

CURRICULUM VITAE

JOSHUA M. CURTICE
Research Associate III
Department of Marine Chemistry and Geochemistry
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

EDUCATION

B.S., Mechanical Engineering, University of Massachusetts, Amherst, 1992; Cum Laude

TRAINING:

Basic Vacuum Practice – 1992, 3 day high vacuum course given by Varian Vacuum Inc.
Mastering Microsoft Visual Basic 6 Fundamentals – 2002, 5 day course given by Pinnacle Training Corporation in Braintree, MA.
LabView Core 1 – 2011, a 3 day course offered at the WHOI Computer Training facility.
Basic Circuit Analysis – a 5 week online class offered by MIT and edX.org

PROFESSIONAL EXPERIENCE

Research Assistant II and III – Supervisor: Dempsey Lott 1992 - 1997
Department of Marine Chemistry and Geochemistry, WHOI, Woods Hole, MA 02543

Responsible for the use and maintenance of high vacuum lines for processing sea water samples. Able to diagnose vacuum system performance and sample integrity to determine whether or not to process the water samples on helium extraction lines and tritium degassing lines. Helium leak checked the high vacuum components used in the processing lines. Involved in all aspects of overhauling the sea-going labs, which includes: oil changes for vacuum pumps, cleaning and leak checking all of the vacuum sections; and rebuilding the vacuum processing lines. Repaired and maintained mechanical pumps, diffusion pumps, ion pumps, Neslab water chillers, and Polycold cryotrap.

Research Assistant III – Supervisor: Dr. Mark Kurz 1997-1998
Department of Marine Chemistry and Geochemistry, WHOI, Woods Hole, MA 02543

Implemented changes to the processing line of the MAP mass spectrometer. This included: designing and building a secondary vacuum system (consisting of a turbomolecular pump, rough pump, valves, and connecting hardware); assembling and mounting a low temperature cryogenic trap and a rock furnace; designing and building a rock crusher manifold; and redesigning the residual gas analyzer and aliquot volumes configuration. Performed every aspect of helium measurements for rock samples including: breaking up large samples and separating into smaller size fractions; using a microscope to pick olivine and pyroxene minerals out of the smaller size fractions; and analyzing the minerals in a mass spectrometer, by crushing and heating under vacuum. Responsible for use and maintenance of various high vacuum equipment, including: helium leak checking; equipment bake outs; degassing of “tritium free” water for the Cosmogenic Nuclide experiment; and operation of three different mass spectrometers. Served as a Chemistry representative to the Graded and Marine Personnel Committee.

Research Associate II and III – Supervisor: Dr. Mark Kurz 1999 – Present
Department of Marine Chemistry and Geochemistry, WHOI, Woods Hole, MA 02543

Responsible for all aspects of noble gas measurements using two mass spectrometers. This includes everything in the “Research Assistant III” section above, along with troubleshooting and repairing the mass spectrometers and any related equipment. This can include electrical, plumbing, mechanical, and high vacuum repairs and fabrication. Required to supervise students and guest investigators in preparing samples for noble gas measurement. Designed and built all metal high vacuum gas extraction lines. Operated three different high vacuum lines to extract helium and carbon dioxide from seawater and hot spring copper tube samples. Responsible for filament changes in two mass spectrometers along with multiple day bakeouts. Designed and built 10” diameter pvc samplers to be used with JASON II and ALVIN for a noble gas contamination experiment.

Research Associate III – Supervisor: Brian Monteleone 2018 - Present
Department of Geology and Geophysics, WHOI, Woods Hole, MA 02543

Responsible for maintaining, troubleshooting, and repairing all of the vacuum, electrical, and mechanical equipment for a Cameca 1280 SIMS and a Cameca 3F SIMS in the Northeast National Ion Microprobe Facility. This has included: replacing soldered parts on electronic boards; replacing turbo molecular pumps; replacement of filaments in the Cesium source and E-Gun; removal and cleaning of DUO Oxygen source; and mechanical pump oil changes.

