

# Daniel A. Stolper

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## Personal Data

Date of birth: May 16, 1986

Department of Earth and Planetary Science  
University of California, Berkeley  
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## Professional History

2022-present Associate Professor, Department of Earth and Planetary Science  
University of California, Berkeley

2017-2022 Assistant Professor, Department of Earth and Planetary Science  
University of California, Berkeley

2017-present Faculty Scientist, Earth & Environmental Sciences Area  
Lawrence Berkeley National Laboratory

2015-2016 Postdoctoral Scholar, Department of Geosciences  
Princeton University

2015 Petroleum Geochemistry Intern  
ExxonMobil Upstream Research Company

2014 Postdoctoral Scholar, Division of Geological Sciences  
California Institute of Technology

## Education

2014 Ph.D. Geobiology  
California Institute of Technology  
Advisors: John Eiler and John Grotzinger

2011 M.S. Geobiology  
California Institute of Technology

2008 A.B. Earth and Planetary Sciences *Magna Cum Laude*  
Harvard College

## Fellowships and Awards

2022 DOE Early Career Research Program Award

2021 NSF CAREER Award  
Geobiology and Low-Temperature Geochemistry

2020 Sloan Research Fellow  
Ocean Sciences

2020 F.W. Clarke Medal  
Geochemical Society

2019 Hisashi Kuno Award  
Volcanology, Geochemistry, & Petrology Section  
American Geophysical Union

2019 Hellman Fellow  
University of California, Berkeley

2017 Rose Hills Innovator  
University of California, Berkeley

2015-2016 NOAA Climate & Global Change Postdoctoral Fellowship

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|-----------|--|
| 2013      | Richard H. Jahns Teaching Prize<br>Division of Geological and Planetary Sciences<br>California Institute of Technology |
| 2010-2013 | NSF Graduate Research Fellowship   |
| 2009-2010 | Eaton Fellowship<br>Division of Geological and Planetary Sciences<br>California Institute of Technology                |
| 2008-2009 | Fulbright Scholar<br>University of Southern Denmark  |
| 2008      | Thomas Temple Hoopes Prize<br>Harvard College  |
| 2004      | National Merit Scholar   |

### Memberships

American Geophysical Union  
Geochemical Society  
Sigma Xi

### Classes Taught

|             |  |
|-------------|--|
| Spring 2023 | EPS 50: The Planet Earth (4 units)                                       |
| Spring 2022 | EPS 125: Stable Isotope Geochemistry (4 units)                           |
| Fall 2021   | EPS 102: History and Evolution of Planet Earth (4 units)                 |
| Spring 2021 | EPS 50: The Planet Earth (4 units)                                       |
| Fall 2020   | EPS 102: History and Evolution of Planet Earth (4 units)                 |
| Spring 2020 | EPS 125: Stable Isotope Geochemistry (4 units)                           |
| Fall 2019   | EPS 102: History and Evolution of Planet Earth (4 units; revamped class) |
| Spring 2019 | EPS 50: The Planet Earth (4 units)                                       |
| Spring 2018 | EPS 125: Stable Isotope Geochemistry (4 units; new class)                |
| Fall 2017   | EPS 24: Freshman Seminar (1 unit; new class)                             |

### Service

#### Committee work

Fall 2022-present: Serve on Geochemical Society Goldschmidt Award selection committee  
Spring 2022-present: Serve on AGU Kuno Award selection committee  
Fall 2021-spring 2022: Served on search committee for a tenure-track search in EPS  
Spring 2020-present: Serve on Ramsden Committee for undergraduate research  
Spring 2019: Interviewer for UC Berkeley undergraduate scholarships (Fiat Lux and Regents' and Chancellor's Scholarships)  
Fall 2017-present: Serve on Fulbright interviewing and selection committee  
Fall 2017-present: Serve on EPS curriculum committee

#### Seminar organization

Spring 2017- spring 2020: Organized the Isotope Geochemistry spring seminar series in the department  
Fall 2017-spring 2020, fall 2021-spring 2022: Organized the main departmental seminar series

#### Reviews

Reviewer for geochemical and earth and planetary science journals (including *Geochimica et Cosmochimica Acta*, *Chemical Geology*, *Earth and Planetary Science Letters*, *Nature Geoscience*) as well as multi-discipline journals such as *Proceedings of the National Academy of Sciences*, *Science*, *Nature Communications*, and *Science Advances*. Reviewer for DOE, NSF, and ACS grants.

