

Helge Gonnermann - CV

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POSTDOCTORAL

School of Ocean and Earth Science and Technology University of Hawaii at Manoa, Department of Geology and Geophysics, Young Investigator, November 2006 - present.

Harvard University, Department of Earth and Planetary Sciences, Daly Postdoctoral Fellowship, 2005-2006.

EDUCATION

University of California, Berkeley. Ph.D., Earth and Planetary Science. Geodynamics and Physical Volcanology. Advisors: M. Manga and M.A. Richards, 2004.

Eruption dynamics of silicic volcanoes: Numerical modeling of nonNewtonian flow, nonequilibrium diffusive bubble growth, open-system degassing, and fragmentation of magma during ascent in the volcanic conduit. Quantitative analysis of flow textures in volcanic rocks.

Thermal and thermochemical convection of the Earth's mantle: Analog experiments and analysis with application to Earth's heat flow, convection in the Earth's outer core and mantle, and convective mixing in the Earth's mantle.

University of Arizona, Tucson. M.S., Geophysics. Seismology. Advisor: R.A. Johnson, 1995.

Preliminary analysis of wide-angle reflection data for Poissons ratio and presence of magma chamber beneath San Francisco Volcanic Field. 3-D slant stack estimation of interval velocity and reflector orientation.

University of Montana, Missoula. B.A., Geology with highest honors. Structural Geology. Advisor: J. Sears, 1992.

Honors Thesis: Andecite-dacite Stratovolcano within the Late Cretaceous Beaverhead Group, Montana.

EMPLOYMENT

Geomatrix Consultants, Inc., San Francisco/Oakland, California. Project Geophysicist and Hydrogeologist, 1996-1999.

(1) Hydrostratigraphic and conceptual models of groundwater flow. (2) Three-dimensional groundwater flow and solute transport modeling of basin- and local-scale aquifers. (3) Uncertainty/sensitivity analysis of groundwater flow models using response functions. (4) Analytical and stochastic methods in groundwater modeling. (5) Aquifer testing and analytical and numerical evaluation of aquifer-test data. (6) Well design, well construction, and long-term performance monitoring for groundwater pump and treatment facilities. (7) Evaluation of third-party groundwater flow models for litigation support. (8) Earthquake response and three-dimensional soil-structure interaction at Bay Bridge, San Francisco, California using the finite element program SASSI. (9) Field investigations: groundwater monitoring and sampling, well installation and development, and aquifer testing.

British Petroleum Exploration Co., Houston, Texas. Summer Intern, 1994.

Subsalt depth- uncertainty estimation in the Gulf of Mexico.

Yellowstone National Park, Wyoming. Summer Intern, 1989.

AWARDS

SOEST Young Investigator, University of Hawaii, 2006.
 Daly Postdoctoral Fellowship, Harvard University, 2005.
 Turner Fellowship, University of California, Berkeley, 2003.
 Outstanding Senior, Department of Geology, University of Montana, Missoula, 1992.
 University of Montana Foundation Scholarship, University of Montana, Missoula, 1992.
 Scholar of the College of Arts and Sciences, University of Montana, Missoula, 1991.
 Nominated and chosen for NAGT-USGS Cooperative Summer Field Training Program, 1991.

TEACHING

University of California, 2001-2004. University of Arizona, 1994.
Assist in supervising/mentoring undergraduate student during senior thesis project in geodynamics (Manga).
Assist in developing and grading of homework problem sets and laboratory exercises (UCB, Geodynamics - Manga; UCB, The Planets - DePater, Boering; UA, Structural Geology - Davis, Beck).
Tutor students on class material and problem sets (UCB, Geodynamics - Manga; UCB, The Planets - DePater, Boering; UA, Structural Geology - Davis, Beck).
Teach laboratory sections (UCB, The Planets - DePater, Boering; UA, Structural Geology - Davis, Beck).
Supervise and grade student projects (UCB, The Planets - DePater, Boering; UA, Structural Geology - Davis, Beck).
Organize and lead field trips (UA, Structural Geology - Davis, Beck).

Geomatrix Consultants, Inc, 1989-1990.
Teach and supervise junior staff in groundwater modeling.
Train and supervise staff for groundwater monitoring.

