

North African mineral dust composition from R/V Knorr cruises KN199-04, KN204-01 in the Subtropical northern Atlantic Ocean from 2010-2011 (U.S. GEOTRACES NAT project)

Website: <https://www.bco-dmo.org/dataset/4063>

Version: 2014-09-17

Project

» [U.S. GEOTRACES North Atlantic Transect \(GA03\)](#) (U.S. GEOTRACES NAT)

Program

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

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Table of Contents

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

Dataset Description

Mineral dust composition (aerosol trace metals) (Li, Na, Mg, Al, P, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Rb, Sr, Zr, Cd, Sn, Sb, Cs, Ba, La, Ce, Nd, Pb, Th, U) from the Northern Africa region. Collected on the 2010 and 2011 U.S. GEOTRACES North Atlantic Transect cruises.

Related Dataset: [GT10-11 - Trace Metals Aerosol](#)

Please note that some US GEOTRACES data may not be final, pending intercalibration results and further analysis. If you are interested in following changes to US GEOTRACES NAT data, there is an RSS feed available via the BCO-DMO [US GEOTRACES project page](#) (scroll down and expand the "Datasets" section).

Current version: 17 Sept 2014 Removed Ga69 columns from display

6 May 2014: Un-restricted the dataset

Original version: 23 Oct 2013

Methods & Sampling

Sample Collection

Aerosol samples were collected on acid-washed Whatman 41 (W41) cellulose ester filter papers deployed in one of two high-volume aerosol samplers (model 5170-VBL, Tisch Environmental) deployed simultaneously operating at approximately 1.2 cubic meters air per minute. The aerosol samplers were deployed on the ship's flying bridge (14 m above sea level) as high off the water as possible. Contamination from the ship's stack exhaust was avoided by controlling aerosol sampling with respect to wind sector and wind speed using an anemometer interfaced with a Campbell Scientific CR800 datalogger and PC. The samplers were allowed to run

when the wind was +/- 60 degrees from the bow and > 0.5 m/s. When the wind failed to meet these two criteria, the motors were shut off automatically and not allowed to restart until the wind met both the speed and direction criteria for 5 continuous minutes. The anemometer was deployed nearby on a separate pole in 'free air' where turbulence from the wind crossing the bow did not cause the wind vane to wobble excessively.

Trace Metal Determination

For determinations of total aerosol trace metal composition, the W41 filter discs were digested in tightly capped Teflon vials using sequential additions of concentrated acid solutions [nitric acid (Optima) and hydrofluoric acid (Optima)] at 150 degrees C (Morton et al., 2013, accepted). Any solution remaining after each digestion step was heated to dryness. After the final digestion and dry down, the samples were re-dissolved with 0.32 M nitric acid for analysis using inductively-coupled plasma mass spectrometry (ICP-MS; Agilent 7500CS and Thermo Element 2). All filter digestions were performed under a Class 100 laminar flow hood at the National High Magnetic Field Laboratory at Florida State University (FSU).

Filters for both the total and soluble aerosol concentration measurements were stored frozen prior to processing.

Blank solutions for the acid digestions were prepared by digesting W41 discs that had been deployed in the aerosol samplers for 1 h while not in operation. For example, blanks accounted for 65.6 ± 0.52 ng m⁻³ air Fe (representing an average of $0.09 \pm 0.001\%$ of the Fe sample concentrations). Trace metal concentrations in the blanks were subtracted from all acid-digested filter samples. Leachate blanks were prepared by passing 100 mL of deionized water through W41 filters that had also been deployed in the same way as the acid digestion blanks. Blank leachates averaged 0.004 ± 0.001 ng m⁻³ air dissolved Fe (representing an average of $1.6 \pm 0.38\%$ of the Fe sample concentrations) and were subsequently subtracted from all leachate sample concentrations. Relative standard deviations of replicate analyses averaged 7% for total Fe concentrations. Replicate analyses of soluble Fe produced relative standard deviations of 10%.

References:

- Buck**, C.S., et al. 2010. The solubility and deposition of aerosol Fe and other trace elements in the North Atlantic Ocean: observations from the A16N CLIVAR/CO2 repeat hydrography section. *Marine Chemistry* 120, 57-70. doi: [10.1016/j.marchem.2008.08.003](https://doi.org/10.1016/j.marchem.2008.08.003).
- Buck**, C. S., Landing, W.M., Resing, J. A., Lebon, G. T. 2006. Aerosol iron and aluminum solubility in the northwest Pacific Ocean: Results from the 2002 IOC cruise. *Geochemistry, Geophysics, Geosystems*. 7. doi: [10.1029/2005GC000977](https://doi.org/10.1029/2005GC000977).
- Morton**, P.L. et al. 2013. Methods for the sampling and analysis of marine aerosols: results from the 2008 GEOTRACES aerosol intercalibration experiment. *Limnology and Oceanography Methods* 11:62-78. doi: [10.4319/lom.2013.11.62](https://doi.org/10.4319/lom.2013.11.62).

