

ADAM C. MALOOF

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<http://www.princeton.edu/geosciences/people/maloof>

EDUCATION

- 1998-2004 Harvard University (Cambridge, MA)
Ph.D., Earth and Planetary Sciences, Advisor: Paul F. Hoffman
Thesis: Three non-uniformitarian changes that shaped the Neoproterozoic Earth
- 1994-1998 Carleton College (Northfield, MN)
B.A., Geology; Junior year, University Courses on Svalbard (Spitsbergen, Norway)

PROFESSIONAL EXPERIENCE

- 2012→ Associate Professor of Geosciences, Princeton University
- 2006-2012 Assistant Professor of Geosciences, Princeton University
James B. Macelwane medalist, Alfred P. Sloan Fellow
- 2004-2006 Agouron Postdoctoral Fellow, Massachusetts Institute of Technology
- 1999 & 2002 Teaching Fellow, Harvard University, two *Distinction in Teaching* awards

RESEARCH INTERESTS

My interests center on the relationship between ancient life, climate and geography. The Neoproterozoic-Cambrian Era (900-490 million years ago) is a particularly important interval in Earth history because, at the same time that Earth endured unusually rapid drift of the continents and ice ages that advanced glaciers to sea level in tropical latitudes, animals first evolved and quickly became large and diverse. I choose precipitated sedimentary rocks such as limestone as my history books because a single outcrop of limestone may contain physical evidence for the energetics of winds, waves and currents, biological imprints of ecology and evolution, chemical records of the climate system, and magnetic evidence of latitude and geography. My group conducts extended field campaigns to map these physical and chemical records into a three-dimensional landscape of ancient environments. I also pair these studies of ancient systems with Modern and Cenozoic analogues in order to understand how better-constrained Earth-system changes, such as bacterial iron, sulfur and carbon cycling in modern peritidal carbonate systems, Pleistocene sea level variability, and Cenozoic orbital forcing of climate, actually are recorded in sediments. The goal of my research is to better understand the origin of animals, the evolution of Earth's climate, and the sensitivity of the Earth-system to physical, chemical and biological perturbations.

MEMBERSHIPS

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|---|--|
| Geological Society of America (GSA) | Society for Sedimentary Geology (SEPM) |
| American Geophysical Union (AGU) | European Geophysical Union (EGU) |
| American Association of Petroleum Geologists (AAPG) | Sigma Xi |

JOURNAL ARTICLES (*student or †postdoc for whom I was the primary or co-primary advisor)

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40. †Ewing, R.C., Eisenman, I., Lamb, M.P., *Poppick, L., **Maloof, A.C.**, Fischer, W.W. 2014, New constraints on equatorial temperatures during a Late Neoproterozoic snowball Earth glaciation, *Earth & Planetary Science Letters* 406, pp. 110-122.
 39. *Swanson-Hysell, N. L., Burgess, S.D., **Maloof, A.C.** and Bowring, S.A. 2014, Magmatic activity and plate motion during the latent stage of Midcontinent Rift development, *Geology*, doi:10.1130/G35271.1
 38. *Rose, C.V., **Maloof, A.C.**, Schoene, B., †Ewing, R.C., Linnemann, U., Hofmann, M., Cottle, J.M., *Budnick, A. 2013, The end-Cryogenian glaciation of South Australia, *Geoscience Canada-Hoffman Series*, 40, pp. 256-293.
 37. Kopp, R.E., Simons, F.J., Mitrovica, J.X., **Maloof, A.C.**, Oppenheimer, M. 2013, A probabilistic assessment of sea level variations within the last interglacial stage, *Geophysical Journal International*, 192(3), pp. 1-6
 36. *Swanson-Hysell, N.L, **Maloof, A.C.**, Evans, D.A.D., Kirschvink, J.L., Halverson, G.P. and Hurtgen, M.T. 2011, Constraints on Neoproterozoic paleogeography and Paleozoic orogenesis from paleomagnetic records of the Bitter Springs Formation, Amadeus Basin, central Australia, *American Journal of Science*, 312 pp. 817-884.
 35. *Husson, J.L., **Maloof, A.C.** and Schoene, B. 2012, A syn-depositional age for the Shuram $\delta^{13}\text{C}$ anomaly required by isotope conglomerate tests, *Terra Nova*, 24, pp. 318-325.
 34. Hoffman, P.F., Halverson, G.P., Domack, E.W., **Maloof, A.C.**, *Swanson-Hysell, N.L. and Cox, G.M. 2012, Cryogenian glaciations on the southern tropical paleomargin of Laurentia (NE Svalbard and East Greenland), and a primary origin for the upper Russøya (Islay) carbon isotope excursion, *Precambrian Research*, 206-207, pp. 137-158.
 33. *Proistosescu, C., Huybers, P. and **Maloof, A.C.** 2012, To tune or not to tune? - Detecting orbital variability in pre-Pleistocene climate records, *Earth and Planetary Science Letters*, 325-326 pp. 100-107.
 32. **Maloof, A.C.** and Grotzinger, J.P. 2012, The Holocene shallowing-upward parasequence of Northwest Andros Island, The Bahamas, *Sedimentology*, 59, pp. 1375-1407.
 31. *Rose, C.V., *Husson, J.L., *Swanson-Hysell, N.L., Poppick, L.N., Cottle, J.M., Schoene, B. and **Maloof, A.C.** 2012, Constraints on the origin and relative timing of the Trezona $\delta^{13}\text{C}$ anomaly below the end-Cryogenian glaciation, *Earth and Planetary Science Letters*, 319-320 pp. 241-250.
 30. Mitchell, R.N., Kilian, T.M., Raub, T.D., Evans, D.A.D., Bleeker, W. and **Maloof, A.C.** 2011, Sutton hotspot: Resolving Ediacaran-Cambrian tectonics and true polar wander for Laurentia, *American Journal of Science*, 311 pp. 651-663.
 29. *Swanson-Hysell, N.L, Feinberg, J.M., Berquó and **Maloof, A.C.** 2011, Self-reversed magnetization held by martite in basalt flows from the 1.1-billion-year-old Keweenawan rift, Canada, *Earth and Planetary Science Letters*, 305 pp. 171-184.