#### Mentoring

##### Graduate students mentored

Drew Gorin (fall 2021-present): mentor on secondary research project  
Ziman Wu (fall 2020-present): co-thesis advisor with Don DePaolo  
Jiwoon Hwang (fall 2020-present): mentor on secondary research project  
Andrew Turner (fall 2017-present): thesis advisor

Naomi Intrator (spring 2016): mentor on secondary research project

### Postdocs mentored

Cristina Benker (10/2022-present; jointly advised with Pupa Gilbert)  
Laurent Devriendt (9/2022-present; jointly advised with Pupa Gilbert)  
Jonathan Gropp (EMBO postdoc, 8/2022- present)  
Rebekah Stein (Agouron Geobiology postdoc, 1/2021-12/2022, now assistant professor at Quinnipiac University)  
Barbara Wortham (NOAA Climate and Global Change postdoc, 8/2021-8/22, now Climate Change Manager at PricewaterhouseCoopers)  
Daniel Ibarra (Miller postdoc, 7/2019-6/2021, now assistant professor at Brown)  
Daniel Eldridge (7/2018-7/2021, now a postdoc at Los Alamos National Laboratory)  
Max Lloyd (Agouron Geobiology postdoc, 3/2018-6/2020; now an assistant professor at Penn State)

### Publications

The superscript † indicates a paper by a postdoc at Berkeley working with me while a \* indicates a graduate student at Berkeley working with me.

#### *In review or revision*

[39] Eldridge DL<sup>†</sup>, AC Turner<sup>‡</sup>, M Bill, ME Conrad, **DA Stolper** (in revision). Carbon and Hydrogen Isotope Fractionations and Methane Clumped-Isotope Compositions from Ethane Pyrolysis Experiments from 550 to 600°C. *Geochimica et Cosmochimica Acta*.

#### *Published or in press*

- [38] Stein RA<sup>†</sup>, R Amundson, **DA Stolper** (in press). Clumped Isotope Thermometry in Plant-Derived Carbonates. *Paleoceanography and Paleoclimatology*.
- [37] Geyman EC, Z Wu<sup>\*</sup>, MD Nadeau, S Edmondson, A Turner<sup>\*</sup>, SJ Purkis, B Howes, B Dyer, ASC Ahm, N Yao, CA Deutsch, JA Higgins, **DA Stolper**, AC Maloof. The origin of carbonate mud and implications for global climate. *Proceedings of the National Academy of Sciences*, 119, e2210617119.
- [36] Turner AC<sup>\*</sup>, NJ Pester, M Bill, ME Conrad, KG Knauss, **DA Stolper** (2022). Experimental determination of hydrogen isotope exchange rates between methane and water under hydrothermal conditions. *Geochimica et Cosmochimica Acta*. *Geochemistry*, 329, p. 231-255.
- [35] **Stolper DA**, X Pu, MK Lloyd<sup>†</sup>, NI Christensen, CE Bucholz, RA Lange (in revision). Constraints on Early Paleozoic deep-ocean oxygen concentrations from the iron geochemistry of the Bay of Islands ophiolite. *Geochemistry, Geophysics, Geosystems*, 23, e2021GC010196.
- [34] Ibarra DE<sup>†</sup>, AG Yanchilina, MK Lloyd, KA Methner, CP Chamberlain, R Yam, A Shemesh, **DA Stolper** (in press). Triple oxygen isotope systematics of diagenetic recrystallization of diatom opal-A to opal-CT to microquartz in deep sea sediments. *Geochimica et Cosmochimica Acta*, 320, p. 304-323.
- [33] Hodgin E, N Swanson-Hysell, J DeGraaf, A Kylander-Clark, M Schmitz, A Turner<sup>\*</sup>, Y Zhang, **D Stolper** (2022). Final inversion of the Midcontinent Rift during the Rigolet Phase of the Grenvillian orogeny. *Geology*, 50, p. 547-551.
- [32] **Stolper DA**, JA Higgins, LA Derry (2021). The role of the solid earth in regulating atmospheric O<sub>2</sub> levels. *American Journal of Science*, 321, p. 1381-1444.
- [31] Turner AC<sup>\*</sup>, R Korol, DL Eldridge<sup>†</sup>, M Bill, M Conrad, TF Miller, **DA Stolper** (2021). Experimental and theoretical determinations of hydrogen isotopic equilibrium in the system CH<sub>4</sub>-H<sub>2</sub>-H<sub>2</sub>O from 3 to 200°C. *Geochimica et Cosmochimica Acta*, 314, p. 223-269.
- [30] Lloyd MK<sup>†</sup>, DL Eldridge<sup>†</sup>, **DA Stolper** (2021). Clumped <sup>13</sup>CH<sub>2</sub>D and <sup>12</sup>CHD<sub>2</sub> compositions of methyl groups from wood and synthetic monomers: methods, experimental and theoretical calibrations, and initial results. *Geochimica et Cosmochimica Acta*, 297, p. 233-275.

