

Lorraine E. Lisiecki

Department of Earth Science
University of California, Santa Barbara
Santa Barbara, CA 93106-9630

lisiecki@geol.ucsb.edu
<http://lorraine-lisiecki.com>
805-893-4437

Professional Appointments

Associate Professor, Department of Earth Science, University of California, Santa Barbara, July 2012 – Present

Assistant Professor, Department of Earth Science, University of California, Santa Barbara, July 2008 – 2012

Research Fellow, Department of Earth Sciences, Boston University, Sept. 2007 – Aug. 2008

Postdoctoral Fellow, Department of Earth Sciences, Boston University, Sept. 2005 – Aug. 2007
NOAA Climate and Global Change Fellowship, Advisor: Prof. Maureen Raymo

Education

Ph.D., 2005, Geological Sciences, Brown University, Providence, RI

Thesis title: “Paleoclimate time series: New alignment and compositing techniques, a 5.3-Myr benthic $\delta^{18}\text{O}$ stack, and analysis of Pliocene-Pleistocene climate transitions”

Advisor: Prof. Timothy Herbert

Sc.M., 2003, Geological Sciences, Brown University, Providence, RI

Sc.M., 2000, Geosystems, Massachusetts Institute of Technology, Cambridge, MA

S.B., 1999, Earth, Atmospheric, and Planetary Science, Massachusetts Institute of Technology, Cambridge, MA

Research Interests

My research focuses on computational approaches to the comparison and interpretation of paleoclimate records because the integrated analysis of widely distributed paleoclimate records yields important information about the climate system that cannot be obtained by studying these records individually. I am particularly interested in the evolution of Plio-Pleistocene climate as it relates to orbital forcing, glacial cycles, the carbon cycle, and deep ocean circulation and in improving paleoclimate age models and quantifying uncertainty. My current research focuses on glacial changes in ice volume, the carbon cycle and deep ocean circulation and on quantifying/improving uncertainty in climate record and their age models.

Publications

Underline indicates a Lisiecki student or postdoctoral researcher. * indicates multiples of 100 citations and ● indicates multiples of 1000, based on Google Scholar:

<https://scholar.google.com/citations?user=McNJSi4AAAAJ&hl=en>

1. ***Lisiecki**, L. E., and P. A. Lisiecki (2002), Application of dynamic programming to the correlation of paleoclimate records, *Paleoceanography*, 17, PA1049, doi:10.1029/2001PA000733.
 2. Coles D., Y. Vichabian, R. Fleming, C. DesAutels, V. Briggs, P. Vermeesch, J. R. Arrell, L. **Lisiecki**, T. Kessler, H. Hooper, E. Jensen, J. Sogade, F. D. Morgan (2004), Spatial decision analysis of geothermal resource sites in the Qualibou Caldera, Saint Lucia, Lesser Antilles, *Geothermics*, 33(3), 277-308.
 3. ●●●●**Lisiecki**, L. E., and M. E. Raymo (2005), A Pliocene-Pleistocene stack of 57 globally distributed benthic $\delta^{18}\text{O}$ records, *Paleoceanography*, 20, PA1003, doi:10.1029/2004PA001071.
 4. ***Raymo, M. E., L. E. **Lisiecki**, and K. H. Nisancioglu (2006), Plio-Pleistocene ice volume, Antarctic climate, and the global $\delta^{18}\text{O}$ record, *Science*, 313, doi: 10.1126/science.1123296.
 5. *****Lisiecki**, L. E., and M. E. Raymo (2007), Plio-Pleistocene climate evolution: Trends and transitions in glacial cycle dynamics, *Quaternary Science Reviews*, 26, 56-69.
 6. ***Kawamura, K., F. Parrenin, L. **Lisiecki**, and 15 others (2007), Northern Hemisphere forcing of climatic cycles in Antarctica over the past 360,000 years, *Nature*, 448, 912-917.
 7. **Lisiecki**, L. E., and T. D. Herbert (2007), Automated composite depth scale construction and estimates of sediment core extension, *Paleoceanography*, 22, PA4213, doi:10.1029/2006PA001401.
 8. **Lisiecki**, L. E., M. E. Raymo, and W. B. Curry (2008), Atlantic overturning responses to Late Pleistocene climate forcings, *Nature* 456, 85-88.
 9. **Lisiecki**, L. E., and M. E. Raymo (2009) Diachronous benthic $\delta^{18}\text{O}$ responses during Late Pleistocene terminations, *Paleoceanography* 24, PA3210, doi:10.1029/2009PA001732.
 10. ***Lisiecki**, L. E. (2010), Links between eccentricity forcing and the 100,000-year glacial cycle, *Nature Geoscience*, 3, 349-352.
 11. **Lisiecki**, L. E. (2010), A simple mixing explanation for late Pleistocene changes in the Pacific-South Atlantic benthic $\delta^{13}\text{C}$ gradient, *Clim. Past*, 6, 305-314.
 12. **Lisiecki**, L. E. (2010), A benthic $\delta^{13}\text{C}$ -based proxy for atmospheric pCO_2 over the last 1.5 Myr, *Geophys. Res. Lett.*, 37, L21708, doi:10.1029/2010GL045109.
 13. Imbrie, J. Z., A. Imbrie-Moore, and L. E. **Lisiecki** (2011), A phase-space model for Pleistocene ice volume, *Earth and Planetary Science Letters*, 307, 94-102.
- [Jan. 2011 – Dec. 2011: Medical/maternity leave for birth of triplets.]
14. Stern, J. V., and L. E. **Lisiecki** (2013), North Atlantic circulation and reservoir age changes over the past 41,000 years, *Geophys. Res. Lett.*, 40, doi:10.1002/grl.50679.
 15. **Lisiecki**, L. E. (2014), Atlantic overturning responses to obliquity and precession over the last 3 Myr, *Paleoceanography*, 29, doi:10.1002/2013PA002505.
 16. Peterson, C. D., L. E. **Lisiecki**, and J. V. Stern (2014), Deglacial whole-ocean $\delta^{13}\text{C}$ change estimated from 480 benthic foraminiferal records, *Paleoceanography*, 29, 549–563, doi:10.1002/2013PA002552.

