

CARL SWINDLE

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POSTDOCTORAL POSITIONS

University of California, Los Angeles, B. John Garrick Institute for Risk Sciences, 2023—
Supervisor: Ali Mosleh

Projects: Pacific Gas and Electric Wildfire Mitigation Plan, California Public Utilities
Commission Local Conditions Audit, Garrick Institute for Risk Sciences Review Team

California Institute of Technology (Guest), Geological and Planetary Sciences, 2023—
Supervisors: Kenneth Farley

Projects: Trace Element Geochemistry of Magnesite

EDUCATION

California Institute of Technology, Geological and Planetary Sciences, 2018—2023

MS in Geology, June 2020

PhD in Geology, September 2023

Thesis: [*Fluid-Rock Interactions from the Lithosphere to Earth's Surface*](#)

Advisor: Kenneth Farley

Committee: Kenneth Farley, Paul Asimow, John Eiler, Edward Stolper, and Francois Tissot

University of California, Santa Barbara, Summer 2016—Summer 2018

Bachelor of Science in Earth Science, Summer 2018

Honors Thesis: *Phase equilibria and regional metamorphic field gradients in granulites
from Madagascar*

Advisor: Bradley Hacker, Graduate Mentor: Robert Holder (University of Michigan)

Santa Barbara City College, Fall 2014—Spring 2016

Department of Earth and Planetary Science

Internship Project: Interpreting Oligocene Paleogeography in Southern California Using
a Provenance Analysis of the Sespe Formation

Advisor: Jan Schultz

HONORS AND AWARDS

2020-2023 National Science Foundation Graduate Research Fellowship
For demonstrated early potential for a high achieving scientific career

2019 Ian Campbell Award, Caltech
Outstanding performance in field geology courses

2018-2023 Bernand-Partridge Foundation Scholarship

2018 Charles D. Woodhouse Award, UCSB
Highest award, for merit, scholarship, and promise of success in the profession

2018 Outstanding Academic Achievement in Earth Science, UCSB

2018 Distinction in the Earth Science Major, UCSB

2018 UCSB Earth Science Field Award

2018 Physics Circus Outreach Award

2017-2018 Phillip and Aida Siff Educational Foundation Scholarship

2017-2018 Ridley-Tree Endowed Scholarship

2017 Robert M. Norris Prize in Field Geology, UCSB
Awarded to the top student in upper division field geology

- 2016-2018 University of California Santa Barbara Dean's Honors
 2016-2018 Inskip Endowed Scholarship
 2016 L. Austin Weeks Award, American Association of Petroleum Geologists
 2016 Tom L. Bailey Award, Coast Geological Society
 2016 Academic Achievement Award, American Petroleum Institute
 2016 Dr. Robert Gray Award for Outstanding Geological Sciences Major, SBCC
Highest award for academic excellence in second year geological sciences
 2015 Harold Alexander Award, Geological Sciences, SBCC
Highest award for academic excellence in first year geological sciences
 2015 William Kennett Field Scholarship, SBCC
 2014-2016 Thomas Bennett Geology Field Award Scholarships, SBCC
 2014-2016 Santa Barbara City College President's Honor Roll

WORK SUBMITTED OR IN PREPARATION

3. Swindle C, Present T, Vasconcelos P, Dalleska N, Farley KA (2023). Determination of carbonate-specific trace element compositions in magnesite-bearing soils (submitted).
2. Swindle C, Present T, Vasconcelos P, Dalleska N, Farley KA (2023). Source-to-sink paleoenvironmental proxies inferred from trace element contents in magnesites from Queensland Australia: a potential Jerezo Crater, analog (in preparation).
1. Swindle C, Oberti R, Antosheckin P, Asimow P (2023). A Volume Model for Monoclinic Amphibole (in preparation).

