Bottle data along with US GEOTRACES North Atlantic Transect from the R/V Knorr KN204-01 cruise in the subtropical N. Atlantic during 2011 (U.S. GEOTRACES NAT project)

Website: https://www.bco-dmo.org/dataset/3662
Version: 30 January 2013
Version Date: 2013-02-13

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

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

Contributors	Affiliation	Role
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Dataset Description

CTD bottle data from 30-ODF/SIOR (Ocean Data Facility 12 bottle, 30 liter Niskin rosette) GT11 Transect

Methods & Sampling

Refer to KN204-01 A/B Cruise Report for detailed descriptions of acquisition and processing methodologies

Data Processing Description

Refer to KN204-01 A/B Cruise Report for detailed descriptions of acquisition and processing methodologies.

Processing Notes:
13 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.

The restriction on this dataset was removed according to instructions from the Chief Scientist on April 26, 2013.

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Data Files

File
CTD_ODF_Bottle_GT11.csv (Comma Separated Values (.csv), 524.76 KB) MD5:20660d716af2d9ba4670378f409a1c51 Primary data file for dataset ID 3662

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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
EXPOCODE	EXPOCODE	text
SECT_ID	SECT ID	text
STNNBR	STNNBR	integer
CASTNO	CASTNO	integer
GEOTRC_EVENTNO	GEOTRACES Event Number	integer
DATE	Date	YYYYMMDD
TIME	Time	HHMM
LATITUDE	Latitude (South is negative)	decimal degrees
LONGITUDE	Longitude (West is negative)	decimal degrees
GEOTRC_SAMPNO	GEOTRC SAMPNO	integer
SAMPNO	SAMPNO	integer
BTLNBR	BTLNBR	text
BTLNBR_FLAG_W	BTLNBR FLAG W	integer

BTL_DATE	BTL DATE	YYYYMMDD
BTL_TIME	BTL TIME	HHMM
BTL_LAT	BTL LAT (South is negative)	decimal degrees
BTL_LON	BTL LON (West is negative)	decimal degrees
BTMDEPTH	BTMDEPTH	CORR.M
CTDPRS	CTDPRS	DBARS
CTDDEPTH	CTDDEPTH	METERS
CTDTMP	CTDTMP	ITS-90
CTDSAL	CTDSAL	PSS-78
CTDSAL_FLAG_W	CTDSAL FLAG W	integer
SALNTY	SALNTY	PSS-78
SALNTY_FLAG_W	SALNTY FLAG W	integer
CTDOXY	CTDOXY	UMOL/KG
CTDOXY_FLAG_W	CTDOXY FLAG W	integer
OXYGEN	OXYGEN	UMOL/KG
OXYGEN_FLAG_W	OXYGEN FLAG W	integer
SILCAT	SILCAT	UMOL/KG
SILCAT_FLAG_W	SILCAT FLAG W	integer
NITRAT	NITRAT	UMOL/KG

NITRAT_FLAG_W	NITRAT FLAG W	integer
NITRIT	NITRIT	UMOL/KG
NITRIT_FLAG_W	NITRIT FLAG W	integer
PHSPHT	PHSPHT	UMOL/KG
PHSPHT_FLAG_W	PHSPHT FLAG W	integer
REFTEMP	REFTEMP	ITS-90
REFTEMP_FLAG_W	REFTEMP FLAG W	integer
CFC11	CFC-11	PMOL/KG
CFC11_FLAG_W	CFC-11 FLAG W	integer
CFC12	CFC-12	PMOL/KG
CFC12_FLAG_W	CFC-12 FLAG W	integer
CFC113	CFC113	PMOL/KG
CFC113_FLAG_W	CFC113 FLAG W	integer
SF6	SF6	FMOL/KG
SF6_FLAG_W	SF6 FLAG W	integer
FE_UH	FE UH	NMOL/L
FE_UH_FLAG_W	FE UH FLAG W	integer
AL_UH	AL UH	NMOL/L
AL_UH_FLAG_W	AL UH FLAG W	integer

MN_UH	MN UH	NMOL/L
MN_UH_FLAG_W	MN UH FLAG W	integer
ZN_UH	ZN UH	NMOL/L
ZN_UH_FLAG_W	ZN UH FLAG W	integer
TCARBN_M	TCARBN M	UMOL/KG
TCARBN_M_FLAG_W	TCARBN M FLAG W	integer
ALKALI_M	ALKALI M	UMOL/KG
ALKALI_M_FLAG_W	ALKALI M FLAG W	integer
TCARBN_B	TCARBN B	UMOL/KG
TCARBN_B_FLAG_W	TCARBN B FLAG W	integer
ALKALI_B	ALKALI B	UMOL/KG
ALKALI_B_FLAG_W	ALKALI B FLAG W	integer
TRITUM	TRITUM	TU
TRITUM_FLAG_W	TRITUM FLAG W	integer
HELIUM	HELIUM	NMOL/KG
HELIUM_FLAG_W	HELIUM FLAG W	integer
DELHE3	DELHE3	PERCNT
DELHE3_FLAG_W	DELHE3 FLAG W	integer
DELC13	DELC13	/MILLE

