

Vita – Gavin P Hayes

Current Occupation

Post-doc Researcher

[US Geological Survey National Earthquake Information Center](#)

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Adjunct Faculty Member, [Colorado School of Mines Department of Geophysics](#)

Education

Aug 2002-'07: **PhD, Penn State University.** Advisor: Kevin P. Furlong
5 semesters as a Teaching Assistant, 5 as a Research Assistant
1998-2002: **M.Geophys., Leeds University. Graduated with honors, first class**

Awards

Spring 2003 3rd place in Department of Geosciences student colloquium poster competition
Fall 2003 Department of Geosciences Griffith Scholarship Award.
Spring 2005 Department of Geosciences Scholten-Williams-Wright Scholarship Award
Spring 2006 ConocoPhillips Graduate Fellowship (proposal funded)
Spring 2006 Research Proposal funded, project collaboration, ExxonMobil URC (semester funding)
March 2007 Best Student Poster Award, EarthScope National Meeting
Spring 2007 1st place in Dept. Geosciences Student Colloquium Poster Competition
Spring 2007 2007/08 Peter Deines Lectureship Awardee (1st place in Dept. Geosciences Student Colloquium Oral Presentations, Post-Comprehensive Exam)

Publication Details

Publications: Papers and Theses

Hayes, G.P., 2011. Rapid source characterization of the 2011 Mw 9.0 off the Pacific coast of Tohoku earthquake, *Earth, Planets and Space*, **63**, 1-6.

Hayes, G.P., Earle, P.S., Benz, H.M., Wald, D.J., Briggs, R.W., and the USGS/NEIC Earthquake Response Team, 2011. 88 Hours: The U.S. Geological Survey National Earthquake Information Center response to the 11 March 2011 Mw 9.0 Tohoku earthquake, *Seis. Res. Lett.* **82(4)**, 481-493.

Duputel, Z., Rivera, L., Kanamori, H., Hayes, G.P., Hirshorn, B., & Weinstein, S., 2011. Real-time W Phase inversion during the 2011 off the Pacific coast of Tohoku earthquake, *Earth, Planets and Space*.

Newman, A.V., Hayes, G.P., Wei, Y., Convers, J., 2011. The 25 October 2010 Mentawai tsunami earthquake, from real-time discriminants, finite-fault rupture, and tsunami excitation, *Geophys. Res. Lett.*, **38**, L05302, doi:10.1029/2010GL046498.

Hayes, G.P., and Furlong, K.P., 2010. Quantifying potential tsunami hazard in the Puysegur subduction zone, south of New Zealand, *Geophys. J. Int.*, **183(3)**, 1512-1524.

Hayes, G.P., Briggs, R.W., Sladen, A., Fielding, E.J. Prentice, C., Hudnut, K., Mann, P., Taylor, F.W., Crone, A.J., Gold, R., Ito, T., and Simons, M., 2010. Complex rupture during the 12 January 2010 Haiti earthquake, *Nature Geo.*, doi:10.1038/NGEO0977.

Hayes, G.P., Wald, D.J., and Keranen, K., 2009. Advancing techniques to constrain the geometry of the seismic rupture plane on subduction interfaces *a priori* – higher order functional fits, *Geochem. Geophys.*

Geosyst., **10**, Q09006, doi:10.1029/2009GC002633..

Hayes, G.P., Rivera, L., and Kanamori, H., 2009. Source inversion of W-phase: Real-time implementation and extension to low magnitudes, *Seis. Res. Lett.*, **80(5)**, 817-822.

Hayes, G.P., and Wald, D.J., 2009. Developing framework to constrain the geometry of the seismic rupture plane of subduction interfaces *a priori* – a probabilistic approach, *Geophys. Jour. Int.*, **176**, 951-964.

Hayes, G.P., Furlong, K.P., and Ammon, C.J., 2009. Intraplate Deformation Adjacent to the Macquarie Ridge South of New Zealand - The Tectonic Evolution of a Complex Plate Boundary, *Tectonophysics*, doi:10.1016/j.tecto.2008.09.024.

