

# Emily R. Johnson

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*Department of Geological Sciences*  
*New Mexico State University*

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## EDUCATION

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- 2008      Ph.D. in Geological Sciences, University of Oregon  
            Supervisor: Dr. Paul Wallace  
            Dissertation: *"Volatiles in basaltic magmas from central Mexico: from subduction to eruption"*
- 2003      B.S. in Geological Sciences, High Honors, University of Michigan  
            Supervisor: Dr. Rebecca Lange  
            Honors thesis: *"Pliocene volcanism of the Excelsior Mountains, Nevada"*

## ACADEMIC EMPLOYMENT

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- 1/2014-present      *College Assistant Professor, Department of Geological Sciences, New Mexico State University*
- 10/2011-2013      *Adjunct Faculty, Department of Geological Sciences, University of Oregon*
- 6/2008-9/2011      *Research Fellow, CODES/ARC Centre of Excellence in Ore Deposits Research, University of Tasmania*
- 9/2003-6/2008      *Graduate Teaching Fellow, Department of Geological Sciences, University of Oregon*

## RESEARCH INTERESTS

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Investigating the processes of magma genesis and evolution (including degassing, crystallization, vapor-melt partitioning of volatiles and metals, assimilation and magma mixing) using melt inclusion, glass and mineral geochemistry, crystal zoning, and pyroclast, crystal and vesicle textures

## COURSES TAUGHT

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- Introductory Geology (GEOL 111G): NMSU, Spring 2014, 2015; Fall 2015, 2016
- Volcanology (GEOL 471/571): NMSU, Fall 2014, Spring 2017; UO, Fall 2012
- Seminar: Subduction Zone Magmatism (GEOL 520): NMSU, Spring 2016
- Seminar on Subduction Zones: UO, 2012
- Mineralogy: UO, Winter 2012, 2013

## JOURNAL PUBLICATIONS

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- Johnson, E.R.,** Cashman, K.V. (*in preparation*) Evolving eruption styles at Blue Lake crater, Oregon Cascades: Implications for monogenetic eruption hazards.
- Johnson, E.R.,** Walowski, K. J., DeBari, S.M. (*in preparation*) Along-arc variations in mantle source and subduction inputs in Cascadia: Insights from oxygen isotopes and trace element compositions of primitive mafic magmas.
- Johnson, E.R.,** Kamenetsky, V.S., McPhie, J. (2013). The behavior of metals (Pb, Zn, As, Mo, Cu) during crystallization and degassing of rhyolites from the Okataina Volcanic Center, Taupo Volcanic Zone, New Zealand. *Journal of Petrology* 54(8), 1641-1659.
- Johnson, E.R.,** Kamenetsky, V.S., McPhie, J., Wallace, P.J. (2011). Degassing of the H<sub>2</sub>O-rich rhyolites of the Okataina Volcanic Center, Taupo Volcanic Zone, New Zealand. *Geology* 39, 311-314.
- Johnson, E.R.,** Wallace, P.J., Cashman, K.V., Delgado Granados, H. (2010). Degassing of volatiles (H<sub>2</sub>O, CO<sub>2</sub>, S, Cl) during ascent, crystallization, and eruption of basaltic magmas at mafic monogenetic volcanoes in central Mexico. *Journal of Volcanology and Geothermal Research* 197, 225-238.
- Ruscitto, D.M., Wallace, P.J., **Johnson, E.R.,** Kent, A.J.R., Bindeman, I.N. (2010). Volatile contents of mafic magmas from cinder cones in the Central Oregon High Cascades: Implications for magma formation and mantle conditions in a hot arc. *Earth and Planetary Science Letters* 298, 153-161.
- Erlund, E.J., Cashman, K.V., Wallace, P.J., Pioli, L., Rosi, M., **Johnson, E.,** Delgado Granados, H. (2010). Compositional evolution of magma from Parícutin Volcano, Mexico: The tephra record. *Journal of Volcanology and Geothermal Research* 197, 167-187.
- Johnson, E.R.,** Wallace, P.J., Delgado Granados, H., Manea, V.C., Kent, A.J.R., Bindeman, I.N., Donegan, C.S. (2009). Subduction-related volatile recycling and magma generation beneath central Mexico: Insights from melt inclusions, oxygen isotopes and geodynamic models. *Journal of Petrology* 50, 1729-1764
- Johnson, E.R.,** Wallace, P.J., Cashman, K.V., Delgado Granados, H., Kent, A.J. (2008). Magmatic volatile contents and degassing-induced crystallization at Volcán Jorullo, Mexico: Implications for melt evolution and the plumbing systems of monogenetic volcanoes. *Earth and Planetary Science Letters* 269, 477-486.
- Pioli, L., Erlund, E., **Johnson, E.,** Cashman, K., Wallace, P., Rosi, M., Delgado Granados, H. (2008). Explosive dynamics of violent Strombolian eruptions: The eruption of Parícutin Volcano 1943-1952 (Mexico). *Earth and Planetary Science Letters* 271, 359-368.

