

STEPHANIE B. GROCKE, PH.D.

Institute of Earth Sciences, University of Iceland
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Nationality: U.S. & German Citizen

CURRENT POSITION

Fulbright-NSF Postdoctoral Fellow 2016 – 2017
Arctic Research Scholar; Institute of Earth Sciences, *University of Iceland*,
Reykjavik, Iceland
Blasting through time: the past and future of gas emissions emitted from Icelandic volcanoes; Advisor: Thorvaldur Thordarson

EDUCATION

Ph.D. Oregon State University, Corvallis, OR 2014
College of Earth, Ocean, and Atmospheric Sciences
Dissertation: *Magma dynamics and evolution in continental arcs: Insights from the Central Andes*; Advisors: Shanaka de Silva and Elizabeth Cottrell

B.A. Colby College, Waterville, Maine 2009
Geology Department, Magna Cum Laude
Thesis: *Textural Analysis of the South Pond Phase of the Waldoboro Pluton in Friendship, Maine*; Advisor: Valerie Reynolds

POSITIONS HELD

Smithsonian/GVP Postdoctoral Fellow, Washington D.C. 2014 – 2016
Department of Mineral Sciences, National Museum of Natural History,
Smithsonian Institution, Washington, D.C.
Petrological and experimental constraints on the magmatic systems feeding the largest explosive eruptions on Earth; Advisor: Benjamin Andrews

Pre-Doctoral Fellow 2012 – 2013
Department of Mineral Sciences, National Museum of Natural History,
Smithsonian Institution, Washington, D.C.

Graduate Research Assistant 2009 – 2012; 2013 – 2014
Graduate Teaching Assistant Summer 2011
Oregon State University, College of Earth, Ocean, and Atmospheric Sciences

Research Intern in Science and Engineering (RISE Program) Summer 2007
Institute for Coastal Research, GKSS Research Center, Geesthacht, Germany
Deutscher Akademischer Austausch Dienst (DAAD)

Undergraduate Teaching Assistant 2006 – 2009
Colby College, Geology Department, Waterville, ME

HONORS, AWARDS, FELLOWSHIPS & RESEARCH GRANTS

Waite Grant, *National Geographic*, \$15,000 2016
Fulbright-NSF Arctic Research Scholarship (*University of Iceland*) 2016

CGS/ProQuest Distinguished Dissertation Award, <i>Oregon State University</i> , \$1,000	2014
Smithsonian Postdoctoral Fellowship, <i>Smithsonian Institution</i>	2014
Lance Forsythe Memorial Fellowship, <i>Oregon State University</i>	2014
Women's Center Student Leader Award, <i>Oregon State University</i>	2014
AGU Presentation Student Prize Honorable Mention, <i>GeoPRISMS</i>	2014
Young Explorer's Grant, <i>National Geographic</i> , \$5,000	2013
Goldschmidt Travel Grant, Florence, Italy, <i>Geochemical Society</i>	2013
Smithsonian Pre-Doctoral Buck Fellowship, <i>Smithsonian Institution</i>	2012 – 2013
Mineralogy Geochemistry Petrology Volcanology (MGPV) Research Grant Award, <i>Geological Society of America (GSA)</i> , \$1,000	2011
Graduate Student Research Grant, <i>Geological Society of America (GSA)</i> , \$5,000	2011
Jess Johnson Student Writing Award, <i>Oregon State University</i>	2011
National Science Foundation Graduate Research Fellowship Honorable Mention	2011
Marden Prize in Earth Science, <i>Colby College</i>	2009
Dean of Faculty Travel Grant, <i>Colby College</i>	2008
Junior Geology Student Award, <i>Colby College</i>	2008
Research Internship in Science and Engineering (RISE), <i>Deutscher Akademischer Austausch Dienst (DAAD)</i>	2007
Estwing Prize for Mineralogy, <i>Colby College</i>	2007
Sophomore Geology Student Award, <i>Colby College</i>	2007
Undergraduate Teaching Assistantship, Department of Geology, <i>Colby College</i>	2006

