

JOHN A. TARDUNO

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William R. Kenan, Jr., Professor; Professor of Geophysics
Department of Earth & Environmental Sciences
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University of Rochester, Rochester, NY 14627

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Academic Career:

2021-present Distinguished Scientist, Laboratory for Laser Energetics, U. Rochester, Rochester, NY.
2019-present Dean for Research, Arts, Science & Engineering, University of Rochester
2016-2019 Chair, Department of Earth and Environmental Sciences, Univ. Rochester, N.Y.
2005-present Professor of Physics and Astronomy, University of Rochester, Rochester, NY.
2000-present Professor of Geophysics, University of Rochester, Rochester, NY.
1998-2006 Chair, Department of Earth and Environmental Sciences
1996 Associate Professor of Geophysics, University of Rochester, Rochester, NY.
1993 Assistant Professor of Geophysics, University of Rochester, Rochester, NY.
1990 Assistant Research Geophysicist, Scripps Institution of Oceanography, La Jolla, Ca.
1989 National Science Foundation Postdoctoral Fellow, ETH, Zürich, Switzerland
1988 JOI/USSAC Ocean Drilling Fellow, Stanford University, Stanford, Ca.
1987 Ph.D. (Geophysics), Stanford University, Stanford, Ca
1987 M.S. (Geophysics) Stanford University, Stanford Ca.
1983 B.S. (Geophysics) Lehigh University, Bethlehem Pa.

Honors and Awards:

Phi Beta Kappa (1983)
Fellow, Geological Society of America (1998)
JOI/USSAC Distinguished Lecturer (2000-2001)
Goergen Award for Distinguished Achievement and Artistry in Undergraduate Teaching (2001)
Fellow, American Association for the Advancement of Science (2003)
American Geophysical Union/Geomagnetism and Paleomagnetism Section Bullard Lecturer (2004)
Fellow, John Simon Guggenheim Foundation (2006-2007)
Edward Peck Curtis Award for Excellence in Undergraduate Teaching (2007)
Fellow, American Geophysical Union (2007)
GSA Structure and Tectonics Outstanding Publication Award (2014)
Honorary Professor, University of KwaZulu-Natal, South Africa (2014)

Price Medal, Royal Astronomical Society (2016)
Petrus Peregrinus Medal, European Geosciences Union (2017)
Japan Society for the Promotion of Science Invitational Fellow (2017)
William R. Kenan, Jr., Professor (2018)
Distinguished Lecturer, AGU College of Fellows (2021-2022)

Memberships: AGU, EGU, FRAS, GSA, AAAS, GS, MetSoc

Research Interests:

The origin and long-term history of the geodynamo, planetary habitability, dynamos in meteorite parent bodies, Solar System evolution, paleomagnetism applied to studies of hotspot and polar motion and paleoclimate

Marine Geology and Geophysics Experience:

paleomagnetist, Western Equatorial Pacific ODP Leg 130, Ontong Java Plateau (1990)
paleomagnetist, Mid-Pacific Mountains ODP Leg 143 (1992)
Co-chief scientist and lead proponent, Hawaiian-Emperor Hotspot Test ODP Leg 197 (2001)

Select Field Experience:

2021 Ediacaran intrusions, Jordan
2020 Singhbhum craton, India
2019, 2018, Wichita Mountains, Oklahoma, Cambrian paleointensity
2018 Nain Province, Labrador, Proterozoic paleointensity
2017 Tokoro Belt, Hokkaido, Japan, Mesozoic tectonics
2016 Botswana and South Africa, archeomagnetism
2016, 2012, 2011 Western Australia Archean (Pilbara and Yilgarn cratons)
2015-1990 High Canadian Arctic, led 11 expeditions, Mesozoic lavas and paleoclimate
2014, 2011 Zimbabwe, Archean Great Dyke and related units
2014, Botswana and Zimbabwe, archeomagnetism
2014, 2011, 2009, 2008, 2007, 2004, 2003 South Africa Archean; archeomagnetism
2014, 2012 Northern Quebec, Canada, Cambrian Sept Iles Complex and Cambrian dikes
2011, 2007, 2005, New Zealand (Chatham Islands) Mesozoic lavas
2010 Central India (Chhattisgarh) Archean
2007, 2006 Mauritania, Mesozoic dykes
2006 Eastern Australia, Permian
1998, 1996 Eastern India (Rajmahal Traps) Mesozoic lavas

