

## **LESLIE JEAN SONDER**

**Born** 4 May 1959; Oak Ridge, Tennessee

### **Current address**

Department of Earth Sciences  
Dartmouth College  
Hanover, NH 03755  
(603) 646-2372

16 Iris Way  
White River Junction, VT 05001  
(802) 296-7752

### **Education**

A.B., summa cum laude, May 1981, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO

Thesis: Temperature measurement in diamond-anvil high pressure cells

Advisor: Kenneth Goettel

Ph.D., November 1986, Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA

Thesis: Thermal and mechanical models of continental deformation

Advisor: Philip England

### **Research interests**

Thermal and mechanical evolution of the continental lithosphere; continental deformation; mathematical modelling; investigation of recent or active deformation using paleomagnetic, geodetic, and other geological and geophysical techniques.

### **Awards and honors**

1981: W. A. Tarr and E. Oley Awards for excellence in geology, Department of Earth and Planetary Sciences, Washington University

1982: Estwing Award for excellence in geology, Department of Geological Sciences, Harvard University

1982-1985: Exxon Teaching Fellowship, Department of Geological Sciences, Harvard University

1986-1988: Chaim Weizmann Postdoctoral Fellowship, Division of Geological and Planetary Sciences, California Institute of Technology

## **Professional appointments**

September-December 2000: CIRES Visiting Fellow, University of Colorado, Boulder, CO

February-March 1999: Visiting Professor, Università Roma Tre, Rome, Italy.

July 1994-present: Associate Professor, Department of Earth Sciences, Dartmouth College, Hanover, NH

July 1988-June 1994: Assistant Professor, Department of Earth Sciences, Dartmouth College, Hanover, NH

November 1986-June 1988: Chaim Weizmann Postdoctoral Fellow in Geophysics, California Institute of Technology, Pasadena, CA

September 1981-October 1986: Research and teaching fellow, Department of Geological Sciences, Harvard University, Cambridge, MA

July-August 1982: Associate instructor, Indiana University Geologic Field Station, Cardwell, MT

January 1980-May 1981: Research assistant in experimental petrology, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO

June-August 1980: Summer Research Fellow, Oak Ridge National Laboratory, Oak Ridge, TN

## **Professional societies**

American Geophysical Union, 1981-present; Sigma Xi, 1982-present, Geological Society of America, 1989-90, 1994-1995, 2000-present.

## **Professional service**

Associate Editor, *Journal of Geophysical Research*, 1996-1999.

Member of review panel to evaluate candidates for senior research positions, Danish Lithosphere Institute, June 1998.

Member, review panel for STAR Graduate Fellowships, Environmental Protection Agency, Washington, February 1999- 2001, 2005, 2006.

Member, review panel for MARGINS Program, National Science Foundation, 2001-2002.

Reviewer for NSF proposals, *Journal of Geophysical Research*, *Geology*, *Nature*, *Bull. Geological Society of America*, *Tectonics*

Textbook reviewer, McGraw-Hill Publishing, 2002.

### **Languages**

Italian (fluent); French (reading knowledge)

### **Funded research grants**

Effects of a temperature-dependent rheology on large-scale continental extension, San Diego Supercomputer Center, 40 hours of CRAY X-MP time, June 1987-June 1988.

Relationships between exhumation and uplift: Geodynamic modelling and gravity in the northwest Himalayas, NSF EAR-9207141, June 1992-December 1994, \$11,330.

Collaborative Research: Paleomagnetic investigation of Miocene sediments in the Gale Hills, southern Nevada: Tectonics of vertical axis rotations, NSF EAR-9219299, March 1993-February 1996, \$42,221 (with C. H. Jones and S. A. Salyards).

