ANNUAL REPORT ON GEOTRACES ACTIVITIES IN THE UNITED STATES
MAY 2014 – JUNE 2015

Principal activities of the U.S. GEOTRACES program include:

1. Submitting manuscripts from a North Atlantic zonal section (GA03),
2. Ongoing analysis of samples from a Pacific section between Peru and Tahiti (GP16), and
3. Mobilizing for work in the Arctic Ocean.

Activities

<u>*North Atlantic:*</u> U.S. GEOTRACES investigators remain active in the synthesis and interpretation of results from section GA03 in the North Atlantic. Twenty-five manuscripts appeared in a special issue of Deep-Sea Research Part-II featuring results from GA03. Bill Jenkins, Ed Boyle, Greg Cutter, Rana Fine and Bob Anderson served as guest editors. Papers from this volume are listed separately from other publications produced during the past year by U.S. GEOTRACES investigators at the end of this report.

A substantial amount of work remains to complete the interpretation and publication of results from GA03, especially for the more labor-intensive and time-consuming measurements. U.S. GEOTRACES decided not to pursue a second DSR-II volume. Instead, investigators are encouraged to publish in a journal of their choice.

<u>*Eastern Tropical Pacific:*</u> The second major section carried out by U.S. GEOTRACES, in the eastern tropical Pacific roughly between Peru and Tahiti (GP16, see figure below), was completed in October - December 2013. Chief scientists were James Moffett (University of Southern California) and Christopher German (Woods Hole Oceanographic Institution).

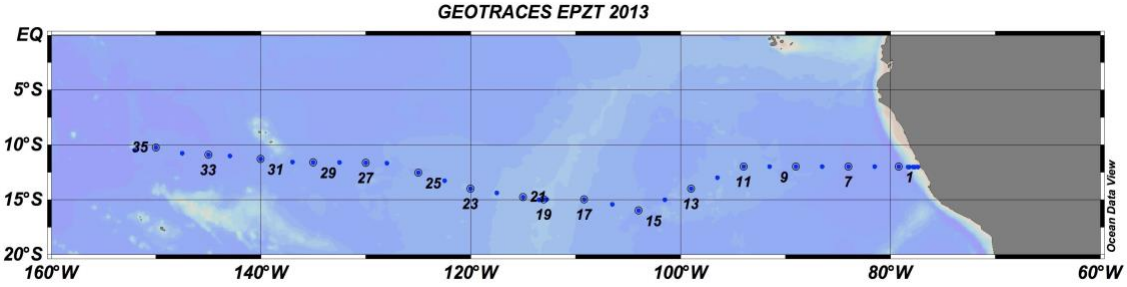


Figure 1: Locations of stations occupied on cruise TGT303 of the Thomas G Thompson in support of the U.S. GEOTRACES completion of section GP16.

Cruise objectives included a comprehensive study of the biogeochemical cycle of trace elements and isotopes within: 1) the highly productive Peru upwelling system, 2) the intense oxygen minimum zone off Peru, and 3) the hydrothermal plume that extends eastward from the East Pacific Rise for up to 3000 km. Preliminary shipboard results from the cruise are presented in the figure below. Many of these results were presented in a special session at the Fall 2014 AGU meeting (San Francisco, California, December 2014) entitled "OS22BTrace Metals and Isotopes in the

Eastern Tropical South Pacific: Results of the 2013 U.S. GEOTRACES Zonal Transect and Complimentary Studies."