- [29] Douglas PMJ, RG Moguel, KM Walter Anthony, M Wik, PM Crill, KS Dawson, DA Smith, E Yanay, MK Lloyd<sup>†</sup>, **DA Stolper**, JM Eiler, AL Sessions (2020). Clumped isotopes link older carbon substrates with slower rates of methanogenesis in northern lakes. *Geophysical Research Letters*, 47, DOI: 10.1029/2019GL086756.
- [28] Eldridge DL<sup>†</sup>, R Korol, MK Lloyd<sup>†</sup>, AC Turner<sup>\*</sup>, MA Webb, TF Miller, **DA Stolper** (2019). Comparison of experimental vs. theoretical abundances of <sup>13</sup>CH<sub>3</sub>D and <sup>12</sup>CH<sub>2</sub>D<sub>2</sub> for isotopically equilibrated systems from 1 to 500°C. *ACS Earth and Space Chemistry*, 3, p. 2747-2764 (Chosen as ACS Editor's Choice).
- [27] Kast ER, **DA Stolper**, A Auderset, JA Higgins, H Ren, XT Wang, A Martínez-García, GH Haug, DM Sigman (2019). Nitrogen isotope evidence for expanded ocean suboxia in the early Cenozoic. *Science*, 364, p. 386-389.
- [26] **Stolper DA** and CE Bucholz (2019). Neoproterozoic to early Phanerozoic rise in island arc redox state due to deep ocean oxygenation and increased marine sulfate levels. *Proceedings of the National Academy of Sciences*, 116.18, p. 8746-8755.
- [25] **Stolper DA**, WW Fischer, ML Bender (2018). Effects of temperature and carbon source on the isotopic fractionations associated with O<sub>2</sub> respiration for <sup>17</sup>O/<sup>16</sup>O and <sup>18</sup>O/<sup>16</sup>O ratios in *E. coli*. *Geochimica et Cosmochimica Acta*, 240, p. 152-172.
- [24] YL Yung, P Chen, K Nealson, S Atreya, P Beckett, JG Blank, B Ehlmann, J Eiler, G Etiope, JG Ferry, F Forget, P Gao, R Hu, A Kleinböhl, R Klusman, F Lefèvre, C Miller, M Mischna, M Mumma, S Newman, D Oehler, M Okumura, R Oremland, V Orphan, R Popa, M Russell, L Shen, BS Lollar, R Staehle, V Stamenković, **D Stolper**, A Templeton, AC Vandaele, S Viscardy, CR Webster, PO Wennberg, ML Wong, J Worden (2018). Methane on Mars and habitability: challenges and responses. *Astrobiology*, 18, p. 1221-1242.
- [23] **Stolper DA**, JM Eiler, JA Higgins (2018). Modeling the effects of diagenesis on carbonate clumped-isotope values in deep- and shallow-water settings. *Geochimica et Cosmochimica Acta*, 227, p. 264-291.
- [22] Lawson M, BJ Shenton, **D Stolper**, JM Eiler, T Rasbury, TP Becker, C Lander, AS Buono, SP Becker, R Pottorf, GG Gray, D Yurewicz, J Gournay (2018). Deciphering the diagenetic history of the El Abra Formation of eastern Mexico using reordered clumped isotope temperatures and U-Pb dating. *Geological Society of American Bulletin*, 130, p. 617-629.
- [21] Brenner D, BH Passey, **DA Stolper** (2018). Influence of water on clumped-isotope bond reordering kinetics in calcite. *Geochimica et Cosmochimica Acta*, 224, p. 42-63.
- [20] Shuai Y, P Douglas, S Zhang, **D Stolper**; M Lewan, M Lawson, G Ellis, M Formolo, J Mi, K He, G Hu, JM Eiler (2018). Equilibrium and non-equilibrium controls on the abundances of clumped isotopologues of methane during thermogenic formation in laboratory experiments: Implications for the chemistry of pyrolysis and the origins of natural gases. *Geochimica et Cosmochimica Acta*, 223, p. 159-174.
- [19] **Stolper DA** and CB Keller<sup>†</sup> (2018). A record of deep-ocean dissolved O<sub>2</sub> from the oxidation state of iron in submarine basalts. *Nature*, 553, p. 323-327.
- [18] **Stolper DA**, M Lawson, MJ Formolo, CL Davis, PMJ Douglas, JM Eiler (2018). The utility of methane clumped isotopes to constrain the origins of methane in natural-gas accumulations. *Geological Society of London, Special Publications*, 468, p. 23-52.
- [17] Douglas PMJ, **DA Stolper**, JM Eiler, AL Sessions, M Lawson, Y Shuai, A Bishop, OG Podlaha, AA Ferreira, EV Santos Neto, M Niemann, AS Steen, L Huang, E Chimiak, DL Valentine, J Fiebig, AJ Luhmann, WE Seyfried Jr., G Etiope, M Schoell, WP Inskeep, JJ Moran, N Kitchen (2017). Methane clumped isotopes: progress and potential for a new isotopic tracer. *Organic Geochemistry*, 113, p. 262-282.
- [16] Ryb U, MK Lloyd, **DA Stolper**, JM Eiler (2017) The clumped-isotope geochemistry of exhumed marbles from Naxos, Greece. *Earth and Planetary Science Letters*, 470, p. 1-12.