Collaborative Research: Relating gravitational potential energy to present day strain rates in the western U.S.: Observations and models, NSF EAR 97-25755, January 1998-December 2000, \$79,422 (with C. H. Jones, U. Colorado)

### **Theses advised**

#### *Undergraduate:*

Kathy Murphy (1990-1991) Paleomagnetic investigation of vertical axis rotations in a shear zone: Las Vegas Valley Shear Zone, Southern Nevada

Logan Dent (1990-1991) Neotectonics of the Cibao basin and Nagua depression, northern Dominican Republic, from gravity and topographic data (with J. Pindell)

Erik Fuller (1990-1991) Implications for flexure of gravity modeling in the Cibao basin, northern Dominican Republic (with J. Pindell)

Stephen Thompson (1990-1992) Gravimetric analysis of Volcan Pacaya, Guatemala: Constraints on subsurface structure (Upham Prize winner)

Jeff Furr (1993-1994) A gravimetric analysis of iron oxide deposits at El Laco, Chile (with N. Oreskes)

Binh Tran (1994-1995) Gravity constraints on the suspected Powder River meteorite impact site, Wyoming.

Carol Gilchrist (1994-1995) The suspected Powder River meteorite impact site, Wyoming: Structural and well data (with G. Johnson)

Lisa Gilbert (1996-1997) Paleomagnetic investigation of the Heart Mountain Fault, Montana/Wyoming. (Upham Prize winner)

Nicholas Sherman (1998-1999) Ridge formation on Europa: Mathematical investigation of the linear diapir model. (Upham Prize winner)

Jill Haynie (2000-2001) Models for the erosional evolution of fault scarps. (Upham Prize winner)

Emily Schaller (2001-2002) Consequences of rotational bursting for the terrestrial accretion of  $^3\text{He}$  retentive interplanetary dust (with M. Sharma)

Meagan Verdeyen (2002-2003) Paleomagnetic analysis of fault motion, Sardinia, Italy.

Kevan Grimaldi (2003-2004) A gravimetric investigation of the proposed Powder River impact structure.

Vicki Allen (2005-6) At what scale can we balance the sedimentary budget (Quantifying source to sink in the Death Valley watershed) (with B. Dade)

Emily Luszcz (2007-8) Paleomagnetic constraints on fault offset and deformation in northeast Sardinia, Italy.

Rebecca Strickfaden (2009-10) Improved models for erosional evolution of fault scarps

Adrian Doran (2010-11) Triggered earthquakes in the Salton Sea area (with Z. Peng, Georgia Tech).

Mark Baum (2014-15) A distinct element model for investigating strike-slip deformation

*Graduate:*

Peter Blisniuk (Ph.D. 1996): Tectonic Evolution of the Trans-Indus Ranges, Northern Pakistan (with Gary D. Johnson)

David Townsend (MS 2000) Rheological control of Buoyancy-Driven Extension in the Rio Grande Rift

Margaret Pollock (MS 2003) Relationship between Buoyancy Forces and Deformation in the Lithosphere with Application to Colorado Plateau Uplift and Basin and Range Extension

Kim Lichtenberg (MS incomplete)

Meagan Verdeyen (MS 2005) (with B. Dade) Geophysical studies of alluvial fan geometry

### **Service (Professional community)**

Associate Editor, Journal of Geophysical Research, 1996- 1998  
NSF MARGINS Grant Proposal Panel, 2001- 2002  
EPA STAR Graduate Fellowships Panel, 1999-2001, 2005-2006

### **Service (Dartmouth)**

EARS Department Chair, 2001-2004  
EARS Undergraduate Advisor and FSP Coordinator, 2004-present  
EARS Graduate Liason, (2013-14)  
Advisory Board, Women In Science Program at Dartmouth (WISP) (1996-present)  
Advisory Board, Dartmouth Undergraduate Journal of Science (DUJS) (1999-2016)  
Organizational and Adjudicational Committee, Dartmouth Panelist, 2005-2007  
Faculty advisor, Women's crew, 2005-2013  
Faculty advisor, Triceratones, 2010-present  
Committee on Off-Campus Activities (member 2007-2010; 2014-16; chair fall 2009, spring 2010)  
Committee on Graduate Fellowships, 2011-13 (member 2011-13, chair fall 2012, winter 2013)  
Committee on Standards Review Committee, winter/spring 2008  
Committee on Standards, ad hoc member 2005-present  
Search committee for Undergraduate Judicial Affairs Director (member, winter-spring 2013)  
Advisory Committee for Assistant Dean of Graduate Advising, summer 2014  
Librarian, Dartmouth Symphony Orchestra, 2005- present  
Search committee, Dartmouth Symphony Orchestra conductor, fall 2015-spring 2016  
Various faculty and staff search committees in Earth Sciences department