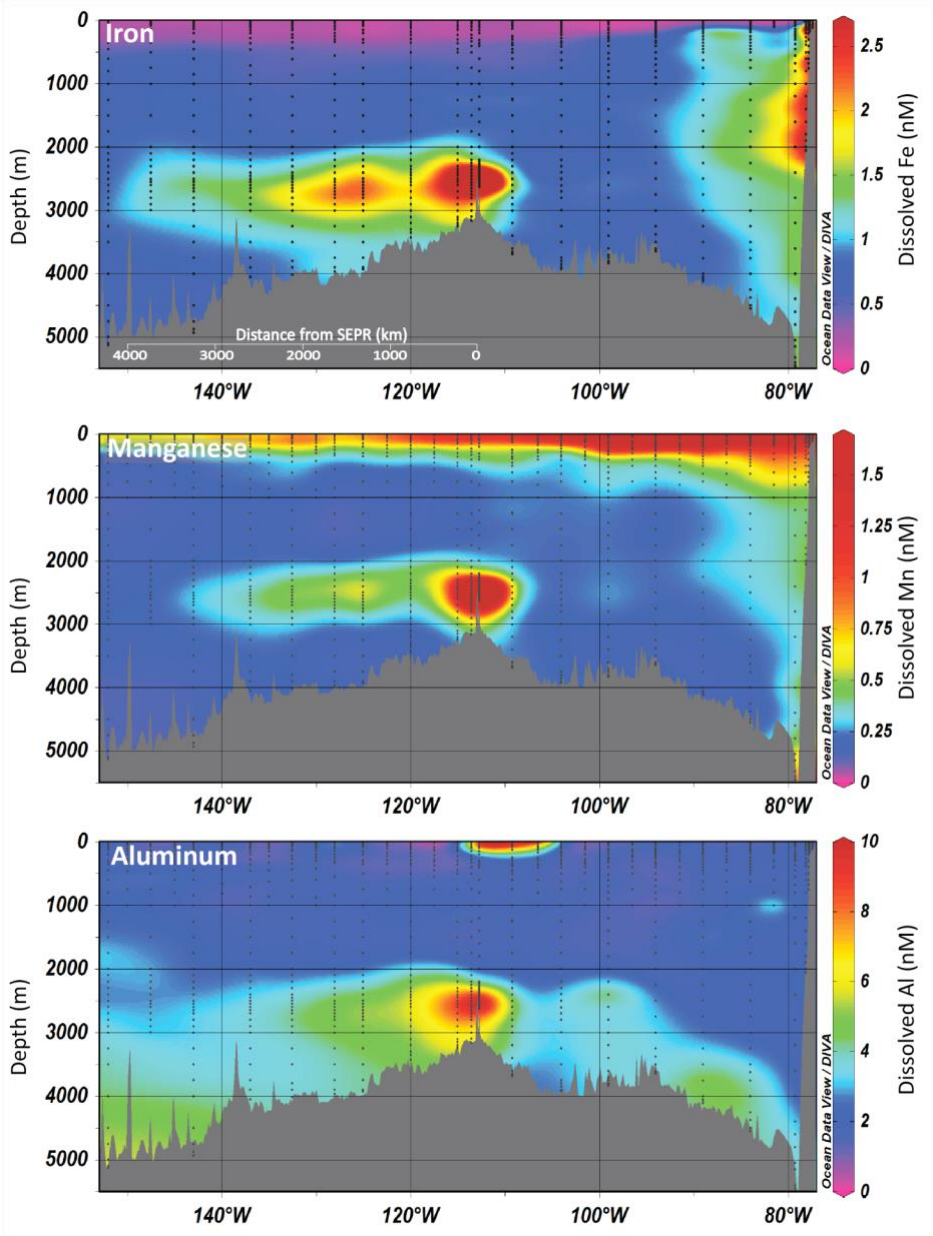


***Figure 2**: Shipboard data for dissolved Fe, Mn and Al collected along section (GP16) illustrate the chemical imprint of the hydrothermal plume extending more than 3000 km (see scale) to the west of the East Pacific Rise. Additional noteworthy features include surface enrichment of Mn, enrichment of Fe and Mn near the eastern boundary, potentially related to redox cycling, and an apparent benthic source of Al. Figure credit: Joe Resing (University of Washington) and Pete Sedwick (Old Dominion University).*

Selected Research Highlights

Atlantic: In a novel approach exploiting stable isotopes of iron, Conway and John (*Nature*, 511 (2014) 212-215, see full reference below) partitioned the measured dissolved iron distribution along section GA03 according to its supply from four principal sources: dust, hydrothermal plume, reductive sediment dissolution, and non-reductive sediment dissolution.

Pacific

1. Results illustrated in the figure above, for Fe, Mn and Al, together with ^{3}He concentrations measured along the same section, indicate surprisingly conservative behavior of dissolved Fe released into the ocean by hydrothermal plumes on the East Pacific Rise. Modeling of the dissolved iron distribution suggests that these hydrothermal plumes may supply a significant fraction of the dissolved iron delivered by upwelling to phytoplankton in the Southern Ocean. These findings are in press in Nature (Resing, J.A., P.N. Sedwick, C.R. German, W.J. Jenkins, J.W. Moffett, B.M. Sohst, and A. Tagliabue. in press. Basin-scale transport of hydrothermal dissolved metals across the South Pacific Ocean. *Nature*.)
2. Additional findings will be discussed at a cruise data workshop to be held in November 2015 (Catalina Island, California).

