

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

Website: <https://www.bco-dmo.org/dataset/3518>

Data Type: Cruise Results

Version: 1

Version Date: 2012-05-23

## Project

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

## Program

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

Contributors	Affiliation	Role
<a href="#">Jenkins, William J.</a>	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator, Contact
<a href="#">Boyle, Edward A.</a>	Massachusetts Institute of Technology (MIT)	Co-Principal Investigator
<a href="#">Cutter, Gregory</a>	Old Dominion University (ODU)	Co-Principal Investigator
<a href="#">Gegg, Stephen R.</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Abstract

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

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## Coverage

Spatial Extent: N:38.33036 E:-9.66001 S:17.34906 W:-24.4998

Temporal Extent: 2010-10-16 - 2010-11-02

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## Dataset Description

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

### **Acquisition Description**

(see individual deployments)

### **Processing Description**

(see individual deployments)

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### **Parameters**

Parameter	Description	Units
CRUISE_ID	Official Cruise Id	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	YYYYMMDD
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
lat_nom	Nominal latitude of station. Obtained from KN199-04 station waypoints provided by Chief Sci.	decimal degrees
lon_nom	Nominal longitude of station. Obtained from KN199-04 station waypoints provided by Chief Sci.	decimal degrees

## Instruments

<b>Dataset-specific Instrument Name</b>	Fluorometer
<b>Generic Instrument Name</b>	Fluorometer
<b>Dataset-specific Description</b>	Fluorometer
<b>Generic Instrument Description</b>	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.

<b>Dataset-specific Instrument Name</b>	Transmissometer
<b>Generic Instrument Name</b>	Transmissometer
<b>Dataset-specific Description</b>	Transmissometer
<b>Generic Instrument Description</b>	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.

<b>Dataset-specific Instrument Name</b>	CTD Sea-Bird SBE 911plus
<b>Generic Instrument Name</b>	CTD Sea-Bird SBE 911plus
<b>Generic Instrument Description</b>	The Sea-Bird SBE 911plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911plus 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 9plus and SBE 11plus is called a SBE 911plus. The SBE 9plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3plus and SBE 4). The SBE 9plus 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

<b>Dataset-specific Instrument Name</b>	Dissolved Oxygen Sensor
<b>Generic Instrument Name</b>	Dissolved Oxygen Sensor
<b>Dataset-specific Description</b>	Dissolved Oxygen Sensor
<b>Generic Instrument Description</b>	An electronic device that measures the proportion of oxygen (O <sub>2</sub> ) in the gas or liquid being analyzed

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## Deployments

### KN199-04

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58066">https://www.bco-dmo.org/deployment/58066</a>
<b>Platform</b>	R/V Knorr
<b>Report</b>	<a href="http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/Cruise_Report_for_Knorr_199_Final_v3.pdf">http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/Cruise_Report_for_Knorr_199_Final_v3.pdf</a>
<b>Start Date</b>	2010-10-15
<b>End Date</b>	2010-11-04

**Description**

KN199-04 is the US GEOTRACES Zonal North Atlantic Survey Section cruise planned for late Fall 2010 from Lisboa, Portugal to Woods Hole, MA, USA. 4 November 2010 update: Due to engine failure, the scheduled science activities were canceled on 2 November 2010. On 4 November the R/V KNORR put in at Porto Grande, Cape Verde and is scheduled to depart November 8, under the direction of Acting Chief Scientist Oliver Wurl of Old Dominion University. The objective of this leg is to carry the vessel in transit to Charleston, SC while conducting science activities modified from the original plan. Planned scientific activities and operations area during this transit will be as follows: the ship's track will cross from the highly productive region off West Africa into the oligotrophic central subtropical gyre waters, then across the western boundary current (Gulf Stream), and into the productive coastal waters of North America. During this transit, underway surface sampling will be done using the towed fish for trace metals, nanomolar nutrients, and arsenic speciation. In addition, a port-side high volume pumping system will be used to acquire samples for radium isotopes. Finally, routine aerosol and rain sampling will be done for trace elements. This section will provide important information regarding atmospheric deposition, surface transport, and transformations of many trace elements. The vessel is scheduled to arrive at the port of Charleston, SC, on 26 November 2010. The original cruise was intended to be 55 days duration with arrival in Norfolk, VA on 5 December 2010. funding: NSF OCE award 0926423 Science Objectives are 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 will target 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. In addition, the major biogeochemical provinces of the subtropical North Atlantic will be characterized. For additional information, please refer to the GEOTRACES program Web site (GEOTRACES.org) for overall program objectives and a summary of properties to be 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 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. List of cruise participants: [ PDF ] Cruise track: JPEG image (from Woods Hole Oceanographic Institution, vessel operator) Additional information may still be available from the vessel operator: WHOI cruise planning synopsis 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: KN199-04 ADCP

**Acquisition Description**

Refer to KN199-04 Cruise Report for detailed descriptions of acquisition and processing methodologies

**Processing Description**

Refer to [http://bcodata.whoi.edu/US\\_GEOTRACES/AtlanticSection/Cruise\\_Report\\_for\\_...](http://bcodata.whoi.edu/US_GEOTRACES/AtlanticSection/Cruise_Report_for_...target=_blank) KN199-04 Cruise Report for detailed descriptions of acquisition and processing methodologies

## 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>

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