

Surface water total dissolvable lead concentrations near Station ALOHA from 1997 to 2013

Website: <https://www.bco-dmo.org/dataset/792783>

Data Type: Cruise Results

Version: 1

Version Date: 2020-02-11

Project

» [Center for Microbial Oceanography: Research and Education](#) (C-MORE)

Contributors	Affiliation	Role
Boyle, Edward A.	Massachusetts Institute of Technology (MIT)	Principal Investigator
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Abstract

Lead samples from 1997-2013 were collected using the MITESS (Moored In situ Trace Element Serial Sampler) moored sampler (Bell et al., 2002) (1997-2005) and ATE shipboard sampling from HOT occupations (1997-2012), the HOE-DYLAN cruises (2012), and the HOE-PhoR cruises (2013).

Table of Contents

- [Coverage](#)
 - [Dataset Description](#)
 - [Acquisition Description](#)
 - [Processing Description](#)
 - [Related Publications](#)
 - [Parameters](#)
 - [Instruments](#)
 - [Project Information](#)
 - [Funding](#)
-

Coverage

Spatial Extent: N:22.77 E:-158 S:22.47 W:-158.13

Temporal Extent: 1997-05-29 - 2013-09-26

Acquisition Description

Lead samples from 1997-2013 were collected using the MITESS (Moored In situ Trace Element Serial Sampler) moored sampler (Bell et al., 2002) (1997-2005) and ATE shipboard sampling from HOT occupations (1997-2012), the HOE-DYLAN cruises (2012), and the HOE-PhoR cruises (2013). Samples from 1997-2000 were analyzed as described by Boyle et al. (2005) and samples after that by the method described by Lee et al. (2011). The 1997-2013 Pb samples were measured as tdPb, that is analysis of an acidified unfiltered seawater sample. Since dissolved Pb (dPb) in pelagic settings is typically >90% of tdPb (Boyle et al., 2005), the tdPb concentrations from the Station ALOHA time-series are directly comparable to the 2015 KM1513 dPb data, i.e. filtered at 0.4 μm .

Processing Description

No data processing were necessary.

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- re-formatted date from m/d/yy to yyyy-mm-dd
- converted longitude coordinates from degrees West to degrees East.

[[table of contents](#) | [back to top](#)]

Related Publications

Bell, J., Betts, J., & Boyle, E. (2002). MITESS: a moored in situ trace element serial sampler for deep-sea moorings. *Deep Sea Research Part I: Oceanographic Research Papers*, 49(11), 2103–2118. doi:10.1016/S0967-0637(02)00126-7 [https://doi.org/10.1016/S0967-0637\(02\)00126-7](https://doi.org/10.1016/S0967-0637(02)00126-7) [details]

Boyle, E. A. (2005). Erratum to Edward A. Boyle, Bridget A. Bergquist, Richard A. Kayser and Natalie Mahowald (2005) "Iron, manganese, and lead at Hawaii Ocean Time-series station ALOHA: Temporal variability and an intermediate water hydrothermal plume", *Geochimica et Cosmochimica Acta* 69, 933–952. *Geochimica et Cosmochimica Acta*, 69(21), 5165–5166. doi:[10.1016/j.gca.2005.03.006](https://doi.org/10.1016/j.gca.2005.03.006) [details]

Hayes, C. T., J. N. Fitzsimmons, L. T. Jensen, N. T. Lanning, M. Hatta, D. McGee, E. A. Boyle (2020), A Lagrangian view of trace elements and isotopes in the North Pacific, Journal of Geophysical Research: Oceans. [\[details\]](#)

Lee, J.-M., Boyle, E. A., Echevoyen-Sanz, Y., Fitzsimmons, J. N., Zhang, R., & Kayser, R. A. (2011). Analysis of trace metals (Cu, Cd, Pb, and Fe) in seawater using single batch nitrilotriacetate resin extraction and isotope dilution inductively coupled plasma mass spectrometry. Analytica Chimica Acta, 686(1-2), 93–101. doi:[10.1016/j.aca.2010.11.052](https://doi.org/10.1016/j.aca.2010.11.052) [\[details\]](#)

[\[table of contents \]](#) | [\[back to top \]](#)

Parameters

Parameter	Description	Units
Expedition	expedition identifier	unitless
Deployment	deployment identifier	unitless
Sample_Date	date of sampling events	unitless
ISO_Date	date of sampling events in ISO8601 format	unitless
Lat	latitude of sampling events	decimal degrees
Lon	longitude of sampling events	decimal degrees
Depth	depth of sampling events	meters (m)
Pb_TD_CONC	total dissolvable lead concentration	picomole per kilogram (pmol/kg)