PROFESSIONAL SERVICE

Conference Session Convener <i>IV.3 The role of volatiles and degassing in magmatic and eruptive processes</i> ; International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI); Portland, OR	2017
Smithsonian – University Travel Programs Introduce students at the high school and undergraduate levels to Icelandic volcanology through field-based exercises	2016 - 2017
Scientist Is In, Q?rius, Smithsonian Institution, NMNH Educate the public about the field of experimental petrology and how scientists simulate magmatic conditions in laboratories to assess pre-eruptive processes	2016
“30 year anniversary of Mount St. Helens”, Q?rius, Smithsonian Institution, NMNH Inform and interact with the public about the history of the Mount St Helens 1980 explosive eruption, monitoring efforts at the Cascade volcanoes, and potential future activity from US volcanoes	2015
Judge for Outstanding Student Paper Award (OPSA) American Geophysical Union Fall Meeting	2014 – 2015
Oregon State University, Outreach Lead live demonstrations of explosive volcanism to the public and children in elementary school	2009 – 2014

Volcano World Website, Webmaster 2009 – 2014
The “Volcano World” website (<http://volcano.oregonstate.edu>) educates all ages about how volcanoes work and what risks they pose. Website allows community to ask questions and learn through virtual fieldtrips and volcano factoids. As webmaster of a volcano website geared at higher education, K-12, and general public outreach, I generated and revised web pages, optimized page content and website performance, and replied to user comments and requests.

FIELD EXPERIENCE & PROFESSIONAL WORKSHOPS

Volcan Santa Maria-Santiago, Guatemala 2017
Led a team of scientists and non-scientists to the Santiago volcanic system, applied photogrammetry techniques to monitor the active lava dome, produced a photo exhibit that describes the potential hazards and risks from active volcanoes in Guatemala, donated the exhibit to the Guatemalan Tourism Board

National Geographic Storytelling Bootcamp 2016
Served as a senior grant recipient at a workshop on communicating science through public speaking and various media outlets

Workshops on Volcanoes (WOP); Volcan Santa Maria-Santiago, Guatemala 2016
Principle scientist; deployed and demonstrated ground-based, time-lapse photogrammetry techniques used to monitor changes in lava dome surface morphology

National Geographic Storytelling Bootcamp 2015
Workshop on communicating science through public speaking and various media outlets

Cerro Galan Volcanic Complex, NW Argentina 2015
Independent fieldwork for post-doctoral fellowship: mapping of volcanic deposits

National Disaster Preparedness Training Center; Volcano Crises Awareness Course 2014
A 5-part FEMA-sponsored course developed by the University of Hawai’i and the USGS Volcano Hazards program that introduces the hazards and impacts of volcanic eruptions and teaches scientists and organizations how preparedness and community-level planning support volcanic hazard mitigation through lectures and an eruption scenario group activity

EarthCube Workshop in Petrology and Geochemistry, Smithsonian Institution 2013
National Museum of Natural History, Washington D.C.
Appointed note taker for breakout sessions

Curso Internacional de Volcanologia en los Andes Centrales, Instituto Geonorte; UNSA Salta, Argentina 2011

Cerro Galan Volcanic Complex, NW Argentina 2011
Independent fieldwork for PhD: mapping of volcanic deposits, sample collection

Workshop on Secondary Ion Mass Spectrometry (SIMS); Arizona State University 2010

Altiplano-Puna Volcanic Complex, Chile 2009
Independent fieldwork: mapping of volcanic deposits, sample collection, and reconnaissance