17. Lin, L., D. Khider, L. E. **Lisiecki**, and C. E. Lawrence (2014), Probabilistic Sequence Alignment of Stratigraphic Records, *Paleoceanography* 29, 976-989, doi:10.1002/2014PA002713.
18. Stern, J. V., and L. E. **Lisiecki** (2014), Termination 1 timing in radiocarbon-dated regional benthic $\delta^{18}\text{O}$ stacks, *Paleoceanography*, 29, 1127-1142.
19. Shakun, J.D., D.W. Lea, L. E. **Lisiecki**, and M.E. Raymo (2015), An 800-kyr record of global surface ocean $\delta^{18}\text{O}$ and implications for ice volume-temperature coupling, *Earth and Planetary Science Letters*, 426, 58-68.
20. Gebbie, G., C. Peterson, L. **Lisiecki**, H. Spero (2015), Global-mean marine $\delta^{13}\text{C}$ and its uncertainty in a glacial state estimate, *Quaternary Science Reviews*, 125, 144-159.19.
21. Kronenberger, M., C. Weber, G.A. Gebbie, O. Kreylos, L.H. Kellogg, L.E. **Lisiecki**, C.D. Peterson, H.J. Spero, B. Hamann, H. and Hagen (2015), A novel distance measure for ocean reconstruction from sparse observations demonstrated on the Atlantic, *Proceedings of IEEE Scientific Visualization 2015*.
22. Spratt, R. M., and L. E. **Lisiecki** (2016), A Late Pleistocene sea level stack, *Climate of the Past*, 12, 1079-1092, doi:10.5194/cp-12-1079-2016.
23. **Lisiecki**, L. E., and Stern, J. V. (2016), Regional and global benthic $\delta^{18}\text{O}$ stacks for the last glacial cycle, *Paleoceanography*, 31, 1-27, doi:10.1002/2016PA003002.
24. Schmittner, A., H. C. Bostock, O. Cartapanis, W. B. Curry, H. L. Filipsson, E. D. Galbraith, J. Gottschalk, J. C. Herguera García, S. Jaccard, L. E. **Lisiecki**, D. Lund, G. Martínez-Méndez, J. Lynch-Stieglitz, A. Mackensen, E. Michel, A. C. Mix, D. Oppo, C. D. Peterson, H. J. Spero, and C. Waelbroeck (2017), Calibration of the carbon isotopic composition ($\delta^{13}\text{C}$) of epibenthic foraminifera, *Paleoceanography*, 32, doi:10.1002/2016PA003072.
25. Ahn, S., D. Khider, L. E. **Lisiecki**, and C. E. Lawrence (2017), A probabilistic Pliocene-Pleistocene stack of benthic $\delta^{18}\text{O}$ using a profile hidden Markov model, *Dynamics and Statistics of the Climate System*, 2, 1-6.
26. Khider, D., S. Ahn, L. E. **Lisiecki**, C. E. Lawrence, M. Kienast (2017), The role of uncertainty in estimating lead/lag relationships in marine sedimentary archives: A case study from the tropical Pacific, *Paleoceanography*, 32, 1275-1290, <https://doi.org/10.1002/2016PA003057>
27. Raymo, M.E., R. Kozdon, D. Evans, L. **Lisiecki**, H. L. Ford (2018), The accuracy of mid-Pliocene $\delta^{18}\text{O}$ -based ice volume and sea level reconstructions, *Earth-Science Reviews*, 177, 291–302.
28. Peterson, C. D., and L. E. Lisiecki (2018), Deglacial carbon cycle changes observed in a compilation of 127 benthic $\delta^{13}\text{C}$ time series (20–6 ka), *Climate of the Past*, 14, 1229-1252, <https://doi.org/10.5194/cp-14-1229-2018>.
29. Simms, A. R., L. **Lisiecki**, G. Gebbie, P. L. Whitehouse, J. F. Clark (2019), Balancing the Last Glacial Maximum (LGM) sea-level budget, *Quaternary Science Reviews*, 205, 143-153.
30. Littler, K., A. J. Drury, D. Liebrand, L. **Lisiecki**, and H. Palike (2019), Astronomical Time Keeping of Earth History: An Invaluable Contribution of Scientific Ocean Drilling, *Oceanography*, 32, 72-76.