28. †Lewis, K.W., *Keeler, T.L., **Maloof, A.C.** 2011, MatStrat: New software for plotting and analyzing stratigraphic data, *EOS Transactions of the American Geophysical Union*, 92, pp. 37-38.
27. **Maloof, A.C.**, Porter, S.M., Moore, J.L., Dudás, F.Ö., Bowring, S.A., Higgins, J.A., Fike, D.A. and *Eddy, M. 2010, The earliest Cambrian record of animals and ocean geochemical change, *Geological Society of America Bulletin*, 122 pp. 1731-1774.
26. Weiss, B.P., Pedersen, S., Garrick-Bethell, I., Stewart, S.T., Louzada, K.L., **Maloof, A.C.** and *Swanson-Hysell, N.L. 2010, Paleomagnetism of impact spherules from Lonar Crater, India and a test for impact-generated fields, *Earth and Planetary Science Letters*, 298 pp. 66-76.
25. Dang, H.B., **Maloof, A.C.** and Romalis, M.V. 2010, Ultrahigh sensitivity magnetic field and magnetization measurements with an atomic magnetometer, *Applied Physics Letters*, 97, 151110.
24. **Maloof, A.C.**, *Rose, C.V., Beach, R., Samuels, B.M., Calmet, C.C., Erwin, D.H., Poirier, G.R., Yao, N. and Simons, F.J., Possible animal-body fossils in pre-Marinoan limestones from South Australia, *Nature Geoscience*, 3 pp. 653-659.
23. *Rose, C.V. and **Maloof, A.C.** 2010, Testing models for post-glacial 'cap dolostone' deposition: Nuccaleena Formation, South Australia, *Earth and Planetary Science Letters*, 296 pp. 165-180.
22. **Maloof, A.C.**, Ramezani, J., Bowring, S.A., Fike, D.A., Porter, S.M., *Mazouad, M. 2010, Constraints on early Cambrian carbon cycling from the duration of the Nemakit-Daldynian–Tommotian boundary $\delta^{13}\text{C}$ shift, Morocco, *Geology*, 38 pp. 623-626.
21. *Swanson-Hysell, N.L., *Rose, C.V., †Calmet, C.C., Halverson, G.P., Hurtgen, M.T., **Maloof, A.C.** 2010, Cryogenian glaciation and the onset of carbon-isotope decoupling, *Science*, 328 pp. 608-611.
20. Jones, D.S., **Maloof, A.C.**, Hurtgen, M.T., Rainbird, R.H. and Schrag, D.P. 2010, Regional and global chemostratigraphic correlation of the early Neoproterozoic Shaler Supergroup, Victoria Island, Northwestern Canada, *Precambrian Research*, 181 pp. 43-63
19. Macdonald, F.A., Schmitz, M.D., Crowley, J.L., Roots, C.F., Jones, D.S., **Maloof, A.C.**, Strauss, J.V., Cohen, P.A., Johnston, D.T. and Schrag, D.P. 2010, Calibrating the Cryogenian, *Science*, 327, pp. 1241-1243.
18. **Maloof, A.C.**, Stewart, S.T., Weiss, B.P., Soule, S.A., *Swanson-Hysell, N.L., Garrick-Bethell, I., Louzada, K.L. and Poussart, P.M. 2010, The geology of Lonar Crater, *Geological Society of America Bulletin*, 122(1), pp. 109-126.
17. †Kopp, R.E., Simons, F.J., Mitrovica, J.X., **Maloof, A.C.** and Oppenheimer, M. 2009, Probabilistic assessment of sea level during the last interglacial stage, *Nature*, 462 pp. 863-868.
16. †Kopp, R. E., Schumann, D., Raub, T.D., Powars, D.S., Godfrey, L.V., *Swanson-Hysell, N.L., **Maloof, A.C.** and Vali, H. 2009, An Appalachian Amazon? Magnetofossil evidence for the development of a tropical river-like system in the mid-Atlantic United States during the Paleocene-Eocene thermal maximum, *Paleoceanography*, 24, PA4211.

