Zeyang Sun, Ph.D.

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Research Interests

I am deeply interested in a range of scientific disciplines, including clumped isotopes, paleoclimate, mass extinctions, terrestrial environments, and carbonate preservation and diagenesis. My long-term research goal is to examine geochemical proxies and the co-evolution of environment and ecology throughout Earth's history.

Education

Ph.D., Geology — **Department of Geology and Geophysics, Texas A&M University** — 2017—2024
Dissertation: Carbonate Clumped Isotope Reordering from an Atomic Approach: Heating Experiment, