

Kathryn Elaine Snell

Associate Professor, Director of [CU Boulder Earth Systems Stable Isotope Lab](#)
 Department of Geological Sciences, University of Colorado Boulder
 email: kathryn.snell@colorado.edu | ORCID: <https://orcid.org/0000-0001-5373-7143>

Research Interests

Paleoclimatology, stable isotope geochemistry, sedimentology, paleoaltimetry and tectonics

1. Education

2002 B.A. cum laude, Geology with Distinctions, The Colorado College
 2004 – 2011 Ph.D., Earth Sciences, University of California, Santa Cruz (Advisor: Dr. Paul Koch)

2. Employment

2023-Present Associate Professor of Geological Sciences, CU Boulder
Sabbatical leave: AY 24/25
 2015-2022 Assistant Professor of Geological Sciences, CU Boulder
Research leave semester: Fall 2016
Parental leave semesters: Fall 2018; Fall 2020
 2014 Senior Postdoctoral Scholar, California Institute of Technology
 2011-2013 Postdoctoral Scholar, California Institute of Technology
 Advisors: Dr. John Eiler and Dr. Brian Wernicke
 2009 Visiting Professor, Block 3, The Colorado College
 2004-2010 Teaching and Research Assistant, UC Santa Cruz
 2003-2004 GIS Research Assistant, GeoMap NW, University of Washington, Seattle, WA
 2003 Hydrologic Technician, USDA Forest Service, Priest Lake, ID

3. Grants, Awards and Honors

2020 – 2022 National Science Foundation Low Temperature Geochem and Geobio grant:
 What Controls Carbonate Formation in Fine-grained and Clay-rich Soils? Gaining Perspective
 from Serial Soil Water Stable Isotope Datasets (Sole PI) EAR-2023385 - \$270,918
 2021 supplement: \$40,843

2020 ICDP Workshop proposal: PlioWest: Drilling Pliocene Lakes in Western North America
 \$62,451 total (Co-PI)

2018 - 2021 National Science Foundation SedGeo and Paleobio grant:
 2021 (1 yr ext) Collaborative Research: Assessing the sensitivity of high-altitude environments to globally
 warm climate as recorded by lacustrine microbialite carbonates (Lead PI; 3 co-PIs including CU
 Co-PI E. Trower) EAR-1826850 - \$317,570 /\$598,733 (CUB/Total)
 2021 supplement: \$55,759

2018 - 2020 National Science Foundation Low Temperature Geochem and Geobio grant:
 2021 (1 yr ext) A predictive framework for micro-scale carbonate diagenesis: Towards more accurate
 reconstructions of global climate and environmental change (Co-PI; Lead is Postdoc Miquela
 Ingalls) EAR-1826805 - \$184,321

2015 - 2017 National Science Foundation Tectonics grant:
 2018 (1 yr ext) Collaborative Research: The Record of Early Cretaceous Growth of the Nevadaplano From
 Syn-orogenic Deposits of the Sevier Hinterland (Lead PI; 2 co-PIs)
 EAR-1524785 – \$140,965 /\$389,514 (CUB/Total)

4. Research and Creative Work

Peer-reviewed Publications: *grad student, ^postdoc, +student committee, #staff, **undergrad

Olsen-Valdez, J., Widlansky, S., Trower, E., Snell, K., Clyde, W. (2025). Carbonates and microbialites record a dynamic lake basin evolution in the Late Cretaceous to Eocene Sheep Pass Formation, Nevada, USA.

Sedimentology. <https://doi.org/10.1111/sed.13264>.

Hollis, S.P. Dennis, P.F., Menuge, J.F., Doran, A.L., Marca, A., **Davidheiser-Kroll, B[#]**, Wilkinson, J.J., **Snell, K.E.**, Turner, O., Guven, J., Boyce, A. *In Review*. Tracking fluid temperature and d18O in carbonate-hosted hydrothermal ore systems using clumped C-O isotopes. *Economic Geology*, 119, 1369-1382.

Washburn AM, Sylvester PJ, Poros Z, Snell KE. (2025). Thermal maximum and overpressure of the Wolfcamp formation in the Delaware Basin of Texas and New Mexico through age and temperature of beef calcite veins. *AAPG BULLETIN*, 108 (11), 2073-2092. <https://doi.org/10.1306/07232423096>

Leapaldt, H. C., Frantz, C. M., Olsen-Valdez, J., Snell, K. E., Trower, E. J., & Ingalls, M. (2024). Primary to post-depositional microbial controls on the stable and clumped isotope record of shoreline sediments at Fayetteville Green Lake. *Geobiology*, 22, e12609. <https://doi.org/10.1111/gbi.12609>

Hönisch, B, and the CenCO₂PIP consortium (83 authors/consortium members; Snell as consortium member and co-author) (2023). Towards a Cenozoic history of atmospheric CO₂. *Science*, 382(6675). DOI: 10.1126/science.adi5177.

