

Robert McCaffrey

Department of Geology
Portland State University, PO Box 751, Portland OR 97207-0751
E-mail: r.mccaffrey@pdx.edu Web-page: <http://web.pdx.edu/~mccaf/>

Education

- Boston College, Geophysics, B.S., 1976
- University of California, Santa Cruz, Geophysics, Ph.D., 1981 (Advisor: Eli A. Silver)
- Postdoctoral Research Associate, Massachusetts Institute of Technology, 1982-1985 (Advisor: Peter Molnar)

Professional Experience

- Adjunct Research Professor, Portland State University, 2010-present
- Full Professor, Rensselaer Polytechnic Institute, 1988-2010 (Chairman 1996-1999).
- Senior Geodetic Scientist, GNS Science, New Zealand 2007-2008
- Visiting Research Scientist (sabbatical), Institute of Nuclear and Geological Sciences, New Zealand, 2003.
- Visiting Professor, Ecole Normale Supérieure, Paris, Summer 2001
- Associate Professor, Rensselaer Polytechnic Institute, 1993-1999
- Visiting Associate Professor (sabbatical), Oregon State University, 1995-1996 academic year
- Assistant Professor, Rensselaer Polytechnic Institute, 1988 - 1993.
- Research Scientist, Massachusetts Institute of Technology, 1985-1988.
- Air Force Geophysics Scholar, Air Force Geophysics Laboratory, 1986-1988.
- Lecturer in Applied Geophysics, University of California, Santa Cruz, 1981.

Teaching

Geology I (1988 -1992); Exploration geophysics (1988); Introduction to geophysics (1990-2000); Geodynamics (1989-1999, 2008); Geophysics II (1989-1992); Seismology (1989); Data analysis (1990); Global tectonics (1991-1997); Flow through porous media (1992-1994); Solid Earth geophysics (1993, 1998, 2009); Groundwater Contaminant Transport (1999); Planet Earth I (2001-2006); Geographic Information Systems (2000-2006, 2008), Natural Disasters (2009) and several graduate level seminar courses on various topics.

Research Advising

Graduate: G. Abers (PhD, MIT, 1989); C. Kulig (MS, Boston College, 1989); D. van Valkenburg (MS, 1994); Fauzi (PhD, 1999); C. Stevens (PhD, 1999); Masturyono (MS, 1994; PhD, 2000); J. Vollick (MS, 2005)

Undergraduate: Tristan Madden (1988); Steve Hinterneder (1992); Roland Lapierre (1992-93); Ellen Bradley (1993); Jennifer Tatten (1997); Davienne Monbleau (1997-98); Cheryl Johnson (1997-99); Maureen Long (1999-2000); Anna Smith (2000-2001); Karin Lackmann (2001), Jon Ganz (2001); Jesse Vollick (2003-2004); Sara Heller (2009); Matt Lancaster (2012)

Secondary advisees: D. Minkle (PhD, 1990); C. H. Lin (PhD, 1990-1994); G. Wall (1993); A. Chen (PhD, 1993-1998); I. Dricker (PhD, 1995-present); T. Cohen Kosanke (PhD, 1998); D. Moore (PhD, 1996); Don Minkel (PhD thesis committee, 1993); Peter Zwick (PhD Advisor); Alan Lin (PhD thesis committee, 1994); Dan Moore (PhD thesis committee, 1996); Tobi Cohen (PhD thesis committee, 1998); Arthur Chen (PhD thesis committee, 1998); Audra Nowosielski (PhD thesis committee, Economics, 2001); John Polimeni (PhD thesis committee, Economics, 2001); Linette Prawirodijiro (Scripps; 1999); Laura Wallace (UCSC; 2001); Suzette Payne (U Idaho; 2012); Shannon Graham (Univ Wisconsin; 2013).

Post-docs: Charles Williams (1998-2000); Anahita Tikku (2004-2006); Zhuqi Zhang (2010); Mohamed Aly (2010)

Field Work

Global Positioning System in Papua New Guinea (1993, 1994), Eastern Indonesia (1992, 1993, 1994, 1996, 1997, 2002, 2004), Sumatra (1989, 1991, 1992, 1993, 2001), and US Pacific Northwest and Snake River Plain (1996-2004; 2008-2013); Biak RAMP aftershock array and GPS measurements (1996); Toba PASSCAL tomography array (1995); PASSCAL Northern Nevada Lithospheric Experiment (1986); Microearthquake surveys in the Molucca Sea and northern Sulawesi Indonesia, (1978), in the eastern Sunda Arc, Indonesia (1982), in northern Utah (1983), and in Papua New Guinea (1988); Gravity surveys of the Narragansett Basin edge in southeastern Massachusetts (1976), of the Sulawesi ophiolite complex, Indonesia (1977), and of the Ben Lomond Fault, Santa Cruz, California (1981); Marine geophysical surveys in the Molucca Sea (1977) and eastern Sunda Arc, Indonesia (1981)

