KARA BRUGMAN kara.brugman@asu.edu

EDUCATION

current PhD candidate, School of Earth and Space Exploration (SESE), Arizona State University, Tempe
- Experimental Petrology
  Advisor: Christy Till, Experimental Petrology and Igneous Processes Center (EPIC)
  Committee: Maitrayee Bose, Steven Desch, Richard Hervig, Everett Shock

2014 B.A., University of Colorado, Boulder – *summa cum laude, with distinction*
- Geological Sciences, minor: Astrophysical & Planetary Sciences
- Honors thesis: Understanding the History of Arabia Terra, Mars Through Crater-Based Tests
  Advisor: Brian Hynek
  Committee: Fran Bagenal, Stephen Mojzsis, Charles Stern

CURRENT PROJECTS

Determination of exoplanet melting curves and crust compositions (2015–current)
- Piston-cylinder experiments to identify location of the dry solidus in mantles of exotic composition
- In association with ASU-NExSS

Diffusion chronometry using Fe-rich clinopyroxene from Yellowstone post-caldera rhyolites to determine rejuvenation-eruption timescales of high-silica systems (2014–current)
- Developed new diffusion modeling method to use a slow-diffusing elemental profile as a proxy to the initial condition of a fast-diffusing elemental profile
- Analyses via LA-ICPMS, EPMA, SIMS, NanoSIMS (also operated)
- Finite differences diffusion model programmed in Python

PAST RESEARCH

Developed a clinopyroxene-liquid geothermometer for clinopyroxene in high-silica systems (2017–2019)
- Cold-seal pressure vessel (CSPV) experiments to supplement calibration dataset

Parameterized geodynamic modeling of exoplanet mantles in association with ASU-NExSS (2015–2017)
- Model programmed in C

Analysis of Martian craters to determine the geological history of the Arabia Terra region (2011–2014)
- Analyzed crater database data and produce plots with Igor Pro and Arc GIS

X-ray diffraction study of Nicaraguan hydrothermal systems to characterize similar relic environments on Mars (2012–2013)
- Prepared samples and conducted x-ray diffraction using the inXitu Terra Field Portable XRD/XRF instrument (functionally equivalent to the CheMin instrument on the MSL/Curiosity rover)
- Analyzed diffractograms using XPowder software

HONORS & FELLOWSHIPS

2019–2020 ASU Graduate College Completion Fellowship
2019 Geochemical Society Planetary Science Grant
2019 ASU Graduate and Professional Student Association Individual Travel Grant
2016, ’18, ‘19 ASU Graduate Education Travel Grant
2014–2018 NSF Graduate Research Fellowship
2016 AGU Outstanding Student Paper Award
2014 Rocky Mountain Association of Geologists Outstanding Student
2014 CU Boulder Bruce F. Curtis Scholarship
2013 CU Boulder T. Keith Marks Award for Outstanding Geological Sciences Majors

PUBLICATIONS

Brugman, K. K. and Till, C. B. (2019). A low-aluminum clinopyroxene-liquid geothermometer for high-silica magmatic systems. American Mineralogist, 104(7), 996–1004. https://doi.org/10.2138/am-2019-6842

Till, C.B., M.E. Pritchard, C.A. Miller, K.K. Brugman, J. Ryan-Davis, 2018. Super-volcanic Investigations. Nature Geoscience, 11(4). doi:10.1038/s41561-018-0100-1

Hynek, B.M., T.M. McCollum, E.C. Marcucci, K.K. Brugman, K.L. Rogers, 2013. Assessment of environmental controls on acid-sulfate alteration at active volcanoes in Nicaragua: Applications to relic hydrothermal systems on Mars, Journal of Geophysical Research—Planets, Special Issue: Early Mars, 118, 2083–2104, doi:10.1002/jgre.20140.

CONFERENCE ABSTRACTS

**invited †talk*

upcoming: Brugman, K.K. and Till, C.B., 2019. New clinopyroxene-liquid geothermometer indicates a broad crystallization interval for low-Al clinopyroxene in high-silica magmatic systems. GSA Annual Meeting abstract 337075, Phoenix, AZ.