Washburn, AM., Sylvester, PJ, **Snell, KE**. 2023. A record of overpressure and Sevier tectonics within beef calcite of the Heath Formation, Central Montana Trough. *Geochemistry*. <https://doi.org/10.1016/j.chemer.2023.126073>.

Havranek, RE*, **Snell, KE**, Kopf, SH, Davidheiser-Kroll[#], B, Morris, V, and Vaughn, B (2023). Technical note: Lessons from and best practices for the deployment of the Soil Water Isotope Storage System, *Hydrol. Earth Syst. Sci.*, 27, 2951–2971, <https://doi.org/10.5194/hess-27-2951-2023>

Smith, A. J., Ito, E., Burls, N., Clarke, L., Donders, T., Hatfield, R., Kuehn, S., Koutsodendris, A., Lowenstein, T., McGee, D., Molnar, P., Prokopenko, A., **Snell, K.**, Valero Garcés, B., Werne, J., & Zeeden, C. (2023). Workshop report: PlioWest-drilling Pliocene lakes in western North America. *Scientific Drilling*, 32, 61–72. <https://doi.org/10.5194/sd-32-61-2023>

Simon, RE⁺, Budd, DA, & **Snell, KE** (2023). The history of calcite diagenesis and origin of exceptionally negative oxygen isotope values in chalks of the Niobrara Formation, Denver Basin, USA. *Depositional Record*, 9(3). <https://doi.org/10.1002/dep2.218>

Fetrow, AC*, **Snell, KE**, di Fiori, R. v., Long, SP, & Bonde, JW (2022). How Hot Is Too Hot? Disentangling Mid-Cretaceous Hothouse Paleoclimate from Diagenesis. *Paleoceanography and Paleoclimatology*, 37(12). <https://doi.org/10.1029/2022PA004517>

Pérez-Angel, LC⁺, Sepúlveda, J., Montes, C., Smith, JJ, Molnar, P., González-Arango, C., **Snell, KE**, & Dildar, N. (2022). Mixed Signals From the Stable Isotope Composition of Precipitation and Plant Waxes in the Northern Tropical Andes. *Journal of Geophysical Research: Biogeosciences*, 127(12). <https://doi.org/10.1029/2022JG006932>

Widlansky, SJ⁺, Secord, R, **Snell, KE**, Chew, AE, & Clyde, WC. Carbon isotope stratigraphy and mammal turnover during post-PETM hyperthermals. *Climate of the Past*, 18, 681-712 (April, 2022).

Ingalls, M[^], **Fetrow, AC^{*}**, **Snell KE**, Frantz, CM, Trower, EJ. "Lake level controls the recurrence of giant stromatolite facies." *Sedimentology*. (December 24, 2021).

Di Fiori, R.V., Long, S.P., **Fetrow, A.C.^{*}**, **Snell, K.E.**, Bonde, J.W., Vervoort, J.D. "The role of shortening in the Sevier hinterland within the U.S. Cordilleran retroarc thrust system: Insights from the Cretaceous Newark Canyon Formation in central Nevada." *Tectonics*. 40 (5) (April 30, 2021).

S. Bernasconi, M Daëron, KD Bergmann, M Bonifacie, AN Meckler, H Affek, N Anderson, D Bajnai, E Barkan, E Beverly, D Blamart, L Burgener, D Calmels, C Chaduteau, M Clog, **B Davidheiser-Kroll[#]**, A Davies, F Dux, JM Eiler, B Elliott, **A Fetrow^{*}**, J Fiebig, S Goldberg, M Hermoso, K Huntington, E Hyland, M Ingalls, M Jaggi, C John, A Jost, S Katz, J Kelson, T Kluge, I Kocken, A Laskar, T Leutert, DS Liang, J Lucarelli, T Mackey, X Mangenot, N Meinicke, S Modestou, I Mueller, S Murray, A Neary, N Packard, B Passey, E Pelletier, S Petersen, A Piasecki, A Schauer, **K Snell**, A Tripathi, P Swart, D Upadhyay, T Vennemann, I Winkelstern, D Yarian, N Yoshida, N Zhang, M Ziegler. "InterCarb: A community effort to improve interlaboratory standardization of the carbonate clumped isotope thermometer using carbonate standards." *Geochemistry Geophysics Geosystems*. 22 (5) (April 13, 2021).