Service to the profession

- Ocean Drilling Program Panel on Tectonics and Climate (1998-1999)
- NSF proposal review panels (1994, 1999, 2012)
- Participated in PBO planning and Subduction sub-committee member
- Review manuscripts and proposals (Excellence in Refereeing award from AGU)
- Institute representative to SCEC, UNAVCO and IRIS
- Participant in Western US Consensus Velocity Working Group, National Seismic Hazards Map Project, SCEC Community Geodetic Model, UNAVCO Geodetic Data Services Advisory Committee
- Frequently visit schools to talk about science, interviews to television stations, radio stations and newspapers regarding my research and current geologic events.

Related skills

- Languages – Indonesian, French (un peu)
- Equipment – can operate many types of GPS and seismic equipment
- Programming – Fortran, MapBasic, Visual Basic, csh scripting
- Software – GAMIT (GPS processing); GMT (mapping); MapInfo (GIS); author of SYN4/MT5 and DEFNODE/TDEFNODE

Publications

(PDFs of many of these available at <http://web.pdx.edu/~mccaf/pubs.html>)

- Silver, E.A., Y.S. Joyodiwiryo and R. McCaffrey, Gravity results and emplacement geometry of the Sulawesi ultramafic belt, Indonesia, *Geology*, **6**, 527-531, 1978.
- McCaffrey, R., E.A. Silver and R.W. Raitt, Crustal structure of the Molucca Sea collision zone, Indonesia, in *The Tectonic and Geologic Evolution of Southeast Asian Seas and Islands*, Geophys. Monogr. **23**, edited by D.E. Hayes, 161-178, AGU, Washington, D.C., 1980.
- McCaffrey, R., E.A. Silver and R.W. Raitt, Seismic refraction studies in the East Arm, Sulawesi-Banggai Islands region of eastern Indonesia, in *The Geology and Tectonics of Eastern Indonesia*, edited by A.J. Barber and S. Wiryosujono, *Geol. Res. Dev. Centre Indonesia, Spec. Publ. No. 2*, 321-325, 1981.
- McCaffrey, R., Lithospheric deformation within the Molucca Sea arc-arc collision zone: Evidence from shallow and intermediate earthquake activity, *J. Geophys. Res.*, **87**, 3663-3678, 1982.
- McCaffrey, R. and R. Sutardjo, Reconnaissance microearthquake survey of Sulawesi, Indonesia, *Geophys. Res. Lett.*, **9**, 739-796, 1982.
- McCaffrey, R., Seismic wave propagation beneath the Molucca Sea arc-arc collision zone, Indonesia, *Tectonophysics*, **96**, 45-57, 1983.
- Silver, E.A., D.R. Reed, R. McCaffrey and Y. Joyodiwiryo, Backarc thrusting in the eastern Sunda Arc, Indonesia: A consequence of arc-continent collision, *J. Geophys. Res.*, **88**, 7429-7448, 1983.
- Silver, E.A., R. McCaffrey and R.B. Smith, Collision, rotation, and the initiation of subduction in the evolution of Sulawesi, Indonesia, *J. Geophys. Res.*, **88**, 9407-9418, 1983.
- Silver, E.A., R. McCaffrey, Y. Joyodiwiryo and S. Stevens, Ophiolite emplacement by collision between the Sula platform and the Sulawesi island arc, Indonesia, *J. Geophys. Res.*, **88**, 9419-9435, 1983.
- Stanley, R. G. and R. McCaffrey, Extent and offset history of the Ben Lomond fault, Santa Cruz County, California, in *Tectonics and Sedimentation Along Faults of the San Andreas Fault System*, edited by D.W. Andersen and M. J. Rymer, Pacific Section, Society of Economic Paleontologists and Mineralogists., 79-90, 1983.
- McCaffrey, R., R. Sutardjo, R. Susanto, R. Buyung, B. Sukarman, M. Husni, Suciono, D. Satuju, and E. Sukamto, Local earthquake surveys of the Molucca Sea and Sulawesi, Indonesia, *Bull. Geol. Res. Dev. Centre Indonesia*, **7**, 13-23, 1983.
- McCaffrey, R., H. Lyon-Caen, P. Molnar, S. Roecker, J.L. Chatelain, K. Hardjawidjaksana, Y. Joyodiwiryo, E. Kertapati, T. Kuntoro, J. Nasution, A. Sukarna, J. Kartusuwita, S. Patmowidodo, P.Y. Prih Haryadi, M. Riyadi, and D. Reed, Preliminary results of the 1982 microearthquake survey in Nusa Tenggara Timur, Indonesia, *Bull. Geol. Res. Dev. Centre Indonesia*, **10**, 1-9, 1984.
- McCaffrey, R., and J. Nabelek, The geometry of backarc thrusting along the eastern Sunda Arc, Indonesia: Constraints from earthquake and gravity data, *J. Geophys. Res.*, **89**, 6171-6179, 1984.
- McCaffrey, R., P. Molnar, S. Roecker, and Y. Joyodiwiryo, Microearthquake seismicity and fault plane solutions related to arc-continent collision in the eastern Sunda arc, Indonesia, *J. Geophys. Res.*, **90**, 4511-4528, 1985.
- McCaffrey, R., and J. Nabelek, Seismological evidence for shallow thrusting north of the Timor Trough, *Geophys. J. Royal Astr. Soc.*, **85**, 365-381, 1986.
- McCaffrey, R., and J. Nabelek, Earthquakes, gravity and the origin of the Bali Basin: An example of a nascent continental fold-and-thrust belt, *J. Geophys. Res.*, **92**, 441-460, 1987.
- Nelson, M. R., R. McCaffrey, and P. Molnar, Source parameters for 11 earthquakes in the Tien Shan, Central Asia, determined by P and SH waveform inversion, *J. Geophys. Res.*, **92**, 12,629-12,648, 1987.