15. *Swanson-Hysell, N.L., **Maloof, A.C.**, Weiss, B.P. and Evans, D.A.D. 2009, No asymmetric geomagnetic reversals recorded by 1.1-billion-year-old Keweenawan basalts, *Nature Geoscience*, 2 pp. 713-717.
14. Louzada, K.L., Weiss, B.P., **Maloof, A.C.**, *Swanson-Hysell, N.L. and Soule, S.A. 2008, Paleomagnetism of Lonar Impact Crater, India, *Earth and Planetary Science Letters*, 275 pp. 308-319.
13. Halverson, G.P., Dudas, F.O., **Maloof, A.C.** and Bowring, S.A. 2007, Evolution of the $^{87}\text{Sr}/^{86}\text{Sr}$ composition of Neoproterozoic seawater, *Palaeogeography, Palaeoclimatology, Palaeocology*, 256 (3-4) pp. 103-129.
12. **Maloof, A.C.**, Kopp, R.E., Grotzinger, J.P., Fike, D., Bosak, T., Vali, H., Weiss, B.P. and Kirschvink, J.L. 2007, Sedimentary iron cycling and the origin and preservation of magnetization in platform carbonate muds, Andros Island, Bahamas, *Earth and Planetary Science Letters*, 259 pp. 581-598.
11. Halverson, G.P., **Maloof, A.C.**, Schrag, D.P., Dudas, F.Ö. and Hurtgen, M.T. 2007, Stratigraphy and geochemistry of a ca 800 Ma negative carbon isotope interval in northeastern Svalbard, *Chemical Geology*, 237 pp. 5-27.
10. Kopp, R.E., Weiss, B.P., **Maloof, A.C.**, Vali, H., Nash, C.Z., and Kirschvink, J.L. 2006, Chains, clumps, and strings: Magnetofossil taphonomy with ferromagnetic resonance spectroscopy, *Earth and Planetary Science Letters*, 247 pp. 10-25.
9. **Maloof, A.C.**, Halverson, G.P., Kirschvink, J.L., Schrag, D.P., Weiss, B.P., and Hoffman, P.F. 2006, Combined paleomagnetic, isotopic and stratigraphic evidence for true polar wander from the Neoproterozoic Akademikerbreen Group, Svalbard, *Geological Society of America Bulletin*, 118 pp. 1099-1124.
8. Halverson, G.P., Hoffman, P.F., Schrag, D.P., **Maloof, A.C.**, and Rice, A.H.N. 2005, Toward a Neoproterozoic composite carbon-isotope record, *Geological Society of America Bulletin*, 117 pp. 1181-1207.
7. **Maloof, A.C.**, Schrag, D.P., Crowley, J.L., and Bowring, S.A. 2005, An expanded record of Early Cambrian carbon cycling from the Anti-Atlas Margin, Morocco, *Canadian Journal of Earth Sciences*, 42 pp. 2195-2216.
6. Halverson, G.P., **Maloof, A.C.**, Hoffman, P.F. 2004, The Marinoan glaciation (Neoproterozoic) in northeast Svalbard, *Basin Research*, 16 pp. 297-324.
5. Hoffman, P.F. and **Maloof, A.C.** 2003, Comment on: A complex microbiota from snowball Earth times: Microfossils from the Neoproterozoic Kingston Peak Formation, Death Valley, USA, by Corsetti, F.A., Awramik, S.M., and Pierce, D., *Proceedings of the National Academy of Sciences*, 100 pp. 4399-4404.
4. **Maloof, A.C.**, Kellogg, J.B., and Anders, A.M. 2002, Neoproterozoic sand wedges: crack formation in frozen soils under diurnal forcing during a snowball Earth, *Earth and Planetary Science Letters*, 204 pp. 1-15.

3. Hoffman, P.F. and **Maloof, A.C.** 2001, Tilting at snowballs, A comment on Proterozoic equatorial glaciation: Has 'snowball Earth' a snowball's chance?. by Williams, G.E. and Schmidt, P.W., *The Australian Geologist*, 117 pp. 21-25.
2. **Maloof, A.C.** 2000, Superposed folding at the junction of the inland and coastal belts, Damaran orogen, NW Namibia, *Communications of the Geological Survey of Namibia*, Henno Martin Commemorative Volume 12 pp. 89-98.
1. Hoffman, P.F. and **Maloof, A.C.** 1999, The snowball theory still holds water, *Nature*, 397 p. 384.