Planning for an Arctic Expedition

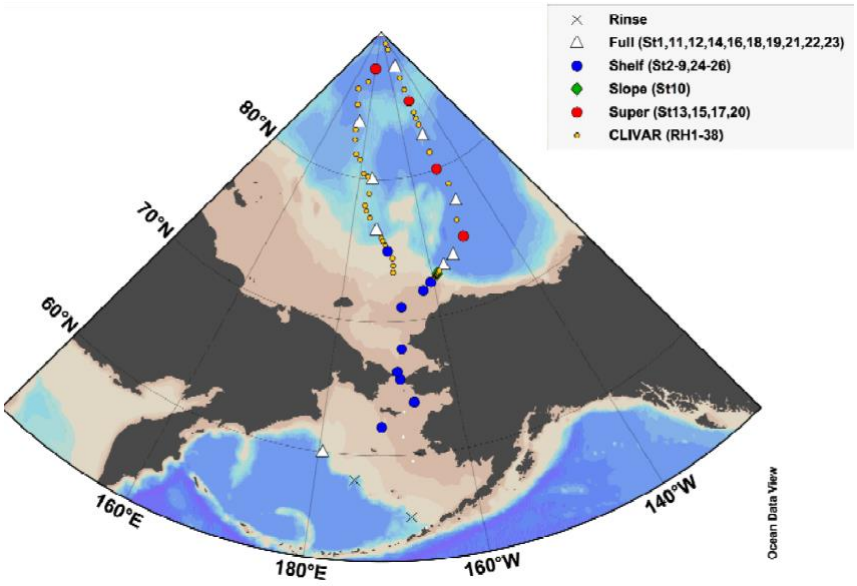


Figure 3*: Planned route of the U.S. GEOTRACES expedition in the Arctic Ocean.*

U.S. investigators will participate in an international GEOTRACES study of the Arctic Ocean during the summer of 2015, sailing aboard the USCGC Healy (7 August - 15 October, 2015; Chief Scientist: David Kadko, Co-Chief Scientist: Bill Landing, Logistics Coordinator: Greg Cutter). Science gear for the expedition was successfully loaded aboard the Healy in Seattle, Washington, during the week of 12 June 2015. GEOTRACES scientists will be accompanied

on the expedition by scientists from the CLIVAR Repeat Hydrography program. It is anticipated that the additional insights into Arctic Ocean circulation provided by the Repeat Hydrographic program will be very beneficial in interpreting the distributions of trace elements and their isotopes to be measured along the cruise track.

New Funding

Funding for the U.S. GEOTRACES Arctic expedition is being provided through a partnership between the Chemical Oceanography program and the Arctic Natural Sciences program at the US National Science Foundation. Altogether, 27 separate projects were funded, involving 49 Principal Investigators, as well as many students, post docs and technicians, representing 29 academic institutions in the U.S.

A proposal to continue funding for the U.S. GEOTRACES project office at the Lamont-Doherty Earth Observatory was submitted to the U.S. NSF in February 2015. We have received verbal notice that the proposal will be recommended for funding, beginning in November 2015 and for a period of three years. The proposal will be funded jointly by the Chemical Oceanography program and the Arctic Natural Sciences program at NSF.

Presentation of results

A large number of presentations based on results from the GP16 section were made at the Fall 2014 meeting of the American Geophysical Union (San Francisco, California, December 2014). Additional presentations are planned for the Goldschmidt Conference (Prague, Czech Republic, August 2015).

U.S. GEOTRACES Meetings

The U.S. GEOTRACES SSC met at the U.S. NSF on 10 and 11 June 2015.

Outreach

<u>Pacific Section (GP16)</u>

The principal outreach activity completed during the past year by U.S. GEOTRACES was a webinar series that was developed by several investigators involved in the U.S. GEOTRACES Eastern Pacific Zonal Transect (GP16) under the leadership of Ben Twining, Director of Research and Education, Bigelow Laboratory for Ocean Sciences. The webinar was organized under the supervision of, and with tremendous technical support from, the COSEE (Center for Ocean Science and Education Excellence)-Ocean Systems Central Office, School of Marine Sciences, University of Maine. Funded by the National Science Foundation's Chemical Oceanography Program, the four-part GEOTRACES webinar series focused on several trace elements and what they can tell us about biogeochemical processes, the carbon cycle, and climate. Nine scientists, each studying a unique facet of the ocean's chemistry, shared their work and the importance of researching these rare and vital "clues" from the ocean:

1. ***An Introduction to GEOTRACES*** - Thursday, April 30, 2015
   Ben Twining - Bigelow Laboratory
   Phoebe Lam - University of California Santa Cruz
2. ***Nutrients in the Open Ocean*** - Tuesday, May 5, 2015

Kathy Barbeau - Scripps Institution of Oceanography
Kristen Buck - College of Marine Science, University of South Florida
Claire Parker - University of California, Santa Cruz.

