Curriculum Vitae

Kerry Sieh

Director and Professor
AXA-Nanyang Chair in Natural Hazards
Earth Observatory of Singapore, Nanyang Technological University
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Academic Degrees

Ph.D. (Geology), Stanford University, 1977
"Late Holocene Displacement History along the South-Central Reach of the San Andreas Fault"
A.B. with highest honors (Geology), University of California, Riverside, 1972

Professional positions

Nanyang Technological University
AXA-Nanyang Chair in Natural Hazards, 2012-present
Professor, Nanyang Technological University, 2008-present
Director, Earth Observatory of Singapore, 2008-present
California Institute of Technology
Robert P. Sharp Professor of Geology, 2003-2008
Assistant Professor, Associate Professor, Professor, Caltech, 1977-2009

Principal Research Activities

Earthquake geology (neotectonics and paleoseismology)
Tsunami geology
Extraterrestrial impact geology

Distinctions and Awards

Harry Fielding Reid Medal, 2013, Seismological Society of America (SSA)
Best Paper Award, 2012, Geological Society of America, Structural Geology Division (for Yule and Sieh, 2003)
Fellow, American Geophysical Union, 2001
Member, National Academy of Sciences, 1999
Fellow, Geological Society of America, 1996
National Academy of Sciences Award for Initiatives in Research, 1982
E.B. Burwell, Jr., Memorial Award of the Engineering Geology Division, Geological Society of America (for Sieh 1978)

Selected Recent Service

Singapore

- Member, Scientific Advisory Board, CENSAM (February 2013 - 2017)
- Member, Committee on Sustainable Earth, NTU (21 Dec 2009 - present)
- Member, International Scientific Advisory Panel (ISAP), Centre for Climate Research Singapore (CCRS) (1 October 2011 - September 2015)
- Member, School Review Committee for Promotion and Tenure (SRCPT) in the Asian School of the Environment (13 February 2015)
- Member, Local Evaluation Panel (LEP) for Singapore NRF Fellowship Award (June 2012– May 2014)

International

- Member, Advisory Panel, Institute of Earth Sciences, Academia Sinica, Taiwan (2000-2013)
- Member, Centre for Tropical Environmental & Sustainability Science (TESS) Scientific Advisory Board (2014)

Professional Societies

American Association for the Advancement of Science
American Geophysical Union (Fellow)
Geological Society of America (Fellow)
Seismological Society of America
National Academy of Sciences

PUBLICATIONS

2017

Rubin, C. M., B. P. Horton, K. Sieh, J. E. Pilarczyk, P. Daly, N. Ismail and A. C. Parnell (2017). "Highly variable recurrence of tsunamis in the 7,400 years before the 2004 Indian Ocean tsunami." **8**: 16019; doi: 16010.11038/ncomms16019 https://www.nature.com/articles/ncomms16019#supplementary-information.

Shi, X., Y. Wang, J. Liu Zeng, R. Weldon, S. Wei, T. Wang and K. Sieh (2017). "How complex is the 2016 M w 7.8 Kaikoura earthquake, South Island, New Zealand?" Science Bulletin **62**(5): 309-311.

Bradley, K. E., L. Feng, E. M. Hill, D. H. Natawidjaja and K. Sieh (2017). "Implications of the diffuse deformation of the Indian Ocean lithosphere for slip partitioning of oblique plate convergence in Sumatra." Journal of Geophysical Research. Solid Earth **122**(1): 572-591.

2017

Philibosian, B., K. Sieh, J.-P. Avouac, D. H. Natawidjaja, H.-W. Chiang, C.-C. Wu, C.-C. Shen, M. R. Daryono, H. Perfettini, B. W. Suwargadi, Y. Lu and X. Wang (2017). "Earthquake supercycles on the Mentawai segment of the Sunda megathrust in the seventeenth century and earlier." Journal of Geophysical Research: Solid Earth **122**(1): 642-676; doi: 610.1002/2016JB013560.

Singh, S. C., N. Hananto, Y. Qin, F. Leclerc, P. Avianto, P. E. Tapponnier, H. Carton, S. Wei, A. B. Nugroho, W. A. Gemilang, K. Sieh and S. Barbot (2017). "The discovery of a conjugate system of faults in the Wharton Basin intraplate deformation zone." Science Advances **3**(1).