JOURNAL ARTICLES IN PRESS OR IN REVIEW

41. *Husson, J.M., **Maloof, A.C.**, Schoene, B., *Chen, C.Y., Higgins, J.A. 2014, Stratigraphic expression of Earth's deepest $\delta^{13}\text{C}$ excursion in the Wonoka Formation of South Australia, *American Journal of Science*, *in press*.
42. *Husson, J. M., Higgins, J.A., **Maloof A.C.** and Schoene, B. 2014, Ca and Mg isotope constraints on the origin of Earth's deepest $\delta^{13}\text{C}$ excursion. *Geochimica et Cosmochimica Acta*, *in review*.
43. *Dyer, B. **Maloof, A.C.** 2014, Isotopic tests for the origin of Paradox Basin cyclothem. *Earth and Planetary Science Letters*, *in review*.
44. *Swanson-Hysell, N. L., **Maloof, A.C.**, Condon, D.J., Jenkin, G. R. T. , Alene, M., Tremblay, M.M., Tesema, T., Rooney, A.D. and Haileab, B. 2014, Age, Synchronicity and duration of the Neoproterozoic Bitter Springs Stage constrained by the Tambien Group, Ethiopia. *Geology*, *in review*.
45. *Husson, J. M., Schoene, B., Blüher, S. and **Maloof, A.C.**. U-Pb constraints on the duration of the Silurian-Devonian boundary $\delta^{13}\text{C}$ excursion from the North American Helderberg Group, *Earth and Planetary Science Letters*, *in review*.
46. *Chen, C.Y., **Maloof, A.C.** 2014, Lake Bonneville's tilted paleoshorelines revisited, *Quaternary Science Reviews*, *in review*.

ORIGINAL FIELD WORK (79 weeks while at Princeton)

- 2015 Anti-Atlas Mountains, Morocco [3 weeks] *The Ediacaran record of paleomagnetic variability and plate motion from the continuous volcanostratigraphic record of the Ouarzazate Group.*
- 2014 Ellesmere Island [3 weeks] *A new early Cambrian Lagerstätte and the coevolution of animal life and climate.*
- 2014 Great Britain [1 week] *The onset of Late Paleozoic Ice Age glaciation constrained by physical and chemo-stratigraphic data from a far-field basin.*
- 2014 Southern Namibia [3 weeks] *A stratigraphic study of the diversity and ecology of Earth's oldest biomineralizing animals, Cloudina and Namacalathus.*

- 2014** Nevada [2 weeks] *Chemostratigraphic constraints on early Cambrian trilobite evolution and global correlation.*
- 2013** Western Australia [4 weeks] *Paleomagnetic and geochronological constraints on plate velocities during the Archaean from Earth's oldest flood basalts.*
- 2012** Western Australia [4 weeks] *The time evolution of Earth's early magnetic field recorded in Earth's oldest zircons*
- 2012** Utah [2 weeks] *A viscoelastic deformation model from paleoshorelines of Lake Bonneville: Implications for late Pleistocene glacial retreat in the Western U.S.*
- 2011, 2012 & 2014** New Mexico [2 weeks] and Utah+Nevada+Colorado+Wyoming [9 weeks] *Frequency and magnitude of sea level change during the late Paleozoic ice age*
- 2010 & 2013** Ethiopia [8 weeks] *Calibrating rates of Neoproterozoic true polar wander*
- 2008** South China [2 weeks] *U-Pb ash calibrated record of Early Cambrian global change*
- 2007 - 2010** South Australia [19 weeks] *Marinoan glaciation and the Wonoka Anomaly*
- 2006 - 2008** Central Australia [18 weeks] *True polar wander hypothesis for global change 800 Ma*
- 2007** Okanagan Highlands, Canada [2 weeks] *Early Eocene climate sensitivity recorded in varved lacustrine sediments*
- 2005 & 2006** Lonar, India [6 weeks] *Bolide impact in basalt-analog for surface processes on Mars*
- 2005 & 2007** Ontario, Canada [4 weeks], *Non-dipole geomagnetic field 1.1 Ga*
- 2005, 2007, 2010 & 2014** Andros Island, Bahamas [10 weeks], *The origin of magnetism and parasequence architecture in platform carbonates*
- 2004** East Greenland [4 weeks] *Sedimentation under sea ice during Cryogenian glaciation*
- 2004** Victoria Island, Canada [4 weeks], *True polar wander hypothesis for global change 800 Ma*
- 2001 & 2003** Mackenzie Mountains, Canada [8 weeks] *Testing the snowball Earth hypothesis in the Windemere Supergroup*
- 1999-2002** East Svalbard, Norway [13 weeks] *Sequence/chemo/magneto-stratigraphy through 250 myr of the Neoproterozoic era*
- 2000-2011 & 2014** Anti-Atlas Mountains, Morocco [34 weeks] *The earliest Cambrian record of animals and ocean geochemical change*
- 2002** W. Newfoundland, Canada [2 weeks] *Early Ordovician oceanic crust and the oxygen-isotopic evolution of seawater*
- 2001** Southern Namibia [3 weeks] *Neoproterozoic glaciation of a continental slope*
- 2000** Adrar, Mauritania [2 weeks] *A terrestrial Neoproterozoic glacial deposit and its cap carbonate*

