

Eric L. Mittelstaedt

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EDUCATION

- 2008 Ph.D. in Geology and Geophysics, SOEST, University of Hawai'i Manoa: "Plume-Ridge Interaction: Shaping the Geometry of Mid-Ocean Ridges". Advisor: Dr. Garrett Ito
- 2002 B.S. in Astrophysics with a minor in Geophysics and Space Physics, University of California, Los Angeles

APPOINTMENTS

- (2013-) Assistant Professor, University of Idaho, Moscow, ID
- (2011-2012) Post-doctoral Investigator, Woods Hole Oceanographic Institution, Woods Hole, MA
- (2008-2010) NSF Post-doctoral Fellow, Fluides, Automatiques, et Systèmes Thermiques, Orsay, France

TEACHING EXPERIENCE

- 2013- current GEOL 510 – "Geosystems" – course for incoming graduate students; U of Idaho
- current GEOL 422 – "Principles of Geophysics" – undergraduate geophysics course; U of Idaho
- GEOL 433/533 – "Geodynamics" – graduate/undergraduate course; U of Idaho
- GEOL 504 – "Introduction to Numerical Modeling of Long-term Tectonics" – graduate; U of Idaho and online participants from WHOI, and U. of Hawaii
- GEOL 502 – "Directed Studies: Continuum Mechanics" – graduate; U. of Idaho
- 2010 Pre-FLAMINGO Cruise Lectures to Undergraduates (University of Colgate): Continuum Mechanics; Gravity and Magnetism
- 2007 Department Tutor (University of Hawai'i): Calculus (year 1 and 2); Physics (mechanics, electricity, magnetism)
- 2005 Teaching Assistant (University of Hawai'i): GG304 Applied Geophysics; GG170 Advanced Introductory Earth Science

AWARDS AND RECOGNITION

- 2015 Awarded the Lloyd and Caroline Harding Fellowship (3 yr) for excellence in research and teaching
- 2010 Mittelstaedt, Ito, and van Hunen (2011) was featured in the 'Research Highlights' section of Nature Geoscience, vol. 3, pp. 818
- 2008 NSF International Research Fellowship
- 2007 Society of Exploration Geophysicists Scholarship
- 2006 ARCS Pulley Scholarship for research in Geology and Geophysics
- 2006 Mittelstaedt and Tackley, 2006 was featured in the 'Research Highlights' section of Nature, vol. 438
- 2005 J. Watumull Merit Scholarship, Student of Year, Geology and Geophysics, Univ. of Hawai'i

SYNERGISTIC ACTIVITIES

Committees: Faculty Appeals Hearing Board (2015-) Dept. of Geology Curriculum Committee; 2015 Master's Research Award Judging Committee; 2013-2015 Judge UI Graduate Innovation Showcase

Co-Convener of 2 Sessions at the 2015 Fall Meeting of the AGU

AGU Monograph Editor: *The Galapagos as a Laboratory for the Earth Sciences* (Publication date: August, 2014)

Co-convener of 2014 CIG-Earthscope Institute for Lithospheric Modeling, Feb 3-4, 2014 Tempe AZ

Co-convener of 2 sessions at the 2013 Fall Meeting of the AGU

Member: Computational Infrastructure for Geophysics' Committee for Long Term Tectonics (2013-)

Proposal Reviewer for: National Science Foundation (USA), Agence National de Recherche (France)

Journal Reviews (last 3 years): Oceanography; Geophysical Research Letters; Journal of Geophysical Research; Earth and Planetary Science Letters; G³

Co-Convener of Fall 2010 AGU session: *175 years of Geological Research in the Galapagos*

Member of Advisory Council, FAST Laboratory (2009-2010)

Co-Convener of Fall 2007 AGU session: *Hot Spot Anomalies and Upper Mantle Processes: Insights from Observations and Modeling*

SOEST Dean Search Committee (2005-2006)

Volunteer at SOEST Biennial Open House (2003, 2005, 2007)

FIELD EXPERIENCE

AT33-03 Popping Rocks Cruise (2016) to the Mid-Atlantic Ridge between 13°N and 14°N (Chief Scientists: M. Kurz and E. Mittelstaedt)

TREET Telepresence Cruise (2014) to the Kick'em Jenny Volcano and Barbados Mud Volcanoes, Early Career Scientist (Chief Sci: Chris German/Steve Carey)