Select External Service Activities:

Member, Joint Oceanographic Institutions (JOIDES) Lithosphere Panel, 1992-1995
Liaison, JOIDES Ocean History Panel, 1992-1995
Member, AGU Geomagnetism and Paleomagnetism Executive Committee, 1996-2002

Chair, JOIDES Scientific Steering and Evaluation Committee, Dynamics of Earth's Interior, 1997-1999

This panel was composed of 16 international members charged with nurturing and reviewing scientific proposals for scientific drilling.

Co-chaired Marine Geology and Geophysics Working Group 1998 SCICEX Planning Meeting (see Arctic Ocean Science from Submarines: A Report Based on the SCICEX 2000 Workshop, published by Applied Physics Laboratory, University of Washington (April, 1999).

Member, Editorial Board for *Geology*, 2001-2003

Member, National Science Foundation Geophysics Panel, 2002-2004

Co-convenor, "A Workshop on the Amerasian Basin and its Margins", Washington, DC, 2004

G-cubed Guest editor, Movement, Dynamics and Geochemical Evolution of the Hawaiian Hotspot Theme, 2003-2004

Member, Review Advisory Committee, Institute for Rock Magnetism, University of Minnesota, 2005-2010

Invited Speaker, AGU Geophysical Information for Teachers (GIFT) workshop, Fall, 2005

Member, Integrated Ocean Drilling Program Detailed Planning Group 2006-2007

Member, National Science Foundation Ocean Sciences Panel, 2007

Editor, *Geochemistry, Geophysics, Geosystems (G-cubed)*, 2005-2008; Senior Editor, 2009

Chair, Institute for Rock Magnetism, University of Minnesota, Review and Advisory Committee, 2006-2010

Member, AGU Fleming Medal Committee, 2010-2012

Chair, Norwegian Research Council Virtual Panel, 2011-2012

Editorial Committee, *Frontiers of Earth Science*, China, 2011-

Member, National Science Foundation Panel, 2011

Member, Proposal Evaluation Panel, Integrated Ocean Drilling Program 2012-2013

Member, National Science Foundation Panel, 2014

Member, Science Evaluation Panel, International Ocean Discovery Program 2014-2015

Member, AGU Fleming Medal Committee, 2015-2017

Guest Lead Editor, *Earth Planets Space*, 2017-2019

Deputy Editor, *Earth and Planetary Physics*, 2017-

Outstanding Reviewer for *Geophysical Journal International*, 2019

Chair, EGU Petrus Peregrinus Award Committee for 2018, 2019-2020

Reader, Guggenheim Foundation, 2019-

Select University of Rochester Service, last 6 years:

Member, Faculty Council Steering Committee, 2014-2015

Director of Undergraduate Studies in Geosciences, 2014-2016

Member, Faculty Senate Executive Committee 2014-2016

Member, Cabinet of Department Chairs 2016-2019

Member, University Committee on Research Policy 2017-2018, ex officio 2019-

Chair, School of Arts & Sciences Faculty Decanal Review Committee 2019

Conflict of Interest Committee 2019-
Research Compliance Committee 2019-
Committee on Science and Security 2019-
Research Executive Committee 2019-
Coronavirus response and restart committees, AS&E Research Lead
AS&E COVID command team, 2020-2021
CURT (Coronavirus University Response Team) 3/2020-6/2020
CURT 2.0 Emergency Operating Command, 6/2020-2022 (recognized by University of Rochester's "2020 Award")
CURT 2.0 River Campus Operations, 6/2020-2022

Select Outreach Activities:

N.Y. Times Interview with Bill Broad on recent decay of Earth's dipole magnetic field: (Will Compasses Point South?)
CNN interview with Lou Dobbs on decay of Earth's dipole magnetic field, see:
<http://transcripts.cnn.com/TRANSCRIPTS/0407/13/ldt.00.html>
Interview on global change for Rochester-based documentary (Comfort Zone), see
<http://comfortzoneproject.com>
Lecturer for University of Hawaii Seminar on Advanced Plate Tectonics (see article Seminar 2.0: Learning with Skype and Video Podcasts, P. Wessel et al., Eos, vol. 90, 2009); podcast available at: <http://www.soest.hawaii.edu/pwessel/podcasts>
Science Teachers Association of New York State/Earth Science Teachers 2009 Speaker
Interview on Arctic paleoclimate distributed via YouTube
(<http://www.youtube.com/watch?v=5ZISVQSBYCE>)
Rochester Museum & Science Center 2013 Richard C. Shultz Science on the Edge Lecturer
"Crocodiles at the Poles: Viewing the Past and Future Ice-free Arctic"
WXXI Rochester Radio Interview on Arctic paleoclimate 2013
Rochester Science Café speaker on Arctic expeditions 2013
Article in N.Y. Times covers our research (Newly Discovered Prehistoric Bird Lived Near a Balmy North Pole) 2016
Essay for The Conversation, "Does an anomaly in the Earth's magnetic field portend a coming pole reversal?", reprinted by *Newsweek* 2017, with over 840,000 reads
BBC interview (podcast) on inner core formation, Feb. 2019

Graduate Advisor: Michael McWilliams (Stanford University)

Postdoctoral Advisor: William Lowrie (ETH)

Teaching:

EES101 Introduction to the Geological Sciences (14 years); EES102Q/202, Earthquakes, Volcanoes and Mountain Ranges: A Field Quest in California (10 years); EES 252/452, Marine Geology,

EES 255/455, Planetary Science; EES 256/456, Paleomagnetism; EES 258/458, Hotspots and Plate Motions; EES299 Field Geology

Postdoctoral Research Advisee: Yoichi Usui (currently at IFREE, Japan), Vincent Hare (University of Capetown), Richard Bono (University of Liverpool), Wentao Huang (Institute of Tibetan Plateau Research).

Graduate Research Advisees (Principal Advisor only):

Wenlai Tian (MS 1998), Michael Myers (MS 1998), Rory Cottrell (MS, 1999; PhD 2000) Alexei Smirnov (MS, 2000; PhD 2002), Olga Libman (MS 2002), Pavel Doubrovine (MS, 2003, Ph.D. 2008) Dorothy Bauch (MS 2006), Deborah Vandermark (MS 2006), Anna Wendt (MS 2008), Julia Voronov (MS, 2009), Yoichi Usui (PhD 2009 Tohoku University), Julia Nelson (MS, 2010), Richard Bono (PhD, 2016), Matthew Dare (MS, 2016), Ben Crummins (MS, 2021), Tim O'Brien (PhD, 2021), Josh Bridges (PhD candidate), Tinghong Zhou (PhD candidate), Atma Anand (PhD candidate).

Undergraduate Research Advisees:

Anna Synder (Undergraduate research project, 1995), Sarah Wilkison (BS Senior thesis, 1997), Bethany Daeffler (Undergraduate research project, 1998), Olga Libman (BS Senior thesis, 1998), Howard Scher (BS Senior thesis, 1999), Sara Pruss (BS Senior thesis, 1999), Chris Butzer (BS Senior thesis, 2000), Nadia Albers (Undergraduate Research project, 2002), Matt Friedman (BS Senior thesis, 2002), Peter Lippert (BS Senior thesis, 2002), Allyson O'Kane (Undergraduate research project, 2003), Kathy Bailey (BS Senior thesis, 2003), Gwen Olton (Undergraduate research project, 2004), Chris Hayes (Undergraduate research project, 2005), Dan Sinnott (BS Senior thesis, 2005), Dorothy Bauch (BS Senior thesis, 2005), Kara Morris, (Undergraduate research project, 2006), Grant Dauber (Undergraduate research project, 2006), Curtis Congreave (Undergraduate research project, 2006), Holly Brown (BS Senior thesis, 2006), Anna Wendt (BS Senior thesis 2007), Allison Sail (BS Senior thesis, 2008), Stephanie Mason (BS Senior thesis, 2008), Julia Voronov (BS undergraduate research project, 2008), Valerie Morris (BS undergraduate research project, 2008), Julia Nelson (BS undergraduate research 2009), Richard Bono (BS Senior thesis, 2010), Julianna Hopkins (BS Senior thesis, 2010), Austen Erickson (BS Senior thesis, 2010), Cecilia Scribner (BS Senior thesis, 2012), Robert McKinley (BS Senior thesis 2013), Paul Kintner (BS undergraduate research 2013), Emily Kraus (BS Senior thesis 2013), Alexandra Kuznetsov (BA research 2013), Samantha Tramontano (BS Senior thesis 2013), Catherine Harmer (REU project, 2013), Divya Persaud (REU project, 2013), Courtney Wagner (REU project, 2014; Senior Thesis, 2015), Susanna Chhibber (undergraduate field research, 2016), Siri Goldman (undergraduate field research 2016), Hannah Topkins (undergraduate field research, 2016), Sebastian Fearn (BS Senior thesis, 2018), Frank Padgett III (BS Senior thesis, 2019), Ben Crummins (BS Senior thesis, 2021), Zuanna Rafalowska (current).

Invited Presentations:

Boston University, Bremen University (Germany); Brock University (Canada); California Institute of Technology; Canadian Geological Survey (Ottawa); Carnegie Institution; Colgate University; ETH Zurich (Switzerland); Franklin & Marshall College; Geological Survey of Japan/AIST; Hobart and William Smith Colleges (Woodrow Lecture); Idaho State University; Kochi University (Japan); Lehigh University; Indian Institute of Geomagnetism, Navi Mumbai (India); Ludwigs-Maximilians-Universitaet Muenchen (Germany); MIT; Michigan Tech; Nanjing University (China), Northwestern University; Ocean Drilling Program (Texas A&M University); Paleomagnetism and Geochronology Laboratory, Beijing (China); Princeton University, Rutgers University; Scripps Institution of Oceanography (University of California, San Diego); Stanford University; State University of New York Albany; State University of New York Brockport; State University of New York Buffalo; Syracuse University; Tohoku University (Japan); Tongji University (China); Trinity College; University of Akron; University of Alaska Anchorage; University of Arizona; University of California Berkeley; University of California Santa Cruz; University of Chicago; University of Hokkaido (Japan), University of Michigan; University of Minnesota; University of Munster (Germany); University of Oslo (Norway), University of Rhode Island; University of Rochester (Earth and Environmental Sciences, Physics and Astronomy, LLE, Provost Seminars, Alumni Association); University of Southern California; University of Toronto (Canada); University of Toronto Scarborough (Canada); Universitaet Tuebingen (Germany); University of Wisconsin River Falls; University of Wisconsin, Madison; University of Wyoming; Yale University; AGU; JpGU; EGS; EGU; GSA; IGC; Cider; IRIS Keynote speaker, Compres Keynote speaker, JOIDES meetings (post-cruise, SCICOM), Peninsula Geological Society (California), NUNA Keynote speaker (Canada), Institute for Rock Magnetism Conferences, SEDI, Science Teachers Association of New York State/Earth Science Teachers Speaker; ESF ArchEnv Mid-term Conference Vienna (Austria); MagIC Keynote speaker; BEPIS Keynote speaker; AGU Chapman Conference on Large-scale Volcanism in the Arctic Keynote Speaker (Selfoss, Iceland); Geocosmos invited Plenary speaker (virtual/Saint-Petersburg, Russia)

Publications

>100 publications, including 15 first-authored papers in *Science*, *Nature*, or *PNAS*

Tarduno, J.A., R.D. Cottrell, K. Lawrence, R.K. Bono, W. Huang, C.L. Johnson E.G. Blackman, A.V. Smirnov, M. Nakajima, C.R. Neal, T. Zhou, M. Ibanez-Mejia, H. Oda, B. Crummins, Absence of a long-lived lunar paleomagnetosphere, *Science Advances*, 7, eabi7647, 2021.