3. ***Oxygen Minimum Zones*** - Thursday, May 7, 2015
   Carl Lamborg - University of California, Santa Cruz
   Dan Ohnemus - Bigelow Laboratory for Ocean Sciences.
4. ***Hydrothermal Vents and Megaplumes*** - Tuesday, May 12, 2015
   Jessica Fitzsimmons - Texas A&M University
   Brandy Toner - University of Minnesota.

Participants joined the webinar from 29 states in the U.S. plus Puerto Rico and 13 other nations. Among the participants joining the webinar, 35% identified themselves as formal educators, 22% were faculty or postdoctoral researchers, 20% were college or graduate students and 10% identified as "other."

Each of the webinar presentations was recorded and posted online within a few days of each event. The webinar archive pages on the COSEE-OS website:
http://cosee.umaine.edu/programs/webinars/geotraces/

Two supplemental pages were created in addition to the archived webinar content. The first outlines how the series aligns with the Next Generation Science Standards, which can help formal K-12 educators find the content most relevant to their teaching needs. The second contains two slide shows that were created, upon user requests, to walk through the process of obtaining data from the eGEOTRACES website.

GEOTRACES and the Next Generation Science Standards:
http://cosee.umaine.edu/programs/webinars/geotraces/ngss/

GEOTRACES Data Access
http://cosee.umaine.edu/coseeos/webinars/geotraces/data.htm

Collectively, the archive pages have received more than 1700 visits since the webinar broadcasts and the webinar archive videos have been played more than 250 times (as of 1 June 2015).

Arctic Section (GN01)

U.S. GEOTRACES plans to involve multiple components of outreach in its Arctic expedition.

An early step has been outreaching to local populations who depend on the Arctic Ocean for their livelihood. Ana Aguilar-Islas (University of Alaska) gave a presentation on the GEOTRACES Arctic project at the 2015 Kawerak Regional Conference in Nome, Alaska (14 June 2015). Kawerak Inc. organizes services for residents of the Bering Strait Region, 75% of whom are Eskimo, Aleut or American Indian, descent. Kawerak's organizational goal is to assist Alaska Native people and their governing bodies to take control of their future. With programs ranging from education to transportation, and natural resource management to economic development, Kawerak seeks to improve the Region's social, economic, educational, cultural and political conditions.

William Schmoker of the Centennial Middle School in Boulder, Colorado, will participate in the US Arctic cruise as a "Teacher at Sea" sponsored by Polar-Trec: http://www.polartrec.com/. The goal of PolarTREC is to invigorate polar science education and understanding by bringing K-12 educators and polar researchers together. Bill Schmoker is an experienced PolarTREC teacher. He has decades of educational experience in and out of the classroom, teaching preschoolers through retirees in formal and informal settings. A widely published bird/wildlife photographer, author, and public speaker, Bill finds adventure and seeks new knowledge wherever he finds himself, whether gardening in his back yard or 800 miles north of Barrow, Alaska in the Arctic Ocean pack ice.

U.S. GEOTRACES will also participate in the "Float Your Boat outreach project" – A Seattle based program: Youths will have the opportunity to prepare precut toy boat hulls for deployment as an ocean drifter, to learn about polar currents and Polar Research. At the time this report was written (30 June 2015), the U.S. GEOTRACES plans to release over 1300 boats near the North Pole was featured on the Float Your Boat home page: http://www.floatboat.org/.

Outreach efforts for the U.S. GEOTRACES Arctic expedition are coordinated by Bill Landing of Florida State University.