PROFESSIONAL AFFILIATIONS AND SERVICES

American Geophysical Union
 Geological Society of America
 The Geochemical Society
 International Association of Volcanology and Chemistry of the Earth's Interior
 Manuscript reviews for:
 Earth and Planetary Science Letters
 Bulletin of Volcanology
 GSA Bulletin
 G3
 Geophysical Research Letters
 Journal of Volcanology and Geothermal Research
 Journal of Geophysical Research
 Grant proposal reviews for NSF
 AGU Fall Meeting 2004, co-chair session V51B: Fragmentation of Magma
 AGU Fall Meeting 2005, convener and co-chair session V17: Bubbles in Magma
 AGU Fall Meeting 2007, convener and co-chair session V17: Dynamics of Gas Transport in Magma

PEER REVIEWED PUBLICATIONS

- Gonnermann, H.M. and Mukhopadhyay, S., Non-equilibrium degassing and a primordial source for helium in ocean-island volcanism, *Nature*, **449** 1037-1040 (2007).
- Gonnermann, H.M. and Manga, M., The fluid mechanics of volcanic eruptions, *Ann. Rev. Fluid Mech.* **39**, 321-356 (2007).
- Gonnermann, H.M. and Manga, M., Nonequilibrium magma degassing: Results from modeling of the ca. 1340 A.D. eruption of Mono Craters, California, *Earth Planet. Sci. Lett.* **238**, 1-16 (2005).
- Gonnermann, H.M. and Manga, M., Flow banding in obsidian: A record of evolving textural heterogeneity during magma deformation, *Earth Planet. Sci. Lett.* **236**, 135-147 (2005).
- Gonnermann, H.M., Jellinek, A.M., Richards, M.A. and Manga, M., Modulation of mantle plumes and heat flow at the core mantle boundary by plate-scale flow: results from laboratory experiments, *Earth Planet. Sci. Lett.* **226**, 53-67 (2004).
- Gonnermann, H.M. and Manga, M., Explosive volcanism may not be an inevitable consequence of magma fragmentation, *Nature* **426**, 432-435 (2003).
- Gonnermann, H.M., Manga, M. and Jellinek, A.M., Dynamics and longevity of an initially stratified mantle, *Geophys. Res. Lett.* **29**, 10.1029/2002GL014851 (2002).
- Jellinek, A.M., Gonnermann, H.M. and Richards, M.A., Plume capture by divergent plate motions: Implications for the distribution of hotspots, geochemistry of mid-ocean ridge basalts, and estimates of the heat flux at the core-mantle boundary, *Earth Planet. Sci. Lett.* **205**, 361-378 (2002).

ABSTRACTS AND OTHER PUBLICATIONS

- Gonnermann, H.M., Houghton, B.F. and Sable, J.E., Vesicle Microtextures and Fragmentation in Basaltic Plinian Eruptions, *Eos Trans. AGU Fall Meet. Suppl.* (2007).
- Schipper, I.C., Houghton, B.F., Gonnermann, H.M. and White, J., Vesicle evolution in primary volcanoclastic material from Loihi seamount, Hawaii, with implications for submarine basalt explosivity, *Eos Trans. AGU Fall Meet. Suppl.* (2007).
- Gonnermann, H.M. and Mukhopadhyay, S., Nothing paradoxical about Helium concentrations in OIBs, *Geochim. Cosmochim. Acta* **71**, A343.
- Gonnermann, H.M. and Mukhopadhyay, S., Degassing of noble gases in mid-ocean ridge and ocean-island basalts: A self-consistent model, *Eos Trans. AGU Fall Meet. Suppl.*, **87 (52)**, V13B-0670 (2006).
- Gonnermann, H.M., Shear brecciation of magma and obsidian formation during the ca. 1340 A.D. sub-Plinian eruption of Mono Craters, California, *Eos Trans. AGU Fall Meet. Suppl.*, **86 (52)**, V41I-04 (2005).
- Gonnermann, H.M. and Manga, M., Nonequilibrium magma degassing: Results from the ca. 1340 A.D. eruption of Mono Craters, California, *Eos Trans. AGU Fall Meet. Suppl.*, **86 (52)**, V13G-05 (2005).
- Gonnermann, H.M., Pre-eruptive exsolved gas in silicic magmas: Constraints from magma degassing during the ca. 1340 eruption of Mono Craters, California, *Caldera volcanism: Analysis, modelling and response*, Tenerife (2005).
- Gonnermann, H.M., Sheared magma, open-system degassing, and obsidian formation during the ca. 1340 A.D. sub-plinian eruption of Mono Craters, California, *Sheared magmas in nature and experiment: bridging the brittle and ductile fields*, Germany (2005).
- Gonnermann, H.M. and Manga, M., Nonequilibrium magma degassing and the formation of obsidian during explosive silicic volcanism, *Soufrière Hills Volcano - Ten Years On ...*, Montserrat, WI (2005).