Anand, A., J. Carroll-Nellenback, E.G. Blackman, J.A. Tarduno, Asteroid magnetization from the early solar wind, *Monthly Notices of the Royal Astronomical Society*, 509, 2957–2968 (2021/2022)

Nichols, C.I.O., Bryson, J.F.J., Cottrell, R.D., Fu, R.R., Harrison, R.J., Herrero-Albillos, J., Kronast, F., Tarduno, J.A., Weiss, B.P., A time-resolved paleomagnetic record of Main Group pallasites: Evidence for a large-cored, thin-mantled parent body. *Journal of Geophysical Research*, 126, e2021JE006900 (2021).

- Tarduno, J.A., Cottrell, R.D., Bono, R.K., Oda, H., Davis, W.J., Fayek, M., van 't Erve, O., Nimmo, F., Huang, W., Thern, E., Fearn, S., Mitra, G., Smirnov, A.V., Blackman, E.G., Paleomagnetism indicates that primary magnetite in zircon records a strong Hadean geodynamo *Proceedings National Academy of Sciences*, doi/10.1073/pnas.1916553117, 2020.
- O'Brien, T., Tarduno, J.A., Anand, A., Smirnov, A.V., Blackman, E.G., Carroll-Nellenback, J. Krot, A.N., Arrival and magnetization of carbonaceous chondrites in the asteroid belt before 4562 million years ago, *Communications Earth & Environment* 1, 54, 2020.
- Huffman, T.N., Whitelaw, G, Tarduno, J.A., Watkeys M.K., Woodborne, D., The Rhino Early Iron Age site, Thabazimbi, South Africa, *Azania: Archaeological Research in Africa* 55, 360-388, 2020.
- Bono, R.K., J.A. Tarduno, H.-P. Bunge, Hotspot motion caused the Hawaiian-Emperor Bend and LLSVPs are not fixed, *Nature Communications*, 10:3370, 2019.
- Tarduno, J.A., Oda, H., Yamamoto, Y., Xuan, C., Lasca, I. Fukuma, K., Special issue "Recent advances in geo-, paleo-, and rock-magnetism" *Earth, Planets and Space*, 71, 68, 2019.
- Kodama, K.P., L.K. Carnes, J.A. Tarduno and C. Berti, Paleointensity of the 1.3 billion-yr-old Gardar basalts, southern Greenland revisited: no evidence for onset of inner core growth, *Geophysical Journal International*, 217, 1974-1987, 2019.
- Tarduno, J.A., and A.A.P. Koppers, When hotspots move: The new view of mantle dynamics made possible by scientific ocean drilling, *Oceanography*, 32, 150-152, 2019.
- Bono, R.K., J.A. Tarduno, F. Nimmo, and R.D. Cottrell, Young inner core inferred from Ediacaran ultra-low geomagnetic field intensity, *Nature Geoscience*, 12, 143-147, 2019.
 _____ see review by P. Driscoll, Geodynamo recharged, *Nature Geoscience*, 12, 83–84. 2019.
- Bono, R.K., Tarduno, J.A., Cottrell, R.D., Primary pseudo-single and single-domain magnetite inclusions in quartzite cobbles of the Jack Hills (Western Australia): implications for the Hadean geodynamo, *Geophysical Journal International*, 216, 598-608, 2019.
- Tarduno, J.A., Subterranean clues to the future of our planetary magnetic shield, *Proceedings National Academy of Sciences*, DOI: 10.1073/pnas.1819025116, 2018.
- Huffman, T.N., M., Manyanga, J.A. Tarduno and M.K. Watkeys, The archaeological context of recent archaeomagnetic research in Zimbabwe, *Southern African Humanities*, 31, 205-21, 2018.
- Blackman, E.G., and J.A. Tarduno, Mass and energy capture from stellar winds for magnetized and unmagnetized planets: implications for atmospheric erosion and habitability, *Monthly Notices of the Royal Astronomical Society*, 5146-5155, 481, 2018.
- Hare, V.H., J.A. Tarduno, T. Huffman, M.K. Watkeys, P.C. Thebe, M. Manyanga, R.K. Bono, R.D.