2015

Tsang, L. L. H., Meltzner, A. J., Hill, E. M., Freymueller, J. T., and Sieh, K., (2015), A paleogeodetic record of variable interseismic rates and megathrust coupling at Simeulue Island, Sumatra: Geophysical Research Letters, v. 42, no. 24, p. 10, doi: 10.1002/2015gl066366.

Gagan, M. K., Sosdian, S. M., Scott-Gagan, H., Sieh, K., Hantoro, W. S., Natawidjaja, D. H., Briggs, R. W., Suwargadi, B. W., and Rifai, H., (2015), Coral C-13/C-12 records of vertical seafloor displacement during megathrust earthquakes west of Sumatra: Earth and Planetary Science Letters, v. 432, p. 461-471, doi: 410.1016/j.epsl.2015.1010.1002.

Feng, L., Hill, E. M., Elósegui, P., Qiu, Q., Hermawan, I., Banerjee, P., & Sieh, K. 2015. Hunt for slow slip events along the Sumatran subduction zone in a decade of continuous GPS data. Journal of Geophysical Research: Solid Earth, 120(12), 8623–8632. doi:10.1002/2015JB012503

Tsang, L. L. H., Meltzner, A. J., Philibosian, B., Hill, E. M., Freymueller, J. T., and Sieh, K., 2015, A 15 year slow-slip event on the Sunda megathrust offshore Sumatra: Geophysical Research Letters, v. 42, no. 16, p. 6630-6638; doi: 6610.1002/2015gl064928.

Meltzner, A. J., Sieh, K., Chiang, H. W., Wu, C. C., Tsang, L. L. H., Shen, C. C., Hill, E. M., Suwargadi, B. W., Natawidjaja, D. H., Philibosian, B., and Briggs, R. W., 2015, Time-varying interseismic strain rates and similar seismic ruptures on the Nias-Simeulue patch of the Sunda megathrust: Quaternary Science Reviews, v. 122, p. 258-281; doi: 210.1016/j.quascirev.2015.1006.1003.

Feng, L., Hill, E. M., Banerjee, P., Hermawan, I., Tsang, L. L. H., Natawidjaja, D. H., Suwargadi, B. W., and Sieh, K., 2015, A unified GPS-based earthquake catalog for the Sumatran plate boundary between 2002 and 2013: Journal of Geophysical Research: Solid Earth, v. 120, no. 5, p. 3566-3598, doi: 3510.1002/2014JB011661.

Hill, E. M., Yue, H., Barbot, S., Lay, T., Tapponnier, P., Hermawan, I., Hubbard, J., Banerjee, P., Feng, L., Natawidjaja, D., and Sieh, K., 2015, The 2012 M(w)8.6 Wharton Basin sequence: A cascade of great earthquakes generated by near-orthogonal, young, oceanic mantle faults: Journal of Geophysical Research-Solid Earth, v. 120, no. 5, p. 3723-3747; doi: 3710.1002/2014jb011703.

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Yue, H., Lay, T., Li, L. Y., Yamazaki, Y., Cheung, K. F., Rivera, L., Hill, E. M., Sieh, K., Kongko, W., and Muhari, A., 2015, Validation of linearity assumptions for using tsunami waveforms in joint inversion of kinematic rupture models: Application to the 2010 Mentawai M-w 7.8 tsunami earthquake: Journal of Geophysical Research-Solid Earth, v. 120, no. 3, p. 1728-1747; doi: 1710.1002/2014jb011721.

Sieh, K., Daly, P., McKinnon, E. E., Pilarczyk, J. E., Chiang, H.-W., Horton, B., Rubin, C. M., Shen, C.-C., Ismail, N., Vane, C. H., and Feener, R. M., 2015, Penultimate predecessors of the 2004 Indian Ocean tsunami in Aceh, Sumatra: Stratigraphic, archeological, and historical evidence: Journal of Geophysical Research: Solid Earth, p. http://dx.doi.org/10.1002/2014JB011538.

2014

Tun, S. T., Wang, Y., Khaing, S. N., Thant, M., Htay, N., Htwe, Y. M. M., ... & Sieh, K. (2014). Surface ruptures of the Mw 6.8 March 2011 Tarlay earthquake, eastern Myanmar. *Bulletin of the Seismological Society of America*, *104*(6), 2915-2932.

Fujino, S., K. Sieh, A. J. Meltzner, E. Yulianto and H.-W. Chiang (2014). "Ambiguous correlation of precisely dated coral detritus with the tsunamis of 1861 and 1907 at Simeulue Island, Aceh Province, Indonesia." Marine Geology **357**(0): 384-391, doi: http://dx.doi.org/310.1016/j.margeo.2014.1009.1047.

