

CURRICULUM VITAE

VERONIQUE LE ROUX, Ph.D.

Associate Scientist with Tenure
Woods Hole Oceanographic Institution, G&G Dept.
Born 01/15/1983 (38)

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Appointments

2021 – Present	Associate Scientist with Tenure , Woods Hole Oceanographic Institution (USA)
2013 – Present	Joint Program Faculty , Massachusetts Institute of Technology/Woods Hole Oceanographic Institution (USA)
2020 – 2021	Visiting Scholar at SCIENCE 2020 , Copenhagen University, Department of Geosciences and Natural Resource Management, Section for Geology (DK)
2017 – 2021	Associate Scientist , Woods Hole Oceanographic Institution (USA)
2013 – 2017	Assistant Scientist , Woods Hole Oceanographic Institution (USA)
2012 – 2013	Post-doctoral Investigator , Woods Hole Oceanographic Institution (USA)
2011 – 2012	Post-doctoral Scholar , Woods Hole Oceanographic Institution (USA).
2009 – 2011	Post-doctoral Fellow , Rice University (USA).
2005 – 2008	Teaching Assistant , University of Montpellier (France)

Academic Preparation

2009	Ph.D. Macquarie University (AU)
2008	Ph.D. Montpellier University (FR)
2005	Master degree (II) Earth Sciences, Montpellier University (FR)
2004	Master degree (I), Earth & Planetary Sciences, University of Nantes (FR)
2003	Bachelor degree, Earth & Planetary Sciences, University of Nantes (FR)

Research Interests

Physical and geochemical processes in the Earth's upper mantle; Volatile budgets in mantle and crustal materials (H₂O, CO₂, halogens); Material transfer in subduction zones; Melt-rock and fluid-rock reactions; Arc and ridge magmatism; Novel developments in Earth Sciences by micro-CT

Peer-reviewed publications

Total citations **1553**; h-index **14**

*Equal 1st authorship; \$Undergraduate advisee; #Graduate advisee; ##Postdoctoral advisee

25. #Urann B.M., **Le Roux V.**, Jagoutz O., Müntener O., Behn M. D., Chin E. J. The root of the problem: a lower crustal perspective on the water contents of arc magmas. *In revision, Nature Geosciences.*
24. **Le Roux V.**, #Urann B.M, Brunelli D., Bonatti E., Cipriani A., Demouchy S., Monteleone B. Post-melting hydrogen enrichment in the oceanic lithosphere. In press, *Science Advances.*
23. Jones M. R., Soule A., Liao Y., Brodsky H., **Le Roux V.**, Klein F. Quantitative vesicle analyses and total CO₂ reconstruction in mid-ocean ridge basalts. *Journal of Volcanology and Geothermal Research.* doi.org/10.1016/j.jvolgeores.2020.107109.
22. *Klein F., ***Le Roux V.** (2020), Quantifying the Volume Increase and Chemical Exchange During Serpentinization. *Geology.* doi.org/10.1130/G47289.1

