

Bottle data from the CTD-ODF carousel on the GEOTRACES Arctic Section cruise (HLY1502) from August to October 2015 (U.S. GEOTRACES Arctic project)

Website: <https://www.bco-dmo.org/dataset/646825>

Data Type: Cruise Results

Version: 5

Version Date: 2019-11-25

Project

» [U.S. Arctic GEOTRACES Study \(GN01\)](#) (U.S. GEOTRACES Arctic)

Program

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

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Abstract

Bottle data from the CTD-ODF carousel on the GEOTRACES Arctic Section cruise (HLY1502) from August to October 2015.

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Coverage

Spatial Extent: N:89.9909 E:180 S:60.165 W:-179.8934

Temporal Extent: 2015-08-12 - 2015-10-08

Dataset Description

Bottle data from the ODF CTD carousel, GEOTRACES Arctic cruise HLY1502.

ODF CTD BOTTLE file name from the Scripps Oceanographic Data Facility (ODF): 20160119ODF

Note: 'FLAG_W' columns correspond to the WHP ([WOCE Hydrographic Program](#)) quality flag scheme.

Methods & Sampling

See the [HLY1502](#) cruise report for more information on data acquisition.

Note: Repeating GEOTRC_SAMPNO indicate samples where multiple smaller sample bottles were used to collect water at the same depth.

Data Processing Description

Version history:

2019-11-25: version 5: changed incorrect LONGITUDE value of sample 11256 (from 180.033.0087 to 180.0000).

2019-07-29: version 4: removed all "placeholder" columns containing no data (-999 only). These columns were included in the original files from ODF to indicate the expected datasets. All data reported from the cruise can be found on the [HLY1502 cruise page](#) or on the [U.S. Arctic GEOTRACES project page](#).

2016-09-01: version 3 (ODF file dated 2016-01-19); replaces v2015-10-09-ODF. Updates include:

- 1) Pressure offset applied
- 2) Additional polyfits applied to temperature and conductivity
- 3) Updated non-linear fits to oxygen sensors
- 4) Updated shore analysis bottles sampled census

BCO-DMO Processing:

- added conventional header with dataset name; PI name; version date;
- added cruise_id column;
- reformatted time as HHMM;
- changed all hyphen, parentheses in parameter names to underscores;
- 2019-07-29: removed all "placeholder" columns containing no data (-999 only); a list of the removed columns available as a tab-separated file: [ODF_Bottle_20190729_removals.tsv](#)
- 2019-11-25: version 5: changed incorrect LONGITUDE value of sample 11256 (from 180.033.0087 to 180.0000).

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Data Files

File
ODF_Bottle_v5_20191125.csv (Comma Separated Values (.csv), 952.97 KB) MD5:2df2bd263c9923497cdd9cfcff40120f Primary data file for dataset ID 646825

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Supplemental Files

File
ARC01 (HLY1502, GN01) cruise report filename: ARC01-report.pdf(Portable Document Format (.pdf), 4.02 MB) MD5:371276af63d6b2d7f9127446e3b2c66e U.S. Arctic GEOTRACES cruise report

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Parameters

Parameter	Description	Units
cruise_id	cruise identification	unitless
EXPOCODE	expedition code assigned by the CCHDO: NODCSHIPCodeYearMonthDay	unitless
SECT_ID	cruise section identification number	unitless
STNNBR	station number	unitless
CASTNO	cast number	unitless
GEOTRC_EVENTNO	GEOTRACES Event Number	unitless
GEOTRC_SAMPNO	GEOTRACES Sample Number	unitless
SAMPNO	sequential sample number within a cast	unitless
BTLNBR	NIS-#: Bottle serial number; SMBT (small boat), UWAY (underway), and CORER (coring) are samples not collected from the rosette but are included for completeness.	unitless
BTLNBR_FLAG_W	Bottle Quality Flag	unitless
DATE	Station Date (GMT); format is YYYYMMDD	unitless
TIME	Station Time (GMT); format is HHMM	unitless
ISO_DateTime.UTC	Date/Time (ISO8601 formatted); format is YYYY-MM-DDTHH:MM:SS[.xx]Z	unitless
LATITUDE	Station Latitude (South is negative)	decimal degrees
LONGITUDE	Station Longitude (West is negative)	decimal degrees
DEPTH	Bottom Depth	meters (corrected)
CTDPRS	CTD pressure	decibars
CTDDEPTH	CTD depth: Fofonoff-Millard depth (non-integrated; also used by SBE)	meters

CTDTMP	CTD temperature; ITS-90	degrees Celsius
CTDSAL	CTD salinity	PSS-78
CTDSAL_FLAG_W	CTD salinity quality flag	unitless
SALNTY	salinity	PSS-78
SALNTY_FLAG_W	salinity quality flag	unitless
SALTREF	salinity reference	G/KG
SALTREF_FLAG_W	salinity reference quality flag	unitless
CTDOXY	CTD oxygen	UMOL/KG
CTDOXY_FLAG_W	CTD oxygen quality flag	unitless
OXYGEN	oxygen	UMOL/KG
OXYGEN_FLAG_W	oxygen quality flag	unitless
SILCAT	SILCAT	UMOL/KG
SILCAT_FLAG_W	SILCAT quality flag	unitless
NITRAT	NITRAT	UMOL/KG
NITRAT_FLAG_W	NITRAT quality flag	unitless
NITRIT	NITRIT	UMOL/KG
NITRIT_FLAG_W	NITRIT quality flag	unitless
PHSPHT	PHSPHT	UMOL/KG
PHSPHT_FLAG_W	PHSPHT quality flag	unitless