- [15] **Stolper DA**, GD Love, S Bates, TW Lyons, E Young, AL Sessions, JP Grotzinger (2017). Paleoecology and paleoceanography of the Athel Silicilyte, Ediacaran-Cambrian boundary. *Geobiology*, 15, p. 401-426.
- [14] **Stolper DA**, ML Bender, GB Dreyfus, Y Yan, JA Higgins (2016). A Pleistocene ice core record of atmospheric O<sub>2</sub> concentrations. *Science*, 363, p. 1427-1430.
- [13] Douglas PMJ, **DA Stolper**, DA Smith, KM Walter Anthony, CK Paull, S Dallimore, M Wik, PM Crill, M Winterdahl, JM Eiler, AL Sessions (2016). Diverse origins of Arctic and Subarctic methane seeps identified with multiply-substituted isotopologues. *Geochimica et Cosmochimica Acta*, 188, p. 163-188.
- [12] **Stolper DA** and JM Eiler (2016). Diagenesis of phosphorites through time as recorded by carbonate clumped isotopes. *Geochimica et Cosmochimica Acta*, 181, p. 238-259.
- [11] **Stolper DA**, AM Martini, M Clog, PM Douglas, SS Shusta, DL Valentine, AL Sessions, JM Eiler (2015). Distinguishing and understanding thermogenic and biogenic sources of methane using multiply substituted isotopologues. *Geochimica et Cosmochimica Acta*, 161, p. 219-247.
- [10] **Stolper DA** and JM Eiler (2015). The kinetics of solid-state isotope-exchange reactions for clumped isotopes: A study of inorganic calcites and apatites from natural and experimental samples. *American Journal of Science*, 315, p. 363-411.
- [9] Clog M, **DA Stolper**, JM Eiler (2015). Kinetics of CO<sub>2,g</sub>-H<sub>2</sub>O<sub>l</sub> isotopic exchange, including mass 47 isotopologues. *Chemical Geology*, 395, p. 1-10.
- [8] **Stolper DA**, M Lawson, CL Davis, A Ferreira, EV Santos Neto, GS Ellis, MD Lewan, AM Martini, Y Tang, M Schoell, AL Sessions, JM Eiler (2014). Formation temperatures of thermogenic and biogenic methane. *Science*, 344, p. 1500-1503.
- [7] Eiler JM, B Bergquist, I Bourq, P Cartigny, J Farquhar, A Gagnon, W Guo, I Halevy, A Hofmann, TE Larson, N Levin, EA Schauble, **D Stolper** (2014). Frontiers of stable isotope geoscience. *Chemical Geology*, 372, p. 119-143.
- [6] **Stolper DA**, AL Sessions, AA Ferreira, EV Santos Neto, A Schimmelmann, SS Shusta, DL Valentine, JM Eiler (2014). Combined <sup>13</sup>C-D and D-D clumping in methane: methods and preliminary results. *Geochimica et Cosmochimica Acta*, 126, p. 169-191.