## INVITED TALKS / SEMINARS

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**Johnson, E.R.** (2016), Along-arc variations in subduction inputs and mantle source in Cascadia: Insights from basaltic arc magmas. *Invited talk*, University of New Mexico.

**Johnson, E.R.**, Walowski, K.J., Wallace, P.J., DeBari, S.M., Bindeman, I.N. (2015), Along-arc variations in subduction inputs and mantle source in Cascadia: Insights from basaltic arc magmas. Abstract V23C-07, *Invited talk* presented at 2015 *Fall Meeting, AGU*, San Francisco, CA, 14-18 December.

**Johnson, E.R.** (2015), Rhyolites of the Taupo Volcanic Zone, NZ: Volatiles, metals, and magma differentiation. *Invited talk*, New Mexico Institute of Technology.

**Johnson, E.R.** (2012), Crystallization, degassing, and the behavior of metals in volatile-rich rhyolites of the Taupo Volcanic Zone, NZ. *Invited talk*, Oregon State University.

**Johnson, E.R.** (2009), Differentiation of rhyolites in the Taupo Volcanic Zone. Invited speaker at *Modern Concepts in Physical Volcanology Workshop*. CODES, University of Tasmania, Australia.

**Johnson, E.R.**, Wallace, P.J., Cashman, K.V. (2009), Magma ascent, degassing, and crystallization in monogenetic volcanoes, Abstract V24C-05 *Invited Talk* presented at 2009 Fall Meeting, AGU, San Francisco, CA, 14-18 December.

**Johnson, E.R.**, Cashman, K., Wallace, P., Delgado Granados, H. (2007), Assessing magmatic processes and hazards at two basaltic monogenetic centers: Volcan Jorullo, Mexico and Blue Lake maar, Oregon, *Eos Transactions AGU*, 88(23), *Invited poster* at Joint Assembly Supplement, Abstract V51A-07.

**Johnson, E.R.**, Wallace, P., Delgado Granados, H. (2007), Across-arc volatile variations in the Michoacan-Guanajuato Volcanic Field, Mexico: Investigating slab devolatilization and the mantle source for basaltic arc volcanoes, *Eos Transactions AGU*, 88(23), *Invited talk* at Joint Assembly Supplement, Abstract T32A-04.

## SELECTED ABSTRACTS

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**Johnson, E.R.** (*submitted*), Fluctuating eruption style at Blue Lake crater, Central Oregon Cascades: Insights from deposit granulometry and componentry and pyroclast textures. 2016 *Fall Meeting, AGU*.

Cole, M., **Johnson, E.R.** (*submitted*), Evaluating variations in subduction contributions in the southern Cascades: Analyses of volatile contents and compositions of basaltic melt inclusions from cinder cones in northern California and southern Oregon. 2016 *Fall Meeting, AGU*.