- 2000** Talkeetna Arc, Alaska with L.M. Mehl [2 weeks] *Structural and compositional mapping of the upper mantle beneath an accreted arc*
- 1999** Paradox Basin, SE Utah with D.L. Barbeau [2 weeks] *Evolution of a Pennsylvanian-Permian flexural basin beside a basement cored uplift*
- 1998** E. Newfoundland, Canada [2 weeks] *Sedimentologic and detrital zircon study of the Late Neoproterozoic Gaskiers Fm diamictite*
- 1998** E. Greenland with A. Andresen and E.H. Hartz [8 weeks] *Structure of the Fjord Region Detachment and deposition of Devonian old red sandstone*
- 1998** Northern Norway with J. Kohler [2 weeks] *Subglacial hydrology of Svartisen glacier*
- 1998** Anti-Atlas Mountains, Morocco with J.L. Kirschvink [4 weeks] *Magnetostratigraphy of Early Cambrian carbonates and lava flows*
- 1997** Northern Namibia [10 weeks] *Subject of undergraduate thesis: Otavi Group stratigraphy and Pan African deformation*
- 1997** W. Spitsbergen, Norway [3 weeks] *Genesis and time-evolution of an arctic valley pingo field*

FUNDING

NSF EAR 1410317, Integrated Earth Systems: Collaborative Research: Toward a global timeline of biological and ocean geochemical change during the early Cambrian (2014-2016; \$1,054,947).

NSF EAR-1323158, Sedimentary Geology and Paleobiology: Collaborative Research: Quantifying Rates of Neoproterozoic Global Change, Ethiopia (2014-2016; \$150,000).

NSF EAR-1251991, Sedimentary Geology and Paleobiology: Collaborative Research: Estimating the Tempo of the Cambrian Explosion (2013; \$30,000).

NSF EAR-1028768, Instrumentation and Facilities: Development of An Integrated Serial Grinder and Photo-Imager for 3D Fossil Reconstruction (2012-2013; \$449,113).

NSF EAR-1121034, Sedimentary Geology and Paleobiology: Testing models for the origin of the deepest carbon-isotope anomaly in Earth history: The Wonoka Formation of South Australia (2011-2012; \$224,115).

Princeton University: Earth's Environments and Ancient Civilizations. Award to fund the FRS-171(187) Freshman Seminar field trip to Cyprus for 3 years with F.J. Simons (2011-2013; \$180,000).

Alfred P. Sloan Foundation Research Fellowship (2010-2012; \$50,000).

NSF EAR-0842946, Sedimentary Geology and Paleobiology: Fluctuating tidewater glaciers, chemical weathering and survival of reef-dwelling organisms: the Marinoan snowball, South Australia (2009-2011; \$226,176).

NSF EAR-0638660, Sedimentary Geology and Paleobiology: Collaborative Research (w/ S.A. Bowring): Calibrating Rates and Duration for Isotopic Variability During the Early Cambrian Radiation of Animals, Anti-Atlas Mountains, Morocco (2007-2011;\$188,507).

Princeton University: Earth's Changing Surface & Climate. Award to fund the FRS-145(9) Freshman Seminar field trip to California for 3 years with F.J. Simons (2007-2009; \$110,000).

NSF EAR-0514657, Sedimentary Geology and Paleobiology: An integrated paleomagnetic, isotopic, and stratigraphic test of the inertial interchange true polar wander hypothesis, Bitter Springs Stage, Australia (2006-2010; \$239,995).

INVITED VISITS/TALKS (SINCE FALL 2006)

12/09/13	American Geophysical Union OS11F-02
11/22/13	Lamont Doherty Earth Observatory
10/04/13	University of Michigan Department of Earth & Environmental Sciences
04/12/13	University of Wisconsin Madison Department of Geoscience
01/09/13	Congress of African Geology (CAG24)
09/29/12	New York State Geological Association, Hamilton College Department of Geology
09/19/12	Geological Society of London Fermor Meeting: The Neoproterozoic Era; Evolution, Glaciation and Oxygenation
02/29/12	Cooper Union School of Architecture
02/17/12	University of Arizona Center for Astrobiology
02/16/12	University of California Santa Barbara Department of Earth Science
11/15/11	Princeton University Department of Geosciences
09/29/11	Institut de Physique du Globe (Paris)
04/05/11	European Geophysical Union (Vienna): Can carbon isotopes solve global carbon cycle conundrums?
04/04/11	European Geophysical Union (Vienna): Microtomography and 3D Modeling in Palaeontology
02/18/11	University of Massachusetts Amherst Department of Geosciences
02/17/11	Amherst College, Department of Geology
01/31/11	University of Toronto, Noble Seminar Series in Atmospheric Physics
11/12/10	Johns Hopkins Department of Earth and Planetary Sciences
10/01/10	Yale University Geology and Geophysics, Frontiers in Crustal Geosciences
07/28/10	University of Adelaide School of Earth and Environmental Sciences
06/28/10	University of Addis Ababa Earth Sciences
10/08/09	Rice University Department of Earth Science
09/07/09	Geological Society of London Fermor Meeting—Rodinia: Supercontinents, Superplumes & Scotland
06/08/09	American Association of Petroleum Geologists Annual Convention
04/08/09	Cornell University Department of Earth & Atmospheric Sciences
12/16/08	American Geophysical Union PP2: Novel insights in historical geobiology
12/03/08	Massachusetts Institute of Technology Earth, Atmospheric & Planetary Sciences
12/01/08	Harvard University Earth & Planetary Sciences
10/01/08	Princeton Plasma Physics Laboratory
04/25/08	University of Pennsylvania Earth and Environmental Sciences
04/08/08	Stanford Geological and Environmental Sciences
10/11/07	NSF Critical Transitions in the History of Life workshop
10/10/07	Rutgers Geological Sciences