Research Associate III – Supervisor: Dr. Peter Barry

2019 – Present

Department of Marine Chemistry and Geochemistry, WHOI, Woods Hole, MA 02543

Responsible for helping to prepare a lab for renovation and the installation of a NU Noblese mass spectrometer. This included cleaning out an existing lab and then providing input for the layout of equipment, power, and water in the new lab. Modified the valves on an existing Nitrogen processing line to change them from manual to pneumatically actuated. Changed existing VB6 software and other hardware to be able to control the valves and read pressures. Then I used the line to measure Nitrogen isotopes in mineral separates. Used AutoCad to design parts and have them machined and welded for high vacuum use. Wrote VB.net software to control valves, read pressures and temperatures, and control cryogenics for a Noble Gas high vacuum processing line.

FIELD EXPERIENCE

ONR Subduction Cruise

With supervision, became familiar with sampling techniques for helium and tritium measurements. Processed samples on the helium extraction and tritium degassing vacuum lines.

WOCE P-18, P-21, I 8, I 10, A4, and A20 Cruises

Responsible for sampling and processing sea water samples for helium and tritium measurements. Had to maintain and troubleshoot the equipment and high vacuum processing lines in the sea going labs.

MW 99 - I participated in a 12 day dredging cruise off the coast of Hawaii aboard the Mauna Wave to collect underwater lava flow samples for noble gas measurements. Included in this trip were 3 days of field work in the Haleakala Crater on Maui collecting rock samples for surface exposure dating. This was done in collaboration with Dave Sherrod of the USGS and Hawaii Volcano Observatory.

DRFT04 - I participated in a 32 day dredging and surveying cruise off the western edge of the Galapagos islands aboard the R/V Revelle. Submarine lava flow samples were collected for noble gas measurements. Since Mark was the chief scientist, I was responsible for most of the pre-cruise ordering and organizing of lab and sampling supplies. I assisted Dan Fornari with repairs to the Towed Digital Camera that was used on the cruise. I was responsible for supervising the three other people on my watch during dredging operations and rock processing.

JASON II - I participated in a 10 day JASON II cruise on the R/V Thompson off the Hawaiian coast. My primary role was to use the anaerobic samplers that I had designed and built. These samplers were taken off the JASON II platform and put in a nitrogen filled glove box. Then they were opened up to remove the rocks and any glass was chipped off them. The glass was put in stainless steel vacuum containers which were then pumped down on an at-sea vacuum line.

AT33-03 and AT40-02 – I participated in two cruises(28 and 32 days) that utilized ALVIN and Sentry on the R/V Atlantis on the Mid Atlantic Ridge. I was responsible for most of the pre-cruise ordering and organizing of lab and sampling supplies. At sea I was primarily responsible for processing the submarine rock samples that were collected. One part of this was chipping volcanic glass off the basalts, sawing the basalts into multiple slabs, and dividing up the processed samples for three groups. The other part was processing samples that were collected in the anaerobic samplers.

SKILLS

Familiar with Windows operating systems, Excel, Microsoft Word, SigmaPlot, Photoshop, Visual Basic
Design of high vacuum and sample processing equipment using AutoCad.
Familiar with sea water sampling techniques.

ABSTRACTS:

Title: Dynamics and Evolution of the Galapagos Hotspot from Helium Isotope Geochemistry
Author: Kurz, Mark D., J. Curtice, and D. Geist.
Submitted: June 1998, GSA Penrose Conference

Title: Helium isotopes in dust from polar ice cores.
Author: Brook, Edward J., M. Kurz, and J. Curtice.
Submitted: 1998 Fall AGU

Title: Dynamics of the Galapagos Hotspot from Helium-Isotopic Geochemistry
Author: Kurz M.D., Curtice J.M., Saal A.E., Geist D.
Submitted: V.M. Goldschmidt Conference, August 1999

