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**Department of Earth and Planetary Sciences, Northwestern University**  
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My research investigates processes within Earth's lithosphere using techniques including seismology, space-based geodesy, and marine geophysics. One major effort focuses on understanding earthquakes better to improve the maps seismologists produce to predict future shaking in earthquakes, which are used to design earthquake-resistant structures and thus reduce losses from earthquakes. Colleagues and I are exploring how to assess how well these maps work around the world, what causes the uncertainties involved, and how to make better forecasts. Another focuses on how the Earth's lithosphere evolve. Our current studies explore the processes that rift continents over time and form new ocean basins, which is important for fundamental geoscience, energy resources at continental margins, and natural hazards.

#### **EDUCATION:**

Ph.D. (Geophysics), California Institute of Technology, 1978  
M.S. (Geophysics), California Institute of Technology, 1977  
B.S. (Earth and Planetary Sciences), Massachusetts Institute of Technology, 1975

#### **PROFESSIONAL EXPERIENCE:**

Humboldt Visiting Professor, University of Göttingen and University of Munich  
(Germany), 2013-2014  
Visiting Scholar, Rachel Carson Center for Environment and Society, University of Munich  
(Germany), 2014  
Faculty Associate, Institute for Policy Research, Northwestern University, 2013-  
William Deering Professor of Geological Sciences, Northwestern University, 2006-  
Scientific Director, UNAVCO (Geoscience GPS consortium, Boulder CO), 1998-2000  
Visiting Senior Scientist, NASA Goddard Space Flight Center, 1993-1994  
Chair, Department of Geological Sciences, Northwestern University, 1989-1992  
Visiting Professor, University of Utrecht (Netherlands), 1988  
Professor of Geological Sciences, Northwestern University, 1987-  
UNESCO Lecturer, International Institute of Seismology and Earthquake Engineering, Japan,  
1985  
Associate Professor of Geological Sciences, Northwestern University, 1983-1987  
Assistant Professor of Geological Sciences, Northwestern University, 1979-1983  
Post-Doctoral Research Affiliate in Geophysics, Stanford University, 1978-1979

#### **RESEARCH INTERESTS:**

Earthquake hazards, seismology, plate tectonics, and space geodesy

**HONORS:**

President, Natural Hazards Section, American Geophysical Union, 2019-2020  
Faculty coauthor, paper awarded Outstanding Student Presentation Award, Seismological Society of America eastern section meeting, 2020  
Faculty coauthor, paper awarded Outstanding Student Presentation Award, Natural Hazards section, American Geophysical Union national meeting, 2019  
Faculty coauthor, paper awarded Outstanding Student Presentation Award, Seismological Society of America national meeting, 2019  
Faculty coauthor, paper awarded Outstanding Student Presentation Award, Seismological Society of America national meeting, 2017  
Price Medal, Royal Astronomical Society, 2014  
Alexander von Humboldt Foundation (Germany) Research Award, 2013  
Foreign Member, Academy of Europe, 2010  
Stephan Mueller Medal, European Geosciences Union, 2010  
George P. Woollard Award, Geological Society of America, 2009  
Institute for Scientific Information Highly Cited Researchers list, 2002-Fellow, Geological Society of America, 1999  
Fellow, American Geophysical Union, 1989  
James B. Macelwane Medal, American Geophysical Union, 1989  
Faculty coauthor, paper awarded Outstanding Student Paper Award, Geodesy section, spring 1997 AGU meeting  
Faculty coauthor, paper awarded Outstanding Student Paper Award, Geodesy section, spring 1995 AGU meeting  
Faculty coauthor, paper awarded Outstanding Student Paper Award, Tectonophysics section, spring 1987 AGU meeting  
Faculty coauthor, paper awarded Outstanding Student Paper Award, Geodesy section, winter 1986 AGU meeting  
Northwestern Undergraduate Student Government Teaching Honor Roll, 1984, 1987  
Fannie and John Hertz Foundation Fellow, 1975-1978  
Phi Beta Kappa, 1975  
National Merit Scholar, 1971  
Presidential Scholar, 1971