- [5] Eiler JM, M Clog, P Magyar, A Piasecki, A Sessions, **D Stolper**, M Deerberg, H-J Schlueter, J Schwieters (2013). A high-resolution gas-source isotope ratio mass spectrometer. *International Journal of Mass Spectrometry*, 335, p. 45-56.
- [4] Frei R, C Gaucher, **D Stolper**, DE Canfield (2013). Fluctuations in Late Neoproterozoic atmospheric oxidation — Cr isotope chemostratigraphy and iron speciation of the late Ediacaran lower Arroyo del Soldado Group (Uruguay). *Gondwana Research*, 23.2, p. 797-811.
- [3] Zhang Y, G Sicot, X Cui, M Vogel, CA Wuertzert, K Lezon-Geyda, J Wheeler, DA Harki, K Muzikar, **DA Stolper**, PB Dervan, AS Perkins (2011). Targeting a DNA binding motif of the EVI1 protein by a pyrrole-imidazole polyamide. *Biochemistry*, 50, p. 10431-10441.
- [2] **Stolper DA**, NP Revsbech, DE Canfield (2010). Aerobic growth at nanomolar oxygen concentrations. *Proceedings of the National Academy of Sciences*, 107, p. 18755-18760.
- [1] Herkenhoff KE, J Grotzinger, AH Knoll, SM McLennan, C Weitz, A Yingst, R Anderson, BA Archinal, RE Arvidson, JM Barrett, KJ Becker, JF Bell III, C Budney, MG Chapman, D Cook, B Ehlmann, B Franklin, LR Gaddis, DM Galuszka, PA Garcia, P Geissler, TM Hare, E Howington-Kraus, JR Johnson, L Keszthelyi, RL Kirk, P Lanagan, EM Lee, C Leff, JN Maki, KF Mullins, TJ Parker, BL Redding, MR Rosiek, MH Sims, LA Soderblom, N Spanovich, R Springer, SW Squyres, **D Stolper**, RM Sucharski, T Sucharski, R Sullivan, JM Torson (2008). Surface processes recorded by rocks and soils on Meridiani Planum, Mars: Microscopic Imager observations during Opportunity's first three extended missions. *JGR-Planets*, 113, p. 1-39.

*Theses*

**Stolper, DA** (2014). New insights into the formation and modification of carbonate-bearing minerals and methane gas in geological systems using multiply substituted isotopologues. PhD thesis. California Institute of Technology.

**Stolper DA** (2008). Constraining the physiological activity of deep-sea sedimentary microbial communities: the development and application of methods to characterize proteins in deep-sea sedimentary sites. Undergraduate Senior Thesis. Harvard College.