Data Processing Description

Concentrations below the detection limit are flagged as "below_DL" (originally "<_DL") in the data columns. Representative detection limits were calculated using an air volume of 1200 cubic meters. See [PDF of detection limits for this dataset](#).

Data quality flag definitions:

- BDL = below detection limit.
0 = No QC performed.
1 = Good data.
2 = Probably good data.
3 = Probably bad data that is potentially correctable.
4 = Bad data.
5 = Value changed.
6 = Sample < blank.
8 = Interpolated value.
9 = Missing value.

BCO-DMO made the following modifications:

- Changed PI-supplied cruise IDs of KN204-5 to KN204-01B. Added 'cruise_part' column to distinguish between parts A and B of cruise KN204-01.
- Modified parameter names to conform with BCO-DMO naming conventions.

Additional GEOTRACES Processing: After the data were submitted to the International Data Management

Office, BODC, the office noticed that important identifying information was missing in many datasets. With the agreement of BODC and the US GEOTRACES lead PIs, BCO-DMO added standard US GEOTRACES information, such as the US GEOTRACES event number, to each submitted dataset lacking this information. To accomplish this, BCO-DMO compiled a 'master' dataset composed of the following parameters: station_GEOTRC, cast_GEOTRC (bottle and pump data only), event_GEOTRC, sample_GEOTRC, sample_bottle_GEOTRC (bottle data only), bottle_GEOTRC (bottle data only), depth_GEOTRC_CTD (bottle data only), depth_GEOTRC_CTD_rounded (bottle data only), BTL_ISO_DateTime_UTC (bottle data only), and GeoFish_id (GeoFish data only). This added information will facilitate subsequent analysis and inter comparison of the datasets.

Bottle parameters in the master file were taken from the GT-C_Bottle_GT10, GT-C_Bottle_GT11, ODF_Bottle_GT10, and ODF_Bottle_GT11 datasets. Non-bottle parameters, including those from GeoFish tows, Aerosol sampling, and McLane Pumps, were taken from the Event_Log_GT10 and Event_Log_GT11 datasets. McLane pump cast numbers missing in event logs were taken from the Particulate Th-234 dataset submitted by Ken Buesseler.

A standardized BCO-DMO method (called "join") was then used to merge the missing parameters to each US GEOTRACES dataset, most often by matching on sample_GEOTRC or on some unique combination of other parameters.

If the master parameters were included in the original data file and the values did not differ from the master file, the original data columns were retained and the name of the parameters were changed from the PI-submitted names to the standardized master names. If there were differences between the PI-supplied parameter values and those in the master file, both columns were retained. If the original data submission included all of the master parameters, no additional columns were added, but parameter names were modified to match the naming conventions of the master file.

See the dataset parameters documentation for a description of which parameters were supplied by the PI and which were added via the join method.

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

Data Files

File
NAfrican_Aerosols_joined.csv (Comma Separated Values (.csv), 7.62 KB) <small>MD5:a8e66313f434a268f49a601b10a24e9f</small>
Primary data file for dataset ID 4063

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

Parameters

Parameter	Description	Units
cruise_id	Official cruise identifier e.g. KN199-04 = R/V Knorr cruise number 199-04.	dimensionless
sample_GEOTRC	Unique identifying number for US GEOTRACES samples; ranges from 5033 to 6078 for KN199-04 and from 6112 to 8148 for KN204-01. PI-supplied values were identical to those in the intermediate US GEOTRACES master file. Originally submitted as 'sample #', this parameter name has been changed to conform to BCO-DMO's GEOTRACES naming conventions.	dimensionless
station_GEOTRC	GEOTRACES station number; ranges from 1 through 12 for KN199-04 and 1 through 24 for KN204-01. Stations 7 and 9 were skipped on KN204-01. Some GeoFish stations are denoted as X_to_Y indicating the tow occurred between stations X and Y. Values were added from the intermediate US GEOTRACES master file (see Processing Description).	dimensionless