21. #Urann. B.M., **Le Roux V.**, John T., Beaudoin G.M., Barnes J.D. (2020), The distribution and abundance of halogens in eclogites: an in situ SIMS perspective of the Raspas Complex (Ecuador). *American Mineralogist* 105 (3): 307–318, doi 10.2138/am-2020-6994. *Invited contribution*.
20. Shinevar W.J., Mark H.F., Clerc F., Codillo E.A., Gong J., Olive J.-A., Brown S.M., Smalls P.T., Liao Y., **Le Roux V.**, Behn M.D. (2019), Causes of oceanic crustal thickness oscillations along a 74-Myr Mid-Atlantic Ridge flow line. *Geochemistry Geophysics Geosystems (G³)*. doi.org/10.1029/2019GC008711
19. **Le Roux V.**, Liang Y. (2019), Ophiolitic pyroxenites record boninite percolation in subduction zone mantle. *Minerals* 9, 565; doi:10.3390/min9090565.
18. Miller W.G.R., Maclennan J., Shorttle O., Gaetani G.A., **Le Roux V.**, Klein F. (2019), Estimating the carbon content of the deep mantle with Icelandic melt inclusions. *Earth and Planetary Science Letters* 523, 115699
17. Jones M. R., Wanless V. D., Soule S. A., Kurz M. D., Mittelstaedt E., Fornari D. J., Curtice J., Klein F., **Le Roux V.**, Brodsky H., Péron S., Schwartz D.M. (2019), New constraints on mantle carbon from Mid-Atlantic Ridge popping rocks. *Earth and Planetary Science Letters* 511, 67-75
16. *\$Codillo E., ***Le Roux V.**, Marschall H., (2018) Arc-like magmas generated by mélange-peridotite interaction in the mantle wedge. *Nature Communications* 9, 2864
15. Nielsen S. G., Horner T. J., Pryer H. V., Blusztajn J., Shu Y., Kurz M. D. and **Le Roux V.**, (2018) Barium isotope evidence for pervasive sediment recycling in the upper mantle. *Science Advances*, 4, no. 7, doi: 10.1126/sciadv.aas8675
14. Jones M., Soule S.A., Gonnermann H., **Le Roux V.**, Clague D. (2018) Degassing-based constraints on ascent and emplacement dynamics during the 2011 eruption of Axial Seamount. *Earth and Planetary Science Letters*, doi.org/10.1016/j.epsl.2018.04.044
13. ##Cruz-Urbe A., Marschall H., Gaetani G., **Le Roux V.** (2018) Generation of alkaline magmas in subduction zones by melting of mélange diapirs. *Geology* 46 (4): 343-346
12. #Urann B.M., **Le Roux V.**, \$Hammond K., Marschall H., Lee C.-T., Monteleone B. (2017) Fluorine and chlorine in mantle minerals and the halogen budget of the Earth's mantle. *Contributions to Mineralogy and Petrology* doi 10.1007/s00410-017-1368-7
11. **Le Roux V.**, Nielsen S.G., ##Sun C., Yao L. (2016) Dating layered websterite formation in the lithospheric mantle. *Earth and Planetary Science Letters* 454 pp. 103–112
10. Miller K.J., Zhu W., Montesi L., Gaetani G., **Le Roux V.**, Xiao X., (2016) Experimental evidence for melt partitioning between olivine and orthopyroxene in partially molten harzburgite. *JGR Solid Earth* 121 doi:10.1002/2016JB013122
9. **Le Roux V.**, Dasgupta R., Lee C.-T.A. (2015) Recommended mineral-melt partition coefficients for FRTEs (Cu), Ga and Ge during mantle melting. *American Mineralogist* 100 pp. 2533–2544
8. **Le Roux V.**, Dick H, Shimizu N. (2014) Tracking flux melting and melt percolation in supra-subduction peridotites (Josephine Ophiolite, USA). *Contributions to Mineralogy and Petrology* 168 pp. 1–22
7. Lee C.-T. A., Luffi P., Chin E. J., Bouchet R., Dasgupta R., Morton D.M., **Le Roux V.**, Yin Q.-Z., Jin D. (2012) Copper systematics in arc magmas and implications for crust-mantle differentiation *Science* 336 pp. 64–68
6. **Le Roux V.**, Dasgupta R., Lee C.-T. A. (2011) Mineralogical heterogeneities in the Earth's mantle: constraints from Mn, Co, Ni and Zn partitioning during partial melting. *Earth and Planetary Science Letters* 307 pp. 395–408
5. Lee, C.-T. A., Luffi, P., **Le Roux, V.**, Dasgupta, R., Albarède F., Leeman W.P. (2010) The redox state of arc mantle using Zn/Fe systematics. *Nature* 468 pp. 681–685
4. **Le Roux V.**, Lee C.-T. A., Turner S.J. (2010) Zn/Fe systematics in mafic and ultramafic systems: implications for detecting major element heterogeneities in the Earth's mantle *Geochimica et Cosmochimica Acta* 74 pp. 2776–2796
3. **Le Roux V.**, Bodinier J.-L., Alard O., O'Reilly S.Y., Griffin W.L. (2009) Isotopic decoupling during porous melt flow: A case-study in the Lherz peridotite. *Earth and Planetary Science Letters* 279 pp. 76–85
2. **Le Roux V.**, Tommasi A., Vauchez A. (2008) Feedback between melt percolation and deformation in an exhumed lithosphere-asthenosphere boundary. *Earth and Planetary Science Letters* 274 pp. 401–413