- Cottrell, New directional records from Iron-Age southern Africa (ca. 425–1550 CE) and implications for the South Atlantic Anomaly, *Geophysical Research Letters*, 45, doi.org/10.1002/2017GL076007, 2018.
- Bono, R.K., J.A. Tarduno, M.S. Dare, G. Mitra, R.D. Cottrell, Cluster analysis on a sphere: Application to magnetizations from metasediments of the Jack Hills, Western Australia, *Earth and Planetary Science Letters*, 484, 67-80, doi.org/10.1016/j.epsl.2017.12.007/2017, 2018.
- Cottrell, R.D., J.A. Tarduno, R. K. Bono, M. S. Dare, and G. Mitra, The inverse microconglomerate test: Further evidence for the preservation of Hadean magnetizations in metasediments of the Jack Hills, Western Australia, *Geophys. Res. Lett.*, 43, 4215–4220, doi:10.1002/2016GL068150, 2016.
- Bono, R.K., J. Clarke, J.A. Tarduno and D. Brinkman, A large ornithurine bird (*Tingmiatornis arctica*) from the Turonian High Arctic: Climatic and evolutionary implications, *Scientific Reports*, 6:38876, 2016.
- Dare, M.S., J.A. Tarduno, R.K. Bono. R.D. Cottrell, J.S. Beard, and K.P. Kodama, Detrital magnetite and chromite in Jack Hills quartzite cobbles: Further evidence for the preservation of primary magnetizations and new insights into sediment provenance, *Earth and Planetary Science Letters*, 451, 298-314, 2016.
- Huffman, T.N., P.C. Thebe, M.K. Watkeys and J.A. Tarduno, Ancient metallurgy in the Tswapong Hills, Botswana: preliminary report on archaeological context, *Southern African Humanities*, 28, 119-133, 2016.
- Bono, R.K., J.A. Tarduno, and R.D. Cottrell, Comment on: Pervasive remagnetization of detrital zircon host rocks in the Jack Hills, Western Australia and implications for records of the early dynamo, by Weiss et al. (2015) *Earth and Planetary Science Letters*, 450, 406-408, 2016.
- Smirnov, A.V., J.A. Tarduno, E.V. Kulakov, S.A. McEnroe¹ and R.K. Bono, Palaeointensity, core thermal conductivity and the unknown age of the inner core *Geophys. J. Int.*, 205, 1190-1195, 2016.
- Tarduno, J.A., Cottrell, R.D., Davis, W.J., Nimmo, F., and Bono, R.K., A Hadean to Paleoproterozoic geodynamo recorded by single zircon crystals, *Science*, 349, 521-524, 2015.
 _____ see review by J. Aubert, Ancient planetary dynamos, take two, *Science*, 349, 475-476, 2015.
- Tarduno, J.A., M. Watkeys, T. Huffman, R.D. Cottrell, E.G. Blackman, A. Wendt, C.A. Scribner, C.L. Wagner, Antiquity of the South Atlantic Anomaly: Evidence for top-down control on the geodynamo, *Nature Communications*, 6:7865, 2015.
- Bono, R.K. and J.A. Tarduno, Stable Earth, reversing field in the Ediacaran: A single silicate crystal study of the ca. 565 Ma Sept-Iles Intrusive Suite in Laurentia, *Geology*, 43, 131-134, 2015.
- Tarduno, J.A., E. Blackman, and E. Mamajek, Detecting the oldest geodynamo and attendant