Philibosian, B., K. Sieh, J.-P. Avouac, D. H. Natawidjaja, H.-W. Chiang, C.-C. Wu, H. Perfettini, C.-C. Shen, M. R. Daryono and B. W. Suwargadi (2014). "Rupture and variable coupling behavior of the Mentawai segment of the Sunda megathrust during the supercycle culmination of 1797 to 1833. Journal of Geophysical Research: Solid Earth **119**(9): 2014JB011200, doi: 011210.011002/012014jb011200

Yue, H., Lay, T., Rivera, L., Bai, Y., Yamazaki, Y., Cheung, K. F., Hill, E. M., Sieh, K., Kongko, W., and Muhari, A. (2014). Rupture process of the 2010 Mw 7.8 Mentawai tsunami earthquake from joint inversion of near-field hr-GPS and teleseismic body wave recordings constrained by tsunami observations. *Journal of Geophysical Research: Solid Earth* 2014JB011082, doi: 10.1002/2014jb011082.

Wang, Y., Sieh, K., Tun, S. T., Lai, K.-Y., and Myint, T. (2014). Active tectonics and earthquake potential of the Myanmar region. *Journal of Geophysical Research: Solid Earth* 119, 2013JB010762, doi: 10.1002/2013jb010762.

Bursik, M., Sieh, K., and Meltzner, A. (2014). Deposits of the most recent eruption in the Southern Mono Craters, California: Description, interpretation and implications for regional marker tephras. *Journal of Volcanology and Geothermal Research* 275, 114-131, http://dx.doi.org/10.1016/j.jvolgeores.2014.02.015.

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Wang, Y., Shyu, J. B. H., Sieh, K., Chiang, H.-W., Wang, C.-C., Aung, T., Lin, Y.-n. N., Shen, C.-C., Min, S., Than, O., Lin, K. K., and Tun, S. T. (2013). Permanent upper plate deformation in western Myanmar during the great 1762 earthquake: Implications for neotectonic behavior of the northern Sunda megathrust. *Journal of Geophysical Research: Solid Earth* 118, 1277-1303, doi: 10.1002/jgrb.50121

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Daryono, M. R., Natawidjaja, D. H., and Sieh, K. (2012) Twin-Surface Ruptures of the March 2007 M > 6 Earthquake Doublet on the Sumatran Fault: Bulletin of the Seismological Society of America, v. 102, p. 2356-2367.

Wiseman, K., Banerjee, P., Burgmann, R., Sieh, K., Dreger, D. S., and Hermawan, I. (2012) Source model of the 2009 Mw 7.6 Padang intraslab earthquake and its effect on the Sunda megathrust. *Geophysical Journal International* 190, 1710-1722.

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Hill, E. M., Borrero, J. C., Huang, Z., Qiu, Q., Banerjee, P., Natawidjaja, D. H., Elosegui, P., Fritz, H. M., Suwargadi, B. W., Pranantyo, I. R., Li, L., Macpherson, K. A., Skanavis, V., Synolakis, C. E., and Sieh, K. (2012) The 2010 Mw 7.8 Mentawai earthquake: Very shallow source of a rare tsunami earthquake determined from tsunami field survey and near-field GPS data. J. Geophys. Res. 117, B06402. 10.1029/2012JB009159

Philibosian, B., Sieh, K., Natawidjaja, D. H., Chiang, H.-W., Shen, C.-C., Suwargadi, B. W., Hill, E. M., and Edwards, R. L. (2012) An ancient shallow slip event on the Mentawai segment of the Sunda megathrust, Sumatra. *J. Geophys. Res.* 117, B05401.

Meltzner, A. J., Sieh, K., Chiang, H.-W., Shen, C.-C., Suwargadi, B. W., Natawidjaja, D. H., Philibosian, B., and Briggs, R. W. (2012). Persistent termini of 2004- and 2005-like ruptures of the Sunda megathrust. *J. Geophys. Res.* 117, B04405, DOI: 10.1029/2011JB008888

Li, L. L., Huang, Z. H., Qiu, Q., Natawidjaja, D. H., and Sieh, K. (2012) Tsunami-induced coastal change: scenario studies for Painan, West Sumatra, Indonesia: Earth Planets and Space, v. 64, p. 799-816.