- Gonnermann, H.M. and Manga, M., Nonequilibrium H₂O-CO₂ exsolution and obsidian formation, *Geochim. Cosmochim. Acta* 69, A153-A153 (2005) .
- Gonnermann, H.M. and Manga, M., Flow banding in volcanic rocks: A record of multiplicative magma deformation, *Eos Trans. AGU Fall Meet. Suppl.* **85** (47), V41A-1364 (2004).
- Manga, M., Gonnermann, H.M. and Namiki, A., Why do volcanoes (only sometimes) erupt explosively? *Eos Trans. AGU Jt. Assem. Suppl.* **85** (17), V24B-01 (2004).
- Gonnermann, H.M. and Manga, M., Shear-Induced fragmentation in silicic volcanism, *Eos Trans. AGU Fall Meet. Suppl.* **84** (46), V51B-02 (2003).
- Gonnermann, H.M., Jellinek, A.M., Richards, M.A. and Manga, M., Core heat flow and suppression of mantle plumes by plate-scale mantle flow: Results from laboratory experiments, *Eos Trans. AGU Fall Meet. Suppl.* **83**(47), U72B-0040 (2002).
- Gonnermann, H.M., Manga, M., Stegman, D.R. and Jellinek, A.M., Dynamics and longevity of an initially stratified mantle with implications for mantle temperatures, *Geophysical and Geochemical Evolution of the Deep Earth, Study of the Earths Deep Interior, 8th Symposium, Lake Tahoe, USA*, S7-21 (2002).
- Stegman, D.R., Manga, M., Gonnermann, H.M., and Richards M.A., Parameterized thermochemical evolution of a layered mantle: stealth layers may require replenishment, *Geophysical and Geochemical Evolution of the Deep Earth, Study of the Earths Deep Interior, 8th Symposium, Lake Tahoe, USA*, S7-23 (2002).
- Jellinek, A.M., Gonnermann, H.M. and Manga, M., The influence of a chemical boundary layer on the fixity and lifetime of mantle plumes, *Eos Trans. AGU Fall Meet. Suppl.* **83** (19)t S32A-06 (2002).
- Gonnermann, H.M., Jellinek, A.M., Richards, M.A. and Manga, M., Effects of imposed largescale flow during convection at large Rayleigh numbers: Plume dynamics and heat flux, *Eos Trans. AGU Fall Meet. Suppl.* **82** (47) T21A-0867 (2001).
- Gonnermann, H.M., Jellinek, A.M. and Richards, M.A., Experimental study of plume- and platescale flow interactions: New insights into plume-ridge dynamics and core heat flux, *Numerical modeling of mantle convection and lithospheric dynamics, 7th Workshop, Aussois, France, MX-6* (2001).
- Mok, C.M., Gonnermann, H.M., Stewart, C.A. and Bean, D.M., Quantitative calibration of a numerically difficult model, *Modflow 2001 and other Modeling Odysseys, Golden* (2001).
- Chang, C.-Y., Mok, C.M., Settgest, R., Wang, Z.-L., Chin, C.C., Gonnermann, H.M., Waggoner, F. and Ketchum, M., Dynamic analyses of large caisson foundation, *Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego* (2001).
- Gonnermann, H.M., Jellinek, A.M. and Richards, M.A., Effects of large-scale flow on mantle plumes: Laboratory experiments at mantle conditions reveal important controls on spatial and temporal character, *Eos Trans. AGU Fall Meet. Suppl.* **81** (48) T21D-04 (2000).
- Mok, C.M., Chang, C.-Y., Settgest, R., Wang, Z.L., Gonnermann, H.M., Chin, C.C., Dynamic soil-foundation structure interaction analysis of large caissons, *U.S. Geol. Survey Open-File Report* **99-0142** 19.1-19.30 (1999).
- Mok, C.M., Chang, C.-Y., Settgest, R., Gonnermann, H.M., Chin, C.C., Waggoner, F. and Ketchum, M., Dynamic soil-structure interaction analysis of large gravity caissons, *U.S.- Japan Soil-Structure Interaction Workshop* (1998).
- Chang, C.-Y., Mok, C.M, Gonnermann, H. and Chin, C.-C., Dynamic analyses of large caisson foundation, *Sixth U.S. National Conference on Earthquake Engineering, EERI, Seattle* (1998).
- Gonnermann, H. M. and Gallinatti, J.D., Graphical technique for multiple-parameter sensitivity analysis: An example for solute transport modeling, *Eos. Trans. AGU Fall Meet. Suppl.* **78** H22E-18 (1997).
- Gonnermann, H. M., An andecite-dacite stratovolcano within the Late Cretaceous Beaverhead

Group, near Bannack, Montana, *Geological Society of America, Rocky Mountain Section, 45th Annual Meeting, Abstracts with Programs* **24 (6)** 15 (1992).