

## Ken L. Ferrier

Assistant professor, Georgia Institute of Technology, School of Earth and Atmospheric Sciences  
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### EDUCATION

University of California, Berkeley, Earth and Planetary Science, Berkeley, California, PhD, 2009  
Cornell University, Physics, Ithaca, New York, A.B., 2000

### APPOINTMENTS

Georgia Institute of Technology, assistant professor, School of Earth and Atmospheric Sciences, 2014-present  
Harvard University, CIFAR postdoctoral fellow, Department of Earth and Planetary Sciences, Cambridge, Massachusetts, 2012-2014  
MIT, postdoctoral associate, Department of Earth, Atmospheric, and Planetary Sciences, Cambridge, Massachusetts, 2010-2012

### PUBLICATIONS

- Callahan R, **Ferrier KL**, Dixon J, Dosseto A, Hahm WJ, Jessup B, Miller S, Hunsaker C, Johnson D, Sklar L, Riebe CS, in review. Arrested development: Erosional equilibrium in the southern Sierra Nevada, California, maintained by feedbacks between channel incision and hillslope sediment production.
- Blackburn T, **Ferrier KL**, Perron JT, in review. Coupled feedbacks between mountain erosion rate, elevation, crustal temperature, and density.
- Ojha L, **Ferrier KL**, Ojha T, in review. Tectonic controls on millennial-scale denudation rates in the Himalaya of Far Western Nepal.
- Pico T, Mitrovica JX, Braun J, **Ferrier KL**, in review. Glacial isostatic adjustment deflects path of the ancestral Hudson River.
- Chilton HT, Schmidt BE, Duarte K, **Ferrier KL**, Hughson KHG, Scully JEC, Wray JJ, Sizemore H, Nathues A, Platz T, Schorghofer N, Schenk PM, Landis M, Bland M, Byrne S, Russell CTR, Raymond CA, in review. Landslides on Ceres: Inferences into ice content and layering in the upper crust.
- Ferrier KL**, Li Q, Pico T, Austermann J, 2018. The influence of water storage in marine sediment on sea-level change. *Geophysical Research Letters*, doi:10.1002/2017GL076592.
- Ferrier KL**, West N, 2017. Responses of chemical erosion rates to transient perturbations in physical erosion rates, and implications for relationships between chemical and physical erosion rates in regolith-mantled hillslopes. *Earth and Planetary Science Letters*, v. 474, p. 447-456
- Ojha L, Chojnacki M, McDonald GD, Shumway A, Wolff MJ, Smith MD, McEwen AS, **Ferrier KL**, Huber C, Wray JJ, Toigo A, 2017. Seasonal slumps in Juventae Chasma. *Journal of Geophysical Research – Planets*, doi: 10.1002/2017JE005375.
- Ferrier KL**, Austermann J, Mitrovica JX, Pico T, 2017. Incorporating sediment compaction into a gravitationally self-consistent model for global sea-level change. *Geophysical Journal International*, v. 211, p. 663-672.
- Ferrier KL**, Riebe CS, Hahm WJ, 2016. Testing for supply-limited and kinetic-limited chemical erosion in field measurements of regolith production and chemical depletion. *Geochemistry, Geophysics, Geosystems*, doi:10.1002/2016GC006273.
- Pico T, Mitrovica JX, **Ferrier KL**, Braun J, 2016. Global ice volume during MIS 3 inferred from a sea-level analysis of sedimentary core records in the Yellow River Delta. *Quaternary Science Reviews*, v. 152, p. 72-79.

