Curriculum Vitae

CHRISTINE SMITH 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 evolution of West Antarctica, Subglacial bedrock geology and deglaciation of Amundsen Sea region, Antarctica; Rocky Mountains structures, Precambrian geology of western North America, sustainable energy initiatives for Colorado College campus

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

Research metrics: Research Gate Google Scholar OrCID iD

Media coverage: The Conversation Science News ArsTechnica Wikipedia

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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 AND RESEARCH EXPERIENCE, PAST 10 YRS.

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

Ongoing: Principal investigator, U.S. Antarctic Program, NSF Office of Polar Programs,

HONORS

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

Selected Professional Activities, past 10 years

2017-22 Scientific Committee on Antarctic Research: INSTANT, PACE, and ACE programs
2017-21 Scientific Committee on Antarctic Research: GeoMAP Action Group
2016-19 Member-at-Large, GSA Penrose / Thompson Field Forums Committee

Professional Affiliations:

American Geophysical Union; 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.

2025 *Proposal Pending*. Collaborative Research: Process-Based Potential Field Analysis of West Antarctic Tectonic and Glacial Structures, $120,907, 36 MO., NSF 2535458, OPP Antarctic Science.

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, OPP Antarctic Science.

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

REFEREED PUBLICATIONS, PAST 5 YRS.

Horikawa, Keiji, Iwai, M., Hillenbrand, C.-D., **Siddoway, C.**, Halberstadt, A.E., Cowan, E.A. *& 7 others*, **in review following revision**, Repeated major inland retreat of Thwaites and Pine Island glaciers (West Antarctica) during the Pliocene, *Proceedings of the National Academy of Sciences.*

Arney, Thomas, Hillenbrand, C.-D., Belgrano, T.M., Milton, J.A., **Siddoway, C.**, Foster, G.L. *& 3 others*, **in revision following review**, West Antarctic subglacial geology distinguished by coupled Pb isotopes & Rb–Sr ages in ice-rafted feldspars, *Earth & Planetary Science Letters.*

Marschalek, James W., van de Flierdt, T., **Siddoway, C.S.**, Thomson, S.N., Paxman, G.J.G., Jamieson, S.S.R. *& 9 others*, **in review,** Reconstructing Eocene Antarctic river drainage from provenance analysis of Amundsen Sea Embayment sediments, *Science Advances*.

Courtney-Davies, L., Flowers, R.M., **Siddoway, C.**, Tasistro-Hart, A., and Macdonald, F., 2024, Hematite U-Pb Dating of Snowball Earth Meltwater Events, Proceedings of the National Academy of Sciences, 121 (47) e2410759121, https://doi.org/10.1073/pnas.241075912.

Fonseca Teixeira, Ludmila Maria, Laurent, O., Troch, J., **Siddoway, C.**, Tavazzani, L., Deering, C., and Bachmann, L., 2024, Tracking quartz and zircon provenance in sedimentary rocks using Ti distributions: Unlocking the volcanic-plutonic connection in old igneous systems, Earth & Planetary Science Letters, v. 643, https://doi.org/10.1016/j.epsl.2024.118906.

Marschalek, J., Thomson, S., Hillenbrand, C.-D. Vermeesch, P., **Siddoway, C.** and 7 others, 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, doi: 0.1038/s41561-019-0370-2.

INVITED LECTURES // PAST 5 YEARS

Cool Science Festival– Colorado Springs, 10/5/2025, Natural "fracking" beneath the Snowball Earth ice sheet – evidence from Colorado Springs' unique Tava sandstone

University of Colorado – Colorado Springs, 4/22/2025 [Earth Day], Progess toward Sustainability through Geodesign … and Geothermal, *for* UCCS Sustainable Speaker Series

Carleton College, 6/14/2024, **Time is on my Side: 40 Years of Antarctic Inquiry (that all started here)**

Duke University, 2/19/2024, From Cores to Continent: Use of detrital minerals and a volcanic ash bed to expand knowledge of West Antarctica's bedrock and neotectonics

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

University of Arizona, Feb. 9 and 16, 2022, Bedrock Geology of Antarctica, and hypotheses about cross-Ross Ice Shelf sedimentary connections (Lectures presented to "CURE" students, course taught by Martin Pepper)

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

ACADEMIC / PROFESSIONAL SERVICE, *2015 TO PRESENT*

Professional Service since 2015

ongoing Peer review for publications and National Science Foundation proposals

2017-20 Deputy Chair, SCAR International GeoMAP Action Group (Antarctica)

2016 – 19 Member-at-Large, GSA Penrose Conferences and Thompson Field Forums Committee; *and* Fellowships and Membership Committee

2016 Review Panel, NSF Antarctic Geoscience

2005-16 Doctoral committee member for Jacquie Baumann and Cailey Condit (U. Colorado); Chris Yakymchuk (U. Maryland); Jamie Levine (U. Texas-Austin); and Rory McFadden (U. Minnesota). Collaborator/advisor for J.V. Jones IV (U. Texas-Austin).