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Wiseman, K., Banerjee, P., Sieh, K., Bürgmann, R., and Natawidjaja, D. H. (2011) Another potential source of destructive earthquakes and tsunami offshore of Sumatra. *Geophys. Res. Lett.* 38, L10311

Wang, Y., Sieh, K., Aung, T., Min, S., Khaing, S. N., and Tun, S. T. (2011). Earthquakes and slip rate of the southern Sagaing fault: insights from an offset ancient fort wall, lower Burma (Myanmar). *Geophysical Journal International* 185, 49-64, 10.1111/j.1365-246X.2010.04918.x.

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Yu-nung Nina Lin,Kerry Sieh,and Joann Stock, (2010) "Submarine landslides along the Malacca Strait-Mergui Basin shelf". *J. Geophys. Res.*, Vol.115, Issue B12102, 5, 10.1029/2009JB007050

Meltzner, A. J., K. Sieh, H.-W. Chiang, C.-C. Shen, B. W. Suwargadi, D. H. Natawidjaja, B. E. Philibosian, R. W. Briggs, and J. Galetzka,, (2010) "Coral evidence for earthquake recurrence and an A.D. 1390–1455 cluster at the south end of the 2004 Aceh–Andaman rupture". *J. Geophys. Res.*,Vol. 115, B10402, 10.1029/2010JB007499

2009

Mériaux, A.-S., Sieh, K., Finkel, R. C., Rubin, C. M., Taylor, M. H., Meltzner, A. J., and Ryerson, F. J., (2009) "Kinematic behavior of southern Alaska constrained by westward decreasing postglacial slip rates on the Denali Fault, Alaska". *J. Geophys. Res.*, Vol.114, B03404. 10.1029/2007JB005053

Megawati, K., Shaw, F., Sieh, K., Huang, Z., Wu, T.-R., Lin, Y., Tan, S. K., and Pan, T.-C., (2009) "Tsunami hazard from the subduction megathrust of the South China Sea: Part I. Source characterization and the resulting tsunami". *J. Asian Earth Sciences*, Vol.36, p.13-20. doi:10.1016/j.jseaes.2008.11.012

2008

Shyu, J. B. H., Sieh, K., Chen, Y.-G., Chuang, R. Y., Wang, Y., and Chung, L.-H., (2008) "Geomorphology of the Southernmost Longitudinal Valley fault: Implications for evolution of the active suture of eastern Taiwan". *Tectonics*, Vol.27, p.TC1019. doi:10.1029/2006TC002060

Shen, C.-C., Li, K.-S., Sieh, K., Natawidjaja, D., Cheng, H., Wang, X., and Kilbourne, K.H., (2008) "Variation of initial 230Th/232Th and limits of high precision U-Th dating of shallow-water corals". *Geochimica et Cosmochimica Acta*, Vol.72, Issue 17, p.4201-4223. 10.1016/j.gca.2008.06.011

Briggs, R. W., Sieh, K., Amidon, W. H., Galetzka, J., Prayudi, D., Suprihanto, I., and Farr, T. G., (2008) "Persistent elastic behavior above a megathrust rupture patch: Nias island, West Sumatra". *J. Geophys. Res.*, Vol.113, p.B12406. doi:10.1029/2008JB005684

Konca, A. O., Avouac, J.-P., Sladen, A., Meltzner, A. J., Sieh, K., Fang, P., and Helmberger, D. V., (2008) "Partial rupture of a locked patch of the Sumatra megathrust during the 2007 earthquake sequence". *Nature*, Vol.456, p.631-635. 10.1038/nature07572

2008

Sieh, K., Natawidjaja, D. H., Meltzner, A. J., Shen, C.-C., Cheng, H., Li, K.-S., and Edwards, R. L., (2008) "Earthquake Supercycles Inferred from Sea-Level Changes Recorded in the Corals of West Sumatra". *Science*, Vol.322, p.1674-1678. 10.1126/science.1163589

Taylor, M. H., Leprince, S., Avouac, J.-P., and Sieh, K., (2008) "Detecting co-seismic displacements in glaciated regions: An example from the great November 2002 Denali earthquake using SPOT horizontal offsets". *Earth and Planetary Science Letters*, Vol.270,, p.209-220.