- Lente, J., **Johnson, E.R.** (2016), Volatile contents and pre-eruptive conditions of rhyolitic magmas from the Organ Caldera, Southern NM. Abstract 284230 *Geological Society of America 2016 Annual Meeting*, Denver, Colorado.
- Lente, J., **Johnson, E.R.** (2016), Volatile contents and pre-eruptive conditions of rhyolitic magmas from the Organ Caldera, Southern NM. Presented at *2016 New Mexico Geological Society Annual Spring Meeting*, Socorro, NM, April 8, 2016.
- Lente, J., **Johnson, E.R.** (2015), Magma storage conditions, eruption initiation and magma evolution over time: Investigating the eruptions of Organ Caldera, Southern NM. Abstract V31B-3032 presented at *2015 Fall Meeting, AGU*, San Francisco, CA, 14-18 December.
- Johnson, E.R.**, Walowski, K., DeBari, S.M., Bindeman, I.N. (2014), Along-arc geochemical variations of Cascades mafic magmas: A role for subducted sediment in the southern arc? *Geological Society of America 2014 Annual Meeting*, Vancouver, British Columbia.
- Johnson, E.R.**, Wallace, P.J. (2012), Investigating Disequilibrium Degassing of H<sub>2</sub>O and CO<sub>2</sub> in Rhyolitic Melts: New Insights from Cold-Seal Decompression Experiments, Abstract V31D-2822 presented at *2012 Fall Meeting, AGU*, San Francisco, Calif., 3-7 Dec.
- Johnson, E.R.**, Kamenetsky, V., McPhie, J. (2011), The behavior of trace elements, metals and volatiles during crystallization and degassing of rhyolites from the Okataina Volcanic Center, Taupo Volcanic Zone, NZ, Abstract V34B-08 presented at *2011 Fall Meeting, AGU*, San Francisco, CA, 5-9 Dec.
- Brown, E.M., **Johnson, E.R.**, Allen, S. R., Proussevitch, A., Jutzeler, M. (2011), Pumice vesicle textures of the 15.7 ka Rotorua eruptive episode, Taupo Volcanic Zone, NZ: Implications for eruptive dynamics and conduit processes. *IUGG General Assembly*, Melbourne, Australia.
- Johnson, E.R.**, Kamenetsky, V., McPhie, J., Wallace, P.J. (2009), Evolution of rhyolitic magmas in the crustal magmatic system beneath the Taupo Volcanic Zone, New Zealand, *Eos Transactions AGU*, 90(52), Fall Meeting Supplement, Abstract V51A-1643.
- Johnson, E.R.**, Wallace, P.J., Cashman, K.V. (2008), Degassing of volatiles (H<sub>2</sub>O, CO<sub>2</sub>, S, Cl) in monogenetic basaltic eruptions: implications for crystallization and eruption processes. *IAVCEI General Assembly*, Reykjavik, Iceland.
- Johnson, E.R.**, Wallace, P.J., Manea, V.C. (2007), Using H<sub>2</sub>O and trace element ratios to produce a spatial map of magmatic H<sub>2</sub>O contents throughout the Trans-Mexican Volcanic Belt, presented at *2007 Fall Meeting AGU*, San Francisco, CA.
- Johnson, E.R.**, Wallace, P., Donegan, C., Delgado Granados, H. (2007), Volatiles in primitive magmas along a cross-arc transect in central Mexico: Implications for slab dehydration and magma generation processes. *State of the Arc Conference*, Chile.

## STUDENT ADVISING

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### **NMSU Graduate Students (Primary Advisor)**

- Jamie Shaffer (MS), started 2016
- Meredith Cole (MS), started 2015: "*Along-arc trends in subduction recycling in the southern Cascades*"
- Jenna Lente (MS), completed July, 2017: "*Investigating the dimensions, dynamics and evolution of a large-volume rhyolitic magma chamber, Organ Caldera, NM*"

### **NMSU Undergraduate Students (Primary Advisor)**

- Jennifer Thines (undergraduate student), started 2015: "*Across-arc variations in geochemistry, mineralogy and petrology of basaltic magmas in southern Oregon*"

### **NMSU Graduate Students (Committee member)**

- Vanessa Swenton (MS), started 2015
- Steven Levesque (MS), started 2015
- Ryan Creitz (MS), started 2015
- Sidney Pinkerton (MS), started 2014
- Trenton Haskell (MS), started 2013
- Jacob Buettner (MS), started 2013

### **University of Oregon Undergraduate Students (Committee member)**

- Ellen Aster (BA honors) 2012-2013 "*Formation of Andesites at Cinder Cones in the Southern Cascades: Crustal Processes and Parental Magma Compositions*"

### **University of Tasmania Undergraduate Students (Primary Advisor)**

- Emma Brown (BS honors) 2010-2011 "*Vesicle and ash textures from the 15.7ka Rotorua eruption episode, Taupo Volcanic Zone, NZ: Implications for eruption dynamics*"

## GRANTS

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- **Sediment recycling in southern Cascadia: Insights from seafloor sediment and mafic volcanic rock geochemistry**

NSF-EAR Petrology & Geochemistry

E.R. Johnson (PI), F. Ramos (Co-PI)