**REVIEW AND ADVISORY PANELS:**

Member, Royal Observatory of Belgium external review committee, 2016  
Chair, European Science Foundation/AXA Foundation Environmental Risks postdoc panel, 2014  
Member, Global Earthquake Model Testing and Evaluation Advisory and Oversight Committee, 2013-2014  
Chair, External Review Committee, University of Kentucky Department of Earth and Environmental Sciences, 2013  
Member, European Research Commission Synergy multidisciplinary research review panel, 2012-2013  
Member, German Science Foundation South Atlantic evolution and processes program review panel, 2008-  
Member, External Review Committee, University of Miami School of Marine and Atmospheric Sciences, Marine Geology and Geophysics Department, 2008  
Member, European Science Foundation TOPO-Europe review panel, 2007-2012

Member, NSF EarthScope Operations and Maintenance review panel, 2007  
Member, NSF Earth Sciences Instrumentation Program Visiting Committee, 2007  
Member, External Review Committee, University of California at Riverside, Department of Geological Sciences, 2006  
Member, NSF EarthScope Facility review panel, 2005  
Member, External Review Committee, Purdue University Department of Earth and Atmospheric Sciences, 2003  
Member, External Advisory Board, Netherlands Research Centre for Integrated Solid Earth Science, 2003-2012  
Member, NASA Solid Earth program panel, 2002  
Member, NASA Dynamics of the Solid Earth program panel, 1991  
Member, NSF proposal review panel: Global Positioning System, 1988

**OTHER PROFESSIONAL ACTIVITIES:**

Commencement Speaker, Virginia Tech Geosciences Department, 2015  
Member, Organizing Committee, Consortium for Mathematics in the Geosciences, 2011-2013  
Member, Group on Earth Observations Geohazards Community of Practice, 2011-2013  
Member, European Geosciences Union Arthur Holmes Medal committee, 2011 - 2013  
Member, Geological Society of America George Woollard Award committee, 2010 - 2013  
Crough Lecturer, Purdue University Department of Earth and Atmospheric Sciences, 2010  
Member, European Geosciences Union Stephan Mueller Medal committee, 2010 - 2013  
Member, Science Panel, IAG Global Geodetic Observing System, 2006 - 2009  
Reviewer, NAS Committee on Disaster Research in the Social Sciences report, 2005  
Member, Fellows nomination committee, Geodesy Section, American Geophysical Union, 2004-, Chair 2006-  
Organizing committee member, NSF MARGINS Theoretical Institute on the Seismogenic Zone, 2003  
Organizing committee member, NATO Advanced Research Workshop on the Adria Microplate, 2003  
Chair, Excellence in Geophysical Education award committee, American Geophysical Union, 2000-2002  
Member, University Relations Committee, University Corporation for Atmospheric Research, 2000  
Member, Governing board, WEGENER European space geodesy consortium, 2000 - 2004  
Member, NASA Shuttle Radar Topographic Mission Science Team, 1999-2002  
Member, Steering Committee, NSF Plate Boundary Observatory Initiative, 1999 - 2000  
Organizing committee member, UNAVCO conference on volcanic geodesy, 1999  
Chair, Bucher Medal committee, American Geophysical Union, 1996-1998  
Invitee, National Academy of Sciences Symposium on Frontiers of Science, 1992  
Chair, Fellows nomination committee, Seismology Section, American Geophysical Union, 1992  
Organizing committee member and session chairman, AGU Chapman conference on time dependent positioning and monitoring of crustal motion, 1991  
Sub-panel chair, NSF workshop: Continental dynamics research in the 1990s, 1991  
Seismology section representative, Macelwane Medal committee, American Geophysical Union, 1990-1992  
Editor, Journal of Geophysical Research, 1986-1989

