Curriculum Vitae

CHRISTINE SIDDOWAY

Professor of Geology
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ACADEMIC BACKGROUND

1995 Ph.D., University of California-Santa Barbara.

1989 M.S., University of Arizona, Tucson.

1984 B.A., Carleton College, Northfield, Minnesota.

RESEARCH INTERESTS: *Tectonic development of West Antarctica, Subglacial bedrock geology of the Ross Ice Shelf and Marie Byrd Land (Antarctica), Rocky Mountains structures, Precambrian geology of western North America, Geodesign for urban environmentalism*

TEACHING EMPHASES: *Structural geology and tectonics, Geological field methods, Geodesign*

PROFESSIONAL APPOINTMENTS

2009- Professor of Geology, Colorado College

2001-2007 Associate professor of Geology, Colorado College, Colorado Springs, CO.

2006 (5 mo.) Visiting Scientist, Lamont-Doherty Earth Observatory, Columbia University

2002-2003 Visiting professor, Department of Geosciences, University of Minnesota.

1996-2001 Assistant professor, Colorado College, Colorado Springs, CO.

1995-96 Fulbright Post-doctoral Research Fellow, Università di Siena, Italy.

FIELD RESEARCH EXPERIENCE SINCE 2000

2019 - 21 International Ocean Discovery Program (IODP) Amundsen Sea West Antarctic Expedition 379 and Iceberg Alley Expedition 382

2000 - present Principal investigator, U.S. Antarctic Program, investigations funded by grants from the Office of Polar Programs, National Science Foundation

2010 - present Record of Mesoproterozoic tectonism and Neoproterozoic sedimentation, Front Range, CO

PROFESSIONAL RECOGNITION

2021 Sigma Xi Scientific Research Honor Society, elected June 2021.

2021 UC Santa Barbara Earth Sciences Distinguished Alumna, recognized June 2021.

2016-19 Thomas M. McKee Professorship in the Natural Sciences, Colorado College.

2009 Fellow, Geological Society of America

Research metrics: Research Gate Google Scholar OrCID iD

Media coverage: Nature Careers Science News ArsTechnica Wikipedia

Selected Professional Activities, past 10 years

2017-22 Scientific Committee on Antarctic Research's GeoMAP Action Group

2016-19 Member-at-Large, GSA Penrose / Thompson Field Forums Committee

2013–14 Joint Technical Program Committee, Structural Geology & Tectonics Division of the Geological Society of America

Professional Affiliations:

American Geophysical Union; Colorado Scientific Society; Geological Society of America; Earth Science Womens Network; Sigma Xi, American Association for the Advancement of Science; United States Antarctic Program.

EXTRAMURAL RESEARCH GRANTS, CURRENT AND OVER PAST 10 YRS.

2020 Collaborative Research: Testing the linchpin of WAIS collapse with diatoms and IRD in Pleistocene and Late Pliocene strata of the Resolution Drift, Amundsen Sea, Antarctica, $55,449, NSF 1939146, Antarctic Science.

2019 Collaborative Research: Ice sheet erosional Interaction with Hot geotherm (ICI-Hot) in West Antarctica, $219,571, NSF 1917176, Antarctic Science.

2018 IODP 379 Amundsen Sea West Antarctic Ice Sheet History, $67,390, Subaward GG009393 FROM OCE 14-50528, LDEO, Columbia University.

2015 Collaborative Research: A systems approach to understanding the **R**oss **O**cean and ice **S**helf **E**nvironment, and **T**ectonic setting **T**hrough **A**erogeophysical surveys and modeling (ROSETTA-ICE), $ 164,441, 36 mo. Funded by NSF Antarctic Integrated Systems Science, www.nsf.gov/awardsearch/showAward?AWD_ID=1443497 .

2013 ACM Seminar in Advanced Interdisciplinary Learning: "Mediterranean Trivium: Earth, Sea & Culture." With S. Ashley & S. Thakur, $106,000. http://sites.coloradocollege.edu/sail/

REFEREED PUBLICATIONS, PAST 5 YRS.

Marschalek, J., Thomson, S., Hillenbrand C.D., Vermeesch, P., **Siddoway, C.**, Carter, A., Nichols, K., Rood, D.H., Venturelli, R.A., Hammond, S.J., Wellner, J., van de Flierdt, T., 2024, Geological insights from the newly discovered granite of Sif Island between Thwaites and Pine Island glaciers, *Antarctic Science,* doi: 10.1017/S0954102023000287.