[\[table of contents \]](#) | [\[back to top \]](#)

Instruments

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Standard Niskin bottle rosettes were used for thorium sampling.
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	MIT Automated Trace Element (ATE) sampler
Generic Instrument Name	Trace element sampler
Dataset-specific Description	The MIT Automated Trace Element (ATE) sampler (Bell et al., 2002) was used for trace metal sampling.
Generic Instrument Description	Automated trace element sampler (MITESS or ATE unit). Bell, J., J. Betts, and E. Boyle (2002) MITESS: A Moored In-situ Trace Element Serial Sampler for Deep-Sea Moorings, Deep-Sea Research I: 49:2103-2118 (pdf) More description: http://boyle.mit.edu/~ed/MITESS/MITESShomepage.html

Dataset-specific Instrument Name	MITESS
Generic Instrument Name	Trace element sampler
Dataset-specific Description	Lead samples from 1997-2013 were collected using the MITESS (Moored In situ Trace Element Serial Sampler) moored sampler (Bell et al., 2002) (1997-2005).
Generic Instrument Description	Automated trace element sampler (MITESS or ATE unit). Bell, J., J. Betts, and E. Boyle (2002) MITESS: A Moored In-situ Trace Element Serial Sampler for Deep-Sea Moorings, Deep-Sea Research I: 49:2103-2118 (pdf) More description: http://boyle.mit.edu/~ed/MITESS/MITESShomepage.html

[[table of contents](#) | [back to top](#)]

Project Information

Center for Microbial Oceanography: Research and Education (C-MORE)

Website: <http://cmore.soest.hawaii.edu/>

Coverage: North Pacific Subtropical Gyre (large region around 22 45 N, 158 W)

Project summary The Center for Microbial Oceanography: Research and Education (C-MORE) is a recently established (August 2006; NSF award: EF-0424599) NSF-sponsored Science and Technology Center designed to facilitate a more comprehensive understanding of the diverse assemblages of microorganisms in the sea, ranging from the genetic basis of marine microbial biogeochemistry including the metabolic regulation and environmental controls of gene expression, to the processes that underpin the fluxes of carbon, related bioelements and energy in the marine environment. Stated holistically, C-MORE's primary mission is: Linking Genomes to Biomes. We believe that the time is right to address several major, long-standing questions in microbial oceanography. Recent advances in the application of molecular techniques have provided an unprecedented view of the structure, diversity and possible function of sea microbes. By combining these and other novel approaches with more well-established techniques in microbiology, oceanography and ecology, it may be possible to

develop a meaningful predictive understanding of the ocean with respect to energy transduction, carbon sequestration, bioelement cycling and the probable response of marine ecosystems to global environmental variability and climate change. The strength of C-MORE resides in the synergy created by bringing together experts who traditionally have not worked together and this, in turn, will facilitate the creation and dissemination of new knowledge on the role of marine microbes in global habitability. The new Center will design and conduct novel research, broker partnerships, increase diversity of human resources, implement education and outreach programs, and utilize comprehensive information about microbial life in the sea. The Center will bring together teams of scientists, educators and community members who otherwise do not have an opportunity to communicate, collaborate or design creative solutions to long-term ecosystem scale problems. The Center's research will be organized around four interconnected themes: (Theme I) microbial biodiversity, (Theme II) metabolism and C-N-P-energy flow, (Theme III) remote and continuous sensing and links to climate variability, and (Theme IV) ecosystem modeling, simulation and prediction. Each theme will have a leader to help coordinate the research programs and to facilitate interactions among the other related themes. The education programs will focus on pre-college curriculum enhancements, in service teacher training and formal undergraduate/graduate and post-doctoral programs to prepare the next generation of microbial oceanographers. The Center will establish and maintain creative outreach programs to help diffuse the new knowledge gained into society at large including policymakers. The Center's activities will be dispersed among five partner institutions: Massachusetts Institute of Technology, Woods Hole Oceanographic Institution, Monterey Bay Aquarium Research Institute, University of California at Santa Cruz and Oregon State University and will be coordinated at the University of Hawaii at Manoa. Related Files: Strategic plan (PDF file)

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
NSF Emerging Frontiers Division (NSF EF)	EF-0424599

[[table of contents](#) | [back to top](#)]