AT26-17 cruise (2014) to the Ashes Vent Field in the Axial Caldera, PI (Chief Sci.: T. Crone) (3 Alvin dives)

FLAMINGO cruise (2010) to the Northern Galápagos Province; scientist in charge of geophysics (Chief Scientist: K. Harpp), included supervision of 9 undergraduates;

BATHYLUCK cruise (2009) to the Lucky Strike hydrothermal field; directed surveying and analysis of video imagery of diffuse venting (Chief Scientist: J. Escartin, IPGP);

HEALY05-02 leg (2005); multibeam sonar technician

FUNDING HISTORY

OCE-1537650 \$68,238; *Collaborative Research: Modeling hydrothermal recharge and outflow in oceanic crust analogs with sharp permeability gradients*, 9/2015-8/2017; PI: E. Mittelstaedt

EAR-1520856 \$219,986; *Variations in Hotspot Volcanism as a Key to Understanding Deep Mantle Dynamics*, 9/2015-8/2018; PI: E. Mittelstaedt

- EAR-1456664 \$225,924; *Emplacement of regularly spaced volcanic centers in the East African Rift: Melt production or melt extraction?*, 6/2015-5/2017; PI: E. Mittelstaedt
- UI Seed Grant \$10,592; *Quantifying Variations in Hydrothermal Venting using Laboratory Models*; 7/2014-8/2015; University of Idaho Seed Grant to PI: E. Mittelstaedt
- OCE-1260578 \$123,383; *Collaborative Research: Coupling Mantle Volatiles, Eruption Dynamics, and Tectonics on the Mid-Atlantic Ridge*; 6/2013-6/2015 PI: E. Mittelstaedt
- OCE-1332371 \$12,243; *EAGER: Collaborative Research: Using Available Sentry AUV aboard R/V Atlantis to Measure Hydrothermal Heat Flux at Axial and Main Endeavour Fields*, 6/2013-10/2013
- OCE-1131772 \$380,369; *Collaborative Research: Developing New Instrumentation to Accurately Measure the Heat and Mass Flux of Hydrothermal Fluids*, 10/2011-09/2013 NSF OTIC proposal; PI: E. Mittelstaedt
- DOEI-16211.01 \$63,578; *Ridge Jumps in 3D – Developing a New Numerical Tool to Examine the Dynamics of Mantle-Lithosphere Interaction*, 9/2011-8/2013, WHOI Internal Grant; PI: E. Mittelstaedt
- OISE-0757920 \$155,248; *The Origin and Evolution of Mid-Ocean Ridge Segmentation at Normal and Hotspot Affected Ridges*; 10/2008-12/2010, NSF International Research Fellowship; PI: E. Mittelstaedt

INVITED TALKS AND PRESENTATIONS

- 2015 University of Idaho Youth Water Summit – Underwater ‘Smokers’, Robots, and Submarines:
Hydrology in the Deep Sea
- 2014 University of Rhode Island, Quantifying Diffuse Hydrothermal Flow Using Image Analysis
- 2013 Boise State University, Keeping it thin and hot: A weight management plan for aging oceanic lithosphere by interaction with the Galápagos Mantle Plume
- 2011 Institut de Physique du Globe, Univ of Paris 7, Multiple expressions of plume-ridge interaction in the Galapagos: Volcanic lineaments and ridge jumps
- 2011 Department of Geosciences Seminar, Univ. of Montpellier, Multiple expressions of plume-ridge interaction in the Galapagos: Volcanic lineaments and ridge jumps
- 2011 Department of Geological Sciences, Univ. of Idaho, The Role of Magmatism and Mantle Plumes in the Formation of Repeat Ridge Jumps
- 2010 Department of Geosciences Seminar, Univ. of Montpellier, Diffuse versus discrete heat flux at the Tour Eiffel vent site
- 2009 Department Seminar Univ. of Girona, Hydrothermal venting at mid-ocean ridges
- 2008 Department Seminar LDEO, Repeated ridge jumps: Plume-ridge interaction, melt migration, and magmatic heating
- 2005 Geodynamics Seminar WHOI, Lithospheric effects of plume-ridge interaction: From volcanic lineaments to ridge jumps