event_GEOTRC	Unique identifying number for US GEOTRACES sampling events; ranges from 2001 to 2225 for KN199-04 events and from 3001 to 3282 for KN204-01 events. PI-supplied values were identical to those in the intermediate US GEOTRACES master file. Originally submitted as 'GT event #', this parameter name has been changed to conform to BCO-DMO's GEOTRACES naming conventions.	dimensionless
cruise_part	Part of cruise. For KN204-01: A = 11/6/2011 to 11/18/2011 (Woods Hole to Bermuda) B = 11/19/2011 to 12/11/2011 (Bermuda to Praia, Cabo Verde)	text
julian_day	Julian day at start of sampling event.	jjj
day_start	2-digit day of month at start of sampling event.	dd (01 to 31)
month_start	2-digit month of year at start of sampling event.	mm (01 to 12)
year_start	4-digit year at start of sampling event.	YYYY
time_start_utc	Time (UTC) at start of sampling event. 24-hour clock.	HHMM
lat_start	Latitude at start of sampling event. North = Positive.	decimal degrees
lon_start	Longitude at start of sampling event. West = Negative.	decimal degrees
day_end	2-digit day of month at end of sampling event.	dd (01 to 31)
month_end	2-digit month of year at end of sampling event.	mm (01 to 12)
year_end	4-digit year at end of sampling event.	YYYY
lat_end	Latitude at end of sampling event. North = Positive.	decimal degrees
lon_end	Longitude at end of sampling event. West = Negative.	decimal degrees
PVC_plate_position	PVC plate position. Location of W41 disc filter on 12 position filter holder.	unitless
Li7_tot	Total Li-7 (Lithium) concentration.	nanograms per cubic meter (ng/m ³)
Li7_flag	Li7_tot data quality flag.	unitless
Na23_tot	Total Na-23 (Sodium) concentration.	nanograms per cubic meter (ng/m ³)
Na23_flag	Na23_tot data quality flag.	unitless
Mg24_tot	Total Mg-24 (Magnesium) concentration.	nanograms per cubic meter (ng/m ³)
Mg24_flag	Mg24_tot data quality flag.	unitless
Al27_tot	Total Al-27 (Aluminum) concentration.	nanograms per cubic meter (ng/m ³)
Al27_flag	Al27_tot data quality flag.	unitless
P31_tot	Total P-31 (Phosphorus) concentration.	nanograms per cubic meter (ng/m ³)
P31_flag	P31_tot data quality flag.	unitless
Sc45_tot	Total Sc-45 (Scandium) concentration.	nanograms per cubic meter (ng/m ³)
Sc45_flag	Sc45_tot data quality flag.	unitless

Ti49_tot	Total Ti-49 (Titanium) concentration.	nanograms per cubic meter (ng/m ³)
Ti49_flag	Ti49_tot data quality flag.	unitless
V51_tot	Total V-51 (Vanadium) concentration.	nanograms per cubic meter (ng/m ³)
V51_flag	V51_tot data quality flag.	unitless
Cr53_tot	Total Cr-53 (Chromium) concentration.	nanograms per cubic meter (ng/m ³)
Cr53_flag	Cr53_tot data quality flag.	unitless
Mn55_tot	Total Mn-55 (Manganese) concentration.	nanograms per cubic meter (ng/m ³)
Mn55_flag	Mn55_tot data quality flag.	unitless
Fe56_tot	Total Fe-56 (Iron) concentration.	nanograms per cubic meter (ng/m ³)
Fe56_flag	Fe56_tot data quality flag.	unitless
Co59_tot	Total Co-59 (Cobalt) concentration.	nanograms per cubic meter (ng/m ³)
Co59_flag	Co59_tot data quality flag.	unitless
Ni60_tot	Total Ni-60 (Nickel) concentration.	nanograms per cubic meter (ng/m ³)
Ni60_flag	Ni60_tot data quality flag.	unitless
Cu63_tot	Total Cu-63 (Copper) concentration.	nanograms per cubic meter (ng/m ³)
Cu63_flag	Cu63_tot data quality flag.	unitless
Zn66_tot	Total Zn-66 (Zinc) concentration.	nanograms per cubic meter (ng/m ³)
Zn66_flag	Zn66_tot data quality flag.	unitless
Ga69_tot	Total Ga-69 (Gallium) concentration.	nanograms per cubic meter (ng/m ³)
Ga69_flag	Ga69_tot data quality flag.	unitless
As75_tot	Total As-75 (Arsenic) concentration.	nanograms per cubic meter (ng/m ³)
As75_flag	As75_tot data quality flag.	unitless
Se78_tot	Total Se-78 (Selenium) concentration.	nanograms per cubic meter (ng/m ³)
Se78_flag	Se78_tot data quality flag.	unitless

