ODF one meter-averaged downcast CTD profiles along the US GEOTRACES North Atlantic Transect from the R/V Knorr KN199-04 cruise in the subtropical N. Atlantic from 2010 (U.S. GEOTRACES NAT project)

Website: https://www.bco-dmo.org/dataset/3699
Data Type: Cruise Results
Version: 3
Version Date: 2013-02-14

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

Program
» U.S. GEOTRACES (U.S. GEOTRACES)

Contributors	Affiliation	Role
Boyle, Edward A.	Massachusetts Institute of Technology (MIT)	Principal Investigator, Contact
Cutter, Gregory A.	Old Dominion University (ODU)	Co-Principal Investigator
Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Coverage

Spatial Extent: **N**:39.70169 **E**:-24.50003 **S**:17.39998 **W**:-69.86286
Temporal Extent: 2011-11-07 - 2011-12-10

Dataset Description

CTD profile data from 30-ODF/SIOR (Ocean Data Facility 12 bottle, 30 liter Niskin rosette)
1m Downcasts

CTD/Hydrographic Measurements Program
Two types of rosette/SBE9plus CTD casts (65 SIOR/30L-Niskin and 40 GT-C/15L-GoFlo) were made at 22 station locations during GEOTRACES 2011. 13 shallow and 13 deep McLane pump profiles were done at all Full and Super Stations, with an SBE19plus CTD attached to the end of the wire.

Data Processing Description

Processing Notes:
14 Feb 2013: BCO-DMO corrected the event number of CTD cast 6 at station 18. The correct event number was verified in the original cast sheets.

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Data Files

File
CTD_ODF_Profiles_GT11.csv (Comma Separated Values (.csv), 18.07 MB) MD5:f3402cbfd146c419a2036a611334ea4d Primary data file for dataset ID 3699

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Parameters

Parameter	Description	Units
cruise_part	Identifier for a segment of a cruise leg, where a leg may have been broken into parts	text
GEOTRACES_CRUISE_ID	GEOTRACES Cruise Id	text
GEOTRC_EVENTNO	GEOTRACES Event Number	integer
STNNBR	Station Number	integer
CASTNO	Cast Number	integer
TYPE	Cast Type	text
DATE	Date in the format YYYYMMDD	unitless
TIME	Time	HHMMSS
LATITUDE	Latitude (South is negative)	DEGREES
LONGITUDE	Longitude (West is negative)	DEGREES
BTMDEPTH	Bottom Depth	CORR METERS
CTDPRS	CTD Pressure	DBAR
CTDPRS_FLAG_W	CTD Pressure Flag W	integer

CTDTMP	CTD Temperature	ITS-90
CTDTMP_FLAG_W	CTD Temperature Flag W	integer
CTDSAL	CTD Salinity	PSS-78
CTDSAL_FLAG_W	CTD Salinity Flag W	integer
CTDOXY	CTD Oxygen	UMOL/KG
CTDOXY_FLAG_W	CTD Oxygen Flag W	integer
TRANSM	Transmissometer	0-5VDC
TRANSM_FLAG_W	Transmissometer Flag W	integer
FLUORM	Fluorometer	0-5VDC
FLUORM_FLAG_W	Fluorometer Flag W	integer
DEPTH	Depth	METERS
DEPTH_FLAG_W	Depth Flag W	integer
CTDNOBS	CTD Number Observations	integer
CTDETIME	CTD Elapsed Time	SECONDS

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Instruments

Dataset-specific Instrument Name	Altimeter
Generic Instrument Name	Altimeter
Dataset-specific Description	Altimeter - Tritech LPRA-200 or Simrad 807 SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise.
Generic Instrument Description	An instrument that measures height above a fixed surface. The data can be used to map ocean-surface topography and generate gridded surface height fields.