36 months, funded 7/15/15

\$136,691

- **NMSU College of Arts and Sciences Travel Grant**

E.R. Johnson

\$1000, funded 11/24/15

## SERVICE & ACTIVITIES

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### Editorial

- Editorial Advisory Board (Volcanology, Geochemistry and Petrology) for international journal 'Eos', the major journal of the American Geophysical Union (AGU), 2015-present

### Peer Reviewer

- National Science Foundation (NSF) Petrology & Geochemistry
- Eos
- GeoPRISMS
- New Zealand Earthquake Commission (EQC) proposals
- Geology
- Contributions to Mineralogy and Petrology
- Lithos
- GSA Bulletin
- Journal of Geomorphology

### Scientific Meeting Convener

- Submitted session proposal "Understanding subterranean processes at monogenetic volcanoes: Magma plumbing systems, ascent rates, and degassing and implications for hazards" for the IAVCEI conference, Portland, OR 2017
- Co-convener of session "From Magmas to Ore Deposits: Tracking the Transition" at the Fall Meeting of the American Geophysical Union (AGU), 2013
- Co-convener of session "A Comprehensive Understanding of the Melting Processes at Subduction Zones" at the Fall Meeting of the American Geophysical Union (AGU), 2012
- Co-convener of session "Role of CO<sub>2</sub> in Magma Evolution and Degassing Processes" at the Fall Meeting of AGU, 2009

### Workshop Participant

- *Ultra-deep Drilling Into Arc Crust: Genesis of Continental Crust in Volcanic Arcs*. Waikoloa, Hawaii, 18-21 September 2012.
- *GeoPRISMS- EarthScope Science Workshop for Cascadia*. Portland, OR, 4-6 April 2012.
- *Modern Concepts in Physical Volcanology Workshop*. CODES, University of Tasmania, Australia (2009)
- *Assessing the State of our Knowledge of Continental Arc Volcanism: The Tatara-San Pedro Complex, 36°S, Andean Southern Volcanic Zone*. Geological Society of America Field Forum, 4-12 February 2007.

### Field Trip Guide Author & Convener

- "Mafic volcanism of the central Oregon Cascades: a volcanic, tectonic, hydrologic, and geomorphic journey", co-authored field guide for IAVCEI conference (2017)

- *“Volcanism of the Tancitaro-Paricutin-Jorullo region, Michoacan (Mexico): Visiting deposits related to collapse of a large stratovolcano and to eruption processes at small monogenetic cones”*, co-authored field guide and co-led field trip associated with AGU Joint Assembly Meeting in Acapulco, Mexico, 26-30 May, 2007

### **Academic (NMSU)**

- Led committee to redesign and rewrite the laboratory exercises and manuals for the introductory geology course at NMSU; wrote three labs, edited and compiled complete manual
- Volunteered to organize colloquium series for NMSU Department of Geological Sciences (Fall 2015), recruited and organized visits for six faculty from geology departments outside NMSU
- Co-organized and led Fall Homecoming weekend fieldtrip for NMSU Department of Geological Sciences alumni to Kilbourne Hole, NM (Fall 2015)
- Volunteered to participate at “Aggie Fest” (2015, 2016); promoted Department of Geological Sciences, handed out information regarding introductory geology classes, created “Geology of New Mexico” trivia game

### **Community**

- Participated in the exhibit ‘GEOMAGIC’ at the University Art Gallery at New Mexico State University; exhibit combined geology and art. Presented talk entitled *“Volcanic creations: A look at volcanic products and processes”*, December 1, (2016)
- Participated in talk and discussion with local elementary school teachers and BLM staff for “Hands on the Land” project aimed at teaching local students about the geology of the nearby Organ Mountains-Desert Peaks National Monument; prepared a lecture and answered questions regarding the geology of Kilbourne Hole crater (2015)
- Volunteered at public event “BioBlitz” with the Asombro Institute for Science Education; co-led hike to examine the geology of the Chihuahuan Desert Nature Park (2015)
- Volunteered at “Museum Identification Day” at the Museum of Natural and Cultural History at the University of Oregon (2012)

### **Professional Memberships**

- American Geophysical Union (2003-present)
- Geological Society of America (2003-present)
- New Mexico Geological Society (2015-present)
- Association for Women Geoscientists (2015-present)
- International Association of Volcanology and Chemistry of the Earth’s Interior (IAVCEI) (2016-present)