- Title: The Neon isotope anomaly in the mantle beneath the superfast spreading East Pacific Rise
 Author: M. Moreira, M. Kurz, J. Curtice, J. Mahoney, J. Sinton
 Submitted: Fall 1999 AGU Conference
- Title: The Leading Edge of the Galapagos Hotspot: New Submarine Evidence from Fernandina Volcano
 Author: M.D. Kurz, D. Fornari, J.M. Curtice, M. Perfit, D. Scheirer, D. Geist.
 Submitted: Fall 2000 AGU Conference
- Title: Helium Isotopic Evolution of Mauna Kea Volcano: New results from the 3 km Drill Core
 Author: M. Kurz, J. Curtice,
 Submitted: Fall 2000 AGU Conference
- Title: Automation of a Mass Spectrometer and Extraction Line for the Determination of Noble Gas Isotopes in Rocks
 Author: Robin Singer, Joshua Curtice, Mark Kurz, and Dempsey Lott
 Submitted: OCEANS 2000 MTS/IEEE
- Title: The Leading Edge of the Galapagos Hotspot: Geochemistry and Geochronology of Submarine Glasses Coupled to New Sidescan Sonar Imagery
 Author: M.D. Kurz, D. Fornari, D. Geist, P. Johnson, J. Curtice, D. Lott, K. Harpp, A. Saal, U. Peckman and DRIFT Leg 4 Science Party(2001)
 Submitted: Fall 2001 AGU Conference
- Title: Noble Gases from the deep mantle: new evidence from oceanic volcanism
 Author: Mark D. Kurz, Joshua M. Curtice, Dempsey E. Lott III, Daniel J. Fornari, and Dennis J. Geist
 Submitted: September 2002 Goldschmidt Conference
- Title: The Leading Edge of the Galapagos Hotspot: New Geochemistry and Geochronology from Submarine Glasses in the Context of MR1 Sonar Imagery.
 Author: M.D. Kurz, D. J. Fornari, D. Geist, P. Johnson, J. Curtice, D. Lott, K. Harpp, A. Saal, U. Peckman and DRIFT Leg4 Science Party.
 Submitted: EOS Trans. AGU 82 (47) F1215.
- Title: Helium Isotope Signatures of peridotites and basalts from Atlantis Bank, Indian Ocean
 Author: Hidenori Kumagai, Joshua M. Curtice, Mark D. Kurz, Henry J. B. Dick, and Shoji Arai
 Submitted: AGU, Fall 2003
- Title: Flux and size fractionation of IDP-borne He3 from Antarctic ice core samples
 Author: Edward J. Brook, Mark D. Kurz, Joshua Curtice
 Submitted: AGU, Fall 2003
- Title: Helium and neon from the deep earth: submarine Galapagos glasses and global correlations.
 Author: Kurz, M.D., D. Fornari, D. Geist, J. Curtice, and D.E. Lott
 Submitted: 2004 Goldschmidt 2004 (Copenhagen) abstracts volume, Geochimica Cosmochimica Acta, 68, number 11S, A278
- Title: Helium in abyssal peridotites: preliminary results from the Southwest Indian Ridge
 Author: M.D. Kurz, J. Curtice, J. Warren, N. Shimizu, H. Dick
 Submitted: AGU, Fall 2006
- Title: , Insight on the timing of the last deglaciation in Iceland from surface exposure ages of subglacial and postglacial volcanic features
 Author: Licciardi, J.M., Kurz, M.D., and Curtice, J.M.
 Submitted: 2007: 37th Annual Arctic Author: Workshop, 2-5 May 2007, Skaftafell, Iceland.

Title: Insight on the timing of the last deglaciation in Iceland from surface exposure ages of subglacial and postglacial volcanic features.
Author: Licciardi, J.M., Kurz, M.D., and Curtice, J.M., 2007,;
Submitted: 2nd Volcano-Ice Interaction on Earth and Mars Conference, 19-22 June 2007, Univ. British Columbia, Canada.