Ingalls, M[^], **Snell, KE**. "Tools for comprehensive assessment of fluid-mediated and solid-state alteration of carbonates used to reconstruct ancient elevation and environments." *Frontiers in Earth Science (Sedimentology, Stratigraphy and Diagenesis)*. 9 (February 25, 2021).

Fetrow AC^{*}, **Snell KE**, Di Fiori R, Long SP, Bonde JW. "Early Sevier orogenic deformation exerted principal control on changes in depositional environment recorded by the Cretaceous Newark Canyon Formation." *Journal Of Sedimentary Research*. 90 (9) (October 01, 2020): 1175-1197.

Suarez MB, Knight JA, Godet A, Ludvigson GA, **Snell KE**, Murphy L, Kirkland JI. "Multiproxy strategy for determining palaeoclimate parameters in the Ruby Ranch Member of the Cedar Mountain Formation." *Geological Society, London, Special Publications* (August 05, 2020).

Perez-Angel LC⁺, Sepulveda J, Molnar P, Montes C, Rajagopalan B, **Snell KE**, Gonzalez-Arango C, Dildar N. "Soil and Air Temperature Calibrations Using Branched GDGTs for the Tropical Andes of Colombia: Toward a Pan-Tropical Calibration." *Geochemistry Geophysics Geosystems*. 21 (8) (August 01, 2020): ARTN e2020GC008941.

Rasmussen DM⁺, Foreman BZ, Fricke HC, **Snell KE**, Gipson L, Housen B. "The early Paleogene stratigraphic evolution of the Huerfano Basin, Colorado." *Rocky Mountain Geology*. 55 (1) (July 01, 2020): 1-26.

Havranek RE^{*}, **Snell KE**, **Davidheiser-Kroll B[#]**, Bowen GJ, Vaughn B. "The Soil Water Isotope Storage System (SWISS): An integrated soil water vapor sampling and multiport storage system for stable isotope geochemistry." *Rapid Communications In Mass Spectrometry*. 34 (12) (June 30, 2020)

Ingalls M[^], Frantz CM, **Snell KE**, Trower EJ. "Carbonate facies-specific stable isotope data record climate, hydrology, and microbial communities in Great Salt Lake, UT." *Geobiology*. 18 (5) (March 20, 2020): 566-593.

Di Fiori, RV, Long, SP, **Fetrow, AC^{*}**, **Snell, KE**, Bonde, JW, Vervoort, J. 2020. Syncontractional deposition of the Cretaceous Newark Canyon Formation, Diamond Mountains, Nevada: Implications for strain partitioning within the U.S. Cordillera. *Geosphere*, v. 16. DOI: 10.1130/GES02168.1

Lukens, WE, Fox, DL, **Snell, KE**, Wiest, LA, Layzell, AL, Uno, KT, Polissar, PJ, Martin, RA, Fox-Dobbs, K, Peláez-Camponaes, P. 2019. Pliocene paleoenvironments in the Meade Basin, southwest Kansas. *Journal of Sedimentary Research*.

Lunt, D.J., Huber, M., Anagnostou, E., Baatsen, M.L.J., Caballero, R., DeConto, R., Dijkstra, H.A., Donnadieu, Y., Evans, D., Feng, R., Foster, G., Gasson, E., von der Heydt, A.S., Hollis, C.J., Inglis, G.N., Jones, S.M., Kiehl, J., Kirtland Turner, S., Korty, R.L., Kozdon, R., Krishnan, S., Ladant, J.B., Langebroek, P., Lear, C.H., LeGrande, A.N., Littler, K., Markwick, P., Otto-Bliesner, B. Pearson, P., Poulsen, C.J., Salzmann, U., Shields, C., **Snell, K.E.**, Starz, M., Super, J., Tabor, C., Tierney, J., Tourte, G.J.L., Tripathi, A., Upchurch, G.R., Wade, B.S., Wing, S.L., Winguth, A.M.E., Wright, N., Zachos, J.C., and Zeebe, R. 2017. DeepMIP: experimental design for model simulations of the EECO, PETM, and pre-PETM. *Geoscientific Model Development*. 10: 889-901. DOI: 10.5194/gmd-10-889-2017.

