

JULIE A. BOWLES

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EDUCATION

University of California, San Diego	Ph.D, Earth Science, 2005
Advisors: Jeff Gee and Lisa Tauxe	
University of Washington , Seattle, WA	B.S., Oceanography (Marine Geology), 1999
University of Puget Sound , Tacoma, WA	B.A., International Business, 1993

POSITIONS HELD

Assistant Professor, University of Wisconsin-Milwaukee, August 2012 - present
Research Associate/Staff Scientist, Institute for Rock Magnetism, University of Minnesota,
Minneapolis, Jan. 2008 – July 2012
Post-Graduate Researcher, University of Hawaii, Aug. 2006 – Dec. 2007
Post-Graduate Researcher/Lecturer, Scripps Institution of Oceanography, Sept. 2005 – 2007
Graduate Student Researcher, Scripps Institution of Oceanography, Sept. 1999 – Sept. 2005
Paleomagnetist, Ocean Drilling Program Leg 208, March – May 2003
Undergraduate Researcher, Magnetics Lab, University of Washington, June 1997 – Aug 1999

RESEARCH INTERESTS

- Short-period variations in the geomagnetic field
- Paleomagnetism as a tool to study volcanic processes
- Paleomagnetic constraints on dynamo formation, evolution, and processes
- Planetary magnetism
- Tectonics and structure
- Marine magnetism
- (Paleo-)Environmental magnetism
- Application of experimental petrology and rock magnetism to the formation of magnetic minerals in igneous materials

AWARDS AND HONORS

Outstanding Reviewer, Geophysical Journal International (2012)
Selected participant in Marine Geoscience Leadership Symposium (2009)
Director's Scholar for postgraduate research and teaching, Scripps Inst. of Oceanography (2005-2006)
Recipient of National Defense Science and Engineering Graduate Fellowship (1999-2003)
Awarded National Science Foundation Graduate Fellowship (1999)

FUNDED WORK**Acquisition of a superconducting rock magnetometer**

Agency: National Science Foundation – EAR

Role: PI

Duration: 2015-2016

\$440,819

Full vector magnetic field record from the Big Pine Volcanic Field, California

Agency: UWM Support for Undergraduate Research Fellows (SURF) Award

Role: PI

Duration: 2015

\$2150

Collaborative Research: Time- and temperature-dependent cation ordering in natural titanomagnetites

Agency: National Science Foundation - EAR

Role: PI (lead)

Duration: 2013-2016

\$297,212 (\$244,525 UWM)

Magnetic mineralogy of reversely magnetized flows

Agency: UWM Support for Undergraduate Research Fellows (SURF) Award

Duration: 2013

\$1600

The Long Valley Volcanic Field: Constraining the Geomagnetic Field and Local Volcanic Processes

Agency: University of Wisconsin – Milwaukee Research Growth Initiative

Role: PI

Duration: 2013-2014

\$133,255 (award value)

Room-sized Magnetostatic Shield for Paleomagnetism, Rock Magnetism and Environmental Magnetism Studies

Agency: University of Wisconsin – Milwaukee Internal Instrumentation

Role: PI

Duration: 2013

\$85,425

Static and shock pressure treatment of synthetic Mars basalts: Implications for understanding the evolution of crustal magnetic anomalies

Agency: NASA

Role: co-I (Lead Investigator Stefanie Brachfeld, Montclair State University)

Duration: 2011 - 2014

\$451,342 (\$94,362 UM)

Collaborative Research: Fine-scale crustal accretion processes and rates of magma supply and replenishment at the southern Juan de Fuca Ridge neovolcanic zone

Agency: NSF-OCE

Role: PI (with PI Brian Dreyer, UC Santa Cruz)

Duration: 2011 - 2013

\$321,863 (\$42,115 UM/UWM)

Facility Support: Institute for Rock Magnetism

Agency: NSF-EAR

Role: co-PI (PI Bruce Moskowitz)