JOURNAL PUBLICATIONS

4. Swindle C, Clark D, Farley KA (2023). [Helium isotope evidence for mixing of mantle-derived fluids and deeply penetrating surface waters in an obducted peridotite massif](#). *Geochimica et Cosmochimica Acta* 353, 45-60. 10.1016. 2023.05.015
3. Scheller EL, Swindle C, Grotzinger J, Barnhart H, Bhattacharjee S, Ehlmann BL, Farley K, Fischer WW, Greenberger R, Ingalls M, Martin PE, Osorio-Rodriguez D, Smith BP (2021). [Formation of Magnesium Carbonates on Earth and Implications for Mars](#). *Journal of Geophysical Research Planets* 126(7) 10.1029. 2021JE006828
2. Swindle C, Shankin-Clarke P, Meyerhof M, Carlson JM, Melack J (2021). [Effects of Wildfires and Ash Leaching on Stream Chemistry in the Santa Ynez Mountains of Southern California](#). *Water* 13(17) 2042.
1. Horton F, Holder R, Swindle C (2022). [An extensive record of orogenesis recorded in a Madagascar granulite](#). *Journal of Metamorphic Geology* 40(2), 287-305.

CONFERENCE PRESENTATIONS AND PROCEEDINGS

5. Swindle C, Present T, Vasconcelos P, Dalleska N, Farley KA (2022). Trace Element Characterization of Magnesite from Queensland Australia: A Potential Analog to Jerezo Crater, Mars. *AGU Fall Meeting*, [PP15A-08](#).
4. Swindle C, Asimow P, Antosheckina P (2020). A Volume Model for Monoclinic Amphiboles, *AGU Fall Meeting*, [V019-0009](#).
3. Swindle C, Farley KA, Clark DH, Tikoff B (2019). How is Helium Hosted in the Mantle? – A Case Study of Exhumed Peridotite from the Twin Sisters Ultramafic Complex. *AGU Fall Meeting*, [V51I-0167](#).
2. Swindle C, Holder R (2018). Mechanisms of granulite formation in an archetypal accretion-to-collision orogen: pseudosections and monazite petrochronology from Southern Madagascar, *AGU Fall Meeting*, [V31E-0171](#).
1. Swindle C, Shankin-Clarke P (2016). Interpreting Oligocene Paleogeography in Southern California Using a Provenance Analysis of the Sespe Formation. *Southern California Earthquake Center Annual Meeting*, [132](#).

ADDITIONAL RESEARCH PRESENTATIONS

- Sept 2023 Precise and Accurate Determination of Carbonite-Specific Trace Element Compositions in Magnesite-Bearing Soils, PhD Defense Seminar, Caltech
- July 2020 How is Helium Hosted in Mantle Peridotites? – A Case Study of Exhumed Peridotite from the Twin Sisters Ultramafic Complex, Caltech Geoclub
- June 2018 Metamorphism of Southern Madagascar, University of California Santa Barbara Petrology (Pet Food) Seminar
- May 2018 Metamorphism of Southern Madagascar, University of California Santa Barbara Undergraduate Research Colloquium
- Feb 2018 Paleogeography of the Southern California Sespe Formation, Santa Barbara City College, Invited Lecture
- Oct 2017 Paleogeography of the Southern California Sespe Formation, Orcutt Mineral Society, Invited Lecture
- May 2017 The effect of post-fire soil conditions on long-term recuperation of carbon and nitrogen, UCSB Undergraduate Research Colloquium
- May 2016 Interpreting Oligocene Paleogeography in Southern California Using a Provenance Analysis of the Sespe Formation, SBCC final internship lecture presentation

HIGHLIGHTED SKILLS

Analytical Techniques: Solution Inductively Coupled Plasma Mass Spectrometry, Noble Gas Mass Spectrometry, Scanning Electron Microscope Analysis, Powder X-Ray Diffraction, XRF Bulk Rock Analysis, Raman Spectroscopy, Fourier Transform Infrared Spectroscopy, Wet Chemistry Techniques

Computational Tools: Python, ArcGIS, QGIS, Adobe Illustrator, Matlab, MELTS, Purplex, LabVIEW, Theriak Domino, Microsoft Office, LaTeX, Monte Carlo Uncertainty Propagation, Regression Analysis, Bayesian Statistics, Regression Analysis, Markov Chain Monte Carlo Parameter Optimization