Cox, S.C., Smith Lyttle, B., Elkind, S., **Siddoway, C.,** Morin, P., Capponi, G., Abu-Alam, T. *and 22 others*, 2023, A continent-wide detailed geological map dataset of Antarctica, Nature *Scientific Data*, **10**, 250, https://doi.org/10.1038/s41597-023-02152-9 .

Flowers, R. M., Ketchum, R.A., Macdonald, FA., **Siddoway, C.S.**, and Havranek, R., 2022, Existing thermochronologic data do not constrain Snowball glacial erosion below the Great Unconformities, *Proceedings of the National Academy of Science*, v. 119 (38), https://doi.org/10.1073/pnas.220845111.

Tankersley, M., Horgan, H., **Siddoway, C.,** Caratori Tontini, F., and Tinto K., 2022, Basement topography and sediment thickness beneath Antarctica's Ross Ice Shelf, Geophysical Research Letters, doi: 10.1029/2021GL097371 .

Tikoff, B., **Siddoway, C.,** Sokoutis, D., and Willingshofer, E., 2022, The lithospheric folding model applied to the Bighorn uplift during the Laramide orogeny, in Craddock, J.P. et al., eds., Tectonic Evolution of the Sevier-Laramide Hinterland, Thrust Belt, and Foreland, and Postorogenic Slab Rollback (180–20 Ma): Geological Society of America Special Paper 555, https://doi.org/10.1130/2021.2555(08) .

Siddoway, C., 2021, Geology of West Antarctica (Chapter 3, *invited*), *in* Kleinschmidt, G., ed., *Geology of the Antarctic Continent*; pp. 87-131. Stuttgart: *Schweizerbart Science Publishers,* ISBN 978-3-443-11034-5.

Siddoway, C., 2020, Antarctica, *in* Scott Elias, S. and Alderton, D. (eds.), Encyclopedia of Geology, 2nd edition; 17 pages. Amsterdam: Academic Press, 10.1016/B978-0-08-102908-4.00136-3.

Flowers, R. M., Macdonald, FA., **Siddoway, C.S.**, and Havranek, R., 2020, Diachronous development of the Great Unconformity prior to Snowball Earth, Proceedings of the National Academy of Sciences, doi: 10.1073/pnas.1913131117.

Jordan, T.A., Riley, T.R. and **Siddoway, C.**, 2020, Geology of West Antarctica, Nature Reviews Earth and Environment, doi: 10.1038/s43017-019-0013-6.

Siddoway, C., Palladino, G., Prosser, G., Freedman, D., and Duckworth, W. C., 2019, Basement-hosted sand injectites: Use of field examples to advance understanding of hydrocarbon reservoirs in fractured crystalline basement rocks, in Bowman, M. (ed.), Subsurface Sand Remobilization and Injection, Geological Society of London Special Publication 493, doi: 10.1144/SP493-2018-140.

Tinto, K. J., Padman, L., **Siddoway, C.S.**, *and 15 others*, 2019, Ross Ice Shelf response to climate driven by the tectonic imprint on seafloor bathymetry, Nature Geoscience, 12, 441–49, doi: 0.1038/s41561-019-0370-2.

Jensen, J.L,. **Siddoway, C. S.**, Reiners, P.W., Ault, A.K., Thomson, S.N. and Steele-MacInnis, M., 2018, Single-crystal hematite (U-Th)/He dates and fluid inclusions document widespread Cryogenian sand injection in crystalline basement, *Earth and Planetary Science Letters*, v. 500, 145–155, doi: 10.1016/j.epsl.2018.08.021.

Colleoni, F., De Santis, L., **Siddoway, C.S.**, Bergamasco, A., Golledge, N., Lohmann, G., Passchier, S. and Siegert, M., 2018, Spatio-temporal variability of processes across Antarctic ice-bed-ocean interfaces, Nature Communications, v. 9, 2289, https://rdcu.be/ZLBl .