Duration: 2011 - 2014

\$1,396,115 (UM)

Development of a Closed Cycle Cryostat for Full-Vector, Low-Temperature Magnetic Measurements of Geologic Materials

Agency: NSF-EAR

Role: co-PI (PI Josh Feinberg)

Duration: 2009 – 2011

\$73,020 (UM)

Collaborative Research: An Evaluation of Ash Flow Tuffs as Geomagnetic Paleointensity Recorders

Agency: NSF-EAR

Role: PI (with PI Jeff Gee, UC San Diego)

Duration: 2010 - 2012

\$191,192 (\$53,930 UM/UWM)

Collaborative Research: Volcanic Eruptions on the Galapagos Spreading Center: Effect of Variable Magma Supply on Eruption and Magma Chamber Processes on Mid-Ocean Ridges

Agency: NSF-OCE

Role: PI with PIs John Sinton and Ken Rubin (Univ. Hawaii) and Scott White (Univ. South Carolina)

Duration: 2009 - 2012

\$659,495 (\$34,827 UM/UWM)

Linking Rock Magnetic Properties to the Performance of Paleointensity Techniques

Agency: NSF-EAR

Role: co-PI (PI Josh Feinberg)

Duration: 2009 - 2011

\$253,597 (UM)

Collaborative Research: Origin of magnetite and magnetic remanence in submarine basaltic glass and implications for glass paleointensities

Agency: NSF-EAR

Role: proposal co-written with PIs Jeff Gee (UC San Diego) and Reid Cooper (Brown University)

Duration: 2006 - 2009

Magnetostratigraphy for ODP Leg 208 Sites, and Paleointensity study of the mid- to late-Paleocene

Agency: Joint Oceanographic Institutions/US Science Support Program)

Role: sole proposal writer (PI Lisa Tauxe)

Duration: 2003 – 2004

\$28,186 (UCSD)

FIELD EXPERIENCE

Soufrière Hills Volcano, Montserrat, paleomagnetic sampling, 2014.
Mt. Katmai, AK; Mt. St. Helens, WA; and Bishop Tuff, CA, paleomagnetic sampling, 2010-2011
Galapagos Spreading Center (R/V Atlantis with Alvin submersible and Sentry ROV), April-May 2010
Erebus volcanic province, Antarctica, paleomagnetic sampling, November – December 2006
Kilauea Volcano, Hawai'i, volcanology field course – September 2004
Galapagos Triple Junction (R/V Revelle), geophysical cruise, January 2004
Walvis Ridge (ODP Leg 208, R/V JOIDES Resolution), March – May 2003
South Pacific (RV/IB Palmer), geophysical cruises, August 1999, December 2000
Puget Sound/Whidbey Island Fault, gravity and magnetics survey, March 1998

SERVICE

Instructor, International Assn. of Geomagnetism and Aeronomy Summer School, 2015.
Geomag./Paleomag. Section Secretary, American Geophysical Union, 2015-2016
Invited session chair at 10th Santa Fe Conference on Rock Magnetism, 2014
Fleming Medal Selection Committee, American Geophysical Union, 2013-2014

- **Chair**, 2015-2016

Geomag./Paleomag. Section Executive Committee, American Geophysical Union, 2010-2014
Invited presentation to Wisconsin Women's Club, Milwaukee, February 2013
Co-organizer and Instructor, Summer School in Rock Magnetism, Minneapolis, 2011
Mentor, Manoomin Project, Investigating the past, present, and future of wild rice lakes on the Fond du Lac Band of Lake Superior Ojibwe Reservation, 2011
State Science Fair Judge, Honolulu, 2007; Minneapolis, 2011
Professional development workshop for educators at Bakken Museum of Electricity and Magnetism, Minneapolis, 2009
Volunteer Park Interpreter, Hanauma Bay Nature Preserve, Honolulu, 2007
Science Judge/Field Trip Leader, National Ocean Science Bowl, San Diego, 2001–2004, 2006
Guest Lecturer, OASIS (Education for Older Adults), San Diego, 2004
Workshop Leader, Expanding Your Horizons Conference, San Diego, 2002, 2003