Hayes, G.P., 2007. Integrating seismological and tectonic studies to constrain lithospheric evolution at complex plate boundaries, PhD Thesis, Department of Geosciences, Penn State University.

Hayes, G.P., and Furlong, K.P., 2007, Abrupt Changes in Crustal Structure Beneath the Coast Ranges of Northern California – Developing New Techniques in Receiver Function Analysis, *Geophys. Jour. Int.*, **170**, 313-336.

Hayes, G.P., Johnson, C.B., and Furlong, K.P., 2006, Evidence for melt injection in the crust of Northern California?, *Ear. Plan. Sci. Lett.* **248**, 638–649.

Hayes, G.P., Stuart, G.W., and Reyners, M., 2004, The Waiouru, New Zealand, earthquake swarm – persistent mid crustal activity near an active volcano, *Geophys. Res. Lett.*, **31**, doi:10.1029/2004GL020709.

Hayes, G.P., 2001, Relocating the hypocenters of an earthquake swarm near Waiouru, south east of Ruapehu, North Island, New Zealand, Msc Thesis, Department of Earth Sciences, The Univ. of Leeds.

Papers in Review

Hayes, G.P., Wald, D.J., and Johnson, R.L., 2011. Slab1.0 – a new three-dimensional model of global subduction interface geometry, *in review at JGR*.

Duputel, Z., Rivera, L., Kanamori, H. and Hayes, G.P., 2011. W-phase ($M_w \geq 6.5$, 1990 - 2010), *in review at GJI*.

Hayes, G.P., and McNamara, D., 2011. Quantifying potential tsunami hazard in the Lesser Antilles subduction zone, *in internal review for submission to Geophys. Res. Lett.*

Relevant Work Experience

September 2007-Present	Post-doctoral researcher, U.S. Geological Survey National Earthquake Information Center, Golden, CO.
August 2002-Aug. 2007	Graduate Assistant, Dept. Geosciences, Penn State University, USA. Teaching Assistant Fall 2002, Spring 2003, Spring 2004, Spring 2005; Research Assistant Summer 2003, Fall 2003, Fall 2004, Summer 2005, Fall 2005, Spring 2006.
June-August 2006	U.S.G.S. National Earthquake Information Center, Golden, CO, USA. Summer Internship.
May-August 2004	Exxon Mobil Upstream Research Company, Houston TX, USA. Summer Internship.
Jan 2001-May 2001	Graduate Assistant, Geodynamics Research Group, PSU, USA.

References

- Kevin P. Furlong:** Professor of Geosciences, Dept. Geosciences, Pennsylvania State University, USA.
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PH: 814-863-0567
- Charles J. Ammon:** Associate Professor of Geosciences, Dept. Geosciences, Pennsylvania State University, USA.
E-mail: cammon@geosc.psu.edu
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- Harley Benz:** Scientist-in-charge, U.S. Geological Survey National Earthquake Information Center, Golden, CO, USA.
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Published Abstracts

Below is a list of abstracts published for major global conferences, of which I am first author:

Hayes, G.P., Earle, P.S., Benz, H.M., Wald, D.J., Briggs, R.W., and the USGS/NEIC Earthquake Response Team, 2011. The USGS-NEIC response to the 2011/03/11 Mw 9.0 Tohoku earthquake – magnitude and rupture modeling, *Seism. Res. Lett.* **82:3**, p. 453.

Hayes, G.P., Wald, D.J., 2011. Exploring controls on seismogenesis by comparing models of three-dimensional subduction geometry with source inversions of large earthquakes, *Seism. Res. Lett.* **82:2**, p. 306.

Hayes, G.P., & Wald, D.J., 2011. Exploring interface coupling variability using new models of three-dimensional subduction zone geometries, Abstract T43E-08 presented at 2010 *Fall Meeting, AGU, San Francisco, Calif.*, 13-17 Dec.

Hayes, G.P., Earle, P.S., Wald, D.J., Benz, H.M., Ji, C., & Shao, G., Real time source inversion of the Maule earthquake, Invited abstract G31B-01 presented at 2010 *Fall Meeting, AGU, San Francisco, Calif.*, 13-17 Dec.