Dataset-specific Instrument Name	Fluorometer
Generic Instrument Name	Fluorometer
Dataset-specific Description	Fluorometer - Seapoint SCF SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Dissolved Oxygen Sensor
Generic Instrument Name	Oxygen Sensor
Dataset-specific Description	Dissolved Oxygen Sensor - A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise.
Generic Instrument Description	An electronic device that measures the proportion of oxygen (O2) in the gas or liquid being analyzed

Dataset-specific Instrument Name	SBE 43 Dissolved Oxygen Sensor
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Dataset-specific Description	SBE 43 Dissolved Oxygen Sensor SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise.
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. More information from the manufacturer: https://www.seabird.com/products/sbe-43-dissolved-oxygen-sensor

Dataset-specific Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Name	Sea-Bird SBE 911plus CTD
Dataset-specific Description	CTD/Hydrographic Measurements Program Two types of rosette/SBE9plus CTD casts (65 SIOR/30L-Niskin and 40 GT-C/15L-GoFlo) were made at 22 station locations during GEOTRACES 2011. 13 shallow and 13 deep McLane pump profiles were done at all Full and Super Stations, with an SBE19plus CTD attached to the end of the wire. SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise
Generic Instrument Description	[tethered, real-time] The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Transmissometer
Generic Instrument Name	Transmissometer
Dataset-specific Description	Transmissometer - WET Labs C-Star SIOR/30L-Niskin Rosette/CTD casts were performed with a package consisting of a 12-bottle rosette frame (SIO/STS), a 24-place carousel (SBE32) and 12 30L General Oceanics bottles with an absolute volume of 30L each. Underwater electronic components consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT) dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (WET Labs C-Star), fluorometer (Seapoint SCF) and altimeter (Tritech LPRA-200 or Simrad 807). A second dissolved oxygen plus oxygen temperature sensor (JFE Advantech RINKO-III) was incorporated into the data stream for future sensor evaluation; it was not processed for this cruise
Generic Instrument Description	A transmissometer measures the beam attenuation coefficient of the lightsource over the instrument's path-length. This instrument designation is used when specific manufacturer, make and model are not known.

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Deployments

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	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) **Methods & Sampling** Refer to KN204-01 A/B Cruise Report for detailed descriptions of acquisition and processing methodologies **Processing Description** Refer to http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/STS_Prelim_GT11_Doc... A/B Cruise Report for detailed descriptions of acquisition and processing methodologies

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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)

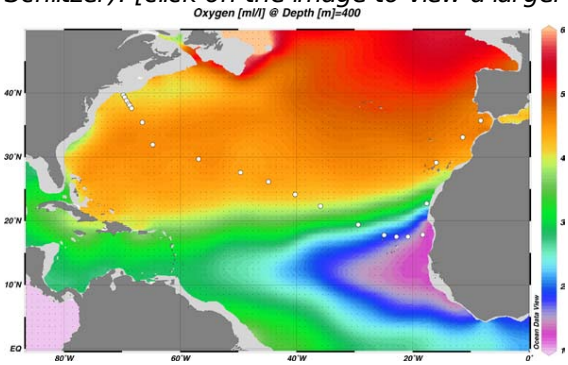
Much of this text appeared in an article published in OCB News, October 2008, by the OCB Project Office.

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]

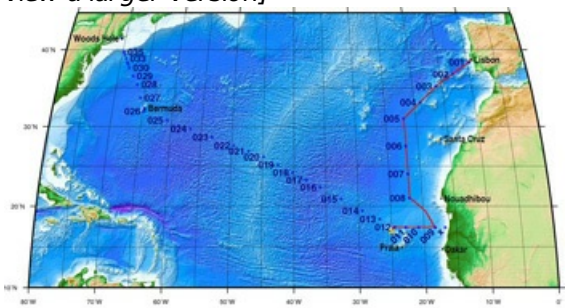


Hydrography, CTD and nutrient measurements will be supported by the Ocean Data Facility (J. Swift) at Scripps Institution of Oceanography and funded through NSF Facilities. They will be providing an additional CTD rosette system along with nephelometer and LADCP. A trace metal clean Go-Flo Rosette and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

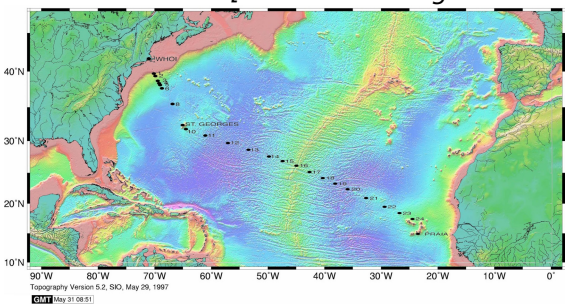
Figure 2. The red line shows the cruise track for the first leg of the US Geotraces North Atlantic Transect on the R/V Knorr in October 2010. The rest of the stations (beginning with 13) will be completed in October-December 2011 on the R/V Knorr (courtesy of Bill Jenkins, Chief Scientist, GNAT first 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
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926423
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926092

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