- Designed and led hands-on workshops for girls in grades 5-10; local geology/coastal erosion

PEER-REVIEWED PUBLICATIONS

Bowles, J.A., J.S. Gee, M.J. Jackson, and M. Avery, Geomagnetic paleointensity in historical pyroclastic density currents: Testing the effects of emplacement temperature and postemplacement alteration, *Geochem. Geophys. Geosys.*, 16, doi:10.1002/2015GC005910, 2015.

Brachfeld, S., D. Shah, E. First, J. Hammer, and J.A. Bowles, Influence of redox conditions on the intensity of Mars crustal magnetic anomalies, *Meteoritics & Planetary Science*, 50, 1703-1717, 2015.

Feinberg, J.M., P.A. Solheid, N.L. Swanson-Hysell, M.J. Jackson, J.A. Bowles (2015), Full vector low-temperature magnetic measurements of geologic materials, *Geochemistry, Geophysics, Geosystems*, 16, 301-314, doi:

10.1002/2014GC005591.

- Brachfeld, S., D. Cuomo, L. Tatsumi-Petrochilos, J.A. Bowles, D. Shah, and J. Hammer, Contributions of multidomain titanomagnetite to the intensity and stability of Mars crustal magnetic anomalies, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL062032, 2014.
- Jackson, M.J., and J.A. Bowles, Ignimbrite emplacement temperatures, cooling rates and titanomagnetite Curie temperatures: Effects of exsolution and nonconvergent cation ordering, *Geochem. Geophys. Geosys.*, 15, doi:10.1002/2014GC005527, 2014.
- Bowles, J.A., A. Coleman, J.T. McClinton, J. Sinton, S.M. White, K. Rubin, Eruptive timing and 200-year episodicity at 92°W on the hotspot-influenced Galapagos Spreading Center derived from geomagnetic paleointensity, *Geochem. Geophys. Geosys.*, 15, doi:10.1002/2014GC005315, 2014.
- Bowles, J.A., M.J. Jackson, T.S. Berquó, P.A. Solheid, and J.S. Gee, Inferred time- and temperature-dependent cation ordering in natural titanomagnetites, *Nature Commun.*, 4, doi: 10.1038/ncomms2938, 2013.
- Coleman, A., J.M. Sinton, S.M. White, J.T. McClinton, J.A. Bowles, K. Rubin, M. Behn, B. Cushman, D. Eason, T. Gregg, K. Gronvold, S. Hidalgo, J. Howell, O. Neill, C. Russo, Effects of variable magma supply on mid-ocean ridge eruptions: Constraints from mapped lava flow fields along the Galápagos Spreading Center, *Geochem. Geophys. Geosys.*, 13, Q08014, doi:10.1029/2012GC004163, 2012.
- Bowles, J.A., L. Tatsumi-Petrochilos, J.E. Hammer, S.A. Brachfeld, Multi-component cubic oxide exsolution in synthetic basalts: temperature dependence and implications for magnetic properties, *J. Geophys. Res.*, 117, B03202, doi:10.1029/2011JB008867, 2012.
- Bowles, J.A., J.S. Gee, K. Burgess, and R.F. Cooper, Timing of magnetite formation in submarine basaltic glass: a comparison of natural and synthetic samples with implications for geomagnetic paleointensity studies, *Geochem. Geophys. Geosys.*, doi:10.1029/2010GC003404, 2011.
- Burgess, K., R.F. Cooper, J.A. Bowles, J.S. Gee, and D.J. Cherniak, Effects of open- and closed-system oxidation on texture and magnetic response of remelted basaltic glass, *Geochem. Geophys. Geosys.*, 11, Q10007, doi:10.1029/2010GC003248, 2010.
- Jackson, M., J.A. Bowles, I. Lascu, and P. Solheid, Deconvolution of u-channel magnetometer data: Experimental study of accuracy, resolution and stability of different inversion methods, *Geochem. Geophys. Geosys.*, 11, Q07Y10, doi:10.1029/2009GC002991, 2010.
- Gee, J.S., Y. Yu, and J.A. Bowles, Paleointensity estimates from ignimbrites: an evaluation of the Bishop Tuff, *Geochem. Geophys. Geosys.*, 11, Q03010, doi:10.1029/2009GC002834, 2010.
- Bowles, J.A., J.E. Hammer, and S.A. Brachfeld, Magnetic and petrologic characterization of synthetic Martian basalts and implications for the surface magnetization of Mars, *J. Geophys. Res. – Planets*, 114, E10003, doi:10.1029/2009JE003378, 2009.
- Westerhold, T., U. Röhl, I. Raffi, E. Fornaciari, S. Monechi, V. Reale, J. Bowles, H.F. Evans, Astronomical calibration of the Paleocene time scale, *Palaeogeogr. Palaeoclimatol. Palaeoecol.*, 257, 377-403, 2008.
- Bowles, J., Coring-related deformation of Leg 208 sediments from Walvis Ridge: Implications for paleomagnetic data, *Phys. Earth Planet. Int.*, 161, 161-169, 2007.
- Westerhold, T., U. Röhl, J. Laskar, I. Raffi, J. Bowles, L. Lourens, J.C. Zachos, On the duration of magnetochrons C24r and C25n and the timing of early Eocene global warming events: Implications from the Ocean Drilling Program Leg 208 Walvis Ridge depth transect, *Paleoceanography*, 22, PA2201, doi:10.1029/2006PA001322, 2007.
- Bowles, J., Data Report: Revised magnetostratigraphy and magnetic mineralogy of sediments from Walvis Ridge, Leg 208, *In D. Kroon, J.C. Zachos, J.C., and C. Richter (Eds.), Proc. ODP, Sci. Results*, 208: College Station, TX (Ocean Drilling Program), 1–24, doi:10.2973/odp.proc.sr.208.206.2006, 2006.
- Bowles, J., J.S. Gee, D.V. Kent, M. Perfit, A. Soule, D. Fornari, Paleointensity results from 9° - 10°N on the East Pacific Rise: implications for timing and extent of eruptive activity, *Geochem. Geophys. Geosys.*, 7, Q06006, doi:10.1029/2005GC001141, 2006.