31. Macdonald, F. A., Swanson-Hysell, N. L., Park, Y., and **Lisiecki**, L. E. (2019), Arc-continent collisions in the tropics set the Earth's climate state, *Science*, 364, 181-184, doi:10.1126/science.aav5300.
32. Gebbie, G., A. R. Simms, and L. E. **Lisiecki** (2019), Why estimates of deglacial ice loss should be biased low, *Earth and Planetary Science Letters*, 515, 112–124

Research Grants

- Lisiecki, L.E., National Science Foundation (MGG 0926735). Climate forcing of Atlantic overturning over the last 3 Myr. \$317,113. Sept. 2009 – August 2012.
- Lawrence, C. and L. E. Lisiecki, National Science Foundation (CMG 1025444). Uncertainty estimation in graphic correlation algorithm, \$234,170. Sept. 2010 – Sept. 2013
- Spero, H., G. Gebbie, and L. E. Lisiecki, National Science Foundation (CDI 1125181). Collaborative Research – 4 Dimensional Visualization of Past Ocean Circulation from Paleoceanographic Data, \$303,207. Sept. 2011 – Sept. 2015
- Lisiecki, L. E., C. E. Lawrence, G. Gebbie, National Science Foundation (MGG 1760878). Collaborative Research: Bringing the Late Pleistocene into Focus: Better Estimates of Ages and Ocean Circulation Through Data-Model Comparison. \$231,625. Apr. 2018-Mar. 2021.
- MacDonald, F., L. E. Lisiecki, R. M. Flowers, O. Jagoutz, N. L. Swanson-Hysell, J. C. H. Chiang, National Science Foundation (FRES 1926001). Collaborative proposal: Do arc-continent collisions in the tropics set the Earth's climate state?, \$833,741, Aug. 2019- July 2022.

Invited Talks and Meeting Abstracts (past 5 years)

- Lisiecki, L. E., (**Invited**, Dec. 2018), Paleoclimate Data Compilation: Lessons from the Pleistocene, PP11F-1318, AGU Fall Meeting, Washington, D.C.
- Lisiecki, L. E., (**Invited**, Dec. 2018), A Marine Perspective on Marine Isotope Stage 4, PP31F-1719, AGU Fall Meeting, Washington, D.C.
- Rand*, D. S., L. E. Lisiecki, C. E. Lawrence, T. Lee (Dec. 2018), Measuring Atlantic $\delta^{18}\text{O}$ Lag Times, PP41F-1916, AGU Fall Meeting, Washington, D.C. *Received Outstanding Student Presentation Award
- Peterson, C., M. Odalen, L. E. Lisiecki, A. Ridgwell (Dec. 2018), Using an Earth system model to quantify the changes in carbon storage and ocean circulation encoded in benthic $\delta^{13}\text{C}$ patterns across the deglaciation, PP13A-07, AGU Fall Meeting, Washington, D.C.
- Lisiecki, L. E., C. Herrero, A. Garcia-Olivares (Sept. 2018), "Interactions between ice sheets, orbital forcing and carbon dioxide during the MIS 13 interglacial," PALSEA-QUIGS Joint meeting on Climate, ice sheets and sea level during past interglacial periods, Galloway, NJ.
- Lisiecki, L. E., C. E. Lawrence, T. Lee, D. S. Rand (Aug. 2018) Probabilistic age models incorporating both benthic $\delta^{18}\text{O}$ alignments and radiocarbon dating, annual meeting of OC3 PAGES working group, Cambridge, UK.
- Lisiecki, L. E. (**Invited**, March 2018), "Comparing Pleistocene Records of Temperature, CO_2 , and Ice Volume," Smithsonian Museum Earth Temperature History Workshop, Washington, D.C.