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- Abers, G.A., C. Bryan, S. Roecker, and R. McCaffrey, Thrusting of the Hindu Kush over the Tadjik Basin, Afghanistan: Evidence from two large earthquakes, *Tectonics*, **7**, 41-56, 1988.
- Fredrich, J., R. McCaffrey, and D. Denham, Source parameters of seven large Australian earthquakes determined by body waveform inversion, *Geophys. J.*, **95**, 1-13, 1988.
- Abers, G., and R. McCaffrey, Active deformation in the New Guinea fold-and-thrust belt: Seismological evidence for strike-slip faulting and basement-involved thrusting, *J. Geophys. Res.*, **93**, 13,332-13,354, 1988.
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- McCaffrey, R., Earthquakes and ophiolite emplacement in the Molucca Sea collision zone, Indonesia, *Tectonics*, **10**, 433-453, 1991.
- McCaffrey, R., and G.A. Abers, Orogeny in arc-continent collision: the Banda arc and western New Guinea, *Geology* **19**, 563-566, 1991.
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- McCaffrey, R., On the role of the upper plate in great subduction zone earthquakes, *J. Geophys. Res.* **98**, 11,953-11,966, 1993.
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- Abers, G.A., and R. McCaffrey, Active arc-continent collision: Earthquakes, gravity anomalies and fault kinematics in the Huon-Finisterre collision zone, Papua New Guinea, *Tectonics* **13**, 227-245, 1994.
- McCaffrey, R., Global variability in subduction thrust zone - forearc systems, *Pure Appl. Geophys.* **142(1)**, 173-224, 1994.
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- McCaffrey, R., Slip partitioning at convergent plate boundaries of SE Asia, *Tectonic Evolution of Southeast Asia Symposium, Geol. Soc. London Special Publication No. 106*, 3-18, 1996.
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- Stevens, C., R. McCaffrey, Y. Bock, J. Genrich, C. Vigny, C. Subarya, S.S.O. Puntodewo, and Fauzi, GPS evidence for rapid rotations about a vertical axis in a collisional setting: the Palu fault of Sulawesi, Indonesia, *Geophys. Res. Letters*, **26**, 2677-2680, 1999.
- McCaffrey, R., M. D. Long C. Goldfinger, P. Zwick, J. Nabelek C. K. Johnson, and C. Smith, Rotation and plate locking along the southern Cascadia subduction zone, *Geophys Res. Letters*, **27**, 3117-3120, 2000.
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- Genrich, J.F., Y. Bock, R. McCaffrey, L. Prawirodirdjo, C.W. Stevens, S.S.O. Puntodewo, C. Subarya, and S. Wdowinski, Distribution of slip at the northern Sumatra fault System, *J. Geophys. Res.* **105**, 28,327-28,341, 2000.
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- Wallace, L. M., C. W. Stevens, E. Silver, R. McCaffrey, W. Loratung, S. Hasiata, R. Curley, R. Rosa, J. Taugaloidi, and H. Davies, GPS constraints on active tectonics and arc-continent collision in Papua New Guinea: evidence for edge-driven microplate rotations, *Journal of Geophysical Research* **109**, B05404, doi:10.1029/2003JB002481, 2004.
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- McCaffrey, R., Block kinematics of the Pacific - North America plate boundary in the southwestern US from inversion of GPS, seismological, and geologic data, *Journal of Geophysical Research* **110**, B07401, doi:10.1029/2004JB003307, 2005.
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