- Bowles, J., J. Gee, D. Kent, E. Bergmanis, J. Sinton, Cooling rate effects on paleointensity estimates in submarine basaltic glass and implications for dating young flows, *Geochem. Geophys. Geosys.*, 6, Q07002, doi: 10.1029/2004GC000900, 2005.
- Lourens, L., A. Sluijs, D. Kroon, J. Zachos, E. Thomas, U. Röhl, J. Bowles, I. Raffi, An early Eocene transient warming (~53 Ma): Implications for astronomically paced early Eocene hyperthermal events, *Nature*, 435, 1083-1087, 2005.
- Bowles, J., L. Tauxe, J. Gee, D. McMillan, S. Cande, The source of tiny wiggles in Chron C5: A comparison of sedimentary relative intensity and marine magnetic anomalies, *Geochem. Geophys. Geosys.*, 4, doi:10.1029/2002GC000489, 2003.
- Bowles, J., J. Gee, J. Hildebrand, L. Tauxe, Archaeomagnetic intensity results from California and Ecuador: evaluation of regional data, *Earth Planet Sci. Lett.*, 203, 967-981, 2002.
- Bowles, J., and H.P. Johnson, Behavior of oceanic crustal magnetization at high temperatures: Viscous magnetization and the marine magnetic anomaly source layer, *Geophys. Res. Lett.*, 26, 2279-2282, 1999.