Member, NASA GPS Geodetic Systems Working Group, 1986-1988  
Associate Editor, Journal of Geophysical Research, 1986  
Associate Editor, Geophysical Research Letters, 1986  
UNAVCO: Northwestern University representative, 1985-; Scientific Director, 1998- 2000;  
Board of Directors, 2010-2012  
Incorporated Research Institutions for Seismology: Northwestern University  
representative, 1984-1990; member, Executive Committee, 1986-1988; Chair,  
nominations committee, 1990; Education and Outreach Committee, 2004 -2007  
Seismology Program Chair, AGU Fall Annual meeting, 1984 - 1985  
Member, Ocean Margin Drilling Caribbean Regional Synthesis Group, 1981 - 1982

### **EDUCATION/OUTREACH ACTIVITIES:**

Developing material about Midcontinent Rift for the public and national and state park  
interpreters, including interpretive guide in National Park Service journal *Park  
Science* and video "*Lake Superior and the Midcontinent Rift: the billion year story*"  
(<http://www.earthscope.org/blog/watch-a-new-earthscope-funded-video>)  
Design consultant, Field Museum of Natural History "Nature Unleashed" disasters exhibit,  
2008- (touring exhibit seen by more than a million people to date)  
Extensive work with news media, including many interviews, e.g.  
[www.bbc.co.uk/programmes/p01c4qgt](http://www.bbc.co.uk/programmes/p01c4qgt)  
[news.bbc.co.uk/2/hi/8342600.stm](http://news.bbc.co.uk/2/hi/8342600.stm)  
[www.livescience.com/137-tsunami-earthquake-times-larger-thought.html](http://www.livescience.com/137-tsunami-earthquake-times-larger-thought.html)  
Development of outreach material, such as  
EarthScope video about Mid-continent Rift project  
[www.youtube.com/watch?v=JPtWu\\_WATXs](http://www.youtube.com/watch?v=JPtWu_WATXs)  
Northwestern video on class kayak trips on Chicago River  
[www.youtube.com/watch?v=s-W6OnBfKSg](http://www.youtube.com/watch?v=s-W6OnBfKSg)  
UNESCO video about extreme geohazards  
[www.youtube.com/watch?v=Pki1oJOQCCs](http://www.youtube.com/watch?v=Pki1oJOQCCs)  
History Channel video  
[www.tv.com/shows/how-the-states-got-their-shapes/the-  
great-plains-trains-and-automobiles-1589675](http://www.tv.com/shows/how-the-states-got-their-shapes/the-<br/>great-plains-trains-and-automobiles-1589675)  
Lecturer for Illinois EarthScope Teachers' workshop  
(<http://www.earth.northwestern.edu/people/seth/Disdef/Teachnm>) 2011, 2013  
Organizing Midwest teachers' workshop about Midcontinent rift for August 2014  
Faculty advisor in Northwestern Science & Engineering Committee on Multicultural Affairs  
(SECMA) and Alliances for Graduate Education and the Professoriate (AGEP)  
programs to increase numbers of underrepresented minority students receiving  
doctorates in science  
Distinguished Lecturer, Incorporated Research Institutions for Seismology/Seismological  
Society of America, 2006 ("*Giant earthquakes: why, where, when, and what we can  
do*")  
Author of widely used seismology textbook  
Author of general audience book on Midwest earthquakes  
Author of natural hazards policy textbook

### **FIELD PROGRAMS:**

Co-investigator, EarthScope Superior Province Rifting Experiment, 2011-2014

Principal investigator, GPS survey of South America - Nazca plate convergence zone 1994-2000

Principal investigator, GPS survey of New Madrid, Missouri seismic zone, 1991 - 1998

R/V Moana Wave Sea Marc survey of the Easter Microplate, East Pacific Rise, 1989

GPS survey, Hebgen Lake region, 1991

### **COURSES TAUGHT:**

Earth 102: Lake Michigan and the Chicago River (freshmen)

