Bottle file from Leg 1 (Seattle, WA to Hilo, HI) of the US GEOTRACES Pacific Meridional Transect (PMT) cruise (GP15, RR1814) on R/V Roger Revelle from September to October 2018

Website: https://www.bco-dmo.org/dataset/777951
Data Type: Cruise Results
Version: 5
Version Date: 2021-03-26

Project
» US GEOTRACES Pacific Meridional Transect (U.S. GEOTRACES PMT)

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

Contributors	Affiliation	Role
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Abstract
Bottle data collected by the GTC (GEOTRACES Trace element Carousel) and ODF (Ocean Data Facility) CTD rosettes, underway, and tow fish on the US GEOTRACES Pacific Meridional Transect (PMT) cruise (GP15). Leg 1 (RR1814) took place from 24 September to 21 October 2018 on R/V Roger Revelle. Data from the different sampling systems was compiled into one file by ODF. For complete acquisition and processing information, refer to the cruise report.

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Coverage

Spatial Extent: **N**:56.0585 **E**:-151.9992 **S**:19.6808 **W**:-156.9628
Temporal Extent: 2018-09-24 - 2018-10-21

Dataset Description

Bottle data collected by the GTC (GEOTRACES Trace element Carousel) and ODF (Ocean Data Facility) CTD rosettes, underway, and tow fish on Leg 1 of the US GEOTRACES Pacific Meridional Transect (PMT) cruise (GP15) from September to October 2018. Data from the different sampling systems was compiled into one file by ODF. For complete acquisition and processing information, refer to the cruise report (PDF).

Processing Description

FLAG columns follow the [WOCE Hydrographic Program (WHP) quality flag definitions](#).

The WHP quality codes for the water bottle itself are:
1 = Bottle information unavailable.
2 = No problems noted.
3 = Leaking.
4 = Did not trip correctly.
5 = Not reported.
6 = Significant discrepancy in measured values between Gerard and Niskin bottles.
7 = Unknown problem.
8 = Pair did not trip correctly. Note that the Niskin bottle can trip at an unplanned depth while the Gerard trips correctly and vice versa.
9 = Samples not drawn from this bottle.
(Flags 6, 7, and 8 apply primarily to large volume samplers.)

The WHP bottle parameter data quality codes are:
1 = Sample for this measurement was drawn from water bottle but analysis not received. Note that if water is drawn for any measurement from a water bottle, the quality flag for that parameter must be set equal to 1 initially to ensure that all water samples are accounted for.
2 = Acceptable measurement.
3 = Questionable measurement.
4 = Bad measurement.
5 = Not reported.
6 = Mean of replicate measurements (Number of replicates should be specified).
7 = Manual chromatographic peak measurement.
8 = Irregular digital chromatographic peak integration.
9 = Sample not drawn for this measurement from this bottle.

The WHP CTD data quality codes are:
1 = Not calibrated.
2 = Acceptable measurement.
3 = Questionable measurement.
4 = Bad measurement.
5 = Not reported.
6 = Interpolated over >2 dbar interval.
7 = Despiked.
8 = Not assigned for CTD data.
9 = Not sampled.

BCO-DMO Processing:
- changed time format to hhmm;
- added ISO8601 date/time column;
- filled in missing values with "nd";
- replaced -999 and -999.000 with "nd";
- Version history:
- 2021-03-26 (v5; current) - replaced GEOTRC_EVENTNO "6544" with "6548" (for samples 12486-12509). As per the event log, 6544 was aborted and those sample numbers were used in event 6548.
- 2020-09-22 (v4) - from original file named "33RR20180918_hy1_v5_door_barcodes.xlsx" contains GEOTRACES DOoR-formatted names; splits the data into one file per leg.
- 2020-03-02 (v3) - from original file named "33RR20180918_hy1_v5.xlsx" submitted on 02-March-2020.
- 2019-10-22 (v2) - from original file named "33RR20180918_hy1_v4_pjl.xlsx" submitted on 2019-10-14.
- 2019-09-25 (v1) - from original file named "33RR20180918_hy1_v3.csv" submitted on 2019-09-10.

[ ]

Related Datasets

IsContinuedBy

Casciotti, K. L., Cutter, G., Lam, P. J. (2020) **Bottle file from Leg 2 (Hilo, HI to Papeete, French Polynesia) of the US GEOTRACES Pacific Meridional Transect (PMT) cruise (GP15, RR1815) on R/V Roger Revelle from October to November 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 4) Version Date 2020-09-22 doi:10.26008/1912/bco-dmo.824867.4 [view at BCO-DMO]
Relationship Description: GP15 was made up of two cruise legs, RR1814 (Leg 1) and RR1815 (Leg 2).