1. Le Roux V., Bodinier J.-L., Tommasi A., Alard O., Dautria J.-M., Vauchez A., Riches A.J.V. (2007) The Lherz spinel lherzolite: refertilized rather than pristine mantle, Earth and Planetary Science Letters 259 pp. 599–612

Research Grants

§ Principal Investigator

§2020: Independent Research And Development Awards, *Effect of alteration on the volatile contents of mantle rocks* (Le Roux) \$82,869

§2019-2022: National Science Foundation, Geophysics program/Petrology and Geochemistry program, *Collaborative Research: Voyage to the bottom of Arcs: interplay between water, deformation, and lower crustal stability* (Le Roux, Chin & Behn), \$790,939

§2019-2022: National Science Foundation, Geoprisms program, *Collaborative Research: Melange-peridotite Interactions in the Source of Arc Magmas* (Le Roux & Behn), \$546,403

§2019-2021: National Science Foundation, Petrology and Geochemistry Program, *Halogen budget of subducted eclogites: the in-situ perspective* (Le Roux), \$363,064

§2018-2020: The Andrew W. Mellon Foundation Award for Innovative Research, *Magma Pulses in the Abyss* (Le Roux), \$64,078

2017-2019: National Science Foundation, Antarctic Earth Sciences, *Collaborative Research: Determining Magma Storage Depths and Ascent Rates for the Erebus Volcanic Province, Antarctica Using Diffusive Water Loss from Olivine-hosted Melt Inclusion* (Gaetani, Le Roux, Sims, Wallace), \$499,907

§2016-2019: Ocean Exploration Institute, *What is the transport mechanism of sediments in subduction zones?* (Le Roux), \$74,984

§2016-2019: National Science Foundation, Petrology and Geochemistry Program, *Quantifying the Volume Changes During Serpentinization of Peridotite using Hydrothermal Laboratory Experiments and X-ray Microtomography* (Klein & Le Roux), \$350,000

2016-2018: National Science Foundation, Marine Geology and Geophysics Program. *Collaborative Research: Does Calcification By Paleoceanographically Relevant Benthic Foraminifera Provide A Record Of Localized Methane Seepage?* (Bernhard, Martin & Le Roux), \$218,355

2016-2019: National Science Foundation, Geobiology and Low-Temperature Geochemistry Program. *Collaborative Research: Alteration of microbially-produced carbonate rock by unicellular predators to better understand early Earth's dominant ecosystem* (Visscher, Bernhard, & Le Roux), \$255,000

§2017: Independent Research And Development Awards Developing in-situ trace element analysis capabilities in silicates at WHOI, \$74,758

§2015-2017: National Science Foundation, Petrology and Geochemistry Program, *F and Cl in peridotite minerals: analytical development and applications to fluid cycling in the Earth's mantle* (Le Roux, Monteleone, & Shimizu), \$298,072

2015-2017: Ocean Exploration Institute, *A chronometer for magmatic processes at mid-ocean ridges* (Gaetani & Le Roux), \$59,032

§2015: Independent Research And Development Awards *Micro-tomography at WHOI: Test Scans and 3-D Data Processing of Geological and Biological Samples* (Le Roux) \$58,297

§2014-2016: Andrew W. Mellon Foundation Award for Innovative Research, *Connecting Mineral physics and Geochemistry* (Le Roux), \$59,744

§2013-2015: Deep Ocean Exploration Institute, *Innovative tracers of hydrous melting in the Earth's mantle* (Le Roux & Shimizu), \$71,433

§2012-2014: National Science Foundation, Petrology and Geochemistry Program, *Widespread pyroxenite layering in the mantle*, (Le Roux & Tivey), \$259,097

§2011-2013: Deep Ocean Exploration Institute, *A new experimental approach to constraining H₂O cycling in subduction zones*, (Le Roux & Gaetani), \$67,590

§2011-2012: Deep Ocean Exploration Institute Scholarship (Le Roux), WHOI, \$62,000

\$2007-2009: International Macquarie University Research excellence Scholarship (MQRES), Macquarie University, AUD \$19,231/year