- shielding from the solar wind: Implications for habitability, *Physics of Earth and Planetary Interiors*, 233, 68-87, 2014.
- Tarduno, J.A., and R.D. Cottrell, Signals from the ancient geodynamo: A paleomagnetic field test on the Jack Hills metaconglomerate, *Earth and Planetary Science Letters*, 367, 123-132, 2013.
- Tarduno, J.A., R.D. Cottrell, F. Nimmo, J. Hopkins, J. Voronov, A. Erickson, E. Blackman, E.R.D. Scott and R. McKinley, Evidence for a dynamo in the main group pallasite parent body, *Science*, 338, 939-942, 2012.
- Tarduno, J.A., Geomagnetism: Hum from the quiet zone, *Nature Geoscience*, 5, 161-162, 2012.
- Neukirch, L.P. and J.A. Tarduno, T.N. Huffman, M.K. Watkeys, C.A. Scribner and R.D. Cottrell, An archeomagnetic analysis of brunt grain bin floors from ca. 1200 to 1250 AD Iron-age Africa, *Physics Earth Planetary Interiors*, 190-191, 71-79, 2012.
- Smirnov, A.V. and J.A. Tarduno, Evolving core conditions ca. 2 billion years ago detected paleosecular variation, *Physics Earth Planetary Interiors*, 187, 225-231, 2011.
- Smirnov, A.V. and J.A. Tarduno, Development of a low-temperature insert for the measurement of remanent magnetization direction using superconducting quantum interference device rock magnetometers, *Geochemistry, Geophysics, Geosystems*, 12, Q04Z23, 2011.
- Tarduno, J.A., R.D. Cottrell, M.K. Watkeys, A. Hofmann, P.V. Doubrovine, E.E. Mamajek, D. Liu, D.G. Sibeck, L.P. Neukirch and Y. Usui, Geodynamo, Solar wind, and magnetopause 3.4 to 3.45 billion years ago, *Science*, 327, 1238-1240, 2010.
 _____ see review by M. Jardine, Sunscreen for the young Earth, *Science*, 327, 1206--1207, 2010.
- Aubert, J., J.A. Tarduno and C.L. Johnson, Observations and models of the long-term evolution of Earth's magnetic field, *Space Sci. Rev.*, 155, 337-370, 2010.
- Smirnov, A.V., and J.A. Tarduno, Co-location of eruption sites of the Siberian Traps and North Atlantic Igneous Province: Implications for the nature of hotspots and mantle plumes, *Earth Planet. Sci. Lett.*, 297, 687-690, 2010.
- Tarduno, J.A., H.-P. Bunge, N. Sleep and U. Hansen, The bent Hawaiian-Emperor hotspot track: Inheriting the mantle wind, *Science*, 324, 50-53, 2009.
- Tarduno, J.A., Geodynamo history preserved in single silicate crystals: Origins and long-term mantle control, *Elements*, 5, 217-222, 2009.
- Usui, Y., J.A. Tarduno, M. Watkeys, A. Hofmann and R.D. Cottrell, Evidence for a 3.45 billion-year-old magnetic remanence from conglomerates of South Africa, *Geochem. Geophys. Geosystems (G-cubed)*, 10, Q09Z07, 2009.
- Doubrovine, P.A., J.A. Tarduno and X. Zhao, On the magnetostratigraphic age of Nauru Basin

