

## OLIVER S. BOYD

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### EDUCATION

#### University of Colorado at Boulder

PhD Geophysics	2000 - 2004
MS Geology	1995 - 1997
BA Geology emphasis in Geophysics	1991 - 1995

### WORK EXPERIENCE

#### *RESEARCH*

**Research Geophysicist** May 2007 - present

#### United States Geological Survey

- Study seismic hazards related to the Central and Eastern United States.

#### Mendenhall Postdoctoral Fellow

October 2004 – May 2007

#### United States Geological Survey

- Investigate time-dependent probabilistic seismic hazard resulting from viscoelastic stress transfer, plate loading, characteristic earthquake recurrence intervals, and additional fault processes and implement new understanding for time-dependent probabilistic seismic hazard maps of Alaska, Indonesia and Afghanistan.
- Investigate absolute shear stresses on faults before and after earthquakes to better understand physical bases for time-dependent earthquake probabilities.
- Produce time-independent probabilistic seismic hazard maps for Alaska, Indonesia and Afghanistan.
- Administrate 80 node Opteron cluster and develop MPI applications to further research in probabilistic seismic hazards.

#### Research Assistant, Dept. of Geology and CIRES, University of Colorado at Boulder

August 2004 to October 2004

- Applied conversion point stacking and Kirchhoff migration techniques to a New Zealand broadband seismic dataset to image subducting Pacific Plate structure.

#### Graduate Research Assistant, Dept. of Geology and CIRES, University of Colorado at Boulder

August 2000 to August 2004

- Performed seismic velocity and attenuation tomography in the upper mantle beneath the Rocky Mountains and Sierra Nevada to predict mantle lithosphere temperatures and compositions. Investigated seismic anisotropy and receiver functions across the Alpine fault of New Zealand to assess extent and style of lithospheric deformation as well as subducting slab and transition zone structure.
- Calculated delay times and integrated attenuation factors,  $t^*$ , through cross-correlation and calculation of multitaper spectral estimates. These methods require the use of SAC, Matlab, and additional programs written in C, Awk, and C shell on Solaris

platforms.

- Managed acquisition and maintenance of passive seismic arrays on the south island of New Zealand for three months.

**Lab/Graduate Research Assistant, Dept. of Geology and CIRES, University of Colorado at Boulder**      January 1993 to December 1997

- Studied the effects of fluids and pore surface properties on seismic propagation in porous media.
- Programmed data acquisition software in Basic and Matlab on DOS based PC's.
- Worked with piezo-electric transducers, amplifiers, waveform generators, oscilloscopes, and interferometers.
- Machined parts for attenuation apparatus.

**TEACHING**

**Instructor, Colorado School of Mines**      Fall 2005 – Spring 2007

- PAGN-279 Handball – Cover the basics of the historic and exceptionally rewarding sport of handball, emphasizing symmetric body conditioning, nutrition, and sportsmanship.

**Guest Lecturer, Coal Creek Elementary School**      2004

- Teach 4th graders very basic concepts in geology including a simple introduction to plate tectonics and rock types.

**Teaching Assistant, Dept. of Geology, University of Colorado at Boulder**      September 2003 to December 2003

- GEOL 1110 Global Change Laboratory – Weekly field lectures covering local geology and laboratory facilities with respect to climate change. An emphasis is given to the scientific method in geology as well as basic vocabulary and concepts in the geological sciences.

**Instructor, Dept. of Geology, University of Colorado at Boulder**      Fall 2002

- Introduction to Scientific Programming – Five one hour sessions introducing the Matlab and C programming languages utilizing examples appropriate to scientific investigation such as numerical techniques including finite differences.

**INDUSTRY**

**Geophysicist, Western Geophysical**      January 1998 to August 2000  
January 1999 to August 2000

- Performed quality control on 3D seismic surveys in Algeria and Egypt.
- Used Western Geophysical's seismic planning software, SPECS, to preplan and monitor the progress of seismic surveys. Used Western Geophysical's processing software, OMEGA, to verify and partially process seismic data. Used additional Western software packages to process upholes, DGPS data, and vibrator output.
- Improved quality control procedures by developing scripts written in C Shell, Korn Shell, and Awk and programs written in C, C++, and Microsoft Visual Basic to make field based quality control more effective. Some of these procedures are being

considered for use in OMEGA.

January 1998 to January 1999

- Worked with the Applied Technology group testing and supporting Western Geophysical's seismic survey design software, SPECS, on AIX. Began working on a first break picking program for Windows. It is written in C++ using the Microsoft Visual C++ platform and is currently in use on Western land seismic crews.

Job Training

- AIX Basic System Administration
- Health, Safety, Environment - Land Seismic
- Teamwork Skills

**Technician, Geo-Insight, Inc.**

May 1996 to December 1997

- Loaded client's seismic and well data into multiple geological software platforms on networked Sun and SGI workstations.
- Wrote scripts in C Shell, Korn Shell, and Awk to help manage clients' data.
- Dealt with security issues concerning clients' data.

