.
- Corrected start and end dates of event #3203 from 12/01/11 to 12/02/11 based on rain data from William Landing.
- Corrected location of event #3219 from transit to station 10 to transit to station 20.
- Changed end time of event #3217 from 0000 to nd.
- Corrected lon value of event #3228 from -25.87 to -35.87 based on aerosol data from William Landing.

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## Parameters

Parameter	Description	Units
event	Unique event number.	integer
location	Location descriptor (typically station ID).	text
time_start	Start time (GMT); 24-hour clock.	HHMM
time_end	End time (GMT); 24-hour clock.	HHMM
lat	Latitude (South is negative).	decimal degrees
lon	Longitude (West is negative).	decimal degrees
depth_min	Minimum depth.	meters
depth_max	Maximum depth.	meters
event_description	Description of sampling event. See 'Acquisition Description' for event code definitions.	text
samples_taken	Samples taken. See 'Acquisition Description' for sample code definitions.	text
GEO_sample_id_range	Range of GEOTRACES ID numbers.	text
comment	Free-text comments about the event.	text
cruise_id	Official cruise identifier.	text
year	4-digit year of the cruise.	YYYY
month_start	2-digit month at start of event (GMT).	mm (01 to 12)
day_start	2-digit day of the month at start of event (GMT).	dd (01 to 31)
month_end	2-digit month at end of event (GMT).	mm (01 to 12)
day_end	2-digit day of the month at end of event (GMT).	dd (01 to 31)

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## Deployments

KN204-01

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58786">https://www.bco-dmo.org/deployment/58786</a>
<b>Platform</b>	R/V Knorr
<b>Report</b>	<a href="http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/STS_Prelim_GT11_Doc.pdf">http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/STS_Prelim_GT11_Doc.pdf</a>
<b>Start Date</b>	2011-11-06
<b>End Date</b>	2011-12-11
<b>Description</b>	<p>The US GEOTRACES North Atlantic cruise aboard the R/V Knorr completed the section between Lisbon and Woods Hole that began in October 2010 but was rescheduled for November-December 2011. The R/V Knorr made a brief stop in Bermuda to exchange samples and personnel before continuing across the basin. Scientists disembarked in Praia, Cape Verde, on 11 December. The cruise was identified as KN204-01A (first part before Bermuda) and KN204-01B (after the Bermuda stop). However, the official deployment name for this cruise is KN204-01 and includes both part A and B. Science activities included: ODF 30 liter rosette CTD casts, ODU Trace metal rosette CTD casts, McLane particulate pump casts, underway sampling with towed fish and sampling from the shipboard "uncontaminated" flow-through system. Full depth stations are shown in the accompanying figure (see below). Additional stations to sample for selected trace metals to a depth of 1000 m are not shown. Standard stations are shown in red (as are the ports) and "super" stations, with extra casts to provide large-volume samples for selected parameters, are shown in green. Station spacing is concentrated along the western margin to evaluate the transport of trace elements and isotopes by western boundary currents. Stations across the gyre will allow scientists to examine trace element supply by Saharan dust, while also contrasting trace element and isotope distributions in the oligotrophic gyre with conditions near biologically productive ocean margins, both in the west, to be sampled now, and within the eastern boundary upwelling system off Mauritania, sampled last year. The cruise was funded by NSF OCE awards 0926204, 0926433 and 0926659. Additional information may be available from the vessel operator site, URL: <a href="http://www.whoi.edu/cruiseplanning/synopsis.do?id=1662">http://www.whoi.edu/cruiseplanning/synopsis.do?id=1662</a>. Cruise information and original data are available from the NSF R2R data catalog. ADCP data are available from the Currents ADCP group at the University of Hawaii at the links below:KN204-01A (part 1 of 2011 cruise; Woods Hole, MA to Bermuda)KN204-01B (part 2 of 2011 cruise; Bermuda to Cape Verde)</p>