### **Peer-reviewed articles**

England, P.C., Houseman, G. A., and **Sonder, L. J.**, 1985, Length scales for continental deformation in convergent, divergent, and strike-slip environments: analytical and approximate solutions for a thin viscous sheet model, *J. Geophys. Res.* 90, 3551-3557.

**Sonder, L. J.**, and England, P.C., 1986, Vertical averages of rheology of the continental lithosphere: relation to thin sheet parameters, *Earth Planet. Sci. Lett.* 77, 81-90.

**Sonder, L. J.**, England, P.C., and Houseman, G. A., 1986, Continuum calculations of continental deformation in transcurrent environments, *J. Geophys. Res.* 91, 4797-4810.

**Sonder, L. J.**, England, P.C., Wernicke, B. P., and Christiansen, R. L., 1987, A physical model for the Cenozoic extension of western North America, in *Continental Extensional Tectonics*, Coward, M. P., Dewey J. F., and Hancock, P. L., eds., *Geol. Soc. Lond. Sp. Pub.* 28, 187-201.

Wernicke, B. P., Christiansen, R. L., England, P.C., and **Sonder, L. J.**, 1987, Tectonomagmatic evolution of Cenozoic extension in the North American Cordillera, in *Continental Extensional Tectonics*, Coward, M. P., Dewey, J. F., and Hancock, P. L., eds., *Geol. Soc. Lond. Sp. Pub.* 28, 202-221.

**Sonder, L. J.**, and England, P.C., 1989, Effects of a temperature-dependent rheology on large-scale continental extension, *J. Geophys. Res.* 94, 7603-7619.

**Sonder, L. J.**, 1990, Effects of density contrasts on the orientation of stresses in the lithosphere: relation to principal stress directions in the Transverse Ranges, California, *Tectonics* 9, 761-771.

Chamberlain, C. P., and **Sonder, L. J.**, 1990, Heat producing elements and the thermal and baric patterns of metamorphic belts, *Science* 250, 763-769.

**Sonder, L. J.** and Chamberlain, C. P., 1992, Tectonic controls of metamorphic field gradients, *Earth Planet. Sci. Lett.* 111, 517-535.

**Sonder, L. J.** and Chamberlain, C. P., 1993, Reply to comment by B. Harte and T. J. Dempster: Metamorphic zones and field gradients in orogenic belts: Tectonic controls of metamorphic field gradients, *Earth Planet. Sci. Lett.* 116, 183-184.

**Sonder, L. J.**, Jones, C. H., Salyards, S., and #Murphy, K. 1994, Vertical axis rotations in the Las Vegas Valley Shear Zone: Paleomagnetic constraints on kinematics and dynamics of block rotations, *Tectonics*, 13, 769-788.

Jones, C. H., Unruh, J. R., and **Sonder, L. J.**, 1996, The role of gravitational potential energy in active deformation in the southwestern United States, *Nature*, 381, 37-41.

#Blisniuk, P. and **Sonder, L. J.**, 1998, Development of the NW-Himalayan thrust front: Implications from sediment characteristics in the Trans-Indus Ranges, northern Pakistan, *Tectonics*, 17, 766-779.

Unruh, J. R., **L. J. Sonder**, and C. H. Jones, 1998, Relation of Gravitationally-Driven Lithospheric Extension to Low Slip-Rate Faults and Regional Seismic Hazards in the Western U.S., in Lund, W.R. (ed), Proc. Volume, *Basin and Range Province Seismic Hazards Summit*, Misc. Pub, Utah Geol. Surv. 98-2, 167-179.