PEER-REVIEWED PUBLICATIONS

- Tontini, F.C., T. Crone, C., Ronde, D.J., Fornari, J. Kinsey, E. **Mittelstaedt**, M. Tivey (In Press) Crustal magnetization and the seafloor structure of the ASHES vent field (Axial Seamount, Juan de Fuca Ridge): Implications for the exploration of hydrothermal sites, *Geophys. Res. Lett.*
- Mittelstaedt E.**, T. Crone, D.J. Fornari, J. Kinsey (2016) Diffuse venting at the ASHES hydrothermal field: Heat flux and tidally modulated flow variability derived from in situ time-series measurements, *Geochem. Geophys. Geosys.*, 17, doi:10.1002/2015GC006144

- Olive, J. A., Behn, M. D., **Mittelstaedt, E.**, Ito, G., & Klein, B. Z. (2016). The role of elasticity in simulating long-term tectonic extension. *Geophysical Journal International*, doi:ggw040.
- Cooper, C., E. **Mittelstaedt**, C. Currie, J. van Wijk, L. Kellogg, L. Hwang, R. Arrowsmith (2015) Moving Lithospheric Modeling Forward: Attributes of a community computer code, *GSA Today*, v.25, no. 5, doi:10.1130/GSATG230GW.1
- Mittelstaedt**, S. Soule, K. Harpp, D.J. Fornari, (2014) Variations in crustal thickness, plate rigidity, and volcanic processes throughout the Northern Galápagos Volcanic Province, in *The Galapagos: A Natural Laboratory for the Earth Sciences*, AGU Monograph Series
- Mittelstaedt**, Soule, Harpp, Fornari, McKee, Tivey, Geist, Kurz, Sinton, and Mello (2012) Multiple expressions of plume-ridge interaction in the Galapagos: Volcanic lineaments and ridge jumps, *Geochem. Geophys. Geosys.*, v.13, no. 5, doi:10.1029/2012GC004093
- Mittelstaedt**, E., J. Escartin, N. Gracias, J.-A. Olive, T. Barreyre, A. Davaille, M. Cannat (2012), Diffuse versus discrete venting at the Tour Eiffel vent site, Lucky Strike hydrothermal field, *Geochem. Geophys. Geosys.*, v. 13, no. 4, doi:10.1029/2011GC003991
- Barreyre, T., J. Escartin, R. Garcia, M. Cannat, E. **Mittelstaedt** (2012), Constraints on the structure and evolution of a deep-sea hydrothermal field from seafloor image mosaics, *Geochem. Geophys. Geosys.*, v.13, no. 4, doi:10.1029/2011GC003990
- Di Giuseppe, A. Davaille, E. **Mittelstaedt**, and M. François (2012), Effects of Particle Size and Volume Concentration on Rheological (and Mechanical) Behavior of Hard-Sphere Silica Colloids Through Flow and Oscillatory Tests, *Rheology Acta*, 1-15, doi:10.1007/s00397-011-611-9
- Mittelstaedt**, Ito, and van Hunen (2011), Repeated ridge jumps associated with plume-ridge interaction, melt transport, and ridge migration, *J. Geophys. Res.*, 116, doi:10.1029/2010JB007504
- Mittelstaedt**, Davaille, van Keken, Gracias, and Escartin (2010), A non-invasive method for measuring the velocity of diffuse hydrothermal flow by tracking moving refractive index anomalies, *Geochem. Geophys. Geosys.* v.11 n.10, DOI: 10.1029/2010GC003227
- Mittelstaedt**, Ito and Behn (2008) Mid-ocean ridge jumps associated with hotspot magmatism, *Earth Planet. Sci. Lett.*, 266 (3-4) DOI: 10.1016/j.epsl.2007.10.055
- Mjelde, R., A.J. Breivik, T. Raum, E. **Mittelstaedt**, G. Ito, and J.I. Faleide (2007) Plume related evolution of the North Atlantic, *JGS* v.165 n.1 p. 31-42 DOI: 10.1144/0016-76492007-018
- Mittelstaedt** and Garcia (2007), Modeling the sharp compositional interface in the Pu'u O'o magma reservoir, Kilauea volcano, Hawai'i, *Geochem. Geophys. Geosys.* Vol. 8, Q05011 DOI 10.1029/2006GC001519
- Mittelstaedt** and Tackley (2006), Plume heat flow is much less than CMB heat flow, *Earth Planet. Sci. Lett.*, 241, pp 202-210 Featured in *Nature*
- Mittelstaedt** and Ito (2005), Plume-ridge interaction, lithospheric stresses, and the origin of near-ridge volcanic lineaments, *Geochem. Geophys. Geosys.*, 6, Q06002 DOI 10.1029/2004GC000860