REFTMP	REFTEMP	ITS-90
REFTMP_FLAG_W	REFTEMP quality flag	unitless
CFC_11	CFC-11	PMOL/KG
CFC_11_FLAG_W	CFC-11 quality flag	unitless
CFC_12	CFC-12	PMOL/KG
CFC_12_FLAG_W	CFC-12 quality flag	unitless
CFC113	CFC113	PMOL/KG
CFC113_FLAG_W	CFC113 quality flag	unitless
SF6	SF6	FMOL/KG
SF6_FLAG_W	SF6 quality flag	unitless
TCARB	TCARB	UMOL/KG
TCARB_FLAG_W	TCARB quality flag	unitless
PH_SWS	PH_SWS	unitless
PH_SWS_FLAG_W	PH_SWS quality flag	unitless
PH_TMP	PH_TMP	degrees Celsius
ALKALI	ALKALI	UMOL/KG
ALKALI_FLAG_W	ALKALI quality flag	unitless
METHANE	METHANE	NMOL/L
METHANE_FLAG_W	methane quality flag	unitless

BTL_DATE	Bottle Date (GMT); format is YYYYMMDD	unitless
BTL_TIME	Bottle Time (GMT); format is HHMM	unitless
BTL_LAT	Bottle Latitude (South is negative)	decimal degrees
BTL_LON	Bottle Longitude (West is negative)	decimal degrees

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Description	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	
Generic Instrument Name	Niskin bottle
Dataset-specific Description	NIS: Niskins bottles sampled from the the 12-place 30 liter rosette. GSNIS: Niskins bottles sampled from the 36-place 10 liter GO-SHIP rosette.
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

HLY1502

Website	https://www.bco-dmo.org/deployment/638807
Platform	USCGC Healy
Report	https://datadocs.bco-dmo.org/docs/302/geotraces/GEOTRACES_ARCTIC/data_docs/cruise_reports/healy1502.pdf
Start Date	2015-08-09
End Date	2015-10-12
Description	Arctic transect encompassing Bering and Chukchi Shelves and the Canadian, Makarov and Amundsen sub-basins of the Arctic Ocean. The transect started in the Bering Sea (60°N) and traveled northward across the Bering Shelf, through the Bering Strait and across the Chukchi shelf, then traversing along 170-180°W across the Alpha-Mendelev and Lomonosov Ridges to the North Pole (Amundsen basin, 90°N), and then back southward along ~150°W to terminate on the Chukchi Shelf (72°N). Additional cruise information is available in the GO-SHIP Cruise Report (PDF) and from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/HLY1502

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Project Information

U.S. Arctic GEOTRACES Study (GN01) (U.S. GEOTRACES Arctic)

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

Coverage: Arctic Ocean; Sailing from Dutch Harbor to Dutch Harbor (GN01)

Description from NSF award abstract:

In pursuit of its goal "to identify processes and quantify fluxes that control the distributions of key trace elements and isotopes in the ocean, and to establish the sensitivity of these distributions to changing environmental conditions", in 2015 the International GEOTRACES Program will embark on several years of research in the Arctic Ocean. In a region where climate warming and general environmental change are occurring at amazing speed, research such as this is important for understanding the current state of Arctic Ocean geochemistry and for developing predictive capability as the regional ecosystem continues to warm and influence global oceanic and climatic conditions. The three investigators funded on this award, will manage a large team of U.S. scientists who will compete through the regular NSF proposal process to contribute their own unique expertise in marine trace metal, isotopic, and carbon cycle geochemistry to the U.S. effort. The three managers will be responsible for arranging and overseeing at-sea technical services such as hydrographic measurements, nutrient analyses, and around-the-clock management of on-deck sampling activities upon which all participants depend, and for organizing all pre- and post-cruise technical support and scientific meetings. The management team will also lead educational outreach activities for the general public in Nome and Barrow, Alaska, to explain the significance of the study to these communities and to learn from residents' insights on observed changes in the marine system. The project itself will provide for the support and training of a number of pre-doctoral students and post-doctoral researchers. Inasmuch as the Arctic Ocean is an epicenter of global climate change, findings of this study are expected to advance present capability to forecast changes in regional and global ecosystem and climate system functioning.

As the United States' contribution to the International GEOTRACES Arctic Ocean initiative, this project will be part of an ongoing multi-national effort to further scientific knowledge about trace elements and isotopes in the world ocean. This U.S. expedition will focus on the western Arctic Ocean in the boreal summer of 2015. The scientific team will consist of the management team funded through this award plus a team of scientists from U.S. academic institutions who will have successfully competed for and received NSF funds for specific science projects in time to participate in the final stages of cruise planning. The cruise track segments will include the Bering Strait, Chukchi shelf, and the deep Canada Basin. Several stations will be designated as so-called super stations for intense study of atmospheric aerosols, sea ice, and sediment chemistry as well as water-column processes. In total, the set of coordinated international expeditions will involve the deployment of ice-capable research ships from 6 nations (US, Canada, Germany, Sweden, UK, and Russia) across different parts of the

Arctic Ocean, and application of state-of-the-art methods to unravel the complex dynamics of trace metals and isotopes that are important as oceanographic and biogeochemical tracers in the sea.

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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-1355913
NSF Division of Ocean Sciences (NSF OCE)	OCE-1355833
NSF Division of Ocean Sciences (NSF OCE)	OCE-1356008
NSF Division of Ocean Sciences (NSF OCE)	OCE-1455924

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