- Oregon State Field Camp, Mitchell, Oregon 2009
 GEO495, *Advanced Field Geology*
 Mapping of Permian metamorphic rocks, Cretaceous marine sediments, and Tertiary volcanic rocks
- Center for the Study of Active Volcanoes (CSAV), University of Hawai'i at Hilo 2008
 GEOL471, *Field Methods in Volcanology*
 Exposure to volcano monitoring methods, including volcanic gas sampling techniques, GPS and EDM ground deformation monitoring, and installing seismic stations and interpreting seismic signals
- Semester Abroad, University of Otago, Dunedin, New Zealand 2008
 GEOL252, *Field Studies & New Zealand Geology*
 Bedrock mapping of Mesozoic basement

LABORATORY EXPERIENCE

- Synchrotron-based X-ray Micro-Tomography (Lawrence Berkeley Laboratory, Advanced Light Source) – 3D imaging of experimental and natural samples
- Cold-Seal Waspaloy Pressure Vessel Experimental Petrology
- Microcolorimetry – determination of Fe speciation in whole rocks
- Fourier Transform Infrared Spectroscopy – H₂O and CO₂ analyses of melt inclusions and matrix glass
- Secondary Ion Mass Spectrometry (Arizona State University, Cameca 6f) – H₂O and trace element analysis
- Electron Microprobe (Oregon State University, Cameca; National Museum of Natural History, Smithsonian Institution, JEOL) – mineral chemistry and glass analysis
- Synchrotron-based micro X-ray Absorption Near Edge Structure (Brookhaven National Laboratory) – determination of Fe speciation in glasses
- Laser-Ablation Inductively Coupled Plasma Mass Spectrometry (Oregon State University) – trace element and REE analysis
- Sample Preparation – experience preparing thin sections, doubly intersected melt inclusions hosted in quartz and olivine, and experimental run products

TEACHING EXPERIENCE

- Invited Guest Lecturer 2017
 Utah State University; ANTY 4800: 'People's and Cultures of South Asia'
- Invited Guest Lecturer 2016
 University of Montana; ANTY 330: 'People's and Cultures of South Asia'
- Graduate Teaching Assistant *Summer 2011*
 College of Earth, Ocean, and Atmospheric Sciences, Oregon State University
 GEO495 'Advanced Field Geology'
- Undergraduate Teaching Assistant 2006 – 2009
 Department of Geology, Colby College
 GEO101 'Introduction to Geology'

PUBLICATIONS

Grocke, S.B., de Silva, S.L., Wallace, P.J., Cottrell, E., Schmitt, A.L. (*in press*). Catastrophic Caldera-Forming (CCF) Monotonous Silicic Magma Reservoirs: Constraints from Volatiles in Melt Inclusions from the 3.49 Ma Tara Supereruption, Guacha II Caldera, SW Bolivia. *Journal of Petrology*.

Grocke, S.B., Andrews, B.J., de Silva, S.L. (2017). Experimental and petrological constraints on long-term magma dynamics and post-climactic eruptions at the Cerro Galán caldera system, NW Argentina *Journal of Volcanology and Geothermal Research*. 347, 296-311.
<https://doi.org/10.1016/j.jvolgeores.2017.09.021>

Grocke, S.B., de Silva, S.L., Iriarte, R., Lindsay, J.M., Cottrell, E. (2017). Catastrophic Caldera-Forming (CCF) monotonous silicic magma reservoirs: Geochemical and petrologic constraints on heterogeneity, magma dynamics, and eruption dynamics of the 3.49 Ma Tara Supereruption, Guacha II Caldera, SW Bolivia. *Journal of Petrology*, 58 (2), 227-260.
<https://doi.org/10.1093/petrology/egx012>

Grocke, S.B., Cottrell, E., de Silva, S.L., Kelley, K.A. (2016). The role of crustal and eruptive processes versus source variations in controlling the oxidation state of iron in Central Andean magmas. *Earth and Planetary Science Letters*, 440, 92-104.
<http://dx.doi.org/10.1016/j.epsl.2016.01.026>.

