GENE A. ICHINOSE

Project Manager/Senior Scientist

Area of Expertise	Geophysics and Seismology: Seismic and Tsunami Hazard Assessment
Years of Experience	**8**
LLNL	1
URS	6
MTC	1

Education

Ph.D. 2000 Geophysics, University of Nevada Reno
B.S. 1995 Geology, San Diego State University

Overview

Dr. Ichinose obtained his Ph.D. from the University of Nevada at Reno where he completed his dissertation titled "*Seismicity and Stress Transfer Studies in Eastern California and Nevada: Implications for Earthquake Sources and Tectonics*." He also worked at the Lawrence Livermore National Laboratory, Geophysics and Global Security Division in 1999 while finishing his Ph.D. He joined URS in 2000 as an assistant project seismologist and has been active in earthquake source, tsunami modeling, and crustal structure research for several projects. He has 6 years of experience in managing and consulting on projects for the U.S. Geological Survey, U.S. Bureau of Reclamation, Institute Geological and Nuclear Sciences, New Zealand, Geosciences Austrailia, the Japanese Ministry of Education Culture Sports Science and Technology, Geological Survey of Israel, Defense Threat Reduction Agency, National Nuclear Security Administration, Air Force Research Laboratory and for many private industry and public utility clients. Dr. Ichinose now works for MTC Technologies, Inc. in the Treaty Monitoring Division at the Air Force Technical Applications Center.

Project Experience

Assistant Project Seismologist, Ground Truth Locations - A synergy of seismic and INSAR methods, Defense Threat Reduction Agency, National Nuclear Security Administration, Air Force Research Laboratory, (2001-2006). Many products used to improve the location of earthquakes in regions of sparse seismic station coverage, including Asia and Africa, requires the accurate location of validation events. Without enough data from man-made explosions, we instead used earthquakes that generate very small surface ground displacements observed by space satellites using radar to improve the number of events in the validation catalogs. These validation catalogs are improving the products used in the monitoring of nuclear explosions.

Assistant Project Seismologist, Rupture Process of the 1944 Tonankai, 1946 Nankaido, 1943 Tottori, and 1948 Fukui Earthquakes, Ohsaki Research Institute (2000-2004). We used historical seismograms recorded by low-gain seismographs to understand the spatial and temporal distribution of slip for several damaging earthquakes in Japan. We included geodetic trilateration data and tide gauge records to improve the constraints on these models. The project was very important for the Japanese government in preparation of its Tokai-gap seismic hazard reevaluation.

Assistant Project Seismologist, Validation of nonlinear effective stress analysis approach in preparation for seismic stability evaluation for North Haiwee and Tinemaha Dams (2001). Consulted on the use and quality control of the Pleasant Valley strong ground motion records as time histories for the seismic stability of Dams in southern California.

Project Seismologist, Source characteristics of modern and historical in-slab

earthquakes applicable to strong motion modeling, U.S. Geological Survey (2002) $50,000. We used historical records recorded by regional and global seismographs to understand the rupture process of large intraslab earthquakes that occurred in the Puget Sound region since 1930's. We also inverted local strong motion, teleseismic and geodetic data for the slip distribution of the recent 2001 Nisqually, Washington Earthquake. This project provides useful source parameter constraints on ground motion modeling of 3D basin effects and source scaling relationships. The study also provided additional importance of 3D basin edge effects in ground motion modeling.

Assistant Project Seismologist, Crustal Structure of Central Honshu, Japan Using Iterative Waveform Inversion Method, GeoResearch Institute (2003). In the revision of the national seismic hazard assessment, the Japanese are concerned with unidentified earthquakes including the 1984 Nagano (M 6.4) earthquake. We used an iterative waveform inversion method to develop 1D path specific velocity models for calibrating Green's functions used in the kinematic and dynamic modeling of the Nagano earthquake source. These new velocity models help identify that the major region of moment release was shallow which may have contributed to the earthquake characterization of an unknown but potentially damaging source.