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Parameters

Parameter	Description	Units
EXPOCODE	Expedition code	unitless
SECT_ID	Section ID	unitless
STNNBR	Station number	unitless
CASTNO	Cast Identifier	unitless
SAMPNO	Sample number	unitless
BTLNBR	Bottle Number	unitless
BTLNBR_FLAG_W	Bottle quality flag; see WHP quality codes for the water bottle itself	unitless
GEOTRC_EVENTNO	GEOTRACES Event number	unitless
GEOTRC_SAMPNO	GEOTRACES Sample number	unitless
DATE	Date; format: yyyymmdd	unitless
TIME	Time; format: HHMM	unitless
LATITUDE	Latitude; positive values = North	decimal degrees
LONGITUDE	Longitude; positive values = East	decimal degrees
DEPTH	Bottom depth	meters (m)
CTDPRS	Sample/sensor pressure	decibars
CTDTMP	Temperature from CTD sensor in the ITS-90 convention	degrees Celsius
CTDSAL	Practical salinity from CTD sensor on the PSS-1978 scale	psu
CTDSAL_FLAG_W	CTDSAL flag	unitless
Sigma0	Sigma theta	kilograms per cubic meter (kg/m3)
REFTMP	Reference temperature; ITS-90	degrees Celsius
REFTMP_FLAG_W	REFTMP flag	unitless
BTL_DATE	Date of bottle firing; format: yyyymmdd	unitless
BTL_TIME	Time of bottle firing: format: HHMM	unitless
BTL_ISO_DateTime_UTC	Date and time (UTC) of bottle firing formatted to ISO8601 standard: YYYY-MM-DDThh:mmZ	yyyy-MM-dd'T'HH:mm'Z'
BTL_LAT	Latitude of bottle firing; positive values = North	decimal degrees
BTL_LON	Longitude of bottle firiing; positive values = East	decimal degrees

SILICATE_D_CONC_BOTTLE_l9fh07	Concentration of dissolved silicate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_SILICATE_D_CONC_BOTTLE_l9fh07	Quality flag; WHP bottle parameter data quality code	unitless
PHOSPHATE_D_CONC_BOTTLE_lof4ap	Concentration of dissolved phosphate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_PHOSPHATE_D_CONC_BOTTLE_lof4ap	Quality flag; WHP bottle parameter data quality code	unitless
NITRATE_D_CONC_BOTTLE_xhgtuv	Concentration of dissolved NITRATE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRATE_D_CONC_BOTTLE_xhgtuv	Quality flag; WHP bottle parameter data quality code	unitless
NITRITE_D_CONC_BOTTLE_z8gng0	Concentration of dissolved NITRITE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRITE_D_CONC_BOTTLE_z8gng0	Quality flag; WHP bottle parameter data quality code	unitless
OXYGEN_D_CONC_BOTTLE_qizf9x	Concentration of dissolved oxygen from a bottle sample	micromoles per kilogram (umol/kg)
Flag_OXYGEN_D_CONC_BOTTLE_qizf9x	Quality flag; WHP bottle parameter data quality code	unitless
SALINITY_D_CONC_BOTTLE_tcj2lg	Practical salinity from bottle sample on the PSS-1978 scale	psu
Flag_SALINITY_D_CONC_BOTTLE_tcj2lg	Quality flag; WHP bottle parameter data quality code	unitless
SILICATE_D_CONC_FISH_fhawk1	Concentration of dissolved silicate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_SILICATE_D_CONC_FISH_fhawk1	Quality flag; WHP bottle parameter data quality code	unitless
PHOSPHATE_D_CONC_FISH_llbawa	Concentration of dissolved phosphate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_PHOSPHATE_D_CONC_FISH_llbawa	Quality flag; WHP bottle parameter data quality code	unitless
NITRATE_D_CONC_FISH_gstces	Concentration of dissolved NITRATE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRATE_D_CONC_FISH_gstces	Quality flag; WHP bottle parameter data quality code	unitless
NITRITE_D_CONC_FISH_b3cecm	Concentration of dissolved NITRITE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRITE_D_CONC_FISH_b3cecm	Quality flag; WHP bottle parameter data quality code	unitless
SALINITY_D_CONC_FISH_xdgku2	Practical salinity from a towed fish sample on the PSS-1978 scale	psu
Flag_SALINITY_D_CONC_FISH_xdgku2	Quality flag; WHP bottle parameter data quality code	unitless
SILICATE_D_CONC_PUMP_twyjqu	Concentration of dissolved silicate in a water sample collected using a bottle attached to a pump, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_SILICATE_D_CONC_PUMP_twyjqu	Quality flag; WHP bottle parameter data quality code	unitless
PHOSPHATE_D_CONC_PUMP_cnbzm8	Concentration of dissolved phosphate in a water sample collected using a bottle attached to a pump, samples may or may not have been filtered	micromoles per kilogram (umol/kg)