\$2006-2008: ‘Aide à la mobilité internationale’ (Research funds for international collaborations), Ministère délégué à l’enseignement supérieur et à la recherche, 5100 €

Formal presentations

Invited presentations

- 2021. Goldschmidt Conference, Lyon, France (*pending*)
- 2020. Centre de Recherches Pétrographiques et Géochimiques, France (*Remote*).
- 2020. Copenhagen University, Denmark (*Remote*).
- 2019. European Institute for Marine Studies, Geosciences Ocean, Brest, France
- 2019. Laboratoire Magmas et Volcans, Clermont-Ferrand, France
- 2019. Geosciences Environnement Toulouse, France
- 2019. Geosciences Montpellier, France
- 2019. Water in the mantle workshop, Lamont Doherty Earth Observatory, USA
- 2018. Boston College, USA
- 2018. Aarhus University, Denmark
- 2018. California Institute of Technology, USA
- 2015. American Geophysical Union, Fall Meeting, San Francisco, USA
- 2015. Massachusetts Institute of Technology, USA
- 2015. Goldschmidt Conference, Prague, Czech Republic
- 2014. Ecole Normale Supérieure de Lyon, France
- 2013. Bayerisches Geoinstitut, Germany
- 2012. Unité Mixte de Recherche Domaines Océaniques, Brest, France
- 2010. University of New Mexico, USA
- 2010. Wood Hole Oceanographic Institution, USA
- 2010. Goldschmidt Conference, Knoxville, USA
- 2010. Geosciences Montpellier, France
- 2010. Ecole Normale Supérieure de Lyon, France
- 2009. American Geophysical Union, Fall Meeting, San Francisco, USA

85 contributed presentations at international conferences and institution seminars since 2005; 39 as lead presenter.

Supervision and mentoring

Postdoctoral advisees

- 2021 – Present:** Benjamin Urann
- 2017 – 2019:** Emily Cooperdock (co-advisor Klein)
- 2016 – 2019:** Ayla Pamukcu (co-advisor Gaetani)
- 2015 – 2016:** Chenguang Sun (main advisor Dick)
- 2015** Alicia Cruz-Urbe (main advisors Marschall and Gaetani)

PhD student advisees

- 2017 – Present:** Emmanuel Codillo (MIT/WHOI Joint Program)
- 2015 – 2020:** Benjamin Urann (MIT/WHOI Joint Program)
- 2013.** Ning Zhao (MIT/WHOI Joint Program; main advisor Keigwin) – Geodynamics Class project, Spring

Undergraduate/Master student advisees

2020: Leena Sen - San Jose State U. (USA) — Summer Student Fellow Program student (3 mo; main adviser Bernhard)

2020: Hugo Lestrelin — Ecole Normale Supérieure Paris (France) — Guest Student Fellow (1 mo due to covid-19; planned for 6 months)

2019: Alexandra Nordyke — Bennington College (USA) — Summer Student Fellow (3 mo; main advisor Gaetani)

2017 – 2018: Taylor Hough — Brown U. (USA) — Summer Student Fellow and Master's thesis

2016: Nadine Doiron — UMass Amherst — NENIMF summer student (3 mo; main advisor Gaetani)

2015 – 2016: Emmanuel Codillo — U. of Philippines — Guest student (9 mo)

2015: Emma Soucy — Northeastern U. (USA) — Co-op internship program (6 mo)

2015: Keiji Hammond — Northeastern U. (USA) — Co-op internship program (6 mo)

2015: Marienel Basiga — San Jose State U. (USA) — Summer Student Fellow Program student (3 mo)

2014: Marienel Basiga — San Jose State U. (USA) — Partnership Education Program student (minority program; 3 mo)

2013: Jeremy Slangenwhite — U. of Houston (USA) — Guest student (1 month)

Other Guest or Short-term students

2019–2020: Collaboration with PhD student Olivia Anderson (UCSB, USA); **Feb. 2018:** Guest Ph.D. students Stamatis Flemetakis and Dominik Loroeh (U. of Muenster, Germany); **Dec. 2017:** Guest undergraduate student Megan Reilly (Northeastern U.); **May 2017:** Guest Ph.D. student Manon Bickert (IPGP, France)

