Jiale Mou 牟嘉乐

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Research Interests

I use geochemical analyses integrated with numerical and computational modeling, thermodynamics, and statistical approaches to address the following research questions:

- Mantle structure and thermal conditions: I explore the composition, thermal structure, and evolution of Earth's mantle, and how these relate to tectonics and crust formation, using geochemical datasets combined with parameterized modeling.
- Crustal differentiation and thermal evolution: I study how crustal processes influence the redistribution of radiogenic elements and then the thermal structure and stability of the continental crust, using numerical modeling and geochemical constraints.
- Application of two-phase flow in porous media to magma chamber processes: I apply numerical and computational tools to model melt migration and segregation in magma systems, with implications for ore formation.

Education

Rice University, PhD in Geology 09/2022-expected 08/2026

University of Science and Technology of China, B.S in Geochemistry 09/2018-06/2022

Thesis: "The role of magmatic-hydrothermal processes on the genesis and evolution of granites"

Advisor: Fang Huang, PhD

Working Experience

Research Assistant, Rice University 06/2019-present

Research Assistant at Key Laboratory of Crust-Mantle Materials and Environments, USTC 06/2019-06/2022

Grants, Honors & Awards

CPO2H Graduate Fellowship 12/2024

Alison Henning Teaching Award 01/2024

National Encouragement Scholarship 11/2020

National Encouragement Scholarship 11/2021

Endeavour Scholarship 11/2020

Publications

1. **Mou, J.-L.**, Lee, C.-T., & Borchardt, J. (2025). Calibrating olivine forsterite content as a measure of melting degree in residual peridotites. Geochimica et Cosmochimica Acta. https://doi.org/10.1016/j.gca.2025.08.021
2. **Mou, J.-L.** & Lee, C.-T. A step change in Earth's thermal history driven by the onset of plate tectonics. Proceedings of the National Academy of Sciences, in review.
3. **Mou, J.-L.**, Lee, C.-T., & Zhang, J. Crustal thickness effects on the distribution of heat-producing elements and implications for craton stability. Manuscript in preparation.

Conference Abstract

Jia-Le Mou, Cin-Ty Lee. A step change in Earth's thermal history driven by the onset of plate tectonics [Poster]. AGU Fall Meeting, 2025.

Jia-Le Mou, Cin-Ty Lee. A step change in Earth's thermal history driven by the onset of plate tectonics [Poster]. Gordon Research Conference, 2025.

Jia-Le Mou, Jackson Borchardt, Cin-Ty Lee. Calibrating olivine Forsterite content as a measure of melting degree in residual peridotites [Oral presentation]. Goldschmidt Conference, 2024.

Jia-Le Mou, Dingsheng Jiang, Gengxin Deng, Fang Huang. Ba isotope constraints on the genesis of the Koktotay pegmatite associated with giant metal deposits [Poster]. 18th Annual Academic Conference of the Chinese Society for Mineralogy and Geochemistry, 2021.

Field Work Experience

Southern Oregon, USA (1 week, 2024, collection of integrated geologic and geophysical data)
New Mexico, USA (3 days, 2023; igneous petrology, structure/tectonics, as a TA)
New Mexico, USA (1 week, 2023; sedimental petrology)
Utah State, USA (3 days, 2022**,** igneous petrology, structure/tectonics**)**
Altay Region, Xinjiang, China (2 weeks, 2021; sampling, igneous petrology, structure/tectonics)
Dabie Mountains, Anhui, China (1 week, 2021; metamorphic petrology, igneous petrology, tectonics)
Tan Lu Fault Zone, Anhui, China (1 week, 2021; structural geology, tectonics, metamorphic petrology)
Chaohu Lake, Anhui, China (1 week, 2019; sedimentary petrology, stratigraphy, structural geology)
Beidaihe, Hebei, China (1 week, 2019; igneous petrology, sedimentology)
Loess Plateau Region, Shaanxi; Laohugou Glacier No.12, Gansu, China (1 week, 2019; paleoclimate, climate)

Teaching

EEPS 322 Earth and Planetary Material 09/2023-12/2023
Teaching assistant
EEPS 110 Earth, Environment and Society 09/2023-12/2023
Teaching assistant

Service & Outreach

EEPS Open House outreach event, EEPS, Rice University Spring 2025
Secretary of GeoUnion, EEPS, Rice University 2023-2024
Captain of Women's Football Team of School of Earth and Space Sciences, USTC 09/2020-12/2021

Skills

Analytical instruments: EPMA, SEM, MC-ICP-MS, ICP-MS
Programming & modeling: Python, OpenFOAM (C++)
Isotope geochemistry & sample preparation: column chemistry (Fe & Ba isotopes)