05/14/07 Yale Geology and Geophysics, Geobiology of the Proterozoic-Cambrian conference
10/24/06 GSA T110. Magnetostratigraphy of Critical Intervals in Earth History

COURSES TAUGHT

GEO/WRI 201 *Measuring Climate Change: Methods in Data Analysis & Scientific Writing [Fall '14 (11) with A. Irwin Wilkins]*: In this course, students will use drone-derived photographs and elevation models of landscapes, georeferenced field observations of the natural world, and data mining of the primary literature in combination with quantitative modeling and interpretation to answer questions like: How have ancient climate changes been preserved in modern landscapes and the rock record? What is the difference between climate and weather? How is climate changing now, and how do we measure it? What impact does climate change have on modern human society, and how have humans affected climate change? How do we quantify the uncertainties on measurements of climate change, and how do we communicate these uncertainties to the public? GEO/WRI 201 is designed to help students build on what they learn as freshmen in the Writing Seminars about the values held in common across disciplines—e.g., articulating a compelling question or problem, making an argument based on evidence and analysis, engaging responsibly with sources—and translate them into the context of more advanced and discipline-specific writing projects. In the classroom, on campus field excursions, and on the mandatory eight-day Fall-Break research trip to the American Southwest, students will gain practical experience piloting drones, collecting paleoclimatological and climatological data, and analyzing these data using software and programming languages like ArcGIS and Matlab. Through weekly writing and oral presentation workshops, students will learn to communicate their original research effectively within the formal structure of journal-style scientific writing and the L^AT_EX typesetting language. Students will emerge from this class ready to tackle the demands of junior and senior independent work, including how to use the research and writing process recursively to hone their ideas. FIELD TRIPS: AMERICAN SOUTHWEST [7 DAYS], NEW YORK [2 DAYS], CAMPUS [2 AFTERNOONS].

FRS 171(187) *Earth's Environments and Ancient Civilizations [Fall '11(15), '12 (15) & '13 (13) with F.J. Simons]*: In this Freshman Seminar, you will combine field observations of the natural world with mathematics, physics, chemistry and computer science in order to answer questions like: Why are mountains high? Why are some landscapes wetter, drier, smoother, or more jagged than others? How does environmental change alter the course of civilization, and how do civilizations modify their environment? In the classroom, through problem sets, and on campus excursions, you will gain practical experience collecting geological and geophysical data in geographic context, and analyzing these data using software and programming languages like ArcGIS and Matlab. During the required week-long Fall break trip to Cyprus, you will engage in research projects that focus on the interplay between active tectonic landscapes, changing climate, and ancient civilizations. We will help you turn what you learn into three research papers. Scientific writing is an integral part of this course and its assessment. FIELD TRIPS: CYPRUS [7 DAYS], NEW YORK [2 DAYS], CAMPUS [2 AFTERNOONS].

FRS 145(9) *Earth's Changing Surface & Climate [Fall '06(19), '07(20), '08(14), & '09(16) with F.J. Simons]*: How does Earth's surface evolve in response to internal (e.g., tectonic), external (e.g., extraterrestrial), and anthropogenic (e.g., engineering and resource use) forcing? This course is composed of weekly 3-hour seminars on the size and shape of Earth in our solar system, topography,

gravity, tectonics, climate and Earth history designed to provide a basic understanding of the processes that shape Earth's surface. We emphasize data collection and analysis using free internet data sources and software such as MatLab and ARCGIS. The centerpiece of the course is a 7 day field trip to the Mono-Inyo Crater system on the south shore of Mono Lake, where students combine geologic observations with quantitative measurements of topography, gravity, and weather to tell a story of Earth surface change in the region. The course culminates in group presentations and written reports that combine original field observations, internet data sources and modern software. FIELD TRIPS: CALIFORNIA [7 DAYS], NEW YORK [2 DAYS], CAMPUS [2 AFTERNOONS].

GEO/CEE/ENV 370 *Sedimentology – previously GEO 450 Earth Surface Processes [Spring '07(11), '09(9), '10(9), '12(3) & '14(15)]*: This course presents a treatment of the physical processes that shape Earth's surface, such as solar radiation, the flow of water (vapor, liquid, and solid) under the influence of gravitational and capillary forces, and deformation of the solid Earth. In particular, the generation, transport, and preservation of sediment in response to these processes is studied in order to better read stories of Earth history in the geologic record and to better understand processes involved in modern and ancient environmental change. FIELD TRIPS: BAHAMAS OR NEW MEXICO [8 DAYS], KENTUCKY [4 DAYS], NEW YORK [4 DAYS].