INVITED LECTURES // PAST 5 YEARS

Duke University - Nicholas School of the Environment**,** Feb. 19, 2024, Deep sea sediment records of West Antarctic Ice Sheet fluctuations, Amundsen Sea, from IODP379 drilling

Community Workshop on Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research**,** National Academy of Sciences, February 9-10, 2023

Colorado Scientific Society [Denver, CO], Jan. 22, 2022, Antarctica at the juncture of bedrock geology and dynamic ice sheet

Northern Illinois University, Nov. 20, 2020, From Cores to Continent: Use of detrital minerals and a volcanic ash bed to expand knowledge of West Antarctica's bedrock and neotectonics

SCAR-COMNAP Open Science Conference, Aug. 6, 2020, Updated tectonic framework of West Antarctica and legacy of formation upon Gondwana's complex convergent margin

Café Scientifique – Univ. Colorado/Colorado Springs, Nov. 12, 2019, Tavakaiv Quartzite: An uncommon rock record of 'Snowball Earth' times, preserved on the flanks of Pikes Peak.

Lamont-Doherty Earth Observatory, Nov. 6, 2019 [Geochemistry Seminar], Subglacial geology and its influence on icesheet origins and processes, West Antarctica.

University of Minnesota, Oct. 4, 2018, A "rosetta stone" for Antarctic tectonics: New gravity and magnetics data for the Ross Ice Shelf region, ***and*** **ICI-Hot** : ICe sheet erosional Inter- action with Hot geotherm beneath an Ice Sheet

ACADEMIC / PROFESSIONAL SERVICE, *2012 TO PRESENT*

Professional Service since 2012

ongoing	Peer review for publications and National Science Foundation proposals
2017-20	International GeoMAP Action Group of SCAR (Scientific Comm. on Antarctic Research)
2016 – 19	Member-at-Large, GSA Penrose Conferences and Thompson Field Forums Committee; *and* Fellowships and Membership Committee

Colorado College – administrative appointments and committee service

2023-24	Sustainability Operational Group; Tree Advisory Committee
2022	Faculty Executive Committee (Governance Subcommittee)
2020-23	Chair, Department of Geology, Colorado College (three-year term)
2019-20	Natural Sciences Division Executive Committee

CONFERENCE PRESENTATIONS, *2020 to present*. (selected abstracts, as-yet unpublished work)

Siddoway, C.; Morin, P.; Elkind, S.; Cox, S.C.; and Smith Lyttle, B., 2023, Glacial sequences and surficial features within Antarctic GeoMAP, the new open-access geological map dataset of Antarctica, 30th Annual West Antarctic Ice Sheet Workshop (Sept. 25-28, Cloquet, MN), WAIS 2023 booklet, p 81.

Courtney-Davies, L., Flowers, R.M., **Siddoway, C.,** 2023, Hematite U-Pb dating brackets age of Tavakaiv sandstone injectites and provides minimum age for Great Unconformity erosion surface, Colorado, USA. Gordon Research Conference in Geochronology (13-18 August 2023, Mt Snow, VT).

Siddoway, C., 2023, West Antarctica crustal evolution and ice sheet history, investigated using IRD, coarse sediment and volcanic tephra from IODP379 cores and Marie Byrd Land shelf deposits. IODP Expedition 379 Science Meeting (2–4 May 2023, Heidelberg University, Germany).

Horikawa, K., Iwai, M., Asahara, Y., Hillenbrand, C.-D., Cowan, E., **Siddoway C.,** and Halberstadt, A.R., 2023, West Antarctic Ice Sheet retreat in the glacial–interglacial cycles during the Mid Pliocene: Results from Sr-Nd-Pb isotopes, IODP Expedition 379 Science Meeting (2–4 May 2023, Heidelberg University, Germany).

Siddoway, C., Thomson, S.N., Cavosie, A., Alfaro, J. and Iverson, N., 2023, Inventory of ice-rafted clasts and sediment constituents that track with dynamic ice-margin processes and biological productivity, Amundsen Sea region, Antarctica. European Geophysical Union Meeting (Vienna, 23–28 April), Abstract EGU23-9728, https://doi.org/10.5194/egusphere-egu23-9728.

Thomson, S.T., **Siddoway, C.** (presenter), Hemming, S., Colorado College CURE undergraduates, Expedition 379 scientists, Expedition 382 scientists, 2022, Evidence of Diminished WAIS and Open Interior Seaway, from Distinctive Dropstones in Amundsen Sea that Originated in the Ellsworth Mountains, 29th Annual WAIS Workshop (Sept. 27-29, Estes Park, CO).