Hayes, G.P., & Wald, D.J., 2010. Applications of a new three-dimensional model of global subduction zone geometries to the understanding of seismogenesis, *AGU Chapman conference on giant earthquakes and their tsunamis*.

Hayes, G.P., Wald, D.J., Earle, P.E., Benz, H.M., Briggs, R.W., Sipkin, S.A., Dewey, J.W., Choy, G., Jaiswal, K., Lin, K-W, Marano, K., & Hearne, M., 2010. The USGS National Earthquake Information Center response to recent large earthquakes, *Seism. Res. Lett.* **81:3**, p. 543.

Hayes, G.P., Wald, D.J., & Johnson, R.J., 2009. The creation and applications of a three-dimensional model of global subduction zone geometries, *AGU 2009 fall meeting, EOS Transactions, American Geophysical Union*, **89**, Abstract T14A-04.

Hayes, G.P., Wald, D.J., Earle, P.E., Jaiswal, K., Lin, K-W, Marano, K., & Hearne, M., 2009. The USGS toolbox for earthquake planning and response, *Geological Society of America Abstracts with Programs*, **41**, p. 429.

Hayes, G.P., Wald, D.J., & Ji, C., 2009. Subduction geometry constraints for earthquake source inversions and hazard analyses, *Asia Oceania Geosciences Society*, Abstract SE55-A027.

- Hayes, G.P., and Furlong, K.P., 2009. Potential significant tsunami hazard in the Puysegur subduction zone, south of New Zealand, *Geophys. Res. Abstracts*, **11**, EGU2009-3550.
- Hayes, G.P., and Wald, D.J., 2008. Resolving the geometry of global subduction interfaces *a priori* – working towards improved earthquake source modeling, *AGU 2008 fall meeting, EOS Transactions, American Geophysical Union*, **89**, Abstract U51A-0001.
- Hayes, G.P., and Wald, D.J., 2008. Developing framework for constraining the geometry of the seismic rupture plane *a priori*, *2008 IRIS Workshop, Stevenson, WA*.
- Hayes, G.P., and Wald, D.J., 2008. Developing framework for constraining the geometry of the seismic rupture plane *a priori* – a probabilistic approach, *Seism. Res. Lett.* **79:2**, p. 344.
- Hayes, G. P., & Furlong, K. P., 2007. Intraplate deformation adjacent to the Macquarie Ridge south of New Zealand; the tectonic evolution of a complex plate boundary; *AGU 2007 fall meeting. EOS, Transactions, American Geophysical Union*, **88**, Abstract T23B-1422.
- Hayes, G.P., and Furlong, K.P., 2007. Quantifying regional velocity ratio in California: using seismic data to map shallow structure, *2007 Earthscope National Meeting*, Poster 131.
- Hayes, G.P., and Furlong, K.P., 2006. The Evolution of a Plate Boundary System - crustal structure, seismicity and volcanism in Northern California, *Seism. Res. Lett.* **77:2**, p. 204.
- Hayes, G. P., Johnson, C. B., & Furlong, K. P., 2005. Evidence for melt injection in the crust of northern California? *AGU 2005 fall meeting. EOS, Transactions, American Geophysical Union*, **86**, Abstract S21C-04.
- Hayes, G. P., Furlong, K. P., & Schwartz, S. Y., 2005. The crustal structure of the northern California Coast Ranges from receiver functions, *Geological Society of America, Cordilleran section, 101st annual meeting; American association of petroleum geologists, pacific section, 80th annual meeting. Abstracts with Programs - Geological Society of America*, **37**, p. 68.
- Hayes, G. P., Furlong, K. P., & Schwartz, S. Y., 2004. Using receiver functions to analyze rapid transitions in crustal structure and deformation in northern California; *AGU 2004 fall meeting. EOS, Transactions, American Geophysical Union*, **85**, Abstract T33C-1396.
- Hayes, G. P., Furlong, K. P., Schwartz, S. Y., Ammon, C. J., & Hall, C., 2003. Integrating seismological studies of crustal structure in the northern California Coast Ranges to construct a regional 3D strain model; *AGU 2003 fall meeting. EOS, Transactions, American Geophysical Union*, **84**, Abstract T51C-04.