GEO/CEE 373 *Structural Geology [Spring '11(8) with B. Schoene]*: An introduction to the physics and geometry of brittle and ductile deformation in Earth's crust. We consider deformation at scales from atomic to continental, in the context of mountain building, rifting, and the origin of topography. WEEKEND FIELD TRIPS: KENTUCKY, PENNSYLVANIA, NEW JERSEY, NEW YORK.

GEO 506 *Fundamentals of Geosciences II - The history of Glaciation on Earth [April 23 – May 04, 2012(5)]*: This two week module examines each major ice age in Earth history, focussing on boundary conditions, character of ice volume variability, and impact of on the biosphere. *The Evolution of Earth's Orbit [February 18-29, 2008(9)]*: This two week module examines the evolution of Earth's orbit over the last 4.5 Gy. Topics include the length of day, Earth-Moon distance, modulation of the precession parameters and the relationship between Earth's orbit and its radiative balance. *Pangaea [April 20 - May 01, 2009(6)]*: This two week module examines the formation and breakup of the Pangaeian supercontinent. Topics include paleomagnetic reconstruction of paleogeography, non-dipole magnetic fields, plate tectonics, true polar wander, and the effect of supercontinents on climate and sea level.

GEO 538 *Paleoclimatology [Spring '07(6) & Fall '13 (10), with M. Bender]*: The course begins with a series of lectures discussing the physical processes that govern Earth's climate, relevant numerical models, and key properties of sediments from which the nature of past climates can be deduced. The next section of the class investigates the major events of Earth's climate history, from the faint early sun paradox to global change. In this section students will be asked to present 1 paper from the literature each week. This course requires a 2000 word paper on a topic of the students choice.

GEO 570 *Sedimentology [Spring '10(3), '12 (5) & '14(3)]*: This course shares lectures with GEO 370, but has modified problem sets, no exams, and a major final paper assignment based on the field research conducted during spring break.

PRINCETON COMMITTEE SERVICE

2014→	University Council on Teaching and Learning
2012→	Undergraduate Departmental Representative
2012→	Academic Athletic Fellow, Baseball
2011	University Committee for the President's Award for Distinguished Teaching
2010-2013	University Faculty Committee on the Course of Study
2009-2013	Geosciences Departmental Seminar Coordinator
2007-2012	Faculty Search Committee (with Rubin, Duffy, Tromp & Simons)
2007-2009	Hess Postdoc Search Committee (with Suppe, Bender & Tromp)
2007 →	Geosciences Web Site Committee (with Myneni & Simons)
2007 →	Mineral Collection Committee (with Myneni & Duffy)
2006-2013	Undergraduate Work Committee (with Myneni/Keller, Duffy/Sigman and Schoene)

PRINCETON STUDENT ADVISING (not including Ph.D. and B.A. students from other Universities that I have advised)

	POSTDOCS
2009-2013	Kevin Lewis (w/ F. Simons; Testing the orbital hypothesis for climate variability in the Lacustrine Green River Formation & MatStrat: New software for plotting and analyzing stratigraphic data)
2009-2011	John Higgins (w/ M. Bender; Carbon isotope variability in Holocene platformal carbonate sediments, organic matter and porewater from the Bahamas)
2009-2010	Ryan Ewing (The stratigraphic record of aeolian dunes and climate change in the Holocene of White Sands, NM and the Cryogenian of South Australia)
2007-2009	Bob Kopp (w/ M. Oppenheimer; Probabilistic assessment of sea level during the last interglacial stage & Magnetofossil evidence for the development of a tropical river-like system in the mid-Atlantic United States during the Paleocene-Eocene thermal maximum)
	GRADUATE STUDENTS
2013 →	Alliya Akhtar (Ph.D. Stratigraphic record of the co-evolution of animals and climate)
2013 →	Jenn Kasbohm (Ph.D. Paleomagnetic and Geochronological record of Precambrian plate motion)
2013 →	Akshay Mehra (Ph.D. Serial grinding and 3D imaging of early animal fossils)
2010 →	Blake Dyer (Ph.D.; Sea level change, climate variability, and coal deposition) during glacial-interglacial cycles of the Late Paleozoic Ice Age)
2009-2014	Jon Husson (Ph.D., with B. Schoene; Constraining rates, timing, and origin of unusual carbon cycle dynamics in the terminal Proterozoic and early), <i>now a postdoctoral fellow at University of Wisconsin Madison.</i>
2007-2012	Catherine Rose (Ph.D. 06/05/12; An integrated sedimentological, stratigraphic and geochemical study of the end-Cryogenian ice age in South Australia), <i>Now an assistant professor at Trinity College, Dublin.</i>
2006-2011	Nicholas Swanson-Hysell (Ph.D. 09/16/11; Stratigraphic records of paleogeography and global change from two late Proterozoic basins), <i>Now an assistant professor at University</i>