## RESEARCH GRANTS

CIRES Graduate Research Fellowship

Sept. 2002 – Aug. 2003

RMAG Student Scholarship

Fall 2001

Bill Hiss Travel Grant

2001, 2002, 2003

Jeffrey Dean Memorial Scholarship

Spring 2004

## PUBLICATIONS

**Boyd, O. S.**, M. K. Savage, C. H. Jones, and A. F. Sheehan, Illuminating upper mantle structure beneath Cook Strait, New Zealand, with receiver functions, *Journal of Geophysical Research*, *in press*.

**Boyd, O. S.**, C. S. Mueller, and K. S. Rukstales, Preliminary probabilistic seismic hazard map for Afghanistan, U. S. Geological Survey Open File Report 2007-1137, 2007.

Wesson, R. L., and **O. S. Boyd**, Stress before and after the 2002 Denali fault earthquake, *Geophysical Research Letters*, 34, L07303, doi:10.1029/2007GL029189, 2007.

Wesson, R. L., **O. S. Boyd**, C. S. Mueller, C. G. Bufe, A. D. Frankel, and M. D. Petersen, Revision of time-independent probabilistic seismic hazard maps for Alaska, U. S. Geological Survey Open File Report 2007-1043, 2007.

**Boyd, O. S.**, An efficient Matlab script to calculate heterogeneous anisotropically elastic wave propagation in three dimensions, *Computers and Geosciences*, 32 (2), 259-264, 2006.

**Boyd, O. S.**, and A. F. Sheehan, Attenuation tomography beneath the Rocky Mountain Front: Implications for the physical state of the upper mantle, in *AGU Monograph: The Rocky Mountain Region: An Evolving Lithosphere*, edited by K. E. Karlstrom, and G.

R. Keller, 361-377, 2005.

Sheehan, A. F., V. Schulte-Pelkum, **O. S. Boyd**, and C. K. Wilson, Passive source seismology of the Rocky Mountain Region, in *AGU Monograph: The Rocky Mountain Region: An Evolving Lithosphere*, edited by K. E. Karlstrom, and G. R. Keller, 309-315, 2005.

**Boyd, O. S.**, The heterogeneous upper mantle: Insights from seismology, *Doctoral Dissertation*, University of Colorado, 147 pp., 2004.

Wilson, C. K., C. H. Jones, P. Molnar, A. F. Sheehan, and **O. S. Boyd**, Evidence for continuous deformation in the lower crust and upper mantle beneath a continental strike-slip fault zone: Marlborough fault system, South Island, New Zealand, *Geology*, 32 (10), 837-840, 2004.

**Boyd, O. S.**, C. H. Jones and A. F. Sheehan, Foundering lithosphere imaged beneath the southern Sierra Nevada, California, USA, *Science*, 305, 660-663, 2004.

Schuett, H., J. Khoeler, **O. S. Boyd**, and H. Spetzler, Seismic attenuation in partially saturated dime-shaped cracks, *Pure and Applied Geophysics*, 157 (3), 435-448, 2000.

**Boyd O. S.**, Effects on seismic absorption due to changed pore surface properties resulting from exposure to propanol: A study utilizing artificial glass cracks, *Masters Thesis*, University of Colorado, 121 pp., 1997.

Moerig, R., W. Waite, **O. S. Boyd**, I. Getting, and H. Spetzler, Seismic attenuation in artificial glass cracks: Physical and physicochemical effects of fluids, *Geophysical Research Letters*, 23, 2053-2056, 1996.

#### MANUSCRIPTS SUBMITTED AND IN PREPARATION

Bufe, C. G., and **O. S. Boyd**, Fault interaction in Alaska: Coulomb stress transfer, submitted to AGU monograph on tectonics of Alaska.

Wesson, R. L., **O. S. Boyd**, C. S. Mueller, and A. D. Frankel, Challenges in Making a Seismic Hazard Map for Alaska and the Aleutians, submitted to AGU monograph on tectonics of Alaska.

**Boyd, O. S.**, F. Pollitz, Y. Zeng, J. Hardebeck, C. G. Bufe, and R. L. Wesson, Time-dependent Probabilistic Hazard Maps for Alaska, submitted to AGU Monograph on Tectonics of Alaska.

**Boyd, O. S.** and Y. Zeng, Increased seismic hazard in northern Sumatra due to the M 9 and M 8.7 Sumatra subduction zone earthquakes, in preparation to be submitted to BSSA.

#### MEETING PRESENTATIONS (full list of abstracts available upon request)

Presenting results since 1995 at the:

Computational Infrastructure for Geodynamics Annual Meeting

American Geophysical Union Annual Meeting

Seismological Society of America Annual Meeting  
Incorporated Research Institutions for Seismology Annual Meeting  
Southern California Earthquake Center Annual Meeting  
American Geophysical Union Chapman Conference on Alaskan Tectonics  
Gordon Conference on the Interior of the Earth