

James Eguchi

NASA Postdoctoral Program Fellow

Department of Earth & Planetary Sciences • University of California, Riverside
• Riverside, CA • USA
Phone: (909) 263-9255 • Email: james.eguchi@ucr.edu

Research Interests: Cycling of volatiles between Earth and planetary interiors, with a strong emphasis on carbon. I am particularly interested in how igneous and metamorphic processes in planetary interiors affect the evolution of planetary atmospheres and habitability.

Education:

- Ph.D. Rice University (Geology) 2019
Thesis Advisor: Rajdeep Dasgupta
Thesis: Carbon in graphite-saturated silicate melts – Implications for the oxidation state of Earth’s surface and interior
- M.S. UCLA (Geology) 2014
Thesis Advisor: Craig Manning
Thesis: Calcite solubility in H₂O-NaCl-KCl-LiCl solutions at elevated pressure and temperature.
- B.S. UCLA (Geology) 2012

Current Appointment:

- NASA Postdoctoral Program Fellow 2019-Present
NASA Astrobiology Institute – Alternative Earths Team
Supervisor: Timothy Lyons
Project: Evolution of atmospheric O₂ and CO₂ driven by planetary tectonics

Research Experience Prior to M.S.:

- 2010-2012 Undergraduate Research Assistant in UCLA PTX Laboratory with Craig Manning
- 2012 Summer Intern at Institute for Study for Earth’s Interior, Okayama University with Xianyu Xue and Kanzaki Masami

Awards:

- 2019 NASA Postdoctoral Program Fellowship – NASA
- 2019 Leroy Caleb Gibbon Award – Rice Earth, Environmental, & Planetary Sciences
- 2017-2018 Lodieska Stockbridge Vaughn Fellowship – Rice Office of Graduate & Postdoctoral studies
- 2018 Third Place Poster – Houston Geological Society Meeting
- 2016 Torkild Rieber Award – Rice Earth Science
- 2014 Additional stipend awarded to top candidates – Rice Earth Science
- 2013 Truex fellowship – UCLA Earth & Space Science

- 2012 Misasa Student Internship Program – Travel, housing, and daily stipend for research project at Institute for Study for Earth’s Interior, Okayama University
- 2012 Clarence Hall Summer Field Award – UCLA Earth & Space Science

Teaching Experience

- 2012 Teaching Assistant - Earthquakes, UCLA
- 2013-2014 Teaching Assistant - Metamorphic Petrology, UCLA
- Summer 2018 Mentored summer high school intern

Practical and Analytical Proficiency:

Piston cylinder, Multi-anvil, FTIR, EPMA, Matlab, thermodynamic modeling (Perple_X)

Peer-Reviewed Publications:

1. Rajdeep, D., Chowdhury, P., **Eguchi, J.**, Sun, C., Saha, S. (under review). Volatile-bearing partial melts in the lithospheric and sub-lithospheric mantle on Earth and other rocky planets. *Reviews in Mineralogy and Geochemistry*.
2. **Eguchi, J.**, Li, Y., Manning, C.E.. (in press). Experimental determination of calcite solubility in H₂O-KCl-NaCl-LiCl solutions at 700 °C and 8 kbar. *AGU Monographs: Carbon in Earth’s Interior*.
3. **Eguchi, J.**, Seales, J., Dasgupta, R. (2019). Great Oxidation and Lomagundi events linked by deep cycling and enhanced degassing of carbon. *Nature Geoscience*. doi: 10.1038/s41561-019-0492-6.
4. **Eguchi, J.**, Dasgupta, R. (2018). Redox state of the convective mantle from CO₂-trace element systematics of oceanic basalts. *Geochemical Perspectives Letters*. vol 8. pp. 17-21. doi: 10.7185/geochemlet.1823
5. **Eguchi, J.**, Dasgupta, R. (2018). A CO₂ solubility model for silicate melts from fluid saturation to graphite or diamond saturation. *Chemical Geology*. vol 487. pp. 23-28. doi: 10.1016/j.chemgeo.2018.04.012
6. Xue, X., Kanzaki, M., Flury, P., Tobase, T., **Eguchi, J.** (2018). Carbonate speciation in depolymerized and polymerized (alumino) silicate glasses: Constraints from ¹³C MAS and static NMR measurements and ab initio calculation. *Chemical Geology*. vol. 479. pp. 151-165. doi: 10.1016/j.chemgeo.2018.01.005
7. **Eguchi, J.**, Dasgupta, R. (2017). CO₂ content of andesitic melts at graphite-saturated upper mantle conditions with implications for redox state of oceanic basalt source regions and remobilization of reduced carbon from subducted eclogite. *Contributions to Mineralogy and Petrology*. vol. 172. pp. 12. doi: 10.1007/s00410-017-1330-8