Project Seismologist, Simulation of tsunamis and lake seiches for Pleistocene Lake Lisan and for the Modern Dead Sea, Geological Survey of Israel (2003) $10,000. In collaboration with the GSI, we simulated the possibilities of tsunamis triggered by earthquakes within the Dead Sea and Pleistocene Lake Lisan. The tsunamis may have been an alternative to climatic changes as a method by which gypsum is precipitated within the lake thereby creating vast sedimentary deposits. Since the dates of deposition appear to occur near the dates of historical earthquakes, their potential use in more accurate earthquake dates provides the longest catalog of historical earthquakes going back more than 50,000 years.

Consulting Geophysicist, Ohakuri Dam Project, Institute Geological Nuclear Sciences, New Zealand (2003). We consulted on the results of an earthquake generated ground deformation study for New Zealand dams.

Consulting Geophysicist, ILO project-Analysis of the tsunami generated by the 2001 Mw 8.2 Arequipa Peru Earthquake, ABSG Consulting Inc., (2003). We provided a case proving that ground motions were unusually large at a specific site of interest due to the earthquake source and not site or path effects. I provided constraints on source models using the tsunami that was generated by the earthquake. The tsunami wave arrival times favored the larger source model that would explain the damage at the site of interest thereby ruling out the case for poor construction or design.

Project Seismologist, Ground motion studies of modern and historical Cascadia intraslab earthquakes using one and three dimensional waveform modeling methods to generate shake-maps, U.S. Geological Survey (2004) $44,213. We continued to use historical records recorded by regional and global seismographs to understand the rupture process of large intraslab earthquakes that occurred in the Puget Sound region since 1930's. This project improved source parameters for the 1949 Olympia (Mw 6.8; M 7.1) earthquake.

Assistant Project Seismologist, Crustal Velocity Structure and Source Model-December 23, 2003 San Simeon Earthquake, Pacific Gas & Electric (2004). The main focus of this project is to provide a comprehensive source model for the

San Simeon earthquake that best fits all available geophysical datasets. The project already provides a compelling case that the earthquake initiated at a deeper depth than initially reported. This has implications against the potential existence of thrust ramps that might extend beneath a nearby nuclear power plant.

Project Seismologist, Ground Motion Attenuation Relations for the Intermountain West, USGS, National Earthquake Hazards Reduction Program, (2006) $50,000. Provide input and consultation on earthquake source parameters for broadband hybrid simulation method to compute synthetic ground motions and attenuation relations for the next U.S. National Seismic Hazard Maps.

Project Seismologist, Rupture Process of the 1964 Prince William Sound Alaska Earthquake Using Teleseismic Body-waves, Geodetic Displacements, and Tsunami Records, U.S. Bureau of Reclamation (2004-2005) $39,581. The main focus of this project is to provide the bureau with the needed constraints on near source ground motions for dams in the Pacific northwest where large megathrust (M 9) subduction zone earthquakes have occurred but because of the lack of observations, the hazards from such earthquakes are difficult to access.

Project Manager, Simulating forward and backward scattering in viscoelastic 3D media with random velocity variations and basin structure, USGS, National Earthquake Hazards Reduction Program, (2006) $51,853. Investigate the effect of layered geological basin structure on the effect of seismic coda in 1D, 2D, and 3D media using the f-k reflectivity and finite-difference methods. Modify the broadband hybrid simulation method to include a stochastic coda effect at high frequencies for improving the calculation of strong ground motions.

Consultant, Diablo Canyon Power Plant Tsunami Hazard Assessment, Pacific Gas and Electric, (2005-?) $150,000. Deterministic modeling and Probabilistic Hazard Analysis of tsunami generated by local, regional, and far-field earthquakes as well as local and regional landslide sources.