- Ferrier KL**, Mitrovica JX, Giosan L, Clift PD, 2015. Sea-level responses to erosion and deposition of sediment in the Indus River basin and the Arabian Sea. *Earth and Planetary Science Letters*, v. 416, p. 12-20.
- Jefferson AJ, **Ferrier KL**, Perron JT, Ramalho R, 2014. Controls on the hydrological landscape evolution of shield volcanoes and volcanic ocean islands. In: *The Galapagos: A National Laboratory for the Earth Sciences*, AGU Geophysical Monograph 204. Eds. Harpp KS, Mittelstaedt E, d'Ozouville N, Graham DW.
- Ferrier KL**, Huppert KL, Perron JT, 2013. Climatic control of bedrock river incision. *Nature*, v. 496, p. 206-209, doi:10.1038/nature11982.
- Kirchner JW, **Ferrier KL**, 2013. Mainly in the plain. *Nature*, v. 495, p. 318-319.
- Dalca AV, **Ferrier KL**, Mitrovica JX, Perron JT, Milne GA, Creveling JR, 2013. On post-glacial sea level – III: Incorporating sediment redistribution. *Geophysical Journal International*, doi:10.1093/gji/ggt089.
- Ferrier KL**, Perron JT, Mukhopadhyay S, Rosener M, Stock JD, Huppert KL, Slosberg M, 2013. Covariation of climate and long-term erosion rates across a steep rainfall gradient on the Hawaiian island of Kaua'i. *Geological Society of America Bulletin*, doi:10.1130/B30726.1.
- Perron JT, Richardson PW, **Ferrier KL**, Lapôtre M, 2012. The root of branching river networks. *Nature*, v. 492, p. 100-103.
- Ferrier K.L.**, Kirchner J.W., Finkel R.C., 2012. Weak influences of climate and physical erosion rates on chemical erosion rates: Measurements along two altitudinal transects in the Idaho Batholith. *JGR Earth Surface*, v. 117, F02026, doi:10.1029/2011JF002231.
- Ferrier K.L.**, Kirchner J.W., Finkel R.C., 2011. Estimating millennial-scale rates of dust incorporation into eroding hillslope soils using cosmogenic nuclides and immobile weathering tracers. *JGR Earth Surface*, v. 116, F03022, doi:10.1029/2011JF001991.
- Ferrier K.L.**, Kirchner J.W., Riebe C.S., Finkel R.C., 2010. Mineral-specific chemical weathering rates over millennial timescales: Measurements at Rio Icacos, Puerto Rico. *Chemical Geology*, v. 277, p. 101-114, doi:10.1016/j.chemgeo.2010.07.013.
- Ferrier K.L.**, Kirchner J.W., 2008. Effects of physical erosion on chemical denudation rates: A numerical modeling study of soil-mantled hillslopes. *Earth and Planetary Science Letters*, v. 272, p. 591-599, doi: 10.1016/j.epsl.2008.05.024.
- Ferrier K.L.**, Kirchner J.W., Finkel R.C., August 2005. Erosion rates over millennial and decadal timescales at Caspar Creek and Redwood Creek, Northern California Coast Ranges. *Earth Surface Processes and Landforms*, v. 30, p. 1025-1038, doi: 10.1002/esp.1260.

## FUNDING

- Lead PI, NSF, “Collaborative research: Microscopic fracturing and macroscopic weakening: A novel model for bedrock fracturing by biotite weathering”, with co-PIs Chloe Arson (Georgia Tech) and Nicole West (Central Michigan University), \$441,322, 2018/8/15 – 2021/8/14.
- PI, American Chemical Society - Petroleum Research Fund, “Sensitivity of sea level to sediment erosion and deposition in massive sedimentary systems” \$110,000, 2017/9/1 – 2019/8/31.
- Lead PI, NSF, “Collaborative research: Sea level responses to sediment erosion and deposition over the past 3 million years”, with co-PI Jerry Mitrovica, \$288,460, 2015/9/1 – 2018/8/31.
- Co-PI, NASA, “Cascading hazards: Understanding triggering relations between wet tropical cyclones, landslides, and earthquakes”, with Lead PI Shimon Wdowinski (Florida International University) and co-PI Zhigang Peng (Georgia Tech), \$1,200,000, 2017/7/1-2020/8/31.
- Co-PI, PRIME Lab Seed Grant, “Tectonic and climatic effects on chemical erosion rates in the Klamath Mountains” with PI Nicole West (Central Michigan University), \$5450, 2017/8/1-2017/12/31.

Proposals in review:

- Lead PI, NSF, “Collaborative research: Mapping bed forces to granular flow properties”, with co-PIs Scott McCoy (University of Nevada, Reno) and Joe Dufek (University of Oregon), \$513,607, 2018/8/15 – 2021/8/14.