Synergistic Activities

Journal Reviewer:

American Mineralogist; American Journal of Science; Chemical Geology; Contributions to Mineralogy and Petrology; Earth and Planetary Science Letters; Earth Science Reviews; Elements; Geochimica et Cosmochimica Acta; Geochemical Perspectives Letters; Geochemical Society of America Special Papers; Geochemistry Geophysics Geosystems (G³); Geology; Journal of Geophysics Research-Solid Earth; Journal of Petrology; Lithos; Mineralogy and Petrology; Nature Communications; Nature Scientific Reports; Science Advances; Tectonophysics

Proposal Reviewer and Panelist:

2020 Panel member, National Science Foundation (*Remote*)
2018 – Present Reviewer for Deutsche Forschungsgemeinschaft (German Research Foundation)
2014 Panel member, National Science Foundation
2010 – Present Reviewer for National Science Foundation: Petrology and Geochemistry, Frontier Research in Earth Sciences (FRES), Collaborative studies of the Earth Interior (CSEDI); Tectonics; Polar Programs
2013 Reviewer for ETH Zurich Research Commission

Institution and departmental service (WHOI):

2021 WHOI search committee for Deep Submergence Faculty position
2016 – Present MIT/WHOI Joint Committee for Marine Geology & Geophysics (PhD program oversight)
2020 – Present Assistant Scientist mentoring committee member (A. Cross)
2019 Substitute for Education Coordinator of PhD program (2 months)
2016 – 2018 NENIMF ion microprobe steering committee
2018 WHOI Inter-disciplinary award proposal review committee
2017 WHOI search committee for Vice-President of Academic Program and Dean

2017	WHOI search committee for Geochemistry/Petrology Faculty position
2016	Geology and Geophysics Department Chair transition committee
2016	WHOI search committee for Geophysics Faculty position
2016 – 2017	WHOI women’s committee
2016	WHOI Catalyst program, proposal review panel
2016	Visioning committee for Vice-President of academic programs and Dean
2015 – 2016	Department representative, Summer Student Fellowship committee

Thesis committees (excluding own students):

2020 – Present	PhD Thesis committee, MIT student Cassandra Seltzer
2020	Thesis proposal committee, MIT student Cassandra Seltzer
2020	General examination committee, MIT student Cassandra Seltzer
2019 – Present	PhD Thesis committee, MIT/WHOI PhD student Fiona Clerc
2019	Thesis proposal committee, MIT/WHOI PhD student Fiona Clerc
2019	Chair of General examination committee, MIT/WHOI PhD student Fiona Clerc
2017 – 2019	PhD Thesis committee, MIT/WHOI PhD student Meghan Jones
2017	Thesis proposal committee, MIT/WHOI PhD student Meghan Jones
2017	General examination committee, MIT/WHOI PhD student Meghan Jones
2017	General examination committee, MIT/WHOI PhD student Gabriela Serrato
2017	General examination committee, MIT/WHOI PhD student William Shinevar
2017	Chair of PhD defense, MIT/WHOI PhD student Emily Sarafian

Other Service to Field:

2018	Goldschmidt session co-convener (Igneous Processes throughout the Arc Crustal Column and Oceanic Mantle)
2015	Goldschmidt session co-convener (How chalcophile are the chalcophile elements?)
2015.	AGU session co-convener (Endogenous mantle melting: petrology and geophysics)
2015	AGU session co-convener (The Ophiolite-Subduction Connection: Using peridotites as analogs for subduction zone mantle)
2015	AGU session co-convener (Melt and Liquids in Earth and Planetary Interiors)
2013	Geodynamics program co-organizer (WHOI). Theme: ‘Simulating the Earth in the lab’ http://www.who.edu/main/2013-geodynamics-program
2013	AGU session co-convener (Deformation Processes: Microstructure, Rheology, and the Effects of Fluids)
2009–2011	Reading group organizer: Petrology/Geochemistry (Rice University; 2009–2010); Subduction Zones (WHOI; 2011)
2010	Goldschmidt session co-convener (New and Old Paradigms on the Origin and Evolution of Continental Lithosphere)