Geology and Field Skills: Geologic Mapping, Field Sampling of Geological Materials (eg: rock, ash, soil, stream water), Rock and Mineral Identification, Structural Analysis, Palinspastic Reconstruction, Cross Section Production, Measuring and Documenting Sections of Sedimentary Rock, Digital Elevation Model Production and Processing

Science Communication: Data Visualization, Scientific Writing, Oral Presentations, Field Trip Development

TEACHING EXPERIENCE

- 2023 Winter Field Geology Seminar (Geology 122b, Caltech), Teaching Assistant. Field topics in Southern California are examined in both seminar and field format.
- 2021-2022 Regional Field Geology of the Southwestern United States (Geology 136abc, Caltech), Teaching Assistant (Fall, Winter, Spring). Field trips (3-4 days) into areas displaying highly varied geology. Each student is assigned a pertinent topic and becomes the resident expert for the trip.
- 2021 Spring Nuclear Chemistry (Geology/Chemistry 127, Caltech), Teaching Assistant. Properties of nuclei and atomic phenomena in nuclear-particle detection.
- 2020 Winter Analytic Techniques Laboratory (Geology 116, Caltech), Teaching Assistant. Methods of quantitative laboratory analysis of rocks, minerals, and fluids in geological and planetary sciences.

UNDERGRADUATE RESEARCH MENTORING

2017-2021 Parker Shankin-Clarke (senior honor thesis, UCSB): Impacts of Wildfires and Ash Leaching on Stream Chemistry in the Santa Ynez Mountains of Southern California

SYNERGISTIC ACTIVITIES

2020-present GO Outdoors, K-12 Geology Outreach, Organizer and Presenter, Caltech GPS
2020-2022 Petrology Reading Group, Organizer, Caltech GPS
2016-2018 Physics Circus K-12 Outreach Program Volunteer Presenter, UCSB
2015-2016 Science Discovery Days, Volunteer Presenter, SBCC

RESEARCH GRANTS

2020-2023 National Science Foundation Graduate Research Fellowship Program
2016-2017 A comprehensive analysis of the replenishment of organic pools in soils after burning, Undergraduate Research and Creative Activities Award, UCSB
2015-2016 Interpreting Oligocene Paleogeography in Southern California Using a Provenance Analysis of the Sespe Formation, Santa Barbara City College Foundation Undergraduate Research Award

FIELD WORK RESEARCH SITES

2023 Tourmaline King Mine, California, USA
2020 Twin Sisters Mountain, Northern Cascades Washington, USA
2019 Gumigil Chrysoprase Mine, Yaamba Magnesite Mine, and Kunwarara Magnesite Mine, Queensland, Australia
2019 Nopah Range, California USA
2018 San Gabriel Mountains, California, USA
2017-2018 Santa Ynez Mountains, Southern California, USA
2015-2016 Transverse Ranges, Southern California, USA

ACADEMIC FIELD TRIPS ORGANIZED

2022 Spring Northern Arizona: Highlighting the south rim of the Grand Canyon, Meteor Crater and Lava River Cave (4-day field trip, Caltech Ge136c)
2022 Winter Anza Borrego State Park and the Imperial Valley (3-day field trip, Caltech Ge136b)
2021 Fall Transverse Ranges of Southern California (3-day field trip, Caltech Ge136a)

ACADEMIC FIELD TRIPS ATTENDED

Owens Valley, California, USA (Caltech, SBCC); Big Sur, California, USA (Caltech); Lake Mead, Arizona, USA (Caltech); Caliente, Nevada, USA (Caltech); Snake Range, Nevada, USA (UCSB); Santa Cruz Island, California, USA (UCSB); Mojave Desert, California, USA (Caltech, UCSB, SBCC); Upper Oso Canyon, California, USA (UCSB); Pyramid Lake, California, USA (UCSB); Colorado Plateau, California, Nevada, Arizona, Utah & Colorado, USA (Caltech, SBCC); Death Valley, California USA (Caltech, SBCC)