- Lisiecki, L. E. (Feb. 2018), “Late Pleistocene Interactions between Ice Volume, CO₂ and Orbital Forcing,” Hewett Club Lecture Series, Earth Sciences department at the University of California, Riverside, CA.
- Lisiecki, L. E. (**Invited**, July 2017), Reconstructing $\delta^{13}\text{C}$ Changes in Space and Time since the Last Glacial Maximum, Gordon Research Conference on Chemical Oceanography, New London, N. H.
- Lisiecki, L. E., A. Jones, and C. E. Lawrence (June 2017), Comparing four age model techniques for eight Iberian Margin cores, 2017 meeting of OC3 PAGES working group, Corvallis, Oregon.
- Lisiecki, L. E. C. Herrero, and A. Garcia-Olivares (2016), Insight to Marine Isotope Stage 13 using Late Pleistocene relaxation models of ice volume and carbon cycle change, AGU Fall Meeting, San Francisco, Calif.
- Lisiecki, L. E., S. Ahn, A. Jones, D. Khider, C. E. Lawrence, G. Gebbie (**Invited**, 2016) Quantitative approaches to paleoclimate data, models, and their intercomparison, AGU Fall Meeting, San Francisco, Calif.
- Peterson, C., and L. E. Lisiecki (2016), Benthic $\delta^{13}\text{C}$ stacks: Metrics for deglacial changes in deep ocean carbon storage and the terrestrial biosphere, AGU Fall Meeting, San Francisco, Calif.
- Lisiecki (2016), Marine Isotope Stratigraphy and Termination Timing, QUIGS “Glacial Terminations: Timing & Shape” Workshop, Montreal, Canada.
- Lisiecki (2016), What is the future of stacking?, 12th International Conference on Paleoceanography, Utrecht, Netherlands.
- Peterson, C., and L. E. Lisiecki (2016), Benthic $\delta^{13}\text{C}$ stacks: Metrics for deglacial changes in deep ocean carbon storage and the terrestrial biosphere, 12th International Conference on Paleoceanography, Utrecht, Netherlands.
- Ahn, S., D. Khider, L. E. Lisiecki, and C. E. Lawrence (2016), A probabilistic Pliocene-Pleistocene stack of benthic $\delta^{18}\text{O}$ using a profile hidden Markov model, 12th International Conference on Paleoceanography, Utrecht, Netherlands.
- Ahn, S., D. Khider, L. E. Lisiecki, and C. E. Lawrence (2015) Probabilistic Stack of 178 Plio-Pleistocene Benthic $\delta^{18}\text{O}$ Records Constructed Using Profile Hidden Markov Models, 2015 Fall Meeting, AGU, San Francisco, Calif.
- Shakun, J. D., D.W. Lea, L. E. Lisiecki, and M.E. Raymo (2015), An 800-kyr Record of Global Surface Ocean $\delta^{18}\text{O}$ and Implications for Ice Volume-Temperature Coupling, AGU Fall Meeting, San Francisco, Calif.
- Peterson, C., and L. E. Lisiecki (2015), Deglacial and global benthic $\delta^{13}\text{C}$ stacks, AGU Fall Meeting, San Francisco, Calif.
- Peterson, C., and L. E. Lisiecki (2015), 3D movies for teaching seafloor bathymetry, plate tectonics, and ocean circulation in large undergraduate classes, AGU Fall Meeting, San Francisco, Calif.
- Khider, D., S. Ahn, L. E. Lisiecki, C. E. Lawrence, M. Kienast (2015), On the timing of glacial terminations in the equatorial Pacific, AGU Fall Meeting, San Francisco, Calif.
- Khider, D., and L.E. Lisiecki (2014), Statistical constraints on the relative link between eccentricity forcing and the 100,000-year glacial cycle, PP41D-1436, AGU Fall Meeting, San Francisco, Calif.
- Peterson, C., and L.E. Lisiecki (2014), Spatio-temporal variability in benthic $\delta^{13}\text{C}$ across the last deglaciation, PP11B-1344, AGU Fall Meeting, San Francisco, Calif.