Data Management at BCO-DMO

website:	http://www.bco-dmo.org
email:	info@bco-dmo.org
U.S. GEOTRACES:	http://www.bco-dmo.org/program/2022

Overview

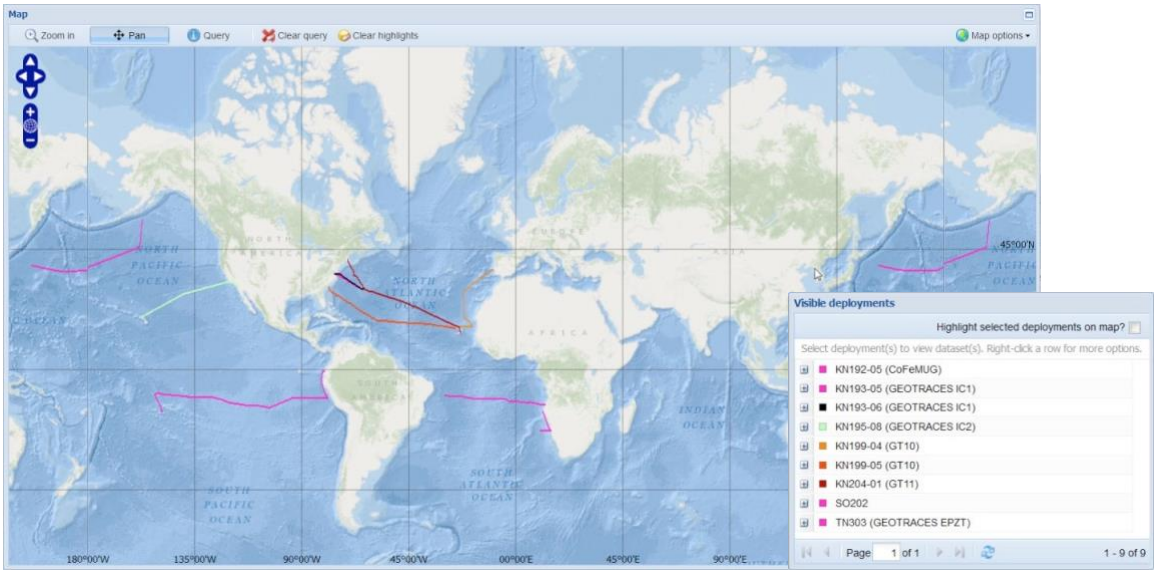
The Biological and Chemical Oceanography Data Management Office (BCO-DMO), based at Woods Hole Oceanographic Institution, manages GEOTRACES data from U.S. funded investigators. Serving as the U.S. GEOTRACES Data Assembly Center (DAC), BCO-DMO currently serves data from the GEOTRACES Intercalibration cruises, the North Atlantic Transect cruises, the East Pacific Zonal Transect cruise, and from projects producing GEOTRACES-compliant data.

The BCO-DMO data managers work closely with contributing investigators to ensure the quality and completeness of data and metadata before transferring the data to the GEOTRACES International DAC at the British Oceanographic Data Center (BODC).

Summary of U.S. GEOTRACES Data Available from BCO-DMO as of June 2015.

Cruise ID	Chief Sci	Dates	# of Datasets
CoFeMUG (GEOTRACES-compliant data)			
KN192-05 (GAc01_CoFeMUG)	Mak Saito	2007-11-16 to 2007-12-13	9
Intercalibration Cruises			
KN193-05 (InterCal 1 Leg 1)	Greg Cutter	2008-06-08 to 2008-06-27	3
KN193-06 (InterCal 1 Leg 2)	Greg Cutter	2008-06-29 to 2008-07-12	6
KN195-08	Greg Cutter	2009-05-06 to 2009-05-29	3
SO202-INOPEX			
SO202-INOPEX (GPc01_INOPEX)	Rainer Gersonde	2009-07-08 to 2009-08-28	1
North Atlantic Transect (NAT)			
KN204 (Section Cruise GA03)	Ed Boyle	2011-11-06 to 2011-12-11	61
KN199-04 (Section Cruise GA03)	William Jenkins	2010-10-15 to 2010-11-04	66
KN199-05	Oliver Wurl	2010-11-08 to 2010-11-26	5
East Pacific Zonal Transect (EPZT)			
TN303 (Section cruise GP16)	Jim Moffett / Chris German	2013-10-25 to 2013-12-22	22
Arctic			
CGC Healy HLY1502 (Section cruise GN01)	David Kadko	2015-08-07 to 2015-10-10	N/A

Cruise tracks from which U.S. GEOTRACES data are managed by BCO-DMO.



Current and Future Activities

As of June 2015, datasets from the NAT cruises are all publicly available (with a few exceptions) and were contributed to BODC for inclusion in the Intermediate Data Product. NAT data were contributed from over 30 PIs across the U.S.