Consultant, Tsunami Early Warning and Hazard Assessment, Geoscience Australia, (2005-2006) $159,000. Develop and implement a system for tsunami early warning, and to assess the tsunami hazard in Australia due to local and distant earthquake sources. Some of the highlights of this project include, validation of procedure to predict tsunami wave height from earthquake slip models, using the 2004 and 2005 earthquakes in Sumatra, transfer capabilities in rapid near real-time moment tensor determination for large subduction earthquakes. Transfer capabilities in rapid near real-time slip model determination for large subduction earthquakes, provide libraries of Green's functions for GA's use in tsunami simulation, validate a procedure for PTHA calculation using the NE Indian Ocean area surrounding Sumatra, test calculations of PTHA, and technology transfer.

Consultant, Port of Long Beach Liquid Natural Gas Environmental Impact Report, URS (2006) $5,040. Consult on the impact of seiche and tsunami hazards at the proposed POLB-LNG facility.

Project Manager, Source and 1D Crustal Structure Inversion Codes, Point Source Methods, Ohsaki Research Institute, Japan, (2006) $24,000. Provide computer programs, technical and scientific support for the regional-wave point source moment tensor inversion and iterative waveform inversion method.

Review of New Zealand tsunami hazard study by GNS, IAG Reinsurance

(2006) $14,887. Provide consultation and tsunami modeling for validating the New Zealand tsunami hazard report by GNS released in 2005.

Professional Societies

American Geophysical Union (1994), Seismological Society of America (1994), Earthquake Engineering Research Institute (2000), Seismological Society of Japan (2001)

Awards

1999 Student of the Year in Geophysics, University of Nevada Reno, 1993 Baylor Brooks Scholarship in Historical Geology, San Diego State University

Publications

Ichinose, G. A., and P. Goldstein, Inversion of far-regional broadband P-waves for the estimation of source parameters from shallow earthquakes, J. Geophys. Res., 112, B02304, doi:10.1029/2006JB004724, 2007.

Ichinose, G. A., P. G. Somerville, H. K. Thio, R. W. Graves, and D. O'Connell, Rupture process of the 1964 Prince William Sound, Alaska earthquake from the combined inversion of seismic tsunami and geodetic data, J. Geophys. Res., (in press), 2007.

Ichinose, G. A., H. K. Thio, and P. G. Somerville, Moment tensor and rupture model for the 1949 Olympia, Washington, earthquake and scaling relations for Cascadia and global intraslab earthquakes, *Bull. Seismol. Soc. Am*., 96(3), 10.1785/0120050132, 1029-1037, 2006.

Saikia, C. K., A. Pitarka, and G. A. Ichinose, Effects of Irregular Structure of the Mississippi Embayment on Ground Motion Amplification, *Bull. Seismol. Soc. Am.,* 96(4A), doi: 10.1785/0120050113, 1448-1473, 2006.

Somerville, P., W. P. Graf, H. K. Thio, and G. Ichinose, Tsunami Risk – What Insurers and reinsurers need to know, *Journal of Reinsurance* 12(3), 59-72, 2005.

Ichinose, G. A., P. G. Somerville, H. K. Thio, S. Matsushima, T. Sato, Rupture process of the 1948 Fukui Earthquake (M 7.1) from the joint inversion of seismic waveform and geodetic data, *J. Geophys. Res*., 110(B05301), doi:10.1029/2004JB003437, 2005.

Ammon, C. J., J. Chen, H. K. Thio, D. Robinson, S. Ni, V. Hjorleifsdottir, H. Kanamori, T. Lay, S. Das, D. Helmberger, G. Ichinose, J. Polet, D. Wald, Rupture Process of the Great 2004 Sumatra-Andaman Earthquake, *Science*, 308, 1133-1139, 2005.

Begin, Z. B., D. M. Steinberg, G. A. Ichinose, S. Marco, A 40,000 year unchanging seismic regime in the Dead Sea rift, *Geology*, 33(4), 257-260, doi:10.1130/G21115.1, 2005.

Ichinose, G. A., and Z. B. Begin, Simulation of Tsunamis and Lake Seiches for the Late Pleistocene Lake Lisan and the Dead Sea, The Ministry of National Infrastructures, Geological Survey of Isreal, Report GSI/7/04, Jerusalem, Israel, 2004.