- Spratt, R., and L.E. Lisiecki (2014), Late Pleistocene sea level stack, PP33C-1258, AGU Fall Meeting, San Francisco, Calif.
- Lisiecki, L. E., and J.V. Stern (2014), New benthic $\delta^{18}\text{O}$ stacks and age models for the last glacial cycle (0-150 kyr ago), PP41D-1434, AGU Fall Meeting, San Francisco, Calif.
- Shakun, J., D.W. Lea, L.E. Lisiecki, and M.E. Raymo (2014), An 800-kyr record of global surface ocean $\delta^{18}\text{O}$ and implications for ice volume-temperature coupling, PP41F-04, AGU Fall Meeting, San Francisco, Calif.
- Gebbie, G., C. Peterson, L.E. Lisiecki, and H. Spero (2014), Toward the inference of deglacial ocean dynamics from the spatial pattern of LGM-to-modern $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ change, PP41B-06, AGU Fall Meeting, San Francisco, Calif., 15-19 Dec.
- Lisiecki, L. E., and J.V. Stern (2014), An isolated deep Indian water mass during Heinrich 1?, iPODS-OC3 Joint Meeting, Bern, Switzerland, 30 Sept-3 Oct
- Peterson, C., and L.E. Lisiecki (2014), Spatio-temporal variability in benthic $\delta^{13}\text{C}$ across the last deglaciation, iPODS-OC3 Joint Meeting, Bern, Switzerland, 30 Sept-3 Oct
- Lisiecki, L. E. (2014), Orbital responses in North Atlantic ice-rafted debris records and links with overturning circulation, Goldschmidt, Sacramento, CA

Awards & Honors

- Subaru Outstanding Woman in Science Award, Geological Society of America, 2008
- Editors' Citation for Excellence in Refereeing for *Paleoceanography*, 2008
- Travel funding to the Leverhulme Climate Symposium, March 2008.
- NOAA Climate and Global Change Postdoctoral Fellowship, September 2005 – August 2007
- Joukowsky Outstanding Dissertation Award, May 2005
(The sole dissertation award presented by Brown for the physical sciences.)
- Charles Wilson Brown Fellowship, September 2004 – May 2005
- Schlanger Ocean Drilling Fellowship, September 2002 – August 2003
- University Fellowship, Brown University, September 2000 – May 2001
- Graduate Fellowship, Exxon Educational Foundation, September 1999 – May 2000

Professional Organizations

- American Geophysical Union
National Association of Geoscience Teachers

Other Professional Activities

- Ted Ed video (<https://ed.ted.com/lessons/when-will-the-next-ice-age-happen-lorraine-lisiecki>), ~600,000 views
- Organizing committee for PAGES OC3 working group (Ocean Circulation and Carbon Cycling)
- Founded and organized Earth Science Women's Career Development lunches at UCSB (2013 to present)
- Interview on forecastpod.org, 2015
- Session convener and chair at 2014 AGU Fall Meeting: Understanding Uncertainties in Paleoclimate and Paleoecology: Age Models, Proxy Processes, and Beyond II
- NSF OCE review panel, Fall 2014

IODP Schlanger Fellowship review panel, January 2014
Guest editor for *Proceedings of the National Academy of Science*, 2009
Mentor for GSA's Women in Geology Mentor Program, 2008
On-air interview on Progressive Radio Network show "Paradise Parking Lot," 2008.
Organizer of Climate Science Seminar, Boston University, September 2005 – 2008
Session chair, American Geophysical Union Fall Meeting, 2007
Referee for *Nature*; *Science*; *Geology*; NSF proposals; *Nature Geoscience*; *PNAS*; *Nature Communication*; *Geophysical Research Letters*; *Paleoceanography*; *Earth and Planetary Science Letters*; *Climate of the Past*; *Quaternary Science Reviews*; *G-cubed*; *Journal of Geophysical Research*; *Quaternary Geochronology*; *Journal of Climatic Change*; Integrated Ocean Drilling Program proposals; ACS Petroleum Research Fund proposal; *Journal of Quaternary Science*; *Climate Research*

Courses Taught

Earth 4, Introduction to Oceanography
Earth 105/205, Earth's Climate: Past and Present (co-developed new course)
Earth 106/206, Introduction to Climate Modeling (developed new course)
Earth 201C, Mathematical Methods in Earth Science (developed new course)
Earth 202, Writing for Publication in Earth Science (developed new course)

Students & Post-docs Advised

Deborah Khider, post-doc, 2013-2015
Joseph V. Stern, PhD, 2014
Carlye Peterson, PhD, 2016
Alan Jones, Masters, 2017
Rachel Spratt, PhD, expected 2019
Devin Rand, Masters, expected 2019