Jones, C. H., **Sonder, L. J.**, and Unruh, J., 1998, Lithospheric gravitational potential energy and past orogenesis: Implications for conditions of initial Basin and Range and Laramide deformation, *Geology*, 26, 639-642.

Erikson, J. P., Pindell, J. L., Karner, G., **Sonder, L. J.**, #Fuller, E., and #Dent, L., 1998, Neogene sedimentation and tectonics in the Cibao basin and northern Hispaniola: An example of basin evolution near a strike-slip-dominated plate boundary, *J. Geology*, 106, 475-494.

Feng, X., Peterson, J. C., Quideau, S.A., Virginia, R.A., Graham, R.C. **Sonder, L.J.**, and Chadwick, O.A., 1999, Distribution, accumulation, and fluxes of soil carbon in four monoculture lysimeters at San Dimas Experimental Forest, California, *Geochim. Cosmochim. Acta*, 63, 1319-1333.

**Sonder, L. J.** and Jones, C. H., 1999, Western United States extension: How the West was widened, *Ann. Rev. Earth Planet. Sci.*, 27, 417-462 (invited article).

**Sonder, L. J.** and Pockalny, R. A., 1999, Anomalously rotated abyssal hills along active transforms: Distributed deformation of oceanic lithosphere, *Geology*, 27, 1003-1006.

Jones, C. H., **Sonder, L. J.**, and Unruh, J., 1999, Lithospheric gravitational potential energy and past orogenesis: Implications for conditions of initial Basin and Range and Laramide deformation (reply to comment), *Geology*, 27, 475-476.

**Sonder, L.J.**, 2001, "Ductile shear zones as counterflow boundaries in pseudoplastic fluids" by C. J. Talbot: Discussion and theory, *J. Struct. Geol.*, 23, 149-153.

#Townsend, D. A. and **Sonder, L.J.**, 2001, Rheologic control of buoyancy-driven extension in the Rio Grande Rift, *J. Geophys. Res.* 106, 16,515-16,523.

Shu, Yong, Feng, Xiahong, Posmentier, Eric S., **Sonder, Leslie J.**, Faiia, Anthony M., Yakir, Dan, 2008, Isotopic studies of leaf water, 1. A physically based two-dimensional model for Pine Needles, *Geochim. Cosmochim. Acta*, 72.21, 5175-5188.

Shu, Y., Feng, X., Posmentier, E., Faiia, A. M., Ayers, M., Conkey, L. **Sonder**, 2008, Isotopic studies of leaf water, 2. Between-age isotopic variations in pine needles, *Geochim. Cosmochim. Acta*, 72.21, 5189-5200.

Putman, A., Posmentier, E., **Sonder, L. J.**, Feng, X. 2017, Annual variation in precipitation  $\delta^2\text{H}$  reflects vapor source region at Barrow, AK, *J. Atmos. Chem. Phys.*, 17, 4627-4639, doi:10.5194/acp-17-4627-2017.

Putman, A., Posmentier, E., Faiia, A., **Sonder, L. J.**, Feng, X., 2017, Testing a novel method for initializing air parcel back trajectories using reanalysis data, *J. Atmos. Ocean Tech.*, 34, 2393-2405, 2017, doi: 10.1175/JTECH-D-17-0053.1

B. G. Kopec , X. Feng , E. S. Posmentier, L. J. Sonder, 2018, Seasonal deuterium excess variations of precipitation at Summit, Greenland, and their climatological significance, *J. Geophysical Res.- Atmospheres*, 124, 72-91, 2018, [https://doi-org.dartmouth.idm.oclc.org/10.1029/2018JD028750](https://doi.org.dartmouth.idm.oclc.org/10.1029/2018JD028750)

Feng, X, Posmentier, ES, Sonder, LJ, and Fan, N., 2019, "Rethinking Craig and Gordon's approach to modeling isotopic compositions of marine boundary layer vapor", *Atmos. Chem. Phys.*, 19, 4005-4024, 2019, <https://doi.org/10.5194/acp-19-4005-2019>.