Other Publications:

- Eguchi, James.** 2019. Carbon in graphite-saturated silicate melts – Implications for the oxidation state of Earth’s surface and interior. Rice University Electronic Theses and Dissertations.
- Eguchi, James.** 2014. Experimental determination of calcite solubility in H₂O-KCl-NaCl-LiCl solutions at 700 °C and 8 kbar. UCLA Electronic Theses and Dissertations.

Scientific Presentations and Abstracts:

- Eguchi, J.**, Dasgupta, R. 2019. Experimental investigation of a model ophiocarbonate at deep subduction zone conditions – Implications for cycling of CO₂ and H₂O. AGU Fall Meeting 2019.
- Eguchi, J.**, Seales, J., Dasgupta, R. 2019. Association of Large oxidation events and carbon isotope excursions – Increased CO₂ drawdown and deep recycling of organic carbon. Goldschmidt 2019.
- Eguchi, J.**, Seales, J., Dasgupta, R. 2018. Genetic link for Great Oxidation and Lomagundi Events: Tectonically driven increase of CO₂ emissions/drawdown and deep recycling of organic C. AGU Fall meeting 2018
- Eguchi, J.**, Dasgupta, R. 2017. Redox state of the recycled crustal lithologies in the convective upper mantle constrained using oceanic basalt CO₂-trace element systematics. AGU Fall meeting 2017.
- Eguchi, J.**, Dasgupta, R. 2017. A new CO₂ solubility model for silicate melts from fluid-saturation to graphite-saturation: Implications for the redox state of oceanic basalt source regions. Goldschmidt 2017.
- Manning, C.E., **Eguchi, J.**, Galvez, M. 2015. Controls on calcite solubility in metamorphic and magmatic fluids. AGU Fall Meeting 2015.
- Eguchi, J.**, Dasgupta, R. 2015. Experimental determination of dissolved CO₂ content in nominally anhydrous andesitic melts at graphite/diamond saturation – Remobilization of deeply subducted reduced carbon via partial melts of MORB-like eclogite. AGU Fall Meeting 2015.
- Eguchi, J.**, Li, Y., Manning, C.E. 2014. Calcite solubility in H₂O-KCl-NaCl-LiCl solutions at 700°C and 8 kbar: Experimental determination and modeling. AGU Fall Meeting 2014
- Manning, C.E., **Eguchi, J.**, Li, Y. 2013. Fluids, subduction, and deep carbon. Goldschmidt 2013
- Eguchi, J.**, Manning, C.E., Li, Y. 2013. Experimental determination of calcite solubility in H₂O-KCl-NaCl-LiCl at 700°C and 8 kbar. AGU Fall Meeting 2013
- Xianyu, X., Kanzaki, M., **Eguchi, J.** 2012 Water speciation in sodium silicate glasses (quenched melts): A comprehensive NMR study. AGU Fall Meeting 2012.

Field Mapping Experience:

- Poleta Folds, White Mountains, California: One month of mapping as undergraduate.
- Diligencia Basin, Orocochia Mountains, California: Mapping over one quarter as undergraduate.
- Rainbow Basin, Barstow, California: Mapping over one quarter as undergraduate.

Departmental and External Service:

- Reviewer for Journal of Geophysical Research; Earth, Planetary & Science Letters
- Co-organizer of Graduate Interdisciplinary Earth Science Symposium – Rice University
- Co-organizer of Astrobiology Hour – University of California, Riverside

Membership in Professional Societies:

American Geophysical Union, Mineralogical Society of America, Geochemical Society