

Lorraine E. Lisiecki

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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

Professional and Academic Appointments

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

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

Ph.D. Candidate, Department of Geological Sciences, Brown University, 2000 – 2005

Master's Candidate, Dept. of Earth, Atmosphere, and Planetary Science, Massachusetts Institute of Technology, 1999 – 2000

Research Assistant, Atmospheric and Environmental Research, Inc., Cambridge, MA, 1999

Research Interests

I believe we cannot confidently predict future climate change until we understand past climate responses. 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. I developed a "stack" (average) of benthic oxygen isotope ($\delta^{18}\text{O}$) records from 57 globally distributed sites, which provides the paleoclimate community with an important stratigraphic tool to aid in the comparison of widely distributed marine climate records and has been cited in >500 journal articles since 2005. My current research focuses on glacial changes in the carbon cycle and deep ocean circulation and on quantifying/improving uncertainty in climate record and their age models.

Research Grants

- Spero, H., G. Gebbie, and L. E. Lisiecki, National Science Foundation – CDI. Collaborative Research – 4 Dimensional Visualization of Past Ocean Circulation from Paleoceanographic Data. Sept. 2011 – Sept. 2015
- Lawrence, C. and L. E. Lisiecki, National Science Foundation – CMG. Uncertainty estimation in graphic correlation algorithm. Sept. 2010 – Sept. 2013
- Lisiecki, L.E., National Science Foundation – MGG. Climate forcing of Atlantic overturning over the last 3 Myr. Sept. 2009 – August 2012.

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

Publications

- 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.
- Lisiecki, L. E. (2010c), 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.
- Lisiecki, L. E. (2010b), A simple mixing explanation for late Pleistocene changes in the Pacific-South Atlantic benthic $\delta^{13}\text{C}$ gradient, *Clim. Past*, 6, 305-314.
- Lisiecki, L. E. (2010a), Links between eccentricity forcing and the 100,000-year glacial cycle, *Nature Geoscience*, 3, 349-352.
- 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.
- Lisiecki, L. E., M. E. Raymo, and W. B. Curry (2008), Atlantic overturning responses to Late Pleistocene climate forcings, *Nature* 456, 85-88.
- 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.
- 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.
- 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.
- 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.

- 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.
- 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.
- 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.

Meeting Abstracts & Invited Talks

- Lawrence, C.E., L. Lin, J. Stern, L.E. Lisiecki (2011), Probabilistic stratigraphic alignment of Pleistocene $\delta^{18}\text{O}$ records, Abstract PP31B-1854 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.
- Peterson, C.D., L.E. Lisiecki (2011), Change in terrestrial carbon storage from the Last Glacial Maximum to the Holocene estimated by benthic foraminiferal $\delta^{13}\text{C}$ records, Abstract PP51C-1878 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.
- Stern, J., L.E. Lisiecki (2011), Timing of Benthic Foraminiferal $\delta^{18}\text{O}$ Change in Deep and Intermediate Waters of the Atlantic for 0-45 ka, Abstract PP51C-1880 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.
- Lisiecki, L.E. (2010), Links between Orbital Eccentricity and the 100,000-year Glacial Cycle, Abstract PP34C-02 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Stern, J., and L.E. Lisiecki (2010), High-resolution Atlantic and Pacific stacks of benthic $\delta^{18}\text{O}$ for the last glacial cycle, Abstract PP21A-1673 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Imbrie, J. Z., A. Imbrie-Moore, and L. E. Lisiecki (2010), A phase-space model for Pleistocene ice volume, Abstract PP31C-1644 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Lisiecki, L.E., (invited, 2010), Pleistocene benthic $\delta^{13}\text{C}$ gradients: Implications for deep Pacific ventilation and atmospheric pCO_2 . International Conference on Paleocanography, San Diego.
- Lisiecki, L.E. (2009) A $\delta^{13}\text{C}$ -based estimate of glacial changes in Pacific Deep Water ventilation, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract PP13A-1370.
- Peterson, C. D., R. J. Behl, C. Nicholson, L. E. Lisiecki, C. C. Sorlien (2009), Orbital- to Sub-Orbital-Scale Cyclicity in Seismic Reflections and Sediment Character in Early to Middle Pleistocene Mudstone, Santa Barbara Basin, California, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract PP31B-1318
- Lisiecki, L. E. (invited, 2009), The effects of eccentricity, obliquity and precession on glacial cycles, University of Wisconsin, Madison.
- Lisiecki, L. E. (invited, 2009), Atlantic overturning responses to ice volume and orbital forcing, Department of Geological Sciences, University of Wisconsin, Madison.
- Lisiecki, L. E. (invited, 2009), Atlantic overturning responses to ice volume and orbital forcing, Department of Geological Sciences, University of Florida, Gainesville.
- Lisiecki, L. E. (invited, 2009), Atlantic overturning responses to ice volume and orbital forcing, Department of Geological Sciences, Department of Geography, UC Davis.