Earth 107: Our dynamic planet (non-majors)

Earth 202: Earth's interior (majors, science distribution, engineers)

Earth 324: Earthquakes and tectonics (majors, grads, civil engineers)

Earth 326: Data analysis for the earth & planetary sciences

(majors, grads, science distribution)

Earth 327: Geophysical time series analysis

(majors, grads, science distribution)

Earth 351: Forming a habitable planet (majors, grads, physics, chemistry, biology students)

Earth 390: Natural hazards policy

Earth 450/ Astronomy 441: Exoplanets as planets (majors, grads, astronomers, science distribution)

Natural hazard policy (seniors and graduate students, University of Gottingen and University of Munich)

International Ph.D. course in Tectonics, University of Copenhagen

**Ph.D. STUDENTS:**

## Principal or co-advisor:

Douglas Wiens; now Professor, Washington University, St. Louis

Joseph Engeln; now Associate Director for Science, Missouri Department of Natural Resources

Paul Stoddard; now Associate Professor, Northern Illinois University

Gary Acton\*; now Professor, Sam Houston State University (Texas)

George Helffrich; now Professor, University of Bristol (U.K.)

John Weber\*+; now Professor, Grand Valley State University (Michigan)

Thomas Shoberg+; now Research scientist, U.S. Geological Survey

Lisa Leffler\*+; now earth science and chemistry teacher, McGill-Toolen Catholic High School (Alabama)

John DeLaughter+; now geophysicist, Murphy Exploration Corp.

Fredrick Marton; now Associate Professor, Bergen Community College (NJ)

Andrew Newman+; now Associate Professor, Georgia Institute of Technology

Eryn Klosko; now Associate Professor, Westchester Community College (New York)

Alberto Lopez; now Associate Professor, University of Puerto Rico

Kimberly Schramm, now geophysicist, Sandia National Laboratory

Laura Swafford, now geophysicist, Chevron Petroleum Technology Corp.

Carl Ebeling, now Senior Development Engineer, IRIS/UC San Diego

Miguel Merino+, now geophysicist, Chevron Petroleum Technology Corp.

Emily Wolin, postdoc, US Geological Survey

Edward Brooks+, natural hazard specialist, Swiss Re

## Other former Ph.D. student coworkers:

Charles DeMets\*, now Professor, University of Wisconsin

Donald Argus, now research scientist, Jet Propulsion Laboratory, California Institute of Technology

John Brodholt, now Professor, University College, London

Paul Lundgren, now research scientist, Jet Propulsion Laboratory, California Institute of Technology

Phillip Richardson+, now Geophysical Coordinator, Chevron Upstream Europe

## Current graduate student projects:

Leah Salditch\*+ (Earthquake hazard map performance assessment), Reece Elling (Midcontinent Rift evolution), James Neely\* (Modeling earthquake clusters and supercycles), Molly Galahue\* (Volcanism and continental rifting), Boris Rosler (Uncertainties in estimation of earthquake seismic moments)

\*Students whose joint paper with me won an Outstanding Student Paper Award

+Awarded the department's Horace Scott Award for Outstanding Graduate Research and Potential

## PUBLICATIONS

### BOOKS:

Morra, G., D.A. Yuen, S.D. King, S.-M. Lee, and S. Stein (eds), *Subduction Dynamics: From Mantle Flow to Mega Disasters*, American Geophysical Union Monograph 211, 2016.

Landgraf, A., E. Hintersberger, S. Kübler, and S. Stein (eds), *Seismicity, Fault Rupture and Earthquake Hazards in Slowly Deforming Regions*, Geological Society of London Special Publication, Special Publications series, volume 432, 2015.

Stein, S., and J. Stein, *Playing Against Nature: Integrating Science and Economics to Mitigate Natural Hazards in an Uncertain World*, American Geophysical Union/Wiley-Blackwell, 2014.