Flag_PHOSPHATE_D_CONC_PUMP_cnbzm8	Quality flag; WHP bottle parameter data quality code	unitless
NITRATE_D_CONC_PUMP_vjkgqy	Concentration of dissolved NITRATE in a water sample collected using a bottle attached to a pump, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRATE_D_CONC_PUMP_vjkgqy	Quality flag; WHP bottle parameter data quality code	unitless
NITRITE_D_CONC_PUMP_jnycxr	Concentration of dissolved NITRITE in a water sample collected using a bottle attached to a pump, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRITE_D_CONC_PUMP_jnycxr	Quality flag; WHP bottle parameter data quality code	unitless
OXYGEN_D_CONC_PUMP_o3vkda	Concentration of dissolved oxygen from a bottle attached to a pump	micromoles per kilogram (umol/kg)
Flag_OXYGEN_D_CONC_PUMP_o3vkda	Quality flag; WHP bottle parameter data quality code	unitless
SALINITY_D_CONC_PUMP_lpmvfn	Practical salinity on the PSS-1978 scale	psu
Flag_SALINITY_D_CONC_PUMP_lpmvfn	Quality flag; WHP bottle parameter data quality code	unitless
SILICATE_D_CONC_UWAY_k45n4v	Concentration of dissolved silicate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_SILICATE_D_CONC_UWAY_k45n4v	Quality flag; WHP bottle parameter data quality code	unitless
PHOSPHATE_D_CONC_UWAY_hocaya	Concentration of dissolved phosphate, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_PHOSPHATE_D_CONC_UWAY_hocaya	Quality flag; WHP bottle parameter data quality code	unitless
NITRATE_D_CONC_UWAY_iz1ch8	Concentration of dissolved NITRATE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRATE_D_CONC_UWAY_iz1ch8	Quality flag; WHP bottle parameter data quality code	unitless
NITRITE_D_CONC_UWAY_qqikvd	Concentration of dissolved NITRITE, samples may or may not have been filtered	micromoles per kilogram (umol/kg)
Flag_NITRITE_D_CONC_UWAY_qqikvd	Quality flag; WHP bottle parameter data quality code	unitless
OXYGEN_D_CONC_UWAY_dmaf2z	Concentration of dissolved oxygen from a ship's underway seawater sampling system	micromoles per kilogram (umol/kg)
Flag_OXYGEN_D_CONC_UWAY_dmaf2z	Quality flag; WHP bottle parameter data quality code	unitless
SALINITY_D_CONC_UWAY_fwoedt	Practical salinity from a seawater sample collected using the ship's underway sampling system on the PSS-1978 scale	psu
Flag_SALINITY_D_CONC_UWAY_fwoedt	Quality flag; WHP bottle parameter data quality code	unitless
CTDRINKO	Voltage from RINKO dissolved oxygen sensor	volts
CTDRINKO_FLAG_W	CTDRINKO quality flag	unitless
CTDFLUOR	Fluorescence from CTD sensor	volts
CTDFLUOR_FLAG_W	CTDFLUOR quality flag	unitless
CTDXMISS	Transmissometer	volts
CTDXMISS_FLAG_W	CTDXMISS quality flag	unitless
CTDOXY	Concentration of dissolved oxygen from sensor on CTD	micromoles per kilogram (umol/kg)

CTDOXY_FLAG_W	CTDOXY quality flag	unitless

Instruments

Dataset-specific Instrument Name	
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	
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.