## TEACHING EXPERIENCE

Georgia Tech, assistant professor (2014-present)

- Geomorphology: Quantitative Surface Processes (for upper level undergraduate majors and grad students, EAS 4814/8826)
- Structural Geology (for upper level undergraduate majors and grad students, EAS 4200)
- Introduction to Environmental Sciences (for majors and Honors Program students, EAS 1600)
- Laboratory Methods for Soil Geochemistry (independent research, EAS 4699)

Boston College, adjunct professor (2012-2013)

- Cosmos (survey astronomy course for non-majors, GE 177)

San Quentin State Prison, Patten University, CA, adjunct professor (2004-2007)

- Geology, Calculus, Geometry, Algebra (for inmates in Associate of Arts program)

University of California, Berkeley, graduate student instructor (2001-2009)

- The Water Planet (survey course for non-majors, EPS 3)
- Geological Influences in California Society (first-year field course, EPS 39)
- The Planet Earth (introductory course for majors, EPS 50)
- Analysis of Environmental Data (upper-level undergraduate statistics course, EPS 120)

## HONORS

AGU Editor's Citation for excellence in refereeing, Journal of Geophysical Research (2016)

CIFAR Global Scholar, Canadian Institute For Advanced Research (2012-14)

Kavli Frontiers of Science Fellow, National Academy of Sciences (2012)

AGU Outstanding Student Presentation, Fall Meeting, Hydrology Section (2008)

AGU Outstanding Student Presentation, Fall Meeting, Hydrology Section (2007)

LSP Graduate Student Fellowship, Lawrence Livermore National Laboratory (2006-09)

Graduate Student Instructor of the Year, University of California, Berkeley (2004)

## INVITED PRESENTATIONS

- 2018 Yale University, Department of Geology and Geophysics  
University of Florida, Department of Geological Sciences  
University of Southern California, Department of Earth Sciences
- 2017 Rice University, Department of Earth, Environmental, and Planetary Sciences
- 2016 University of Florida, Department of Geological Sciences  
Tulane University, Department of Earth and Environmental Sciences  
GSA Fall Meeting, Denver, CO  
EGU Annual Meeting, Vienna, Austria  
CSDMS Annual Meeting, Boulder, CO
- 2015 University of Southern California, Department of Earth Sciences  
North Carolina State University, Department of Marine, Earth, and Atmospheric Sciences  
Vanderbilt University, Department of Earth and Environmental Sciences  
AGU-CGU Joint Assembly, Montreal, QC
- 2014 University of Wyoming, Department of Geology and Geophysics (2 presentations)  
Columbia University, Lamont-Doherty Earth Observatory  
AGU Fall Meeting, San Francisco, CA  
GSA Fall Meeting, Vancouver, BC
- 2013 Cornell University, Department of Earth and Atmospheric Sciences (2 presentations)  
University of Minnesota, Department of Earth Sciences (2 presentations)  
Georgia Tech, School of Earth and Atmospheric Sciences  
AGU Fall Meeting, San Francisco, CA
- 2012 McGill University, Department of Earth and Planetary Sciences  
Wellesley College, Geosciences Department  
Harvard University, Solid Earth Geophysics seminar

Kavli Frontiers of Science Symposium, Solo, Indonesia  
2011 Boston College, Department of Earth and Environmental Sciences  
Wellesley College, Geosciences Department

## **STUDENTS AND POSTDOCS MENTORED**

Current and former Ferrier group members

Dr. Qi Li, postdoc (2016-present)  
Dr. Greg Ruetenik, postdoc (2017-present)  
Dr. Nicole West, postdoc (2015-16; now tenure-track professor, Central Michigan University)  
Kai Hu, PhD student (2017-present)  
Amelia Winner, PhD student (2015-present)  
Riannon Colton, undergraduate researcher (2015-16)  
Johnna Floyd, undergraduate researcher (2015-16)  
Josh Garrett, undergraduate researcher (2015-16)  
Ria Joshi, undergraduate researcher (2016)  
Mckenzie Lane, undergraduate researcher (2018)  
Camilla Liu, undergraduate researcher (2017)  
Lily Rainwater, NSF-REU undergraduate researcher (summer 2017)  
Tyler Ryther, NSF-REU undergraduate researcher (summer 2016)  
Hannah Verbonceour, undergraduate researcher (2018)