Stein, S., *Disaster Deferred: How New Science is Changing our View of Earthquake Hazards in the Midwest*, Columbia University Press, 2010.

Stein, S., and S. Mazzotti, (eds), *Continental Intraplate Earthquakes: Science, Hazard, and Policy Issues*, Geological Society of America Special Paper 425, 2007.

Pinter, N., G. Grenerczy, J. Weber, S. Stein, and D. Medak (eds), *The Adria Microplate: GPS Geodesy, Tectonics and Hazards*, Nato Science Series, Springer, 2005.

Stein, S., and M. Wysession, *Introduction to Seismology, Earthquakes, and Earth Structure*, Blackwell Publishing, 2003. (Figures, homework solutions, and errata available at <http://epscx.wustl.edu/seismology/book>)

Stein, S., and J. Freymueller (eds), *Plate Boundary Zones*, American Geophysical Union, 2002.

Pringle, M., W. Sager, W. Sliter, and S. Stein (eds), *The Mesozoic Pacific*, American Geophysical Union, 1993.

### RESEARCH ARTICLES (most available on WWW homepage):

Elling, R., Stein, S., Stein, C.A., and Gefeke, K., Three major failed rifts in central North America: similarities and differences, *GSA Today*, in press, 2021.

Rösler, B., Stein, S., and Spencer, B.D., Uncertainties in seismic moment tensors inferred from differences between global catalogs. *Seismological Research Letters*, 2021.

Rundle, J., Stein, S., Donnellan, A., Turcotte, D.L., Klein, W. and Saylor, C. The complex dynamics of earthquake fault systems: new approaches to forecasting and nowcasting of earthquakes. *Reports on progress in physics*, 2021.

Stein, C.A., Stein, S., Gallahue, M., and Elling, R., Revisiting hotspots and continental breakup – Updating the classical three-arm model, *GSA Special paper "In the Footsteps of Warren B. Hamilton: New Ideas in Earth Science"*, in press, 2021.

Davis, W.R., Collins, M., Rooney, T., Brown, E., Stein, C., Stein, S., and Moucha, R., Geochemical, petrographic, and stratigraphic analyses of the Portage Lake volcanics: implications for the evolution of main stage volcanism in continental flood basalt provinces, *Geological Society, London, Special Publications*, in press, 2021.

Neely, J.S. and Stein, S., Why do continental normal fault earthquakes have smaller maximum magnitudes?, *Tectonophysics*, 809, 2021.

Hough, S.E., Page, M., Salditch, L., Gallahue, M.M., Lucas, M.C., Neely, J.S., and Stein, S. Revisiting California's past great earthquakes and long-term earthquake rate, *Bulletin of the Seismological Society of America*. <https://doi.org/10.1785/0120200253>, 2020.

Gallahue, M., Stein, S., Stein, C.A., Jurdy, D., Barklage, M., and Rooney, T., A compilation of igneous rock volumes at volcanic passive continental margins, *Marine and Petroleum Geology*, 2020

Neely, J.S., Stein, S., and Spencer, B.D., Large uncertainties in earthquake stress drop estimates and their tectonic consequences, *Seismological Research Letters*, 2020.

Salditch, L., Gallahue, M. M., Lucas, M.C, Neely, J.S., Hough, S.E., and Stein, S., California Historical Intensity Mapping Project (CHIMP): A consistently reinterpreted dataset of seismic intensities for the past 162 years and implications for seismic hazard map, *Seismological Research Letters*, 2020.

Malone, D.H., Stein, C.A., Craddock, J.P., Stein, S., and Malone, J., Neoproterozoic sedimentation in the Laurentian Midcontinent: detrital zircon provenance of the Jacobsville Sandstone, Lake Superior Basin, USA and Canada, *Terra Nova*, 2020.