The basic hydrography datasets (CTD downcasts, CTD bottles, event log, cast logs, etc.) from the EPZT have been contributed to BCO-DMO and are available online. Some of these datasets are under password-protection to prevent public access while still allowing GEOTRACES investigators to access the data until they can be considered final. Investigators may contact the Chief Scientists or the BCO-DMO office (info@bco-dmo.org) to obtain the required log-in information.

BCO-DMO data managers are prepared to work with investigators on making additional EPZT data available online and to provide support to investigators participating in the upcoming Arctic Cruise (HLY1502) led by Chief Scientist Dr. David Kadko. We encourage PIs to contact us with questions or concerns about their data. When contributing datasets, we strongly suggest including complete sample metadata with each record (sample ID number, event number, station number, cast number, bottle number, depth, latitude, longitude, and date-time). PIs may opt to restrict their data for a specified time period, though we encourage open sharing of data as early as possible to foster collaboration and data re-use.

Data Management Resources

The "Resources" page of the BCO-DMO website (http://www.bco-dmo.org/resources) provides valuable information about contributing data to BCO-DMO, as well as general data

management guidance and resources. That page includes data management best practices guides, data management planning guidance, a template for the required NSF two-page Data Management Plan, frequently asked questions, and instructions for submitting data to BCO-DMO.

Publications (GEOTRACES, GEOTRACES Compliant and GEOTRACES-related)

During the past year U.S. GEOTRACES investigators published a total of 46 peer-reviewed papers, 25 of which appeared in a special issue of Deep-Sea Research - Part II devoted to the GA03 section.

U.S. GEOTRACES Papers in the GA03 volume of DSR-II

- Bowman, K.L., Hammerschmidt, C.R., Lamborg, C.H. and Swarr, G., 2015. Mercury in the North Atlantic Ocean: The U.S. GEOTRACES zonal and meridional sections. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 251-261.
- Boyle, E.A., Anderson, R.F., Cutter, G.A., Fine, R., Jenkins, W.J. and Saito, M., 2015. Introduction to the U.S. GEOTRACES North Atlantic Transect (GA-03): USGT10 and USGT11 cruises. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 1-5.
- Brzezinski, M.A. and Jones, J.L., 2015. Coupling of the distribution of silicon isotopes to the meridional overturning circulation of the North Atlantic Ocean. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 79-88.
- Buck, K.N., Sohst, B. and Sedwick, P.N., 2015. The organic complexation of dissolved iron along the U.S. GEOTRACES (GA03) North Atlantic Section. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 152-165.
- Fitzsimmons, J.N., Carrasco, G.G., Wu, J., Roshan, S., Hatta, M., Measures, C.I., Conway, T.M., John, S.G. and Boyle, E.A., 2015. Partitioning of dissolved iron and iron isotopes into soluble and colloidal phases along the GA03 GEOTRACES North Atlantic Transect. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 130-151.
- Hatta, M., Measures, C.I., Wu, J., Roshan, S., Fitzsimmons, J.N., Sedwick, P. and Morton, P., 2015. An overview of dissolved Fe and Mn distributions during the 2010‚Äì2011 U.S. GEOTRACES north Atlantic cruises: GEOTRACES GA03. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 117-129.
- Hayes, C.T., Anderson, R.F., Fleisher, M.Q., Huang, K.-F., Robinson, L.F., Lu, Y., Cheng, H., Edwards, R.L. and Moran, S.B., 2015. 230Th and 231Pa on GEOTRACES GA03, the U.S. GEOTRACES North Atlantic transect, and implications for modern and paleoceanographic chemical fluxes. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 29-41.
- Jacquot, J.E. and Moffett, J.W., 2015. Copper distribution and speciation across the International GEOTRACES Section GA03. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 187-207.
- Jenkins, W.J., Lott Iii, D.E., Longworth, B.E., Curtice, J.M. and Cahill, K.L., 2015a. The distributions of helium isotopes and tritium along the U.S. GEOTRACES North Atlantic sections (GEOTRACES GAO3). Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 21-28.