Students mentored as secondary advisor (at Georgia Tech unless otherwise noted)

Luju Ojha, PhD student of Prof. James Wray (2015-16; now postdoc, Johns Hopkins University)  
Heather Chilton, PhD student of Prof. Britney Schmidt (2015-present)  
Tamara Pico, PhD student of Prof. Jerry Mitrovica, Harvard University (2015-present)

## **SERVICE AND OUTREACH**

Member of executive committee, AGU Earth and Planetary Surface Processes Focus Group (2014-present)

Guest geologist at public schools: Northwood Elementary School, Roswell, GA; Cabot Elementary School, Newton, MA; British School of Boston, MA (2011-present)

Reviewer (12-15 per year) for journals and review panels: American Journal of Science, Applied Geochemistry, Catena, Earth and Planetary Science Letters, Earth Surface Dynamics, Earth Surface Processes and Landforms, Elements, G-cubed, Geochimica et Cosmochimica Acta, Geoderma, Geology, Geomorphology, Geophysical Research Letters, GSA Bulletin, Journal of Geophysical Research-Earth Surface, Nature, Nature Geoscience, NSF-GLD, NSF-GLTG, Science, Science Advances, US Army Research Office

Georgia Tech EAS departmental committees:

Graduate student admission (2014-present)  
Undergraduate curriculum (2017-present)  
Faculty search committee, solid Earth (2016-17)  
Departmental seminar committee (2014-16)

Coordinator of Outstanding Student Presentation Awards, AGU Earth and Planetary Surface Processes Focus Group at AGU Fall Meeting (2013-2015) and AGU-CGU Joint Assembly (2015)

Web editor, AGU Earth and Planetary Surface Processes Focus Group (2012-2014)

Adjunct professor, San Quentin State Prison, Patten University (2004-2007)

## **SELECTED CONFERENCE ABSTRACTS AND PROCEEDINGS (LAST 2 YEARS)**

**Ferrier KL**, Li Q, Pico T, Austermann J, 2017. Water storage in marine sediment and implications for inferences of past global ice volume. AGU Fall Meeting, New Orleans, LA.

Callahan RP, Riebe CS, **Ferrier KL**, 2017. Mountain erosion over decades and millennia: New insights from sediment yields and cosmogenic nuclides. AGU Fall Meeting, New Orleans, LA.