Title: Argon isotopic compositions of deep undegassed mantle: New constraints from the western Galapagos.
Author: Kurz MD, Yamamoto J, Curtice J, et al. (2009)
Published: GEOCHIMICA ET COSMOCHIMICA ACTA Volume: 73 Issue: 13 Pages: A709-A709 Suppl. S

Title: Noble gas tracers of mantle processes beneath the Galápagos archipelago.
Author: Kurz MD, Harpp K, Geist D, Fornari D, Curtice J, Lott D, Jenkins W
Submitted: AGU 2010

Title: Noble gases in the oceanic crust: preliminary results from ODP hole 1256 D
Author: Kurz MD, Curtice J, IODP Expedition 335 Science Party.
Submitted: AGU 2011

Title: Noble gas isotopic composition of mantle xenoliths in a kimberlite
Author: Junji Yamamoto, Mark D. Kurz, Hidemi Ishibashi, Joshua Curtice
Submitted: Goldschmidt 2011. Online abstracts

M. D. Kurz, J. M. Curtice, D. E. Lott III and IODP leg 335 Scientific Party (2012) Noble gas distribution and migration in the oceanic crust: new results from ODP Hole 1256D. Goldschmidt conference oral presentation. Abstract published with program. June 2012

M. D. Kurz, J. M. Curtice and IODP leg 335 Scientific Party (2011) Noble gases in the Oceanic Crust: Preliminary results from ODP Hole 1256D. Fall 2011 meeting of the American Geophysical Union, poster. Abstract published with program 2011.

PUBLICATIONS

E. J. Brook, M.D. Kurz, J. Curtice, and S. Cowburn (2000) Accretion of interplanetary dust in polar ice, *Geophysical Research Letters* 27 (19), 3145-3148

M. Moreira, C. Gautheron, K. Breddam, J. Curtice and M. D. Kurz (2000) Solar neon in the Icelandic mantle: new evidence for an undegassed lower mantle, *Earth and Planetary Science Letters*. 185, 15-23.

Kurz, M.D., J. Curtice, D.E. Lott, and A. Solow (2004). Rapid helium isotopic variability in Mauna Kea shield lavas from the Hawaiian Scientific Drilling Project. *Geochem. Geophysics. Geosystems (G-cubed)*, AGU. 5, Q04G14, doi:10.1029/2002GC000439.

Kurz, M.D., M. Moreira, J. Curtice, D.E. Lott, J.J. Mahoney, and J.M. Sinton (2004) Correlated helium, neon and melt production on the super-fast spreading East Pacific Rise near 17 S. *Earth and Planetary Science Letters*/232, 125-142

Licciardi, J. M., M.D. Kurz, and J.M. Curtice. Cosmogenic (2006) ³He production rates from Holocene lava flows in Iceland. *Earth and Planetary Science Letters*. 246, 251-264

Licciardi, J. M., M.D. Kurz, and J.M. Curtice.(2007) Glacial and volcanic history of Icelandic table mountains from cosmogenic ³He exposure ages. *Quaternary Science Reviews*, 26 (11), p.1529-1546.

Mark D. Kurz, Jessica M. Warren, and Joshua Curtice (2008) Mantle deformation and noble gases: helium and neon in oceanic mylonites. *Chemical Geology* 266, 10-18

Kurz M.D., J. Curtice, D. Fornari, D. Geist, and M. Moreira (2009) Primitive neon from the center of the Galápagos hotspot. *Earth Planet. Sci. Lett.* 286, 23-34.

Brook, E.J, M.D. Kurz, and J. Curtice (2009) Flux and size fractionation of ³He in interplanetary dust from Antarctic ice core samples. *Earth Planetary Science Letters* 286, 565-569.

Recanati A., Kurz M.D., Warren J.M., Curtice J.M. (2012), Helium distribution in a mantle shear zone from the Josephine Peridotite. *Earth and Planetary Science Letters*, Volume: 359 Pages: 162-172 DOI: 10.1016/j.epsl.2012.09.046 Published: DEC 15 2012.