DELC13_FLAG_W	DELC13 FLAG W	integer
DELC14	DELC14	/MILLE
DELC14_FLAG_W	DELC14 FLAG W	integer
O17_O2	17O-O2	/MEGvsAIR
O17_O2_FLAG_W	17O-O2 FLAG W	integer
OXYAR	OXYAR	/MILLEvsAIR
OXYAR_FLAG_W	OXYAR FLAG W	integer
DELO17	DELO17	/MILLEvsAIR
DELO17_FLAG_W	DELO17 FLAG W	integer
D15N_minus_NO3	D15N-NO3	/MILLEvsAIR
D15N_minus_NO3_FLAG_W	D15N-NO3 FLAG W	integer
D18O_minus_NO3	D18O-NO3	/MILLEvsVSMOW
D18O_minus_NO3_FLAG_W	D18O-NO3 FLAG W	integer
O18_H2O	18O H2O	/MILLE
O18_H2O_FLAG_W	18O H2O FLAG W	integer
SI_SW_DISS	SI SW DISS	/MILLE
SI_SW_DISS_FLAG_W	SI SW DISS FLAG W	integer
SI_PM	SI PM	/MILLE
SI_PM_FLAG_W	SI PM FLAG W	integer

HPLC_PIGMENTS	HPLC PIGMENTS	UG/L
HPLC_PIGMENTS_FLAG_W	HPLC PIGMENTS FLAG W	integer
AP_ACTIV	AP ACTIV	/HR
AP_ACTIV_FLAG_W	AP ACTIV FLAG W	integer
CYSTEINE	CYSTEINE	PMOL/L
CYSTEINE_FLAG_W	CYSTEINE FLAG W	integer
GLUTATHIONE	GLUTATHIONE	PMOL/L
GLUTATHIONE_FLAG_W	GLUTATHIONE FLAG W	integer
GAMMA_minus_GLU_minus_CYST	GAMMA-GLU-CYST	PMOL/L
GAMMA_minus_GLU_minus_CYST_FLAG_W	GAMMA-GLU-CYST FLAG W	integer
ARG_minus_CYS	ARG-CYS	PMOL/L
ARG_minus_CYS_FLAG_W	ARG-CYS FLAG W	integer
HOMOCYSTEINE	HOMOCYSTEINE	PMOL/L
HOMOCYSTEINE_FLAG_W	HOMOCYSTEINE FLAG W	integer
PHYTOCHELATINS	PHYTOCHELATINS	PMOL/L
PHYTOCHELATINS_FLAG_W	PHYTOCHELATINS FLAG W	integer
METALLOTHEIONINE	METALLOTHEIONINE	PMOL/L
METALLOTHEIONINE_FLAG_W	METALLOTHEIONINE FLAG W	integer
DNA_CHISHOLM	DNA CHISHOLM	(tbd)

DNA_CHISHOLM_FLAG_W	DNA CHISHOLM FLAG W	integer
DNA_LAROCHE	DNA LAROCHE	(tbd)
DNA_LAROCHE_FLAG_W	DNA LAROCHE FLAG W	integer
BA	BA	NMOL/L
BA_FLAG_W	BA FLAG W	integer
ND143_to_ND144	ND-143/ND-144	RATIO
ND143_to_ND144_FLAG_W	ND-143/ND-144 FLAG W	integer
EPSILON_ND	EPSILON ND	(tbd)
EPSILON_ND_FLAG_W	EPSILON ND FLAG W	integer
PO210	PO-210	DPM/100L
PO210_FLAG_W	PO-210 FLAG W	integer
PB210	PB-210	DPM/100L
PB210_FLAG_W	PB-210 FLAG W	integer
RA226	RA-226	DPM/100L
RA226_FLAG_W	RA-226 FLAG W	integer
PA231	PA-231	FG/KG
PA231_FLAG_W	PA-231 FLAG W	integer
TH230	TH-230	FG/KG
TH230_FLAG_W	TH-230 FLAG W	integer

TH232	TH-232	PG/KG
TH232_FLAG_W	TH-232 FLAG W	integer
TH232_COLLOIDS	TH-232 COLLOIDS	PG/KG
TH232_COLLOIDS_FLAG_W	TH-232 COLLOIDS FLAG W	integer
TH234	TH-234	DPM/L
TH234_FLAG_W	TH-234 FLAG W	integer
U238	U-238	(tbd)
U238_FLAG_W	U-238 FLAG W	integer
CS137	CS-137	BQ/M^3
CS137_FLAG_W	CS-137 FLAG W	integer
NP237	NP-237	MBQ/M^3
NP237_FLAG_W	NP-237 FLAG W	integer
PU239	PU-239	MBQ/M^3
PU239_FLAG_W	PU-239 FLAG W	integer
PU240	PU-240	MBQ/M^3
PU240_FLAG_W	PU-240 FLAG W	integer
PU240_to_PU239	PU-240/PU-239	RATIO
PU240_to_PU239_FLAG_W	PU-240/PU-239 FLAG W	integer
REE_LA_UH	REE LA UH	PMOL/KG