Siddoway, C., Thomson, S.T., Taylor, J., Pepper, M., Furlong, H., Ruggiero, J., Reed, B., 2022, Enlisting Historically Excluded Undergraduates in the Effort to Extend Knowledge of West Antarctica's Bedrock, Through Course-based Undergraduate Research Experiences (CUREs) and Art-Science Initiatives, 29th Annual WAIS Workshop (Sept. 27-29, 2022), Estes Park, CO.

Siddoway, C., Thomson, S.T., Hemming, S., Buchband, H., Quigley, C., Furlong, H., Hilderman, R., and 6 others, 2021, U-Pb zircon geochronology of dropstones and IRD in the Amundsen Sea, applied to the question of bedrock provenance and Pliocene ice sheet extent in West Antarctica, European Geophysical Union v-Meeting, Abstract EGU21-9151, session CR1.1.

Iverson, N., Siddoway C., Zimmerer M., Smellie J., Dunbar N., Gohl K. and IODP Exp. 379 scientists, 2021, Rhyolite volcanism in the Marie Byrd Land volcanic province, Antarctica: New evidence for pyroclastic eruptions during latest Pliocene icesheet expansion, European Geophysical Union v-Meeting, Abstract EGU21-9003, session GMPV9.4.

Siddoway, C., Riley, T., Jordan, T.A., Tinto, K.J. and Tankersley, M., 2020 (invited), Updated tectonic framework of West Antarctica and legacy of formation upon the complex convergent margin of the Gondwana supercontinent, SCAR 2020 Online, Session 13, Abstract 920.

Siddoway, C., Cavosie, A., Bohaty, S., Hillenbrand, C.D. and IODP Expedition 379 scientists, 2020, Origin of detrital and diagenetic minerals in a terrigenous sand layer, Resolution Drift, northern Amundsen Sea (Site U1533, IODP Expedition 379), Scientific Committee on Antarctic Research Open Science Conference, Hobart, Tasmania.

TEACHING AND RESEARCH MENTORING AT COLORADO COLLEGE

Courses taught

GY 140 Introduction to Earth Systems
GY 212 Investigating Earth as a Physical System
GY 250 Topics in Geology: Explore Antarctica / Experience STEM
GY 315 Rock Deformation and the Structure of Mountains
GY 316 Field Analysis of Geological Structures
GY 400 Senor Research Seminar: Antarctic ice sheet evolution and subglacial landscape (2020)
GY 405 Research Topics in Geology: Diverse topics, reflected in the thesis and project titles, below.

STUDENT RESEARCH ADVISING (since 2019)

Senior Research Advising [GY405]:

Juarez Duran, Fer, 2023, Biosignatures as Organic Geochemical approximations to Martian Fossils

Cade Quigley, 2023, Environmental influences on seismic noise across Alaska, using USA-Array data

Emory Pollatsek, 2023, Understanding fault-fluid interaction through stable isotope analysis of tourmaline-coated brittle faults of the West Antarctic Rift System

Roat, Abby, 2022, Characterizing changes in 21st century subglacial hydrology at Humboldt Glacier, Northern Greenland

Swope, Fiona, 2022, Glacial Exhumation History of the DeVicq Region in West Antarctica

Haddad, Helen, 2022, Developing Geology Curriculum in Collaboration with Concrete Couch (local non-profit)

Brandhorst, Claire, 2021, Primary observation and development of online educational resource for the Sutherland Creek / Bear Creek segment of the Ute Pass fault, Colorado Front Range

Norwine, Jonny, 2021, Comparison of geostatistical vs. machine learning workflows applied to a geologic modeling problem

Bering, Liza, 2020, Geological review of notable features surrounding the Stabler Gilmore Cabin

Meyer, Ellie, 2019, Brittle kinematic analysis of transcurrent deformation, Mosca Creek (CO)

Krauss, Zoe, 2019, Magnetics and Gravity modeling of Ross Ice Shelf

Rundquist, Will, 2019, Geodesign for rehabilitiation of campus-creek relationship

Sachs, David, 2019, Geologically Influenced Design (Interdisciplinary Major)

Vick, Jordan, 2019, GIS development and Geodesign for educational use of Monument Park 'duck pond' (post graduation internship for Environmental major)