#PhD, MS, or BA student

### **Other publications**

**Sonder, L. J.**, 2000, Review of *Dynamic Earth: Plates, Plumes and Mantle Convection* by Geoffrey Davies, *Bull. Seismol. Soc. Amer.*, 71, 596-597 (invited).

**Sonder, L. J.**, 2003. Instructor's manual for P. Abbott, *Natural Disasters*, 4<sup>th</sup> ed., McGraw-Hill (invited).

### **Abstracts and conference presentations**

England, P. C., Houseman, G. A., and Sonder, L. J., Length scales for continental deformation in convergent, divergent, and strike-slip environments: Analytical and approximate solutions for a thin viscous sheet model, *EOS*, 65, 284 (presented at 1984 American Geophysical Union Spring Meeting, Baltimore).

Sonder, L. J., England, P. C., and Houseman, G. A., Continental deformation caused by strike-slip motion: A thin viscous sheet model, *EOS*, 65, 284, 1984 (presented at 1984 American Geophysical Union Spring Meeting, Baltimore).

Sonder, L. J. and England, P. C., Average rheologies for continental lithosphere: Relation to thin viscous sheet parameters, *EOS*, 66, 380, 1985 (presented at 1985 American Geophysical Union Spring Meeting, Baltimore).

England, P. C., Sonder, L. J., Christiansen, R. L., and Wernicke, B. P., Thermal and mechanical investigation of Basin and Range deformation (presented at Continental Extensional Tectonics meeting, Geological Society of London, Durham, England, 1985).

Sonder, L. J. and England, P. C., Average rheologies for continental lithosphere: Relation to thin viscous sheet parameters (presented at Continental Extensional Tectonics meeting, Geological Society of London, Durham, England, 1985).

Sonder, L. J. and England, P. C., Effects of a temperature-dependent rheology on the deformation of a thin viscous sheet: relation to large scale continental extension, *EOS*, 67, 1184, 1986 (presented at 1986 American Geophysical Union Fall Meeting, San Francisco).

Sonder, L., Houseman, G., and England, P., Continuum calculations of large-scale continental deformation (invited talk, presented at Computations in Geomechanics Symposium, 1987 American Society of Mechanical Engineers meeting, Cincinnati).

Sonder, L. J. and England, P.C., Effects of a temperature dependent rheology on continental extension (presented at 1987 NASA Crustal Dynamics Workshop, Jet Propulsion Laboratory, Pasadena, CA).

Sonder, L. J., Counterclockwise rotation of stresses in the Transverse Ranges, California, *EOS*, 68, 1507, 1987 (presented at 1987 American Geophysical Union Fall Meeting, San Francisco).

Sonder, L. J., Rotation of stress axes, buoyancy forces, and the Transverse Ranges (presented at 1988 NASA Crustal Dynamics Workshop, Jet Propulsion Laboratory, Pasadena, CA).



Sonder, L. J. and C. P. Chamberlain, Tectonic controls on metamorphic field gradients and a systematic parametrization of mountain belts, *Geol. Soc. Am. Abstr. with Prog.*, 21, 140 (presented at 1989 Geological Society of America annual meeting, St. Louis, MO).

Sonder, L. J., Jones, C. H., and Salyards, S. L., Paleomagnetism of Miocene rocks near the Las Vegas Valley Shear Zone, Lake Mead region, southern Nevada: Spatially variable vertical axis rotations, *EOS*, 70, 1070, 1989 (presented at 1989 American Geophysical Union Fall Meeting, San Francisco).

Salyards, S., Jones, C., and Sonder, L., Magnetostratigraphy of the lower Horse Springs formation, Lake Mead region, Nevada, and tectonic implications, *Geol. Soc. Am. Abstr. with Prog.*, 22, 80 (presented at 1990 Geological Society of America annual meeting).