- Lisiecki, L. E. (invited, 2009), Atlantic overturning responses to ice volume and orbital forcing, Department of Geological Sciences, Interdepartmental Graduate Program in Marine Science, UC Santa Barbara.
- Lisiecki, L. E. (invited, 2009), Atlantic overturning responses to ice volume and orbital forcing, Department of Geological Sciences, Department of Geography, UC Santa Barbara.
- Peterson, C.D., R.J. Behl, C. Nicholson, L.E. Lisiecki, C.C. Sorlien (2009), Orbital-scale cyclicity in seismic reflections and sediment character as a climate proxy in the Plio-Pleistocene Middle Pico formation, Santa Barbara, California, *AAPG Meeting*, Ventura, CA.
- Lisiecki, L. E. and D. Raynaud (2008), Decoupling between the carbon cycle and climate during Pleistocene glaciations, AGU Fall Meeting, Abstract PP41D-1489.
- Lisiecki, L. E. and M. E. Raymo (2008), Asynchronous responses in benthic $\delta^{18}\text{O}$ across glacial terminations, Geological Society of America Joint Annual Meeting, Houston.
- Lisiecki, L. E. and M. E. Raymo (invited, 2008), The LR04 benthic $\delta^{18}\text{O}$ stack and its implications for glacial cycle dynamics, Symposium on Climate Change: From the Geologic Past to the Uncertain Future: A Tribute to Andre Berger, Louvain-La-Neuve University, Belgium.
- Lisiecki, L. E. (2008), North Atlantic Deep Water responses to ice volume, obliquity and precession, Leverhulme Climate Symposium, University of Cambridge and The Royal Society, London.
- Lisiecki, L. E., and M. E. Raymo (invited, 2007), North Atlantic Deep Water responses to obliquity and precession, AGU Fall Meeting, Abstract PP42B-07.
- Lisiecki, L. E., and M. E. Raymo (2007), Age differences between Atlantic and Pacific benthic $\delta^{18}\text{O}$ change at terminations, AGU Fall Meeting, Abstract PP51B-0482.
- Lisiecki, L. E. (invited, 2007), Trends and transitions in Plio-Pleistocene glacial cycle dynamics, IODP Topical Symposium, North Atlantic and Arctic Climate Variability, Universität Bremen, Germany.
- Lisiecki, L. E., and M. E. Raymo (2006), Quantifying the effects of changes in ocean circulation and endmember composition on variability in Late Pleistocene carbon isotope records, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract PP31A-1733.
- Raymo, M. E., L. Lisiecki, and K. H. Nisancioglu (2006, invited), Plio-Pleistocene ice volume, Antarctic climate, and the global $\delta^{18}\text{O}$ record, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract PP51B-1135.
- Raymo, M. E., K. Kawamura, L. Lisiecki, W. G. Thompson, and J. P. Severinghaus (2006), What controls the pacing of 100-ky glacial cycles?, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract GC24A-01.
- Thompson, W. G., H. A. Curran, and L. Lisiecki (2006), The coral record of millennial-scale sea level change: An orbital influence, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract GC24A-03.
- Lisiecki, L. E. (invited, 2006), Trends and transitions in Plio-Pleistocene climate dynamics, International Symposium on the Dynamics of the Ice Age Climate, Nagoya, Japan.
- Lisiecki, L. E. (2006, invited), Multiple modes of orbital-scale change in thermohaline circulation, Summer Institute for the NOAA Climate and Global Change Postdoctoral Fellowship Program.
- Lisiecki, L. E. (2006), A new automated technique for the construction of more accurate composite depth, JOI CoreWall Workshop.

- Lisiecki, L. E., and M. E. Raymo (2005), Multiple modes of orbital-scale change in thermohaline circulation?, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract PP33A-1554.
- Lisiecki, L. E. (2004), The spectral evolution of Plio-Pleistocene $\delta^{18}\text{O}$, *Eos Trans. AGU*, 85 (47), Fall Meet. Suppl., Abstract PP33B-0947.
- Lisiecki, L. E. (2003), A new automated technique for the construction of more accurate composite depth scales and an analysis of core deformation in different sediment types, *Eos Trans. AGU*, 84 (46), Fall Meet. Suppl., Abstract U11B-0010.
- Lisiecki, L. E. (2003), 5.3-Myr benthic $\delta^{18}\text{O}$ stack of 41 sites, *Geophys. Res. Abstracts*, 5, EGS-AGU-EUG Joint Assembly, OS15-1TH3P-0579, Nice, France.
- Lisiecki, L. E., M. Wong, and W. H. Smyth, Io's magnetospheric interactions: Atmospheric heating and neutral escape, *Eos Trans. AGU*, 80 (17), Spring Meeting Supplement, S200, 1999.

Courses Taught

- Earth 105/205, Earth's Climate: Past and Present, Fall 2010 & Winter 2012
- Geo 201C, Mathematical Methods in Earth Science, Spring 2010
- Geo 4, Introduction to Oceanography, Winter 2010
- Geo 172/272, Earth's Climate: Past and Present, Fall 2009 (cotaught with David Lea)
- Geo 4S, Introduction to Oceanography, Spring 2009
- Geo 160/260, Seminar in Geology, Winter 2009
- Geo 270, Seminar on Quaternary Paleoclimatology, Fall 2008 (cotaught with David Lea)

Other Professional Activities

- Guest editor for *Proceedings of the National Academy of Science*, 2009
- Mentor for GSA 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*, 2008-2010; NSF, 2009-2010, 2012; *Nature Geoscience*, 2008, 2010; *Paleoceanography*, 2006-2008, 2010; *Geophysical Research Letters*, 2006-2008, 2010; Integrated Ocean Drilling Program, 2005, 2009; *Journal of Quaternary Science*, 2009; *Climate Research*, 2009; *Earth and Planetary Science Letters*, 2004-2008; *Quaternary Science Reviews*, 2005