PUBLICATIONS IN REVIEW AND IN PREPARATION

- Mittelstaedt E.**, A. Davaille, L. Pauchard (In Prep) Rheology and spreading rate control oceanic microplate formation, *Nature Geoscience*
- Morrow, T., K. Harpp, E. **Mittelstaedt** (In Prep) Geochemistry of the Galápagos Transform Fault: Sampling Depleted Galápagos Mantle Compositions, *Geochem. Geophys. Geosys.*
- Fornari, D.J., **E. Mittelstaedt**, T. Crone (In Prep) Structure and geology of the ASHES hydrothermal field revealed by new high-resolution multibeam and side-scan sonar

- Karnauskas, **Mittelstaedt**, Oppo (In Prep), Regional paleoceanography of the eastern equatorial Pacific and the geologic origins of Galápagos upwelling, PNAS
- Kinsey, J., T. Crone, E. **Mittelstaedt** (In Prep) Flowmow 2: Bigger and Better (working title)
- Sinton, C., K. Harpp, D. Geist, E. Mittelstaedt, D.J. Fornari, S. Soule, C. McConnell (In Prep) Discovery of an Ancient Galápagos Island: A Stepping Stone for Interisland Fauna, *Geology*
- Mittelstaedt**, Harpp, Sinton (In Prep) Quantifying changes in crustal thickness and lava chemistry during a ridge jump (working title), EPSL
- Larimer J., B.J. Yanites, W. Phillips, E. **Mittelstaedt** (In Prep) Late Miocene Salmon River, Idaho, incision: A case for surface processes driven by plume-lithosphere interaction?, *Geology*

SELECTED OTHER ABSTRACTS AND PRESENTATIONS

- Larimer, J.E., Yanites, B.J., Phillips, W.M. , **Mittelstaedt, E** (2016) Surface Processes Driven By Plume-Lithosphere Interaction: Using Cosmogenic ¹⁰be Radionuclides With A River Incision Model To Study Late Miocene Landscape Evolution In Central Idaho, GSA Rocky Mountain Section, May 2016, Abstract 276142
- Mittelstaedt, E.**, D.J. Fornari, T.J. Crone (2015) Time Series Measurements of Diffuse Hydrothermal Flow at the ASHES Vent Field Reveal Tidally Modulated Heat and Volume Flux, EOS Trans. AGU, Fall Meet. Suppl., Abstract OS41B-04
- Morrow, T., E. **Mittelstaedt**, J.-A. Olive (2015) How plates pull transforms apart: 3-D numerical models of oceanic transform fault response to changes in plate motion direction, EOS Trans. AGU, Fall Meet. Suppl., Abstract V14A-06
- Kaminski, K., E. **Mittelstaedt**, J. Warren, M. Kurz, K. Kumamoto (2015) Using a numerical model to quantitatively assess dynamic recrystallization as a mechanism for He enrichment in mantle shear zones, EOS Trans. AGU, Fall Meet. Suppl., Abstract V11B-3071
- Mittelstaedt E.**, T. Crone, D.J. Fornari (2014) Using a New Deep-Sea Camera System to Measure Temporal Variations of the Volume and Heat Flux of Diffuse Hydrothermal Fluids at the ASHES Vent Field EOS Trans. AGU, Fall Meet. Suppl., Abstract
- Kinsey, J.C., T. Crone, E. **Mittelstaedt**, L. Medagoda, D. Fourie, K. Nakamura (2014) Estimating the Heat and Mass Flux at the ASHES Hydrothermal Vent Field with the Sentry Autonomous Underwater Vehicle, EOS Trans. AGU, Fall Meet. Suppl., Abstract V21A-4725.
- Mittelstaedt E.**, A. Davaille (2013) Insights into Segmentation, Stability, and Faulting of Mid-Ocean Ridges from Analogue Experiments with a Rheologically Complex Fluid, EOS Trans. AGU, Fall Meet. Suppl., Abstract T42D-08
- Morrow T., Harpp, K. **Mittelstaedt E.**, (2013) Geochemistry of Intra-Transform Lavas from the Galápagos Transform Fault, EOS Trans. AGU, Fall Meet. Suppl., Abstract S51C-2383
- Sinton C., E. **Mittelstaedt**, K. Harpp (2013) The Temporal Evolution of the Northern Galápagos Volcanic Province, EOS Trans. AGU, Fall Meet. Suppl., Abstract V13F-2674
- Mittelstaedt**, (2013) Keeping it Thin and Hot: A weight management plan for aging oceanic lithosphere by interaction with the Galapagos Mantle Plume, University of Idaho, Dept. Seminar
- Mittelstaedt**, K. Karnauskas, R. Murtugudde, D. Oppo (2012) The Pliocene-Pleistocene Transition: An Alternative View on “Permanent El Niño”, EOS Trans. AGU, Fall Meet. Suppl., Abstract OS53B-197
- Mittelstaedt**, S. Adam Soule, K. Harpp, D. Fornari (2011), Multiple expressions of plume-ridge interaction at the Galápagos: Volcanic lineaments and ridge jumps, Abstract T43K-07 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec

- Mittelstaedt**, A. Davaille, P.E. van Keken, N. Gracias, J. Escartin (2011) Mesure des champs de vitesse dans les champs hydrothermaux océanique; Abstract 461; 20^{ème} Congrès Français de Mécanique; Besançon, 29 août – 2 septembre
- Mittelstaedt**, J. Escartin, N. Gracias, J.-A. Olive, T. Barreyre, A. Davaille, M. Cannat (2010), Diffuse versus discrete venting at the Tour Eiffel vent site, Lucky Strike hydrothermal field, Abstract OS33F-08 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Harpp, K., **Mittelstaedt**, D. Geist, D. J. Fornari, M. D. Kurz, C. W. Sinton, A. M. Koleszar, and S. Soule (2010), Perspectives on plume-ridge interaction in the Northern Galapagos Province, presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Mittelstaedt** (2010) Understanding Mid-Ocean Ridges: A Tale of Two Missions, FAST/LIMSI Inter-Laboratory Seminar
- Mittelstaedt** (2010) Instabilities along the mid-ocean ridge axes, Journée de Ludox, FAST Laboratory
- Mittelstaedt**, A. Davaille, and J. Escartin, (2009) Diffuse flow at hydrothermal vents: A new technique for measuring fluid velocity by tracking of apparent background deformation, EOS Trans. AGU, 90(52), Fall Meet. Suppl., Abstract T13A-1855
- Mittelstaedt**, G. Ito, and J. van Hunen, (2008) Repeated ridge jumps associated with plume-ridge interaction, melt transport, and ridge migration, EOS Trans. AGU, 89(52), Fall Meet. Suppl., Abstract V41B-2089
- Mittelstaedt** and G. Ito, (2007) Ridge jumps associated with plume-ridge interaction: Mantle plume-lithosphere interaction and hotspot magmatism, EOS Trans. AGU, 88(52), Fall Meet. Suppl., Abstract V41G-05
- Mittelstaedt** and G. Ito, (2007) Ridge jumps associated with plume-ridge interaction: Weakening of the lithosphere by upwelling asthenosphere, IUGG XXIV General Assembly, IASPEI, JSS011-2115
- Mittelstaedt** and M.O. Garcia, (2006) Modeling the sharp compositional interface in the Pu'u 'O'o magma reservoir, Kilauea volcano, Hawai'i, EOS Trans. AGU, 87(52), Fall Meet. Suppl., Abstract V11B-0588
- Mittelstaedt**, G. Ito and M. Behn, (2005) Ridge jumps associated with plume-ridge interaction 1: Off-axis heating due to lithospheric magma penetration, EOS Trans. AGU, 86(52), Fall Meet. Suppl., Abstract U52A-05
- Mittelstaedt**, G. Ito, M. Behn, (2005) Ridge jumps associated with plume-ridge interaction 1: Off-axis heating due to lithospheric magma penetration, 9th International Workshop on Numerical Modeling of Mantle Convection and Lithospheric Dynamics, EMFCSC, Erice, Italy
- Mittelstaedt** and G. Ito, (2004) Hotspot-ridge interaction: Shaping the geometry of mid-ocean ridges, EOS Trans. AGU, 85(47), Fall Meet. Suppl., Abstract V33G-06
- Mittelstaedt** and G. Ito, (2003) Rodriguez, Darwin, Wolf...A third type of hotspot island, EOS Trans, 84(46), Fall Meet. Suppl., Abstract V12-0586
- Mittelstaedt** and Tackley, (2001) Plume heat flow is much less than CMB heat flow, EOS Trans, 82(47), Fall Meet. Suppl., Abstract T21A-0869

I confirm that the above information is true and accurate.