Chamberlain, C. P., Sonder, L. J., and Day, H., Quantitative models of metamorphic field gradients: Applications to the New England Appalachians, prog. with abstr., 36, Geochemical Society, 1990 (presented at V. M. Goldschmidt Conference).

Sonder, L. J., and Chamberlain, C. P., 1991, Constraints on the relation of metamorphic field gradients to horizontally varying tectonic history, *EOS, supplement to 23 April issue*, 267, 1991 (presented at 1991 American Geophysical Union Spring Meeting, Baltimore).

Jones, C. H., Sonder, L. J., and Salyards, S. L., Continuum behavior of paleomagnetically determined vertical axis rotations of Miocene sedimentary rocks near Lake Mead, Nevada, *EOS, supplement to 29 Oct. issue*, 126, 1991 (presented at 1991 American Geophysical Union Fall Meeting, San Francisco).

Chamberlain, C. P. and Sonder, L. J., The effect of heat-producing elements on the evolution of the New England Appalachians, *Geol. Soc. Amer. Abstr. w. Prog., NE Sect.*, 23, 16 (presented at New England section Geological Society of America meeting, 1991).

Jones, C. H., Sonder, L. J., and Salyards, S. L., Estimates of maximum characteristic block size in zones of transcurrent deformation using paleomagnetic data, *EOS, supplement to 26 Oct. issue*, 208, 1993 (presented at 1993 American Geophysical Union Fall Meeting, San Francisco).

Salyards, S. L., Jones, C. H., and Sonder, L. J., Magnetostratigraphy and stratigraphic correlation of the Miocene age Horse Spring formation, Clark County, Nevada, and tectonic implications, *EOS, supplement to 1 Nov. issue*, 201, 1994 (presented at 1994 American Geophysical Union Fall Meeting, San Francisco).

Jones, C. H., Sheehan, A. F., Sonder, L. J., Savage, M. K. and Ozalaybey, S., Isolating crustal versus mantle sources of isostatic support of the Colorado Plateau, *EOS, supplement to 7 Nov. issue*, F619, 1995 (presented at 1995 American Geophysical Union Fall Meeting, San Francisco).

Unruh, J. R., Jones, C. H., and Sonder, L., Buoyancy forces and deformation in the western United States (presented at 1995 International Union of Geodesy and Geophysics, Boulder, CO).

Jones, C. H., Sonder, L. J., and Unruh, J. R., Implications of topography for tectonics of the southwest USA (presented at the Geological Society of America Annual Meeting, Denver, October 1996).

Unruh, J. R., Jones, C. H., and Sonder, L., Relation of gravitationally-driven lithospheric extension to low slip-rate faults and regional seismic hazards in the western U.S. (presented at Basin and Range Province Seismic Hazards Summit, Reno, NV, May 13-15, 1997).

Feng, X., Peterson, J. C., Quideau, S.A., Virginia, R.A., Graham, R.C. and Sonder, L.J. (1997) Carbon isotopes in soil carbon accumulated under four single species lysimeters at the San Dimas Experimental Forest, CA. *Geol. Soc. Amer. Abstracts with Programs*, 29, A85.

Pockalny, R. A. and Sonder, L. J., 1997 Anomalously curved abyssal hills along active transforms: Formation mechanisms and rheologic implications, *EOS*, 78, supplement to 18 Nov. issue, F727, 1997 (presented at 1997 American Geophysical Union Fall Meeting, San Francisco).

#Townsend, D. A. and Sonder, L. J., 1997, Rheological control of extension in the Rio Grande Rift, *EOS*, 78, supplement to 18 Nov. issue, F658, 1997 (presented at 1997 American Geophysical Union Fall Meeting, San Francisco)

Unruh, J. R., C. H. Jones, and L. J. Sonder, Slow, gravity-driven lithospheric extension in the Western United States, *Seismological Research Letters*, 69, p. 141, 1998.

Unruh, J. R., L. J. Sonder, L. J., and C. H. Jones, Assessing the role of buoyancy forces in seismogenic deformation of southern California, *EOS 19, supplement to 10 November issue*, F205, 1998 (presented at 1998 American Geophysical Union Fall Meeting, San Francisco).