Rb85_tot	Total Rb-85 (Rubidium) concentration.	nanograms per cubic meter (ng/m ³)
Rb85_flag	Rb85_tot data quality flag.	unitless
Sr88_tot	Total Sr-88 (Strontium) concentration.	nanograms per cubic meter (ng/m ³)
Sr88_flag	Sr88_tot data quality flag.	unitless
Zr90_tot	Total Zr-90 (Zirconium) concentration.	nanograms per cubic meter (ng/m ³)
Zr90_flag	Zr90_tot data quality flag.	unitless
Cd111_tot	Total Cd-111 (Cadmium) concentration.	nanograms per cubic meter (ng/m ³)
Cd111_flag	Cd111_tot data quality flag.	unitless
Sn118_tot	Total Sn-118 (Tin) concentration.	nanograms per cubic meter (ng/m ³)
Sn118_flag	Sn118_tot data quality flag.	unitless
Sb123_tot	Total Sb-123 (Antimony) concentration.	nanograms per cubic meter (ng/m ³)
Sb123_flag	Sb123_tot data quality flag.	unitless
Cs133_tot	Total Cs-133 (Caesium) concentration.	nanograms per cubic meter (ng/m ³)
Cs133_flag	Cs133_tot data quality flag.	unitless
Ba138_tot	Total Ba-138 (Barium) concentration.	ng/m ³
Ba138_flag	Ba138_tot data quality flag.	unitless
La139_tot	Total La-139 (Lanthanum) concentration.	nanograms per cubic meter (ng/m ³)
La139_flag	La139_tot data quality flag.	unitless
Ce140_tot	Total Ce-140 (Cerium) concentration.	nanograms per cubic meter (ng/m ³)
Ce140_flag	Ce140_tot data quality flag.	unitless
Nd145_tot	Total Nd-145 (Neodymium) concentration.	nanograms per cubic meter (ng/m ³)
Nd145_flag	Nd145_tot data quality flag.	unitless
Pb207_tot	Total Pb-207 (Lead) concentration.	nanograms per cubic meter (ng/m ³)
Pb207_flag	Pb207_tot data quality flag.	unitless
Th232_tot	Total Th-232 (Thorium) concentration.	nanograms per cubic meter (ng/m ³)

Th232_flag	Th232_tot data quality flag.	unitless
U238_tot	Total U-238 (Uranium) concentration.	nanograms per cubic meter (ng/m ³)
U238_flag	U238_tot data quality flag.	unitless
ISO_DateTime_UTC_start	Date and time (UTC) formatted to ISO 8601 standard. Calculated from starting date and time provided.	YYYY-MM-DDTHH:MM:SS[.xx] [+/-TZ]
ISO_DateTime_UTC_end	Date and time (UTC) formatted to ISO 8601 standard. Calculated from ending date and time provided.	YYYY-MM-DDTHH:MM:SS[.xx] [+/-TZ]

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

Instruments

Dataset-specific Instrument Name	Aerosol Sampler
Generic Instrument Name	Aerosol Sampler
Dataset-specific Description	Two high-volume Tisch Environmental (model 5170-VBL) aerosol samplers were used.
Generic Instrument Description	A device that collects a sample of aerosol (dry particles or liquid droplets) from the atmosphere.

Dataset-specific Instrument Name	Anemometer
Generic Instrument Name	Anemometer
Generic Instrument Description	An anemometer is a device for measuring the velocity or the pressure of the wind. It is commonly used to measure wind speed. Aboard research vessels, it is often mounted with other meteorological instruments and sensors.

Dataset-specific Instrument Name	Inductively Coupled Plasma Mass Spectrometer
Generic Instrument Name	Inductively Coupled Plasma Mass Spectrometer
Dataset-specific Description	Agilent 7500CS and Thermo Element 2 inductively-coupled plasma mass spectrometers (ICP-MS) were used to determine total aerosol trace metal concentrations.
Generic Instrument Description	An ICP Mass Spec is an instrument that passes nebulized samples into an inductively-coupled gas plasma (8-10000 K) where they are atomized and ionized. Ions of specific mass-to-charge ratios are quantified in a quadrupole mass spectrometer.