Kurz MD, Rowland SK, Curtice JM, Saal A, Naumann T; (2014) Eruption rates for Fernandina volcano: a new chronology at the Galapagos hotspot center. AGU monograph: "The Galapagos as a Laboratory for the Earth Sciences". K. Harpp and E. Mittelstaedt (editors). Wiley

W.J. Jenkins, D.E. Lott III, B.E. Longworth, J.M. Curtice and K.L. Cahill, "The Distributions of helium Isotopes and tritium along the U.S. GEOTRACES North Atlantic Sections (GEOTRACES GA03)", *Deep Sea Res., Part II*, 2014. In press

M.R. Jones, V.D. Wanless, S.A. Soule, M.D. Kurz, E. Mittelstaedt, D.J. Fornari, J. Curtice, F. Klein, V. Le Roux, H. Brodsky, S. Peron, D.M. Schwartz. New constraints on mantle carbon from Mid-Atlantic Ridge popping rocks. *EPSL* 511 (2019) 67-75

S. Peron, M. Moreira, M.D. Kurz, J. Curtice, J. Blusztajn, B. Putlitz, V.D. Wanless, M.R. Jones, S.A. Soule, E. Mittelstaedt. Noble gas systematics in new popping rocks from the Mid-Atlantic Ridge(14N): Evidence for small-scale upper mantle heterogeneities. *EPSL* 519 (2019) 70-82

MEETING PRESENTATION (oral and poster)

M.D. Kurz, D. Fornari, J. Curtice, D.E. Lott, D. Geist, K. Harpp, and P. Johnson; Hotspot influence at the Galapagos spreading center: inferences from Galapagos island seafloor morphology and geochemistry. Inter-Ridge Planning meeting on Plume-Ridge Interaction at Brest, France, Sept. 2003

N. Houts, J. M. Licciardi, K. E. Lapo, M. D. Kurz, J. M. Curtice, COSMOGENIC ³HE SURFACE EXPOSURE DATING OF SP CINDER CONE AND LAVA FLOW IN NORTHERN ARIZONA, USA: RESULTS FROM THE SAN FRANCISCO VOLCANIC FIELD REU PROGRAM, Geological Society of America 2013 Annual Meeting, poster.

K. E. Lapo, J. M. Licciardi, A. N. Houts, M. D. Kurz, J. M. Curtice, COSMOGENIC ³HE SURFACE EXPOSURE DATING OF STRAWBERRY CRATER IN NORTHERN ARIZONA, USA: RESULTS FROM THE SAN FRANCISCO VOLCANIC FIELD REU PROGRAM, Geological Society of America 2013 Annual Meeting, poster.

M. D. Kurz, J. Curtice, D.E. Lott, and the IODP Expedition 335 Science Party (2013) Noble gas distribution and migration in the oceanic crust: new results from ODP Hole 1256D. Oral presentation at Expedition 335 Post Cruise meeting, Corsica, France, May, 2013.

Kurz, M.D., E. Mittelstaedt, V.D. Wanless, S. Soule, D. Fornari, M. Jones, J. Curtice, S. Peron, F. Klein, D. Schwartz, K. Kaminski, J. Escartin. "Popping Rocks from the Mid-Atlantic Ridge at 13.77°N" (Talk) AGU Fall 2016 meeting

Jones, M., S. A. Soule, M.D. Kurz, V.D. Wanless, V. LeRoux, F. Klein, E.L. Mittelstaedt, J. Curtice V34C-05: Popping rocks from the Mid-Atlantic Ridge: Insights into mantle volatile concentrations and degassing dynamics.(Talk) AGU Fall 2016 meeting

Wanless, V.D., M.D. Kurz, J. Elsenbeck, J. Curtice, A. Shaw, E. A. Atekwana, E.A. Atekwana T44C-05: Helium isotopes in hot spring gases as magmatic tracers during incipient rifting in Malawi and Zambia. (Talk) AGU Fall 2016 meeting