Fox, DL, Martin, RA, Roepke, E, **Fetrow, AC***, Femal, B, Uno, KT, Fox-Dobbs, K, **Snell, KE**, Haveles, AW, Polissar, PJ. 2015. Biotic and Abiotic Forcing During the Transition of Modern Grassland Ecosystems: Evolutionary and Ecological Responses of Small Mammal Communities Over the Last 5 Million Years. In P. D. Polly, J. J. Head, & D. L. Fox (Eds.), *Earth-Life Transitions: Paleobiology in the Context of Earth System Evolution*. *Paleontological Society Papers* v. 21. Yale Press, New Haven, CT. p. 197-218.

Snell, KE, Koch, PL, Eiler, JM, Druschke, P. 2014. High elevation of the Nevadaplano during the Late Cretaceous. *Earth and Planetary Science Letters*. 386: 52–63. DOI: 10.1016/j.epsl.2013.10.046

Snell, KE, Thrasher, B, Eiler, JM, Koch, PL, Sloan, LC, Tabor, N, Dettman, D. 2013. Hot summers in the Bighorn Basin during the early Paleogene. *Geology*, 41: 55-58. DOI: 10.1130/G33567.1

Clyde, WC, Ting, S, **Snell, KE**, Bowen, GJ, Tong, Y, Koch, PL, Qian, L, Wang, Y. 2010. New paleomagnetic and stable isotope results from the Nanxiong Basin, China: Implications for the K/T Boundary and the timing of Paleocene mammalian turnover. *Journal of Geology*, 118: 131-143. DOI: 10.1086/649893

Clyde, WC, Tong, Y, **Snell, KE**, Bowen, GJ, Ting, S, Koch, PL, Li, Q, Wang, Y, and Meng, J. 2008. An integrated stratigraphic record from the Paleocene of the Chijiang Basin, Jiangxi Province (China): Implications for mammalian turnover and Asian block rotations. *Earth and Planetary Science Letters*, 269: 553-563. DOI: 10.1016/j.epsl.2008.03.009

Myrow, PM, **Snell, KE**, Hughes, N, Paulsen, T., Heim, N, Parcha, S. 2006. Cambrian depositional history of the Zaskar Valley region of the Indian Himalaya: Tectonic implications. *Journal of Sedimentary Research*, 76: 364-381. DOI: 10.2110/jsr.2006.020

Non-Peer Reviewed Publications and Government Reports:

Kenworthy, J.P., V. L. Santucci, M. McNerney, and **K. Snell**. 2005. Paleontological Resource Inventory and Monitoring, Upper Columbia Basin Network. National Park Service TIC# D-259.

Submitted works In Review or Post-Review Revision:

Havranek, R., Snell, K., Davidheiser-Kroll, B., Brookins, S., 2024. Pedogenic carbonate formation in fine-grained soils. <https://doi.org/10.22541/essoar.173193467.74350158/v1>

Hagen, C., Hibner, B., Olsen-Valdez, J., Brumberger, H., Fontana, C., Gutoski, J., Hankins, J., Kashyap, S., Lincoln, T., Mizrahi, N., Snell, K., Trower, E. (In Review). Microbialite cathodoluminescence: a tool for investigating paleoredox conditions, alteration histories, and primary textures across time. The Depositional Record.

- Perez-Angel, L.C., Sepulveda, J., Molnar, P., Mora-Paez, H., Parrado, A., Eaman, K., Russell, J., Rajagopalan, B., Gonzalez-Arango, C., Snell, K., Montes, C., Crowley, J., Schitz, M., Trayler, R. (In Review) Evolution of Pliocene-Pleistocene tropical terrestrial temperature amplification. PNAS.
- Washburn, A.M., Sylverster, P.J., Snell, K.E. (In Review). Deep basin overpressure resulting from fluid migration and hydraulic head in the Uinta Basin, Utah as indicated by analysis of beef calcite. Basin Research.
- Hagen, C.J., Trower, E.J., Halling, A., Hurley, S.J., Schoenemann, S.W., Ingalls, M., Snell, K.E. (In Prep). Phytoplankton community, seasonality, and water chemistry modulate the lacustrine diurnal carbon cycling. JGR: Biogeosciences.
- Olsen-Valdez, J., Hagen, C.J., Widlansky, S., Trower, E.J., Snell, K.E., Clyde, W.C. (In Prep). Photosynthetic carbon cycling signal preserved in carbonate $\delta^{13}\text{C}$ values of ancient thrombolites. Geology.