- Jenkins, W.J., Smethie Jr, W.M., Boyle, E.A. and Cutter, G.A., 2015b. Water mass analysis for the U.S. GEOTRACES (GA03) North Atlantic sections. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 6-20.
- Lam, P.J., Ohnemus, D.C. and Auro, M.E., 2015. Size-fractionated major particle composition and concentrations from the US GEOTRACES North Atlantic Zonal Transect. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 303-320.
- Measures, C., Hatta, M., Fitzsimmons, J. and Morton, P., 2015. Dissolved Al in the zonal N Atlantic section of the US GEOTRACES 2010/2011 cruises and the importance of hydrothermal inputs. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 176-186.
- Noble, A.E., Echegoyen-Sanz, Y., Boyle, E.A., Ohnemus, D.C., Lam, P.J., Kayser, R., Reuer, M., Wu, J. and Smethie, W., 2015. Dynamic variability of dissolved Pb and Pb isotope composition from the U.S. North Atlantic GEOTRACES transect. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 208-225.
- Ohnemus, D.C. and Lam, P.J., 2015. Cycling of lithogenic marine particles in the US GEOTRACES North Atlantic transect. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 283-302.
- Owens, S.A., Pike, S. and Buesseler, K.O., 2015. Thorium-234 as a tracer of particle dynamics and upper ocean export in the Atlantic Ocean. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 42-59.
- Quay, P. and Wu, J., 2015. Impact of end-member mixing on depth distributions of Œ¥13C, cadmium and nutrients in the N. Atlantic Ocean. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 107-116.
- Ratten, J.-M., LaRoche, J., Desai, D.K., Shelley, R.U., Landing, W.M., Boyle, E., Cutter, G.A. and Langlois, R.J., 2015. Sources of iron and phosphate affect the distribution of diazotrophs in the North Atlantic. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 332-341.
- Revels, B.N., Ohnemus, D.C., Lam, P.J., Conway, T.M. and John, S.G., 2015. The isotopic signature and distribution of particulate iron in the North Atlantic Ocean. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 321-331.
- Rigaud, S., Stewart, G., Baskaran, M., Marsan, D. and Church, T., 2015. 210Po and 210Pb distribution, dissolved-particulate exchange rates, and particulate export along the North Atlantic US GEOTRACES GA03 section. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 60-78.
- Sedwick, P.N., Sohst, B.M., Ussher, S.J. and Bowie, A.R., 2015. A zonal picture of the water column distribution of dissolved iron(II) during the U.S. GEOTRACES North Atlantic transect cruise (GEOTRACES GA03). Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 166-175.
- Shelley, R.U., Morton, P.L. and Landing, W.M., 2015. Elemental ratios and enrichment factors in aerosols from the US-GEOTRACES North Atlantic transects. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 262-272.
- Twining, B.S., Rauschenberg, S., Morton, P.L., Ohnemus, D.C. and Lam, P.J., 2015. Comparison of particulate trace element concentrations in the North Atlantic Ocean as determined with discrete bottle sampling and in situ pumping. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 273-282.
- Voelker, A.H.L., Colman, A., Olack, G., Waniek, J.J. and Hodell, D., 2015. Oxygen and hydrogen isotope signatures of Northeast Atlantic water masses. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 89-106.

- Wu, J. and Roshan, S., 2015. Cadmium in the North Atlantic: Implication for global cadmium-phosphorus relationship. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 226-239.
- Wurl, O., Shelley, R.U., Landing, W.M. and Cutter, G.A., 2015. Biogeochemistry of dissolved arsenic in the temperate to tropical North Atlantic Ocean. Deep Sea Research Part II: Topical Studies in Oceanography, 116(0): 240-250.

Other U.S. GEOTRACES Publications during the past year (2014-2015)