Jones, C. H., L. J. Sonder, and J. R. Unruh, Body forces in western U. S. deformation: Engine, steering, or radio?, *EOS 19, supplement to 10 November issue*, F207, 1998 (presented at 1998 American Geophysical Union Fall Meeting, San Francisco).

Unruh, J. R. and Sonder, L. J. Buoyancy forces, plate stresses, and tectonic thickening of the Los Angeles Basin: Implications for the strength of the western Transverse Ranges lithosphere, Southern California, *EOS 20, supplement to 16 November issue*, F1002, 1999 (presented at 1999 American Geophysical Union Fall Meeting, San Francisco)

Blisniuk, P.M., Ludwig, K., Sharp, W., Ryerson, R., Sonder, L.J., Bi, S. W. Wu Z. H., Ratschbacher, L. Edwards, M., Timing and rates of late Neogene extension in central Tibet, *EOS 81, supplement to 28 Nov 2000 issue*, F1138, 2000 (presented at 2000 American Geophysical Union Fall Meeting, San Francisco)

Sonder, L. J., Half Zantop: A Dartmouth Earth Sciences Perspective Abstracts with Programs: *Geol. Soc. Amer. Abstracts with Programs*, 33, A96, 2001 (presented at 2001 Geological Society of America Meeting, Boston)

#Pollock, M, Sonder, L. J., Relationship Between Surface Strain Rates and Buoyancy Forces, presented at 2002 American Geophysical Union meeting, San Francisco.

#Lichtenberg, K, Sonder, L. J., 2004, Dynamics of Block Rotations in Strike-Slip Fault Zones: A Perspective from Distinct Element Modelling, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract GP43A-0838 (presented at 2004 American Geophysical Union meeting, San Francisco).

Pockalny, R A., Larson, R. L., Popham, C. T. , Natland, J. H., Abrams, L., Sonder, L. J., 2004, Morphology and Tectonic Evolution of Endeavor Deep, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract T13B-1355 (presented at 2004 American Geophysical Union meeting, San Francisco).

#Verdeyen, M., Dade, W., Sonder, L. 2005. A Comparison of Sediment Volumes Supplied to and Retained in Alluvial Fans of NE Owens Valley, California, US. *Eos Trans. AGU*, 86 (52), Fall Meet. Suppl., Abstract H53D-0497 TI (presented at 2005 American Geophysical Union meeting, San Francisco).

Feng, X., Shu, Y., Posmentier, E S, Sonder, L J., Yakir, D., 2007, Revisiting the Boundary Layer Leaf Water Isotopic Model, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract B33D-1580 (presented at 2007 American Geophysical Union meeting, San Francisco).

Meyer E.E., Osterberg E.C., Dade W.B., Sonder L.J., Renshaw C.E., Kelly, M.A., Hawley R.L., Chipman J.W., Mikucki J., Posmentier E.S., Moore J., 2011, Dartmouth College Earth Sciences Mobile Field Program, Fall Meet. Suppl, Abstract ED11A-0766, (presented by Meyer at American Geophysical Union, San Francisco, CA, 5-9 Dec).

Putman, A., Posmentier, E., Sonder, L, Feng, X., 2013, Annual variation of precipitation  $\delta D$  and  $\delta^{18}O$  at Barrow, AK related to seasonal shifts in moisture source Fall Meet. Suppl, Abstract PP23C-1995 (presented by Putman at American Geophysical Union meeting, San Francisco, CA, 5-9 Dec).

Putman, A., Posmentier, E., Faiia, A., Sonder, L.J., Feng, X., 2014, A Comparison of Two Methods for Initiating Air Mass Back Trajectories, Abstract PP31D-1184 (presented by Putman at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec).

Posmentier, E., Fan, N., Sonder, L., Feng, X., 2015, A Model of Atmospheric Vapor Isotopes at Their Source: the Marine Boundary Layer, Abstract PP11B-2232 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec 2015.