- basalts of the western Pacific Ocean and timing of Ontong Java volcanism, *Earth Planet. Sci. Lett.*, 287, 175-184, 2009.
- Vandermark, D., J.A. Tarduno, D.B. Brinkman, R.D. Cottrell and S. Mason, New Late Cretaceous macrobaenid turtle with Asian affinities from the High Canadian Arctic: Dispersal via ice-free polar routes, *Geology*, 37, 183-186, 2009.
- Dobrovine, P. V., and J. A. Tarduno, A Revised Kinematic Model for the Relative Motion between Pacific Oceanic Plates and North America since the Late Cretaceous, *J. Geophys. Res.*, 113, B12101, doi:10.1029/2008JB005585, 2008.
- Cottrell, R.D., J.A. Tarduno and J. Roberts, The Kiaman Reversed Polarity Superchron at Kiama: Toward a field strength estimate based on single silicate crystals, *Physics of the Earth and Planetary Interiors*, 169, 49-58, 2008.
- Dobrovine, P. and J.A. Tarduno, Linking the Late Cretaceous to Paleogene Pacific plate and Atlantic bordering continents using plate circuits and paleomagnetic data, *Journal of Geophysical Research*, 113 B07104 10.1029/2008JB005584, 2008.
- Tarduno, J.A., Hotspots Unplugged, *Scientific American*, 298, 88-93, 2008.
- Tarduno, J.A., R.D. Cottrell, M.K. Watkeys and D. Bauch, Geomagnetic field strength 3.2 billion years ago recorded by single silicate crystals, *Nature*, 446, 657-660, 2007.
- Tarduno, J.A., On the motion of Hawaii and other mantle plumes, *Chemical Geology*, 241, 234-247, 2007.
- Vandermark, D., J.A. Tarduno, and D.B. Brinkman, A fossil champsosaur population from the High Arctic: Implications for Late Cretaceous paleotemperatures, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 248, 49-59, 2007.
- Tarduno, J.A., Single silicate crystal paleomagnetism, *McGraw-Hill 2007 Yearbook of Science and Technology*, Adesnik et al., eds., McGraw-Hill, New York, pp. 215-217, 2007.
- Tarduno, J.A., R.D. Cottrell and A.V. Smirnov, Absolute Paleointensity determination using single plagioclase crystals, in D. Gubbins and E. Herrero-Bervera eds, *Encyclopedia of Geomagnetism and Paleomagnetism*, Encyclopedia of Earth Science Series, Springer, 2007.
- Duncan, R.A., J.A. Tarduno, and D.W. Scholl, Chapter 1. Leg 197 synthesis: Southward motion and geochemical variability of the Hawaiian hotspot, in Duncan, R.A., J.A. Tarduno and D.W. Scholl, *Proceedings of the Ocean Drilling Program, Scientific Results Volume 197*, 1-39, 2006.
- Dobrovine, P.V. and J.A. Tarduno, Alteration and self-reversal in oceanic basalts: Compositional requirements based on data from DSDP and ODP sites in the Pacific Ocean, *Journal of Geophysical Research*, 111, (B12), Art. No. B12S30, 2006.
- Labeyrie, L., V. Salters, J. Tarduno, and P. van Keken, G-Cubed: A snapshot today and a look to the

- future, *Geochemistry, Geophysics, Geosystems*, 7, Art. No. Q03005, 2006.
- Dobrovine P.V., and J.A. Tarduno, N-type magnetism at cryogenic temperatures in oceanic basalt, *Physics of the Earth and Planetary Interiors*, 157, 46-54, 2006.
- Tarduno, J.A, R.D Cottrell, and A.V. Smirnov, The paleomagnetism of single silicate crystals: Recording the geomagnetic field during mixed polarity intervals, superchrons and inner core growth, *Reviews of Geophysics*, 44, Art. No. RG1002, 2006.
- Vandermark, D., J.A. Tarduno, and D.B. Brinkman, Late Cretaceous Plesiosaurid teeth from Axel Heiberg Island, High Canadian Arctic, *Arctic*, 59, 79-82, 2006.
- Tarduno, J.A. and R.D. Cottrell, Dipole strength and variation of the time-averaged reversing and non-reversing geodynamo based on Thellier analyses of single plagioclase crystals, *Journal of Geophysical Research*, 110, B11101, doi 10.101029/2005JB003970, 2005.
- Dobrovine, P.V. and J.A. Tarduno, On the compositional field of self-reversing titanomagnetite: Constraints from DSDP Site 307, *Journal of Geophysical Research*, 110, B11104, doi 10.1029/2005JB003865, 2005.
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General Interest

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