- Huppert KL, Deal E, Perron JT, **Ferrier KL**, Braun J, 2017. Discharge variability and bedrock river incision on the Hawaiian island of Kaua'i. AGU Fall Meeting, New Orleans, LA.
- Li Q, **Ferrier KL**, Austermann J, Mitrovica JX, 2017. Influences of sediment redistribution on sea-level changes along the U.S. Atlantic margin since mid-Pliocene. AGU Fall Meeting, New Orleans, LA.
- Pico T, Mitrovica JX, Perron JT, **Ferrier KL**, Braun J, 2017. Using ancient landscapes along the U.S. mid-Atlantic to assess the influence of glacio-isostatic adjustment on river evolution: the case for the Hudson, Delaware, Susquehanna, and Potomac Rivers. AGU Fall Meeting, New Orleans, LA.
- Riebe CS, Arvin L, **Ferrier KL**, Aciego S, 2017. Dust and chemical erosion biases in erosion rates from cosmogenic nuclides: A factor-of-ten problem that could mask strong climatic effects on landscape evolution. AGU Fall Meeting, New Orleans, LA.
- Wdowinski S, Peng Z, **Ferrier KL**, Lin C-H, Hsu Y-J, Shyu B, 2017. Cascading hazards: Understanding triggering relations between wet tropical cyclones, landslides, and earthquakes. AGU Fall Meeting, New Orleans, LA.
- West N, **Ferrier KL**, 2017. Testing the control of mineral supply rates on chemical erosion in the Klamath Mountains. AGU Fall Meeting, New Orleans, LA.
- Chilton H, Schmidt BE, **Ferrier KL**, Duarte K, Hughson KHG, Scully JEC, Sizemore HG, A. Nathues, T. Platz, C. Russell, C. Raymond, J. Wray, 2017. Ceres' near-surface processes from landslides. GSA Fall Meeting, Seattle, WA.
- Duarte K, Schmidt BE, Chilton H, **Ferrier KL**, Hughson KHG, Scully JEC, Sizemore HG, Nathues A, Platz T, Russell C, Raymond C, Wray JJ, 2017. Determining Ceres' subsurface ice content through the properties of intermediate landslides. GSA Fall Meeting, Seattle, WA.
- Ojha L, Chojnacki M, McDonald GD, Shumway A, Wolff MJ, Smith MD, McEwen AS, **Ferrier KL**, Huber C, Wray JJ, Toigo A, 2017. Seasonal Slumps in Juventae Chasma, Mars. GSA Fall Meeting, Seattle, WA.
- West N, **Ferrier KL**, 2017. Testing the relationship between mineral supply rates and chemical erosion in the Klamath Mountains. GSA Fall Meeting, Seattle, WA.
- Ferrier KL**, 2017. Sea-level responses to sediment redistribution. NSF Feedbacks Among Climate, Erosion and Tectonics (FACET), Corvallis, OR.
- Li Q, **Ferrier KL**, 2017. Sea-level responses to sediment erosion and deposition in the eastern United States since the mid-Pliocene. CSDMS Annual Meeting, Boulder, CO.
- Winner A, Dufek J, **Ferrier KL**, Guinn W, 2017. Experimental and numerical determination of bed force distributions in concentrated pyroclastic density currents. IAVCEI, Eugene, OR.
- Chilton H, Schmidt BE, **Ferrier KL**, Hughson KHG, Scully JE, et al., 2017. Ceres and Mars: Unusual flows and comparison of planetary landslide analysis techniques. Lunar and Planetary Science Conference, The Woodlands, TX.
- Ferrier KL**, West N, 2016. Effects of transient perturbations in physical erosion rate on modeled chemical erosion rates. AGU Fall Meeting, San Francisco, CA.
- Huppert K, Perron JT, **Ferrier KL**, Mukhopadhyay S, Rosener M, Douglas M, 2016. Erosion of volcanic ocean islands: insights from modeling, topographic analyses, and cosmogenic exposure dating. AGU Fall Meeting, San Francisco, CA.
- MacDonald LH, Miles MW, House MR, Belmont P, **Ferrier KL**, 2016. Evaluating sediment sources in the Upper Elk River watershed, northwestern California: Logging and roads vs. natural sources. AGU Fall Meeting, San Francisco, CA.
- Pico T, Mitrovica JX, **Ferrier KL**, Braun J, 2016. Coupling landscapes to solid-Earth deformation over the ice age. AGU Fall Meeting, San Francisco, CA.
- West N, **Ferrier KL**, 2016. Testing the control of mineral supply rates on chemical weathering in the Klamath Mountains. AGU Fall Meeting, San Francisco, CA.
- Winner A, **Ferrier KL**, Dufek J, 2016. Experimental determination of bed conditions in concentrated pyroclastic density currents. AGU Fall Meeting, San Francisco, CA.
- Ferrier KL**, West N, 2016. Effects of transient perturbations in physical erosion rates on chemical erosion rates. GSA Fall Meeting, Denver, CO.

- West N, **Ferrier KL**, 2016. Testing the control of mineral supply rates on chemical weathering in the Klamath Mountains. GSA Fall Meeting, Denver, CO.
- Chilton H, Schmidt BE, Hughson KHG, Scully JEC, Nathues A, Platz T, **Ferrier KL**, Russell CT, Raymond CA, 2016. The role of ice in Ceres' surface flows, landslides, and mass wasting. GSA Fall Meeting, Denver, CO.
- MacDonald LH, Miles MW, Beach S, Harrison N, House MR, Belmont P, **Ferrier KL**, 2016. Development and implications of a sediment budget for the Upper Elk River watershed, Humboldt County. Redwood Sciences Symposium, Eureka, CA, September 2016.
- Winner A, **Ferrier KL**, Dufek J, 2016. Investigating bed erosion from pyroclastic density currents. CSDMS Annual Meeting, Boulder, CO.