Analytical and technical skills

EPMA: CAMECA SX 100. CAMECA SX 50, JEOL JXA-733 Superprobe

SIMS: Cameca IMS 1280 and 3f

HIGH P-T EXPERIMENTS: Piston cylinder, 1-atm furnace

ICPMS and LA-ICPMS: VG Plasmaquad II Turbo, Agilent 7500 ICPMS, ThermoFinnigan Element II Sector ICP-MS

X-RAY MICROTOMOGRAPHY: Skyscan 1272 micro-CT; Synchrotron; 3D Microtomography modeling: Avizo software; Skyscan reconstruction, analysis and visualization software (CtAn; CtVox; CTVol; NRecon; Dataviewer).

Field experience

At sea. 2017. SCARF Research Cruise AR23-02. *R/V Neil Armstrong* (Ponta Delgada-WH)

On land. Introduction to field mapping in sedimentary terrains (France)

Volcanism and Metamorphism (Central Massif, France)

Alpine Ophiolite (Corse, France)

Peridotite Massifs of the Pyrenees (France)
Regular field trips over 3 years; Regular field trips with undergraduate students (5–6 times/year) —
Volcanism in South of France
Conference field trip: Volcanism of Mount Shasta and Shear zones in Josephine Peridotite (USA)
Mantle xenoliths in cinder cones (Colorado Plateau, USA)
Volcanism in the Azores (Portugal)
Peridotites and pyroxenites in the Josephine Ophiolite (USA)
Pyroxenites in the Pyrenean Massifs (France)

Teaching

2018–2019: reading seminar Geochemistry/Petrology
2017. Summer Student Fellow Program Lecturer (undergraduate) – *Travel inside the deep Earth*
2016. 12.703 MIT/WHOI Presenting Scientific Research (graduate)
2015. 12.703 MIT/WHOI Presenting Scientific Research (graduate)
2015. Summer Student Fellow program Lecturer (undergraduate) – *Geology going 3-D: new prospects for Earth Sciences*
2014. Summer Student Fellow program Lecturer (undergraduate) – *Travel inside the deep Earth*
2013. 12.753 MIT/WHOI Geodynamics Class (graduate) – *Experiments: simulating the Earth in the Lab*
2009–2010: L lectures at Rice University – geochemistry and thermodynamics (graduate)
2005–2008: Regular Teaching Assistant at Montpellier University (64 hours of teaching/2 classes/ per year/ 3 years; igneous, metamorphic and sedimentary petrology).

Outreach

Host for volunteer High school students

2015. Maria Barrera – Falmouth Academy (USA), volunteer internship (2 months)
2015. Natasha Garland– Falmouth Academy (USA), volunteer internship (2 months)
2014. Chris Connolly – Falmouth High School (USA) — School-to-Careers internship program (3 months)

School outreach

2018. 3-D models hands-on activities for visually impaired-students (7th to 12th grade), WHOI, MA
2018. ‘Inside the Earth’ presentation and hands-on activities — pre-K class, Woods Hole Daycare Co-op, MA
2018. ‘Forams’ hands-on activities for visually impaired-students (7th to 12th grade) — “The Very Big and the Very Small” Perkins School for the Blind, MA
2016. ‘Inside the Earth’ presentation and hands-on activities — pre-K class, VNA child care center, MA

General public outreach

2018: Interview for ‘Who is WHOI’ short documentary about WHOI. <https://vimeo.com/292046329>
2015–2018: Member of the *Partnership program* between WHOI scientists and Trustees, which encourages dialogue that enhances the understanding of Trustees and Members about WHOI science and culture

Awards and Recognition

2020 Visiting scholar at SCIENCE 2020 award, Copenhagen University, Department of Geosciences and Natural Resource Management, Section for Geology (Copenhagen, DK)
2020 Professor qualification (France)
2011 Deep Ocean Exploration Institute Scholarship, WHOI
2007 Bourse Lavoisier Cotutelle (Salary funds, European scholarship for international collaborations)
2007 International Macquarie University Research excellence Scholarship (MQRES), Macquarie University
2004 Master degree French scholarship for highly ranked students

Languages

French (Native proficiency)

English (Full professional proficiency)

Danish (Limited working proficiency)