Schweickert, R. A., M. M. Lahren, K. D. Smith, J. F. Howle, and G. A. Ichinose, Transtensional deformation in the Lake Tahoe region, California and Nevada, USA, *Tectonophysics*, **388**(1), 245, doi:10.1016/j.tecto.2004.04.019, 2004.

Ichinose, G. A., H. K. Thio, P. G. Somerville, Rupture process and near source shaking of the 1965 Seattle-Tacoma and 2001 Nisqually intraslab earthquakes, *Geophys. Res. Lett.*, **31**, L10604, doi: 10.1029/ GL019668, 2004.

Ichinose, G. A., H. K. Thio, P. G. Somerville, T. Sato, and T. Ishii, Rupture process for the 1944 Tonankai earthquake from the inversion of teleseismic and regional seismograms, *J. Geophys. Res.*, **108**(B10), 2497, doi: 10.1029/2003JB002393, 2003.

Ichinose, G. A., J. G. Anderson, K. D. Smith, and Y. Zeng, Source parameters of eastern California and western Nevada earthquakes from regional moment tensor inversion, *Bull. Seism. Soc. Am.,* **93**, 61-84, 2003.

Saikia, C, H. K. Thio, G. A. Ichinose, P. Bodin, J. Polet, and P. G. Somerville, Bhuj, India Earthquake of January 26, 2001, Reconnaissance Report, Editors: S. K. Jain, W. R. Lettis, C. V. R. Murty, J. P. Bardet, Earthquake Spectra, supplement Vol. 18, Pub# 2002-01, 23-43, 2002.

Ichinose, G. A., K. Satake, J. G. Anderson, R. A. Schweickert, and M. M. Lahren, The potential hazard from tsunami and seiche waves generated by large earthquakes within Lake Tahoe, California-Nevada, *Geophys. Res. Lett.,* **27**, 1203-1206, 2000.

Ichinose, G. A., P. Goldstein, A. J. Rodgers, Relative importance of near-, intermediate-, and far-field displacement terms in layered earth synthetic seismograms, *Bull. Seism. Soc. Am.,* **90**, 531-536, 2000.

Goldstein, P., D. Dodge, G. Ichinose, A. Rodgers, J. Bhattacharyya, and R. Leach, Depth and source mechanism estiamtion for special event analysis, event screening, Lawrence Livermore National Laboratory, Livermore, California, Report UCRL-JC-134309, 1999.

Ichinose, G. A., K. D. Smith and J. G. Anderson, Seismic Analysis of the 7 January 1998 Chemical Plant Explosion at Kean Canyon, Nevada, *Bull. Seismo. Soc. Am.,* **89**, 938-945, 1999.

Ichinose, G. A., J. G. Anderson, K. D. Smith, D. dePolo, R. Anooshehpoor, R. Schweickert, and M. Lahren, The Seismotectonics of the 30 October 1998 Incline Village, Nevada Earthquake and its Effects, *Seism. Res. Lett.,* **70**, 297-305, 1999.

Ichinose, G. A., K. D. Smith and J. G. Anderson, Moment Tensor inversions of the 1994 to 1996 Double Spring Flat, Nevada Earthquake Sequence and implications for local tectonic models, *Bull. Seismo. Soc. Am.,* **88**, 1363-1378, 1998.

Louie, J., G. Shields, G. Ichinose, M. Hasting, G. Plank, and S. Bowman, Shallow geophysical constraints on displacement and segmentation of the Pahrump Valley fault zone, Proceedings Volume Seismic Hazards in the Las Vegas Region conference, *Nevada Bureau Mines Geol., Open-File Rpt., 98-6*, 79-85, 1998.

Ichinose, G. A., K. D. Smith, and J. G. Anderson, Source parameters of the 15 November 1995 Border Town earthquake sequence, *Bull. Seism. Soc. Am.,* **87**, 652-667, 1997.

Ichinose, G. A., S. M. Day, H. Magistrale, T. Prush, F. Vernon and A. Edelman, Crustal thickness variation beneath the Peninsular Ranges, southern California, *Geophys. Res. Lett.,* **23**, 3095-3098, 1996.