*†*upcoming:* Brugman, K.K., Phillips, M.G., and Till, C.B., 2019. Stars to Planets: Experimental Determination of Exoplanet Mantle Solidi and Crust Compositions. Goldschmidt, Barcelona, Spain.

Brugman, K.K., C.B. Till, 2018. Clinopyroxene-Liquid Thermometry Hints at Cold Storage for High-Silica Systems. IAVCEI Commission on Collapse Calderas: VII International Workshop on Collapse Calderas, Toba Caldera, Sumatra, Indonesia.

Brugman, K.K., C.B. Till, 2018. A Revised Low-Al Clinopyroxene-Liquid Geothermometer for High-Silica Igneous Systems. EOS AGU Chapman: Merging Geophysical, Petrochronologic, and Modeling Perspectives of Large Silicic Magma Systems Abstract P-28, Quinamávida, Maule Region, Chile.

*†Brugman, K.K., C.B. Till, 2017. Taking Yellowstone's Temperature: A New Clinopyroxene Geothermometer to Improve Timescales of Pre-Eruptive Events. EOS AGU Fall Meeting Abstract U13B-03, New Orleans, LA.

Brugman, K.K., C.B. Till, 2017. A Revised Clinopyroxene-Liquid Geothermometer for Silicic Igneous Systems with Applications to Diffusion Chronometry of the Scaup Lake Rhyolite, Yellowstone Caldera, WY. EOS AGU Fall Meeting Abstract V11C-0365, New Orleans, LA.

Brugman, K.K., C.B. Till, 2017. Investigation of the Applicability of Clinopyroxene Geothermometers to Silicic Igneous Systems. IAVCEI Scientific Assembly Abstract ME43C-044, Portland, OR.

†Brugman, K.K., C.B. Till, M. Bose, 2016. Clinopyroxene Diffusion Chronometry of the Scaup Lake Rhyolite, Yellowstone Caldera, WY. EOS AGU Fall Meeting Abstract V13F-02, San Francisco, CA.

Brugman, K.K., C.B. Till, M. Bose and R. Hervig, 2015. Development of Clinopyroxene as an Igneous Geospeedometer Using NanoSIMS. EOS AGU Fall Meeting Abstract V31B-3030, San Francisco, CA.

Brugman, K.K., B.M. Hynek, S.J. Robbins, 2015. Crater-based tests unlock the mystery of the origin and evolution of Arabia Terra, Mars. Lunar and Planetary Science Conference, The Woodlands, TX.

INVITED LECTURES

Spring 2019 "Crystal Chemistry" – Geochemistry (GLG 481/CHM 481), professor: Richard Hervig

LEADERSHIP

2019 Convener of AGU Fall Meeting session "Volatiles in magmatic processes and planetary evolution"

2016–curr. Student representative for the AGU Volcanology, Geochemistry, and Petrology section
2017 Convener of AGU Fall Meeting session "Microscale archives of macroscale igneous processes"
2016–2018 Graduate student representative for the ASU Technology Advisory Board
2015–2018 Co-chair of the School of Earth and Space Exploration (SESE) Women in Science Program
2017 AGU Student & Early Career Scientist Conference Planning Committee
2014–2017 Graduate Council delegate for School of Earth and Space Exploration (SESE)
2015 Peer mentor at the AGU Fall Meeting
2012–2013 Student planning committee for the Geological Society of America's 125th Annual Meeting

SELECTED EMPLOYMENT

Research Assistant, School of Earth and Space Exploration (SESE), ASU, Tempe, AZ (2014–current)
Teaching Assistant, School of Earth and Space Exploration (SESE), ASU, Tempe, AZ (2016, 2019)
Research Assistant, Laboratory for Atmospheric and Space Physics, Boulder, CO (2011–2014)

Piston-cylinder, CSPV, ArcGIS, server- and client-side programming languages including Python and C