- Anderson, R.F. and Hayes, C.T., 2015. Characterizing marine particles and their impact on biogeochemical cycles in the GEOTRACES program. Progress In Oceanography, 133(0): 1-5.
- Boss, E., Guidi, L., Richardson, M.J., Stemmann, L., Gardner, W., Bishop, J.K.B., Anderson, R.F. and Sherrell, R.M., 2015. Optical techniques for remote and in-situ characterization of particles pertinent to GEOTRACES. Progress In Oceanography, 133(0): 43-54.
- Conway, T.M. and John, S.G., 2014a. The biogeochemical cycling of zinc and zinc isotopes in the North Atlantic Ocean. Global Biogeochemical Cycles, 28(10): 1111–1128.
- Conway, T.M. and John, S.G., 2014b. Quantification of dissolved iron sources to the North Atlantic Ocean. Nature, 511(7508): 212-215.
- Conway, T.M. and John, S.G., 2015a. Biogeochemical cycling of cadmium isotopes along a high-resolution section through the North Atlantic Ocean. Geochimica et Cosmochimica Acta, 148(0): 269-283.
- Conway, T.M. and John, S.G., 2015b. The cycling of iron, zinc and cadmium in the North East Pacific Ocean: Insights from stable isotopes. Geochimica et Cosmochimica Acta, 164(0): 262-283.
- Fitzsimmons, J.N., Bundy, R.M., Al-Subiai, S.N., Barbeau, K.A. and Boyle, E.A., 2015. The composition of dissolved iron in the dusty surface ocean: An exploration using size fractionated iron-binding ligands. Marine Chemistry, 173(0): 125-135.
- Hayes, C.T., Anderson, R.F., Fleisher, M.Q., Vivancos, S.M., Lam, P.J., Ohnemus, D.C., Huang, K.-F., Robinson, L.F., Lu, Y., Cheng, H., Edwards, R.L. and Moran, S.B., 2015. Intensity of Th and Pa scavenging partitioned by particle chemistry in the North Atlantic Ocean. Marine Chemistry, 170: 49-60.
- Henderson, G.M. and Marchal, O., 2015. Recommendations for future measurement and modelling of particles in GEOTRACES and other ocean biogeochemistry programmes. Progress In Oceanography, 133(0): 73-78.
- Holzer, M. and Brzezinski, M.A., 2015. Controls on the silicon isotope distribution in the ocean: New diagnostics from a data-constrained model. Global Biogeochemical Cycles, 29(3): 267-287.
- Jackson, G.A. and Burd, A.B., 2015. Simulating aggregate dynamics in ocean biogeochemical models. Progress In Oceanography, 133(0): 55-65.
- Jeandel, C., Rutgers van der Loeff, M., Lam, P.J., Roy-Barman, M., Sherrell, R.M., Kretschmer, S., German, C. and Dehairs, F., 2015. What did we learn about ocean particle dynamics in the GEOSECS-JGOFS era? Progress In Oceanography, 133(0): 6-16.
- Lam, P.J. and Marchal, O., 2015. Insights into Particle Cycling from Thorium and Particle Data. Annual Review of Marine Science, 7(1): 159-184.

- Lam, P.J., Twining, B.S., Jeandel, C., Roychoudhury, A., Resing, J.A., Santschi, P.H. and Anderson, R.F., 2015. Methods for analyzing the concentration and speciation of major and trace elements in marine particles. Progress In Oceanography, 133(0): 32-42.
- Lamborg, C., Bowman, K., Hammerschmidt, C., Gilmour, C., Munson, K., Selin, N. and Tseng, C.-M., 2014a. MERCURY in the Anthropocene Ocean. Oceanography, 27(1): 7687.
- Lamborg, C.H., Hammerschmidt, C.R., Bowman, K.L., Swarr, G.J., Munson, K.M., Ohnemus, D.C., Lam, P.J., Heimburger, L.-E., Rijkenberg, M.J.A. and Saito, M.A., 2014b. A global ocean inventory of anthropogenic mercury based on water column measurements. Nature, 512(7512): 65-68.
- McDonnell, A.M.P., Lam, P.J., Lamborg, C.H., Buesseler, K.O., Sanders, R., Riley, J.S., Marsay, C., Smith, H.E.K., Sargent, E.C., Lampitt, R.S. and Bishop, J.K.B., 2015. The oceanographic toolbox for the collection of sinking and suspended marine particles. Progress In Oceanography, 133(0): 17-31.
- Moore, W.S., 2015. Inappropriate attempts to use distributions of 228Ra and 226Ra in coastal waters to model mixing and advection rates. Continental Shelf Research, 105(0): 95-100.
- Rauschenberg, S. and Twining, B.S., 2015. Evaluation of approaches to estimate biogenic particulate trace metals in the ocean. Marine Chemistry, 171(0): 67-77.
- Stichel, T., Hartman, A.E., Duggan, B., Goldstein, S.L., Scher, H. and Pahnke, K., 2015. Separating biogeochemical cycling of neodymium from water mass mixing in the Eastern North Atlantic. Earth and Planetary Science Letters, 412(0): 245-260.
- Wozniak, A.S., Shelley, R.U., McElhenie, S.D., Landing, W.M. and Hatcher, P.G., 2015. Aerosol water soluble organic matter characteristics over the North Atlantic Ocean: Implications for iron-binding ligands and iron solubility. Marine Chemistry, 173(0): 162172.

Submitted by Bob Anderson (boba@ldeo.columbia.edu).