Elling, R., Stein, S., Stein, C.A., and Keller, R., Tectonic implications of the gravity signatures of the Midcontinent Rift and Grenville Front, *Tectonophysics*, 778, 228369, 2020.

Salditch, L., Stein, S., Neely, J., Spencer, B.D., Brooks, E.M., Agnon, A. and Liu, M., Earthquake supercycles and long-term fault memory, *Tectonophysics*, 774, 228289, 2020.

Gunawardana, P.M., Moucha, R., Rooney, T.O., Stein, S., and Stein, C.A., North America's Midcontinent rift magma volume: a coincidental rendezvous of a plume with a rift, *Geology*, submitted, 2020.

Brooks, E.M., Neeley, J., Stein, S., Spencer, B.D., and Salditch, L., Assessments of the performance of the 2017 one-year seismic hazard forecast for the Central and Eastern United States via simulated earthquake shaking data, *Seismological Research Letters*, 90, 1155-1167, 2019.

Neely, J.S., Stein, S., Merino, M., and Adams, J., Have we seen the largest earthquakes in eastern North America?, *Physics of the Earth and Planetary Interiors*, 284, November 2018, Pages 17-27, 2018.

Stein, S., McDonnell, J., and Miller, M.M., Discussing scientific ethics: what would you do?, *Astronomy & Geophysics*, 59, 4, 1 August 2018, Page 4.12, 2018.



Salditch, L., Hough, S.E., Stein, S., Spencer, B.D., Brooks, E.M., Neely, J.S. and Lucas, M.C. The 1952 Kern County, California earthquake: A case study of issues in the analysis of historical intensity data for estimation of source parameters. *Physics of the Earth and Planetary Interiors*, 283, 140-151, 2018.

Stein, S., Stein, C.A., Elling, R., Kley, J., Keller, R., Wyssession, M., Rooney, T., Frederiksen, A. and Moucha, R., Insights from North America's failed Midcontinent Rift into the evolution of continental rifts and passive continental margins. *Tectonophysics*, 744, 403-421, 2018.

Stein, C.A., Stein, S., Elling, R., Keller, G.R. and Kley, J. Is the "Grenville Front" in the central United States really the Midcontinent Rift?. *GSA Today*, 28(5), 2018

Brooks, E.M., Stein, S., Spencer, B.D., Salditch, L., Petersen, M.D. and McNamara, D.E. Assessing earthquake hazard map performance for natural and induced seismicity in the central and eastern United States. *Seismological Research Letters*, 89(1), pp.118-126, 2018.

Vanneste, K., Stein, S., Camelbeeck, T. and Vleminckx. Insights into earthquake hazard map performance from shaking history simulations. *Scientific reports*, 8(1), p.1855, 2018.

Salaree, A., Stein, S., Saloor, N. and R. Elling, Turn your smartphone into a geophysics lab, *Astronomy and Geophysics*, December 2017, Vol. 58, 6.35-36.

Stein, S., Salditch, L., Brooks, E., Spencer, B. and M. Campbell, Is the coast toast? Exploring Cascadia earthquake probabilities, *GSA Today* 27, Nov. 2017, 6-7.

Steckler, M., S. Stein, S. H. Akhter, and L. Seeber, The wicked problem of earthquake hazard in developing countries: the example of Bangladesh, *EOS*, 99, 7 March 2018.

Vanneste, K., S. Stein, T. Camelbeeck, and B. Vleminckx, Insights into earthquake hazard map performance from shaking history simulations, *Sci. Rep.*, 8:1855 | DOI: 10.1038/s41598-018-20214-6, 2018

Stein, C.A., S. Stein, R. Elling, G. Keller, and J. Kley, Is the "Grenville Front" in the central United States really the Midcontinent Rift? *GSA Today*, 28, doi: 10.1130 /GSATG357A, 2018.