Feng, X., Posmentier, E., Sonder, L., Fan, N. Predictions and verification of an isotope marine boundary layer model, Abstract PP53B-1118 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec 2017.

#PhD, MS, or BA student

## **Invited lectures**

Continuum calculations of transcurrent deformation, Sandia National Laboratory, Albuquerque, NM, January 1986

Continuum calculations of transcurrent deformation, Department of Geological Sciences, Harvard University, Cambridge, MA, January 1986

Continuum calculations of transcurrent deformation, Lamont-Doherty Geological Observatory, Palisades, NY, February 1986

Continuum calculations of transcurrent deformation, Seismological Laboratory, California Institute of Technology, Pasadena, CA, March 1986

The Cenozoic extension of western North America, Seismological Laboratory, California Institute of Technology, Pasadena, CA, January 1987

The Cenozoic extension of western North America, Department of Earth Sciences, Dartmouth College, February 1987

The Cenozoic extension of western North America, Department of Geological Sciences, University of Oregon, March 1987.

The Cenozoic extension of western North America, Institute of Geophysics and Planetary Physics, Scripps Institute of Oceanography, University of California, San Diego, May 1987.

The Cenozoic extension of western North America, Department of Geology and Geophysics, University of California, Berkeley, May 1987.

The Cenozoic extension of western North America, Department of Geological Sciences, University of California, Santa Barbara, June 1987

Continuum models of continental deformation, American Society of Mechanical Engineers meeting, Cincinnati, OH, June 1987.

Effects of a temperature dependent rheology on extension, Department of Earth and Space Sciences, University of California, Los Angeles, January 1988.

Continental extension and effects of rheology, Seismological Laboratory, California Institute of Technology, May 1988.

Continental extension and a temperature dependent rheology, Department of Earth Sciences, Rensselaer Polytechnic Institute, October 1988.

What does taffy have to do with continental extension? Department of Earth Sciences, Dartmouth College, October 1988.

Effects of a temperature dependent rheology on large scale continental deformation, Department of Geological Sciences, Cornell University, March 1989.

Continuum calculations of large-scale continental extension: Effects of a temperature-dependent rheology, Symposium on use of supercomputers in the earth sciences, 28th International Geological Congress, Washington, DC, July 1989.

Controls on metamorphic field gradients, Department of Earth and Atmospheric Sciences, Massachusetts Institute of Technology, June 1991.

Rheological controls on large-scale continental extension, National Institute of Geophysics, Rome, Italy, January 1992.

Tectonic controls of metamorphic field gradients, University of Grenoble, France, February 1992.

Origins of extension in the Basin and Range, Department of Earth Sciences, University of Nevada, Reno, March 1992.

Tectonic controls of metamorphic field gradients, Department of Geology, Colorado College, October 1992.

Tectonic controls of metamorphic field gradients, Department of Geological Sciences, Brown University, December 1992.

Tectonics of vertical axis rotations, Department of Geological Sciences, Brown University, December 1992.

Paleomagnetic constraints on the tectonics of vertical axis rotations; Deformation along the Las Vegas Valley Shear Zone, Southern Nevada, USA, National Institute of Geophysics, Rome, Italy, February 1993.

Doing the twist: Constraints on crustal deformation from paleomagnetic determination of vertical axis rotations in southern Nevada, Department of Earth Sciences, Dartmouth College, February 1994.

Paleomagnetic constraints on kinematics and dynamics of block rotations in zones of strike-slip deformation, Department of Earth Sciences, Rensselaer Polytechnic Institute, Troy, NY, April 1995.

Paleomagnetic constraints on kinematics and dynamics of block rotations in zones of strike-slip deformation, Lamont-Doherty Earth Observatory, Columbia University, May 1995.

Doing the twist: Paleomagnetic constraints on kinematics and dynamics of block rotations in zones of strike-slip deformation, Graduate School of Oceanography, University of Rhode Island, February 1996.

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