Dataset-specific Instrument Name	
Generic Instrument Name	GeoFish Towed near-Surface Sampler
Generic Instrument Description	The GeoFish towed sampler is a custom designed near surface (

Dataset-specific Instrument Name	
Generic Instrument Name	Rinko III ARO-CAV Oxygen Sensor
Dataset-specific Description	A RINKO III (ARO-CAV) optical dissolved oxygen sensor was deployed on this cruise. See the following documents for more information: ARO-CAV0296_170410.pdf (calibration certificate provided by ODF)RinkoIII_Manual.pdf (Rinko manual provided by ODF)
Generic Instrument Description	The RINKO III is a fast-response optical dissolved oxygen (DO) and temperature sensor. The DO sensor is coated with photostimulable phosphor (PSP) on the outside of the pressure-resistant acrylic optical window, measuring phosphorescence quenching phase shift. The excitation blue LED pulse generates a red phosphorescence pulse, which in turn has an inverse correlation with the oxygen partial pressure in the water. It is an analogue output version. It has a response time of less than 1 second in air, enabling dissolved oxygen measurements with continuous profiling at high speeds. The dissolved oxygen sensor has a non-linear accuracy of +/-2% of full scale (at 1atm, 25 deg C) and the temperature sensor +/-0.02 deg C. It has a pressure rating of 7000 m. This device is made by JFE Advantech Co. Ltd.

Deployments

RR1814

Website	https://www.bco-dmo.org/deployment/776913
Platform	R/V Roger Revelle
Report	https://datadocs.bco-dmo.org/docs/geotraces/GEOTRACES_PMT/casciotti/data_docs/GP15_Cruise_Report_with_ODF_Report.pdf
Start Date	2018-09-18
End Date	2018-10-21

Project Information

US GEOTRACES Pacific Meridional Transect (U.S. GEOTRACES PMT)

Website: http://www.usgeotraces.org/USGEOTRACES_website/html/pacific-alaska.html

Coverage: Pacific Meridional Transect along 152W (GP15)

A 60-day research cruise took place in 2018 along a transect form Alaska to Tahiti at 152° W. A description of the project titled "*Collaborative Research: Management and implementation of the US GEOTRACES Pacific Meridional Transect*", funded by NSF, is below. Further project information is available on the US GEOTRACES website and on the cruise blog. A detailed cruise report is also available as a PDF.

Description from NSF award abstract:
GEOTRACES is a global effort in the field of Chemical Oceanography in which the United States plays a major role. The goal of the GEOTRACES program is to understand the distributions of many elements and their isotopes in the ocean. Until quite recently, these elements could not be measured at a global scale. Understanding the distributions of these elements and isotopes will increase the understanding of processes that shape their distributions and also the processes that depend on these elements. For example, many "trace elements" (elements that are present in very low amounts) are also important for life, and their presence or absence can play a vital role in the population of marine ecosystems. This project will launch the next major U.S. GEOTRACES expedition in the Pacific Ocean between Alaska and Tahiti. The award made here would support all of the major infrastructure for this expedition, including the research vessel, the sampling equipment, and some of the core oceanographic measurements. This project will also support the personnel needed to lead the expedition and collect the samples.

This project would support the essential sampling operations and infrastructure for the U.S. GEOTRACES Pacific Meridional Transect along 152° W to support a large variety of individual science projects on trace element and isotope (TEI) biogeochemistry that will follow. Thus, the major objectives of this management proposal are: (1) plan and coordinate a 60 day research cruise in 2018; (2) obtain representative samples for a wide variety of TEIs using a conventional CTD/rosette, GEOTRACES Trace Element Sampling Systems, and in situ pumps; (3) acquire conventional CTD hydrographic data along with discrete samples for salinity, dissolved oxygen, algal pigments, and dissolved nutrients at micro- and nanomolar levels; (4) ensure that proper QA/QC protocols are followed and reported, as well as fulfilling all GEOTRACES intercalibration protocols; (5) prepare and deliver all hydrographic data to the GEOTRACES Data Assembly Centre (via the US BCO-DMO data center); and (6) coordinate all cruise communications between investigators, including preparation of a hydrographic report/publication. This project would also provide baseline measurements of TEIs in the Clarion-Clipperton fracture zone (~7.5°N-17°N, ~155°W-115°W) where large-scale deep sea mining is planned. Environmental impact assessments are underway in partnership with the mining industry, but the effect of mining activities on TEIs in the water column is one that

could be uniquely assessed by the GEOTRACES community. In support of efforts to communicate the science to a wide audience the investigators will recruit an early career freelance science journalist with interests in marine science and oceanography to participate on the cruise and do public outreach, photography and/or videography, and social media from the ship, as well as to submit articles about the research to national media. The project would also support several graduate students.

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.

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1657781
NSF Division of Ocean Sciences (NSF OCE)	OCE-1658318
NSF Division of Ocean Sciences (NSF OCE)	OCE-1657944