

Hydrography data collected using the Trace Metal Rosette (TMR) on Metzyme cruise (R/V Kilo Moana KM1128) in the tropical North Pacific in October 2011

Website: <https://www.bco-dmo.org/dataset/716685>

Data Type: Cruise Results

Version: 11 October 2017

Version Date: 2017-10-11

Project

» [Connecting Trace Elements and Metalloenzymes Across Marine Biogeochemical Gradients \(GPc03\)](#)
(MetZyme)

Program

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

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Coverage

Spatial Extent: N:17 E:-154.4 S:-15 W:-174.5

Temporal Extent: 2011-10-03 - 2011-10-24

Dataset Description

Hydrography data from Metzyme cruise (KM1128) collected using the Trace Metal Rosette (TMR).

Methods & Sampling

Data were collected using the Trace Metal Rosette ((TMR), Sea-Bird SEACAT 19+).

Note that the ship's CTD package (Sea-Bird SBE 911+) was also used for sampling at some stations. See the [CTD dataset](#) for these related data.

Data Processing Description

BCO-DMO Processing:

- modified parameter names to conform with BCO-DMO naming conventions (removed spaces, replaced "/" with underscores);
- replaced blanks (missing data) with "nd";
- corrected all years of "0011" to "2011".

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Data Files

File
TMR.csv (Comma Separated Values (.csv), 5.72 MB) MD5:dfdf0eaaeb630296ad34f55756219f0 Primary data file for dataset ID 716685

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Parameters

Parameter	Description	Units
Cruise	Cruise identifier	unitless
Station	Station number	unitless
Latitude	Latitude of TMR deep cast at each station; positive values = North	decimal degrees
Longitude	Longitude of TMR deep cast at each station; 0-360	decimal degrees
Type	Type of cast. T = TMR.	unitless
Date_Time	Date and time of TMR cast at each station; formatted as yyyy-mm-ddThh:mm:ss.sss	unitless
DEPTH	Sample depth	meters (m)
TEMPERATURE	Temperature	degrees Celsius
SALINITY	Salinity (PSS78)	practical salinity units (PSU)
Oxygen	Oxygen	micromoles per kilogram (umol/kg)
TbdCh	Turbidity; measured at stations 4-13. Turbidity on Upoly1 for TMR21-22 and Upoly0 for TMR23-53.	?

FluoroCh	Chlorophyll fluorescence; CTD deep cast stations 1-2 (Upoly0). TMR deep cast stations 4-13 -- Wetlabs ECO fluorometer on Upoly0 for TMR21-22 and Upoly1 for TMR23-53	?
C0mS_cm	Conductivity	milliSiemens per centimeter (mS/cm)
PrdM	Pressure	decibars (db)
Density00	Density	?
Sigma_00	Sigma theta density	?
Xmiss	Beam transmission	percent?
ISUS	CTD cast 4 for station 1 and CTD deep cast (5) for station 2 (Upoly1) - not qc'd at all, use for relative data only!!	?
TMR_Cast	Trace metal rosette cast number (1-53)	unitless
CTD_Cast_ISUS	4 for station 1, 5 for station 2	?
CTD_Cast_FluoroCh_and_Xmiss	1 for station 1, 5 for station 2	?

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CTD Sea-Bird SBE SEACAT 19plus
Generic Instrument Description	Self contained self powered CTD profiler. Measures conductivity, temperature and pressure in both profiling (samples at 4 scans/sec) and moored (sample rates of once every 5 seconds to once every 9 hours) mode. Available in plastic or titanium housing with depth ranges of 600m and 7000m respectively. Minature submersible pump provides water to conductivity cell.

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Deployments

KM1128

Website	https://www.bco-dmo.org/deployment/59053
Platform	R/V Kilo Moana
Start Date	2011-10-01
End Date	2011-10-25
Description	This is a MetZyme project cruise. The original cruise data are available from the NSF R2R data catalog.

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Project Information

Connecting Trace Elements and Metalloenzymes Across Marine Biogeochemical Gradients (GPc03) (MetZyme)

Coverage: Tropical North Pacific along 150 degrees West from 18 degrees North to the equator

MetZyme project researchers will determine the role of enzymatic activity in the cycling of trace metals. Specifically the research will address the following questions: (1) degradation of sinking particulate organic material in the Tropical North Pacific can be influenced by the ability of microbes to synthesize zinc proteases, which in turn is controlled by the abundance or availability of zinc, and (2) methylation of mercury is controlled, in part, by the activity of cobalt-containing enzymes, and therefore the supply of labile cobalt to the corrinoid-containing enzymes or co-factors responsible for methylation. To attain their goal, they will collect dissolved and particulate samples for trace metals and metalloenzymes from three stations along a biogeochemical gradient in the Tropical North Pacific (along 150 degrees West from 18 degrees North to the equator). Sinking particles from metal clean sediment traps will also be obtained. The samples will also be used to carry out shipboard incubation experiments using amendments of metals, metal-chelators, B12, and proteases to examine the sensitivity and metal limitation of heterotrophic, enzymatic degradation of organic matter within the oceanic "Twilight Zone" (100-500 m). This study will result in a novel metaproteomic/metalloenzyme datasets that should provide insights into the biogeochemical cycling of metals, as well as co-limitation of primary productivity and controls on the export of carbon from the photic zone. In addition to the final data being contributed to BCO-DMO, an online metaproteomic data server will be created so the community has access to the raw data files generated by this research.

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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-1031271

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