- of California Berkeley.*
- 2006-2009 Hoan Bui Dang (Ph.D., with M. Romalis; Ultrahigh sensitivity magnetization measurements with an atomic magnetometer)
- UNDERGRADUATE THESES
- 2014-2016 Ali Champion, JP/ST, *The British record of sea level change during the Late Paleozoic Ice Age.*
- Fall 2014 Anna van Brummen, JP, *Spatial analysis of Hoyt's Stromatolite.*
- Spring 2014 Yuem Park, JP, *Determining lateral stratigraphic variation using well-log gamma-ray measurements: A case study in the Paradox Formation of the Southwest USA*
- Spring 2014 Leticia Bombieri, JP, *Porosity of stromatolites from Lagoa Salgada, Rio de Janeiro, Brazil*
- 2013-2014 Kathleen Ryan, ST, *Precision and accuracy of low-cost global positioning augmentation systems.*
- 2012-2014 Sarah Blucher, ST, *An integrated chemostratigraphic approach to understanding the Siluro-Devonian positive carbon isotope excursion. geochronology of intercalated ashes*
- 2012-2013 Christine Chen, ST, *A viscoelastic deformation model from paleoshorelines of Lake Bonneville: Implications for late Pleistocene glacial retreat in the Western U.S.*
- Fall 2012 Charlotte Connor, JP, *Isotopic and trace element fingerprinting of building stones and concrete in Iron Age to Roman structures from Polis, Cyprus*
- 2011-2012 Andrew Budnick, JP, *Origins of the Elatina Rhythmites and the History of the Earth-Moon Orbit.*
- Fall 2011 Christine Chen '13 (JP; Differential GPS and carbon-isotope mapping of submarine channels in the Wonoka Formation of South Australia)
- Spring 2011 Sara Nason '12 (JP; The effects of coastal structures on sand particle size and beach profiles in Pondicherry, India)
- Fall 2010 Steven Shonts '12 (JP; Carbon cycling and an ocean anoxic event in the late Nemakit-Daldynian)
- 2009-2010 Michael Eddy '11 (JP; The tectonic implications of an early Cambrian drop in seawater $^{87}\text{Sr}/^{86}\text{Sr}$)
- 2009-2010 Zach Morse '10 (ST; Reinterpretation of the Elatina Rhythmite fold structures: evidence for a seasonal 'Slushball Earth' and giant impact Lunar formation ~ 4.4 Ga)
- 2009-2010 Michael Eddy '11 (JP; Oxidation of the early Cambrian ocean)
- 2008-2009 Zach Morse '10 (JP; Morphodynamics of an intertidal carbonate platform)
- 2008-2009 Cristian Proistosescu '09 (ST - Physics; An objective test for orbital forcing of Oligo-Miocene climate)
- 2007-2008 James Hamm '08 (ST with M. Romalis - Physics; A spin-exchange-relaxation-free atomic magnetometer for paleomagnetism)
- Spring 2007 Meredith Wall '08 (JP; Ooid growth, cementation and diagenesis: Joulter Cays, Bahamas)
- Spring 2007 James Hamm '08 (JP with M. Romalis - Physics; Frontiers of magnetometry)
- Fall 2006 Bamidele Otemuyiwa '08 (JP; Second-order sea-level variations as a test for Neoproterozoic true polar wander)

LAB WORK

2014→	Anna Erkalova '18 (CBE)
2014→	Adrian Tasistro-Hart '17 (GEO)
2014→	Ray Bartolucci '17 (CBE)
2014	Alexandria Herr '17 (GEO)
2012→	Julia Wilcots '16 (CEE)
2012-2014	Ali Champion '16 (GEO)
2012-2013	Collin Edwards '16 (GEO)
2012-2013	Nan 'Jenny' Jiang '16 (ART)
2011-2013	Natalie Saenz '15 (CHM)
2011-2012	Yuem Park '15 (GEO)
2011-2012	Matt Walsh '15 (TBD)
2009-2011	Christine Chen '13 (GEO)
2009-2011	Steven Shonts '12 (GEO)
2009-2011	Jacque Nesbit '12 (GEO)
2008-2009	Lija Treibergs '11 (GEO)
2008-2009	Tim Keeler '11 (GEO)
2006-2008	Becca Levin '10 (CHM)
2006-2007	Julie Dickerson '10 (ART)
2006-2007	Morgan Fowler '10 (ENV)

FIELDWORK

2014	Adrian Tasistro-Hart '17 (GEO; Namibia - 8 weeks)
2014	Ray Bartolucci '17 (CBE; Namibia - 8 weeks)
2014	Ali Champion '16 (GEO; England - 6 weeks)
2014	Tamara Pico '14 (CHM; Nevada - 2 weeks & England - 6 weeks)
2013	Ali Champion '16 (GEO; Australia - 8 weeks)
2012	Christine Chen '13 (GEO; Utah 8 weeks)
2012	Ballard Metcalfe '14 (CEE; Utah 8 weeks)
2012	Yuem Park '15 (GEO; Nevada, Utah, Colorado 8 weeks)
2012	Lily Adler '15 (CHM; Nevada, Utah, Colorado 8 weeks)
2011	Christine Chen '13 (GEO; Australia - 10 weeks)
2008	Nora Xu '11 (GEO; Australia - 10 weeks)