PUBLICATIONS IN PREPARATION

Grocke, S.B., Andrews, B.J., Manga, M., Quinn, E. (*in prep*). Quantifying Volumes of Biotite Breakdown Reaction Products from 3D Tomographic Analysis of Heating Experiments. *Geology*.

Grocke, S.B., Thordarson, T., Schmidt, A., Carboni, E., Höskuldsson, A., Jónsdóttir, I., Mather, T.A., Grainger, R.G. (*in prep*). A validation of methods used to estimate SO₂ emissions from the 2014-2015 basaltic fissure eruption at Holuhraun (N-Iceland). *Geophysical Research Letters*.

Cernuschi, F., Dilles, J., **Grocke, S.B.**, Valley, J., Kitajima, K., Tepley III, F.J. (*in prep*). Rapid formation of porphyry copper deposits evidenced by diffusion of oxygen and titanium in quartz, *Geology*.

CONFERENCE PRESENTATIONS

International Association of Volcanology and Chemistry of the Earth's Interior 2017
Integrating the empirical petrologic method, satellite retrievals, and model simulations to evaluate sulfur degassing processes at the 2014-2015 basaltic flood lava eruption at Holuhraun (N-Iceland)

Grocke, S.B., Thordarson, T., Schmidt, A., Carboni, E., Höskuldsson, A., Jónsdóttir, I., Mather, T.A., Grainger, R.G., Oral Presentation, PE11B: III.6.

Icelandic Geosciences Spring Meeting 2017
A validation of empirically derived SO₂ emissions from the 2014-2015 eruption on Dyngjúsandur, North Iceland

Grocke, S.B., Thordarson, T., Bonny, E., Wright, R., Höskuldsson, A., Jónsdóttir I. Oral Presentation.

- American Geophysical Union Fall Meeting 2016
 Changes in lava effusion rate, explosion characteristics and degassing revealed by time-series photogrammetry and feature tracking velocimetry of Santiaguito lava dome
 Andrews, B.J., **Grocke, S.B.**, Benage, M., V43A-3129.
- Arctic Circle; Reykjavik, Iceland 2016
 Blasting through time: the past and future of gas emissions emitted from Icelandic volcanoes
Grocke, S.B., Oral Presentation.
- American Geophysical Union Fall Meeting 2015
 Magma Mixing Chronometry: Quantitative 3D Tomographic Analysis of Biotite Breakdown in Heating Experiments
Grocke, S.B., Andrews, B.J., Manga, M., Quinn, A., Oral Presentation, V11F-08.
- American Geophysical Union Fall Meeting 2014
 Storage Conditions of Large Silicic Magmatic Systems: Gauging Melt Evolution from Melt Inclusions Hosted in Different Phenocryst Phases
Grocke, S.B., de Silva, S.L., Wallace, P., Kent, A.J.R., Hervig, R.L., Andrews, B.J., Cottrell, E. Poster Presentation, V51A-4721.
- American Geophysical Union Fall Meeting 2013
 Storage conditions and temporal signals for the Tara supervolcanic magma system; insights from geothermobarometry and quartz chemistry.
Grocke, S.B., de Silva, S.L., Cottrell, E., Andrews, B.J., Lindsay, J.M., 52B-02.
- Goldschmidt Conference 2013
 The role of crustal assimilation on the oxidation state of arc magmas.
Grocke, S.B., Cottrell, E., de Silva, S.L., Andrews, B.J., Kelley, K.A., Oral Presentation Gold2013:abs2743.
- International Association of Volcanology and Chemistry of the Earth's Interior 2013
 Evaluating the role of crustal assimilation on the oxidation state of arc magmas.
Grocke, S.B., Cottrell, E., de Silva, S.L., Andrews, B.J., Kelley, K.A., Oral Presentation, 1P1_1C-O13.
- American Geophysical Union Fall Meeting 2012
 Magma Evolution During a Single Caldera Cycle: Insights from Melt Inclusions of the 3.49 Ma Tara Supereruption, Guacha Caldera, SW Bolivia.
Grocke, S.B., de Silva, S.L., Wallace, P.J., Iriarte, R., V12B-05.
- American Geophysical Union Fall Meeting 2012
 Thermal influences on the development and evolution of large catastrophic caldera-forming magmatic systems.
 De Silva, S.L., Gregg, P.M., **Grocke, S.B.**, Kern, J.M., Kaiser, J.F., Iriarte, R., Burns, D.H., Tierney, C., Schmitt, A.K., Gosnold, W.D., V42A-04.
- American Geophysical Union Fall Meeting 2010
 Eruption and Degassing Processes in a Supervolcanic System: The Volatile Record Preserved in Melt Inclusions from the 3.49Ma Tara Ignimbrite in the Central Andes.
Grocke, S.B., de Silva, S.L., Schmitt, A.K., Wallace, P.J., V53C-2267.