Stein, S., Brooks, E., Spencer, B. and M. Liu, Should all of Nepal be treated as having the same earthquake hazard? in J.H. Kruhl et al. (eds.), *Living Under the Threat of Earthquakes*, Springer, 2018.

Brooks, E., S. Stein, B. Spencer, L. Salditch, M. Petersen, and D. McNamara, Assessing earthquake hazard map performance for natural and induced seismicity in the central and eastern United States, *Seism. Res. Lett.*, 89, 118-126, 2017.

Stein, S., Salditch, L., Brooks, E., Spencer, B. and M. Campbell, Is the coast toast? Exploring Cascadia earthquake probabilities, *GSA Today* 27, Nov. 2017, 6-7.

Stein, S., Brooks, E., Spencer, B., Vanneste, K., Camelbeeck, T. and B. Vleminckx, Assessing how well earthquake hazard maps work, *Earth magazine*, 36-41, March 2017.

Grenerczy, G., Jambor, T., Stein, S., Farkas, P. and M. Ferenc, Towards global space geodetic mapping of the dynamic deformation field after great earthquakes, *Terra Nova*, 1–7, 2017.

Brooks, E., Stein, S. and B. Spencer, Effects of smoothing on the performance of earthquake hazard maps, *International Journal of Earthquake Engineering*, 2, 121-134, 2017.

Liu, M. and S. Stein, Mid-continental earthquakes: spatiotemporal occurrences, causes, and hazards, *Earth-Science Reviews*, 162, 364-386, 2016.

Stein, S., M. Liu, B. Spencer, and E. Brooks, Promise and paradox: why improved knowledge of plate tectonics hasn't yielded correspondingly better earthquake hazard maps, in *Plate Boundaries and Natural Hazards, Amer. Geophys. Un. monograph 219*, 2016.

Brooks, E., S. Stein, and B. Spencer, Comparing the performance of Japanese earthquake hazard maps to uniform and randomized maps, *Seism. Res. Lett.*, 87, 1, 2016.

Stein, S., C. Stein, J. Kley, R. Keller, M. Merino, E. Wolin, D. Jurdy, D. Wiens, M. Wyssession, G. Al-Equabi, W. Shen, A. Frederiksen, F. Darbyshire, G. Waite, W. Rose, E. Vye, T. Rooney, R. Moucha, and E. Brown, New insights into North America's Midcontinent Rift, *EOS*, 97, doi:10.1029/2016EO056659. 04 August 2016 .

Vanneste, K., B. Vleminckx, S. Stein, and T. Camelbeeck, Could Mmax be the same for all continental interiors? *Seism. Res. Lett.*, 87,5, 2016.

D. Malone, C. Stein, J. Craddock, J. Kley, S. Stein, and J. Malone, Maximum depositional age of the Neoproterozoic Jacobsville Sandstone, Michigan: Implications for the evolution of the Midcontinent Rift. *Geosphere*, doi:10.1130/GES01302.1., 12, 4, 2016.

Stein, S., Peresan, A. and E. Brooks, Italy's chain of earthquakes poses a forecasting challenge, *Physics Today*, DOI:10.1063/PT.5.9075, 7 Dec. 2016.

Ola, O., A. W. Frederiksen, T. Bollmann, F. Darbyshire, D. Jurdy, J. Revenaugh, C. Stein, S. Stein, S. Van der Lee, D. Wiens, D., and M. Wyssession, Anisotropic zonation in the lithosphere of Central North America, influence of the Mid-Continent Rift, *Tectonophysics*, 683, 367-381, <http://dx.doi.org/10.1016/j.tecto.2016.06.03>, 2016.

Stein, S., Assessing and mitigating natural hazards in a very uncertain world, in *Routledge Handbook of Risk Studies*, A. Burgess, A. Alemanno and J. Zinn (eds), 2015.

Stein, C., J. Kley, S. Stein, D. Hindle, and G.R. Keller, North America's Midcontinent Rift: when rift met LIP, *Geosphere*, 11, 5, 1607-1616, 2015.