Chlieh M., Avouac, J. -P., Sieh, K., Natawidjaja, D.H., and Galetzka, J., (2008) "Heterogeneous coupling of the Sumatran megathrust constrained by geodetic and paleogeodetic measurements". *J. Geophys. Res.*, Vol.113, p.B05305. doi:10.1029/2007JB004981

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Bilek, S.L., Satake, K., and Sieh, K., (2007) "Introduction to the Special Issue on the 2004 Sumatra-Andaman Earthquake and the Indian Ocean Tsunami". *Bull. Seismol. Soc. America*, Vol.97, Issue 1A, p.S1-S5. doi:10.1785/0120050633

Konca, A. O., Hjorleifsdottir, V., Song, T-R. A., J-P. Avouac, Helmberger, D. V., Chen, J., Sieh, K. Briggs, R., and Meltzner, A., (2007) "Rupture Kinematics of the 2005, Mw 8.6 , Nias-Simeulue Earthquake from the Joint Inversion of Seismic and Geodetic data". *Bull. Seismol. Soc. America*, Vol.98, Issue 1A, p.S307-S322. 10.1785/0120050632

Chlieh, M., Avouac, J-P., Hjorleifsdottir, V., Song, T-R. A., Chen, J., Sieh, K., and Galetzka, J., (2007) "Coseismic Slip and Afterslip of the Great (Mw9.15) Sumatra-Andaman Earthquake of 2004". *Bull. Seismol. Soc. America*, Vol.97, Issue 1A, p.S152-S173. 10.1785/0120050631

Natawidjaja, D.H., Sieh, K., Galetzka, J., Suwargadi, B., Cheng, H., and Edwards, R.L., (2007) "Interseismic deformation above the Sunda megathrust recorded in coral microatolls of the Mentawai islands, West Sumatra". *J. Geophys. Res.*, Vol.112, p.B02404. doi:10.1029/2006JB004450

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Shyu, J.B.H., Chung, L.-H., Chen, Y.-G., Lee, J.-C. and Sieh, K., (2007) "Re-evaluation of the surface ruptures of the November 1951 earthquake series in eastern Taiwan, and its neotectonic implications.". *J. Asian Earth Sciences*, Vol.31,, p.317-331.

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2006

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Subarya, C., Chlieh, M., Prawirodirdjo, L., Avouac, J.-P., McCaffrey, R., Bock, Y., and Sieh, K., (2006) "Plate boundary deformation associated with the great Aceh-Andaman earthquake.". *Nature*, Vol.440,, p.46-51. 10.1038/nature04522

Briggs, R., Sieh, K., Meltzner, A., Natawidjaja, D., Galetzka, J., Suwargadi, B., and Bock, Y., (2006) "Deformation and slip along the Sunda megathrust in the Great 2005 Nias-Simeulue Earthquake". *Science*, Vol.311, p.1897-1901. 10.1126/science.1122602

Natawidjaja, D., Sieh, K., Chlieh, M., Galetzka, J., Suwargadi, B., Cheng, H., and Ward, S., (2006) "Source parameters of the great Sumatran megathrust earthquakes of 1797 and 1833 inferred from coral microatolls". *J. Geophys. Res.*, Vol.111, p.B06403. doi:10.1029/2005JB004025

Sieh, K., (2006) "Sumatran Megathrust Earthquakes - From Science to Saving Lives". *Phil. Trans. R. Soc. London*, Vol.364, Issue 1845, p.1947 - 1963. 10.1098/rsta.2006.1807

Hsu, Y.-J., Simons, M., Avouac, J.-P., Galetzka, J., Sieh, K., Chlieh, M., Natawidjaja, D.H., Prawirodirdjo, L., Bock, L., (2006) "Frictional afterslip following the Mw 8.7, 2005 Nias-Simeulue earthquake, Sumatra". *Science*, Vol.312, p.1921-1926. 10.1126/science.1126960

Van der Woerd J., Klinger, Y., Sieh, K., Tapponnier, P., Ryerson, F. J., Mériaux, A.-S., (2006) "Long-term slip rate of the southern San Andreas Fault from 10 Be- 26 Al surface exposure dating of an offset alluvial fan". *J. Geophys. Res.*, Vol.111, p.B04407. doi:10.1029/2004JB003559

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Sieh, K., (2005) "How Science Can Save Lives: Special Report". *Time Asia Magazine*.

2004

Natawidjaja, D., Sieh, K., Ward, S., Edwards, R.L., Galetzka, J., and Suwargadi, B., (2004) "Paleogeodetic records of seismic and aseismic subduction from central Sumatran microatolls". *J. Geophys. Res.*, Vol.109, Issue B4, p.B04306. doi:10.1029/2003JB002398

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Order from: Academy Press

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