Geological Society of Maine Spring Meeting 2009
Textural Analysis of Selected Enclaves within the South Pond Phase of the Waldoboro Pluton, Friendship, Maine.
Grocke, S.B., Reynolds, V.S.

Geological Society of America Meeting 2008
Taphonomic and paleoecologic aspects of the Early Devonian (Pragian) Tarrantine Formation near Jackman, Maine.
Smith, A.M., Colin, E.D., Daly, R.G., Delano, C.L., **Grocke, S.B.**, Hunt, C.G., Kilian, T.M., Newbury, S.S., Gastaldo, R.A., 249-6.

INVITED TALKS

Centro Universitario de Occidente; Universidad de San Carlos de Guatemala 2017
The Hazards and Risks Posed by Active Volcanoes in Guatemala

Fulbright Commission, Reykjavik, Iceland 2017
Blasting through time: the past and future of gas emissions emitted from Icelandic volcanoes

University of Iceland, Department of Earth Sciences 2017
Magma Dynamics and Evolution in Continental Arcs: Insights from the Central Andes

National Geographic Society 2016

Smithsonian Institution, National Museum of Natural History, Department of Mineral Sciences 2015
Magma dynamics and evolution in continental arcs: Insights from the Central Andes

Cascades Volcano Observatory, USGS 2014
Continental caldera-forming magma systems: Insights from the 3.49 Ma Tara eruption Guacha II Caldera, SW Bolivia

Smithsonian Institution, National Museum of Natural History, Department of Mineral Sciences 2012
Magma Evolution During a Single Caldera Cycle: Insights from Melt Inclusions of the 3.49 Ma Tara Supereruption, Guacha Caldera, SW Bolivia

PUBLIC MEDIA OUTREACH & EDUCATION

2017 Featured in: Live Explorer Classroom [YouTube video](#) on the Santa Maria-Santiago volcanic complex, Guatemala
National Geographic Education

Featured in: “Today I Learned” [YouTube video](#) on the Santa Maria-Santiago volcanic complex, Guatemala
National Geographic Online

2016 Volcanology Instructor for Field Program in Iceland
Smithsonian University Travel Programs

Invited host for a “Facebook Live” online event
National Geographic Kids

Featured in: “Today I Learned” [YouTube video](#) on Mount St. Helens
National Geographic Online

Featured in: Shea, R.H. “On the Road to a Supervolcano”
National Geographic Magazine. February 2016, Field Notes

2015 Invited Speaker at the Washington Youth Summit on the Environment, “Exploring a supervolcano in the Central Andes”
National Geographic Society

Lightning Talk Presentation, “Magma Storage Conditions that Precede the Largest Volcanic Eruptions on Earth”, *Smithsonian Institution, Senate of Scientists*

[Magma storage conditions that precede the largest volcanic eruptions on Earth \(YouTube\)](#)

[Magma storage conditions that precede the largest volcanic eruptions on Earth \(iTunes\)](#)

PROFESSIONAL AFFILIATIONS

Geological Society of America
Mineralogical Society of America
American Geophysical Union
Geochemical Society