Stein, S., M. Liu, T. Camelbeeck, M. Merino, A. Landgraph, E. Hintersberger and S. Kubler, Challenges in assessing seismic hazard in intraplate Europe, in *Seismicity, Fault Rupture and Earthquake Hazards in Slowly Deforming Regions*, A. Landgraph, S. Kubler, E. Hintersberger and S. Stein (eds), Geological Society of London, Special Pub. series, v. 432, 2015.

Landgraph, A., S. Kubler, E. Hintersberger and S. Stein, Active tectonics, earthquakes and palaeoseismicity in slowly deforming continents, in *Seismicity, Fault Rupture and Earthquake*

*Hazards in Slowly Deforming Regions*, A. Landgraph, S. Kubler, E. Hintersberger and S. Stein (eds), Geological Society of London, Special Publications series, volume 432, 2015.

Stein, S., B. Spencer, and E. Brooks, Metrics for assessing earthquake hazard map performance, *Bull. Seism. Soc. Amer.*, 105, 2015.

Stein, C., and S. Stein, Are large oceanic depth anomalies caused by thermal perturbations?, in *GSA Special Paper 514: The Interdisciplinary Earth: A Volume in Honor of Don L. Anderson*, doi:10.1130/2015.2514(12), 2015.

Stein, S., B. Spencer, and E. Brooks, Bayes and BOGSAT: issues in when and how to revise earthquake hazard maps, *Seism. Res. Lett.*, 86, 6-10, 2015.

Wolin, E., S. van der Lee, T. Bollmann, D. Wiens, J. Revenaugh, F. Darbyshire, A. Frederiksen, S. Stein, and M. Wyssession, Seasonal and diurnal variations in long - period noise at SPREE stations: the influence of soil characteristics on shallow stations' performance, *Bull. Seism. Soc. Amer.*, 2015.

Stein, C., Stein, S., Merino, M., Keller, G., Flesch, L. and D. Jurdy, Was the Mid-Continent Rift part of a successful seafloor-spreading episode? *Geophys. Res. Lett.*, 10.1002/2013GL059176, 2014.

Stein, S. and A. Friedrich, How much can we clear the crystal ball?, *Astronomy and Geophysics*, 55, 2.11-2.17, 2014.

Stein, S. and J.L. Stein, How good do natural hazard assessments need to be?, *GSA Today*, 23, no. 4/5, doi: 10.1130/GSATG167GW.1, 2013.

Merino, M., G. Keller, S. Stein, C. Stein, Variations in Mid-Continent Rift magma volumes consistent with microplate evolution, *Geophys. Res. Lett.*, 40, 1513-1516, 2013.

Stein, J.L. and S. Stein, Formulating natural hazard policies under uncertainty, *SIAM/ASA J. on Uncertainty Quantification*, 1, 133-140, 2013.

Stein, S. and J.L. Stein, Shallow versus deep uncertainties in natural hazard assessments, *EOS*, 94, 4, 133-140, 2013.

Wolin, E., S. Stein, F. Pazzaglia, A. Meltzer, A. Kafka, and C. Berti, Mineral, Virginia, earthquake illustrates seismicity of a passive-aggressive margin, *Geophys. Res. Lett.*, 39, L02305, doi:10.1029/2011GL050310, 2012.

Okal, E., S. Hongsresawat, and S. Stein, Split mode evidence for no ultra-slow component to the source of the 2010 Maule, Chile earthquake, *Bull. Seism. Soc. Am.*, 102, 391-397, 2012.

Stein, S., R. Geller, and M. Liu, Why earthquake hazard maps often fail and what to do about it, *Tectonophysics*, 562-563, 1-25, 2012.

Stein, J.L. and S. Stein, Rebuilding Tohoku: a joint geophysical and economic framework for hazard mitigation, *GSA Today*, 22(9) 2012.

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