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## Project Information

### U.S. GEOTRACES North Atlantic Transect (U.S. GEOTRACES NAT)

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

**Coverage:** Subtropical western and eastern North Atlantic Ocean

Much of this text appeared in an article published in OCB News, October 2008, by the OCB Project Office. The first U.S. GEOTRACES Atlantic Section will be specifically centered around a sampling cruise to be carried out in the North Atlantic in 2010. Ed Boyle (MIT) and Bill Jenkins (WHOI) organized a three-day planning workshop that was held September 22-24, 2008 at the Woods Hole Oceanographic Institution. The main goal of the workshop, sponsored by the National Science Foundation and the U.S. GEOTRACES Scientific Steering Committee, was to design the implementation plan for the first U.S. GEOTRACES Atlantic Section. The primary cruise design motivation was to improve knowledge of the sources, sinks and internal cycling of Trace Elements and their Isotopes (TEIs) by studying their distributions along a section in the North Atlantic (Figure 1). The North Atlantic has the full suite of processes that affect TEIs, including strong meridional advection, boundary scavenging and source effects, aeolian deposition, and the salty Mediterranean Outflow. The North Atlantic is particularly important as it lies at the "origin" of the global Meridional Overturning Circulation. It is well understood that many trace metals play important roles in biogeochemical processes and the carbon cycle, yet very little is known about their large-scale distributions and the regional scale processes that affect them. Recent advances in sampling and analytical techniques, along with advances in our understanding of their roles in enzymatic and catalytic processes in the open ocean provide a natural opportunity to make substantial advances in our understanding of these important elements. Moreover, we are motivated by the prospect of global change and the need to understand the present and future workings of the ocean's biogeochemistry. The GEOTRACES strategy is to measure a broad suite of TEIs to constrain the critical biogeochemical processes that influence their distributions. In addition to these "exotic" substances, more traditional properties, including macronutrients (at micromolar and nanomolar levels), CTD, bio-optical parameters, and carbon system characteristics will be measured. The cruise starts at Line W, a repeat hydrographic section southeast of Cape Cod, extends to Bermuda and subsequently through the North Atlantic oligotrophic subtropical gyre, then transects into the African coast in the northern limb of the coastal upwelling region. From there, the cruise goes northward into the Mediterranean outflow. The station locations shown on the map are for the "fulldepth TEI" stations, and constitute approximately half of the stations to be ultimately occupied. Figure 1. The proposed 2010 Atlantic GEOTRACES cruise track plotted on dissolved oxygen at 400 m depth. Data from the World Ocean Atlas (Levitus et al., 2005) were plotted using Ocean Data View (courtesy Reiner Schlitzer). [click on the image to view a larger version]

Hydrography, CTD and nutrient measurements will be supported by the Ocean Data Facility (J. Swift) at Scripps Institution of Oceanography and funded through NSF Facilities. They will be providing an additional CTD rosette system along with nephelometer and LADCP. A trace metal clean Go-Flo Rosette and winch will be provided by the group at Old Dominion University (G. Cutter) along with a towed underway pumping system. The North Atlantic Transect cruise began in 2010 with KN199 leg 4 (station sampling) and leg 5 (underway sampling only) (Figure 2). KN199-04 Cruise Report (PDF) Figure 2. The red line shows the cruise track for the first leg of the US

Geotraces North Atlantic Transect on the R/V Knorr in October 2010. The rest of the stations (beginning with 13) will be completed in October-December 2011 on the R/V Knorr (courtesy of Bill Jenkins, Chief Scientist, GNAT first leg). [click on the image to view a larger version] The section completion effort resumed again in November 2011 with KN204-01A,B (Figure 3). KN204-01A,B Cruise Report (PDF) Figure 3. Station locations occupied on the US Geotraces North Atlantic Transect on the R/V Knorr in November 2011. [click on the image to view a larger version] Data from the North Atlantic Transect cruises are available under the Datasets heading below, and consensus values for the SAFE and North Atlantic GEOTRACES Reference Seawater Samples are available from the GEOTRACES Program Office: Standards and Reference Materials ADCP data are available from the Currents ADCP group at the University of Hawaii at the links below: KN199-04 (leg 1 of 2010 cruise; Lisbon to Cape Verde) KN199-05 (leg 2 of 2010 cruise; Cape Verde to Charleston, NC) KN204-01A (part 1 of 2011 cruise; Woods Hole, MA to Bermuda) KN204-01B (part 2 of 2011 cruise; Bermuda to Cape Verde)

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## Program Information

### U.S. GEOTRACES (U.S. GEOTRACES)

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

**Coverage:** Global

GEOTRACES is a SCOR sponsored program; and funding for program infrastructure development is provided by the U.S. National Science Foundation. GEOTRACES gained momentum following a special symposium, S02: Biogeochemical cycling of trace elements and isotopes in the ocean and applications to constrain contemporary marine processes (GEOSECS II), at a 2003 Goldschmidt meeting convened in Japan. The GEOSECS II acronym referred to the Geochemical Ocean Section Studies To determine full water column distributions of selected trace elements and isotopes, including their concentration, chemical speciation, and physical form, along a sufficient number of sections in each ocean basin to establish the principal relationships between these distributions and with more traditional hydrographic parameters; \* To evaluate the sources, sinks, and internal cycling of these species and thereby characterize more completely the physical, chemical and biological processes regulating their distributions, and the sensitivity of these processes to global change; and \* To understand the processes that control the concentrations of geochemical species used for proxies of the past environment, both in the water column and in the substrates that reflect the water column. GEOTRACES will be global in scope, consisting of ocean sections complemented by regional process studies. Sections and process studies will combine fieldwork, laboratory experiments and modelling. Beyond realizing the scientific objectives identified above, a natural outcome of this work will be to build a community of marine scientists who understand the processes

regulating trace element cycles sufficiently well to exploit this knowledge reliably in future interdisciplinary studies. Expand "Projects" below for information about and data resulting from individual US GEOTRACES research projects.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0926423</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0926092</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0926204</a>

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