Colorado College – administrative appointments and committee service (past 5 yrs)

2023 - 26 Sustainability Operational Group

2025-26 Spaces Operational Group

2024-25 Events Operational Group

2022 Faculty Executive Committee (Governance Subcommittee)

2020-23 Chair, Department of Geology, Colorado College

2019-20 Natural Sciences Division Executive Committee

CONFERENCE PRESENTATIONS, *2020 to present*. (Includes only those not represented by published articles)

Siddoway, C.; Tankersley, M.; Tinto, K. and Bell, R.E., 2025, Characteristics of Thinned Crust and Magnitude of Lithospheric Extension in the West Antarctic Rift System, Geol. Soc. America Abstracts with Programs, v. 57 (3).

Siddoway, C.; Courtney-Davies, L., Flowers, R., Oppenheim, H., Hite, C., Lorenz, L. and Pohlmann, A., 2025, Investigation of a Cryogenian Subglacial Environment using Quartz Micromorphology and Rare Earth Element Signatures of Tava Sandstone Injectites and Sand Ridges, Geol. Soc. America Abstracts with Programs, v. 57 (3).

Siddoway, C.; Thomson, S.N.; Hemming, S. and Brachfeld, S., 2024, Multichronometer dating of dropstones and ice-rafted debris (latest Miocene through Pliocene) recovered from IODP drill cores offshore West Antarctica, AGU Fall Meeting (9-13 December), Paper 1655273.

Siddoway, Christine, 2024, Neoproterozoic origin of the Ute Pass fault (southern Front Range) and structural control upon the preservation of a Snowball Earth sedimentary record in Colorado, GSA Abstracts with Program, 56(4), doi: 10.1130/abs/2024CD-399780

Siddoway, C., Breyak, A., Gevedon, M., Pollatsek, E., Hemming, S., and Cox, S.E., 2024, investigation of tourmaline-mineralized mirrored brittle faults from West Antarctica using ∂O (qz-tur), tourmaline Ar/Ar thermochronology, and brittle kinematic analysis, GSA Abstracts with Program, 56(4), doi: 10.1130/abs/2024CD-399623.

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 Coursebased 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.

Education Activities, past 5 years

GRADUATE AND POST-DOCTORAL RESEARCH MENTORING

Tom Arney, PhD 2024, University of Southhampton, UK, Ice-rafted feldspar grains in recent shelf sediments of West Antarctica: provenance pathways via lead isotope compositions. Doctoral advisor: Steven M. Bohaty.

Ludmila Fonseca Teixeira, PhD 2023, ETH - Zurich, Magmatic to hydrothermal conditions in A-type Pikes Peak granite (Colorado) and associated pegmatites. Doctoral advisor: Olivier Bachmann.

TEACHING AND RESEARCH MENTORING AT COLORADO COLLEGE, 2016 TO PRESENT

Courses taught

CC 120	First Year Program: Writing in the Disciplines – Discerning and Writing the Record of Earth
GY 140	Introduction to Earth Systems
GY 212	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	Senior Research Seminar: Subglacial hydraulics and glaciotectonics of Snowball Earth in Colorado (2025)
GY 400	Senior 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.
GY 445	Regional Studies in Geology (2019): Mojave region, California, to Colorado Plateau

Undergraduate Research Mentoring, past 5 years:

Senior Research Advising [GY405]:

Harold Oppenheim, 2025, Field and SEM study of a subglacial sand ridge formed during Sturtian Snowball Earth glaciation

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

Abby Roat, 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

Undergraduate (non-thesis) Research Projects advised, past 5 years:

Annie Breyak, 2024, Microstructural study of tourmaline-mineralized mirrored brittle faults

Harold Oppenheim, 2024, (U-Th)/He apatite dating of felsic glacial erratics (West Antarctica) for information about thermal history of subglacial bedrock

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

Meeting presentations arising from collaborations with students since 2020

Undergraduates in **boldface** *type,* ***** *indicates graduate student.*

*Giardino, J., *White, S., Blackburn, T., Tulaczyk, S.M., and Siddoway, C, 2024, Pedogenic Carbonates Record Insolation Driven Melting in Antarctica, AGU Fall meeting (9-13 December), Paper 1597941.

Adkins, Roxanne, Taylor, Jennifer M., Siddoway, C., Thomson, S.N. and Teyssier, C., 2024, Unveiling the geologic history of Marie Byrd Land, West Antarctica: insights from thermo-kinematic modeling and low-temperature thermochronology, GSA Abstracts with Program, 56(5), doi: 10.1130/abs/2024AM-402995.

*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, Christine, 2023, West Antarctic pedogenic carbonates record insolation driven snow melt, 30th Annual WAIS Workshop (Sept. 25-28), Cloquet, MN.

Pollatsek, A., 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.

*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.

*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 over the past 5 years:

Thomas Arney, University of Southhampton

Robin E. Bell, Lamont Doherty Earth Institute, Columbia University

Simon C. Cox, GNS Science, New Zealand

Stephen E. Cox, Lamont Doherty Earth Observatory

Liam Courtney-Davies, University of Colorado

Rebecca Flowers, University of Colorado

Keiji Horikawa, Toyama University, Japan

Nels Iverson, New Mexico Tech

James Marschalek, Imperial College, London

Reed Scherer, Northern Illinois University

Matt Tankersley, University of Kiel, Germany

Christian Teyssier, University of Minnesota

Basil Tikoff, University of Wisconsin

Kirsty Tinto, Lamont Doherty Earth Institute, Columbia University

Stuart Thompson, University of Arizona