REE_LA_UH_FLAG_W	REE LA UH FLAG W	integer
REE_CE_UH	REE CE UH	PMOL/KG
REE_CE_UH_FLAG_W	REE CE UH FLAG W	integer
REE_PR_UH	REE PR UH	PMOL/KG
REE_PR_UH_FLAG_W	REE PR UH FLAG W	integer
REE_ND_UH	REE ND UH	PMOL/KG
REE_ND_UH_FLAG_W	REE ND UH FLAG W	integer
REE_SM_UH	REE SM UH	PMOL/KG
REE_SM_UH_FLAG_W	REE SM UH FLAG W	integer
REE_EU_UH	REE EU UH	PMOL/KG
REE_EU_UH_FLAG_W	REE EU UH FLAG W	integer
REE_GD_UH	REE GD UH	PMOL/KG
REE_GD_UH_FLAG_W	REE GD UH FLAG W	integer
REE_TB_UH	REE TB UH	PMOL/KG
REE_TB_UH_FLAG_W	REE TB UH FLAG W	integer
REE_DY_UH	REE DY UH	PMOL/KG
REE_DY_UH_FLAG_W	REE DY UH FLAG W	integer
REE_HO_UH	REE HO UH	PMOL/KG
REE_HO_UH_FLAG_W	REE HO UH FLAG W	integer

REE_ER_UH	REE ER UH	PMOL/KG
REE_ER_UH_FLAG_W	REE ER UH FLAG W	integer
REE_TM_UH	REE TM UH	PMOL/KG
REE_TM_UH_FLAG_W	REE TM UH FLAG W	integer
REE_YB_UH	REE YB UH	PMOL/KG
REE_YB_UH_FLAG_W	REE YB UH FLAG W	integer
REE_LU_UH	REE LU UH	PMOL/KG
REE_LU_UH_FLAG_W	REE LU UH FLAG W	integer

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Instruments

Dataset-specific Instrument Name	GO-FLO Bottle
Generic Instrument Name	GO-FLO Bottle
Generic Instrument Description	GO-FLO bottle cast used to collect water samples for pigment, nutrient, plankton, etc. The GO-FLO sampling bottle is specially designed to avoid sample contamination at the surface, internal spring contamination, loss of sample on deck (internal seals), and exchange of water from different depths.

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Generic Instrument Description	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

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... target="_blank">KN204-01 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)

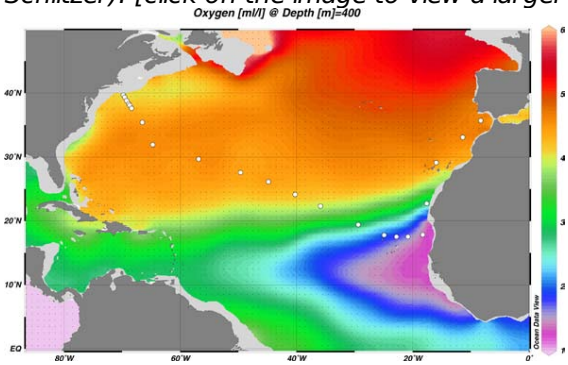
Much of this text appeared in an article published in OCB News, October 2008, by the OCB Project Office.

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]

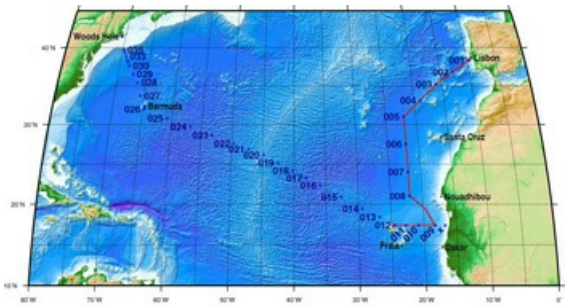


Hydrography, CTD and nutrient measurements will be supported by the Ocean Data Facility (J. Swift) at Scripps Institution of Oceanography and funded through NSF Facilities. They will be providing an additional CTD rosette system along with nephelometer and LADCP. A trace metal clean Go-Flo Rosette and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

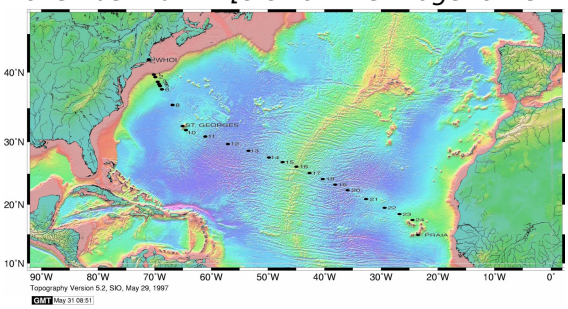
Figure 2. The red line shows the cruise track for the first leg of the US Geotraces North Atlantic Transect on the R/V Knorr in October 2010. The rest of the stations (beginning with 13) will be completed in October-December 2011 on the R/V Knorr (courtesy of Bill Jenkins, Chief Scientist, GNAT first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