Patterson, Kevin, 2019, Matrix analysis of a high strain zone using sillimanite quartz pods as ellipsoidal markers

Undergraduate (non-thesis) Research Projects advised since 2019:

Harold Oppenheim, 2024, Apatite thermochronology of rare conglomerates, recovered from glacial erratic clasts upon bedrock of West Antarctica

Jan Alfaro, 2022, Investigation of volcanic tephra on the West Antarctica marine shelf: composition and potential climate significance

Amanda Yoo, 2021, Iceberg-rafted rocks and what they reveal about climate-warming in Antarctica: Evidence from uranium-lead isotopes and Antarctica's rock record

Jonny Norwine, 2019, Spectral analysis and geological modeling of potential fields data, Ross Ice Shelf

Sarah Packard, 2019, Airborne radar analysis for ice shelf structures, Ross Ice Shelf

Zoe Krauss, 2018, Magnetics and Gravity modeling of Ross Ice Shelf

Will Rundquist, 2019, Geodesign for rehabilitiation of campus-creek relationship

David Sachs, 2019, Geologically Influenced Design

Meeting presentations arising from collaborations with students (since 2020)

Undergraduate students in **boldface** *type,* ***** *indicates graduate student.*

*Furlong, Heather; Scherer, R., and Siddoway, C., 2023, Link Between Iceberg Melt and Diatom Productivity Demonstrated Through Analysis of Mid-Pliocene Amundsen Sea Interglacial Sediments, 30th Annual WAIS Workshop (Sept. 25-28), Cloquet, MN.

Brigham, Noah, Blackburn, T., Gagliardi, J., Tulaczyk, S., Siddoway, C., 2023, West Antarctic pedogenic carbonates record insolation driven snow melt, 30th Annual WAIS Workshop (Sept. 25-28), Cloquet, MN.

*Fonseca Teixeira, Ludmila, Laurent, O., Troch, J., Siddoway, C., and Bachmann, O., 2023, Tracking volcanic, plutonic, and pegmatitic sources in sediments: implications for the Early Earth history. European Geophys. Union Meeting (Vienna, 23–28 April), Abs. EGU23-5447, doi: 10.5194/egusphere-egu23-5447.

Pollatsek, N., Siddoway, C., & Gevedon, M., 2022, Understanding fault-fluid interaction through stable isotope analysis of tourmaline-coated brittle faults of the West Antarctic Rift System, Geological Society of America Abstracts with Programs, v. 54 (5), doi: 10.1130/abs/2022AM-383864.

*Levenstein, Brandon M., Schaen, A., Siddoway, C., Kirk, J., Reiners, P. and Quade, J., 2022, Using clay dating to constrain the ages of paleoweathering environments: a case study from weathered granite beneath the Great Unconformity in Manitou Springs, Colorado, Goldschmidt Conference (Hawai'i), https://conf.goldschmidt.info/goldschmidt/2022/meetingapp.cgi/Paper/12318.

*Tankersley, M., Siddoway, C., Horgan, H., Caratori Tontini, F., Tinto, K., 2021, New Contribution to Ross Ice Shelf (Antarctica) Boundary Conditions: Basement Depths and Sediment Thickness Determined from Aeromagnetic Data, AGU Fall meeting (11-15 December 2021), Abstract C45C-1013.

*Taylor, J., **Swope, F.,** Siddoway, C., Thomson, S.N., Teyssier, C., 2021, Development of Glacial Topographyover a Hot Geotherm: Insights from Low-Temperature Thermochronology and Thermo-Kinematic Modeling in Marie Byrd Land, West Antarctica, AGU Fall meeting (11-15 December 2021), Abstract EP15A-02.

Collaborators/current, and during the past 5 years:

Rebecca Flowers, University of Colorado

Michelle Gevedon, Colorado College

Sidney Hemming, Lamont Doherty Earth Institute, Columbia University

Nels Iverson, New Mexico Tech

Troy Rasbury, Stonybrook University, New York

Reed Scherer, Northern Illinois University

Matt Tankersley, Victoria University, Wellington, New Zealand

Christian Teyssier, University of Minnesota

Basil Tikoff, University of Wisconsin

Kirsty Tinto, Lamont Doherty Earth Institute, Columbia University

Stuart Thompson, University of Arizona