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

Deployments

KN199-04

Website	https://www.bco-dmo.org/deployment/58066
Platform	R/V Knorr
Report	http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/Cruise_Report_for_Knorr_199_Final_v3.pdf
Start Date	2010-10-15
End Date	2010-11-04
Description	<p>This cruise constitutes the first survey section as part of the U.S. participation in an international program named GEOTRACES. Funding: NSF OCE award 0926423 Science Objectives: To obtain state of the art trace metal and isotope measurements on a suite of samples taken on a mid-latitude zonal transect of the North Atlantic. In particular, sampling targeted the oxygen minimum zone extending off the west African coast near Mauritania, the TAG hydrothermal field, and the western boundary current system along Line W. For additional information, please refer to the GEOTRACES program Web site (https://www.geotraces.org/) for overall program objectives and a summary of properties measured. Science Activities include seawater sampling via GoFLO and Niskin carousels, in situ pumping (and filtration), CTDO2 and transmissometer sensors, underway pumped sampling of surface waters, and collection of aerosols and rain. Hydrography, CTD and nutrient measurements were supported by the Ocean Data Facility (J. Swift) at Scripps Institution of Oceanography and funded through NSF Facilities. They provided an additional CTD rosette system along with nephelometer and LADCP. A trace metal clean Go-Flo Rosette and winch were provided by the group at Old Dominion University (G. Cutter) along with a towed underway pumping system. Additional cruise information is available from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/KN199-04 Other Relevant Links: List of cruise participants: [PDF] Cruise track: JPEG image (from Woods Hole Oceanographic Institution, vessel operator) ADCP data are available from the Currents ADCP group at the University of Hawaii: KN199-04 ADCP</p>

KN204-01

Website	https://www.bco-dmo.org/deployment/58786
Platform	R/V Knorr
Report	http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/STS_Prelim_GT11_Doc.pdf
Start Date	2011-11-06
End Date	2011-12-11
Description	<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. Funding: The cruise was funded by NSF OCE awards 0926204, 0926433 and 0926659. Additional cruise information is available from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/KN204-01 Other Relevant Links: 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>

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

Project Information

U.S. GEOTRACES North Atlantic Transect (GA03) (U.S. GEOTRACES NAT)

Website: <https://www.geotraces.org/>

Coverage: Subtropical western and eastern North Atlantic Ocean (GA03)

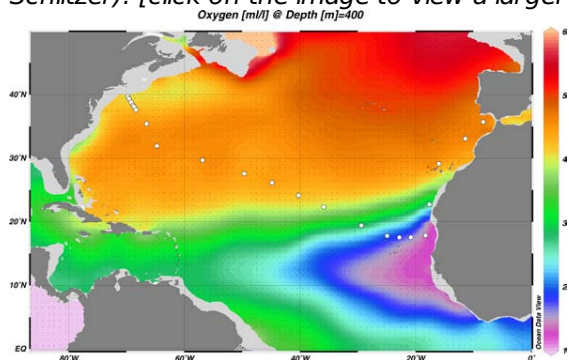
Much of this text appeared in an article published in OCB News, October 2008, by the OCB Project Office.

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]

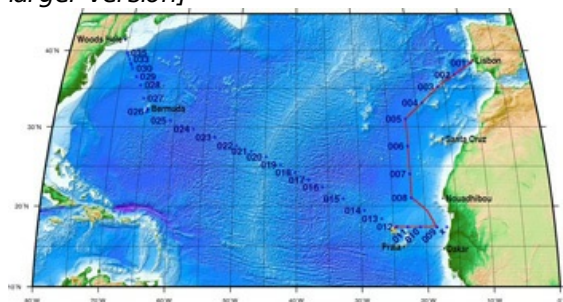


Hydrography, CTD and nutrient measurements will be supported by the Ocean Data Facility (J. Swift) at Scripps Institution of Oceanography and funded through NSF Facilities. They will be providing an additional CTD rosette system along with nephelometer and LADCP. A trace metal clean Go-Flo Rosette and winch system 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 \(PDF\)](#)

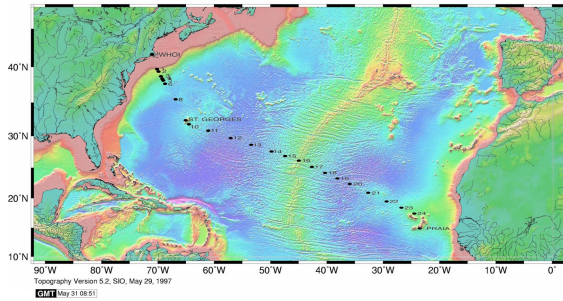
Figure 2. The red line shows the cruise track for the first leg of the US Geotraces North Atlantic Transect on the R/V Knorr in October 2010. The rest of the stations (beginning with 13) will be completed in October-December 2011 on the R/V Knorr (courtesy of Bill Jenkins, Chief Scientist, GNAT first 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)

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

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.

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

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0752351
NSF Division of Ocean Sciences (NSF OCE)	OCE-0929919
NSF Division of Ocean Sciences (NSF OCE)	OCE-1132766

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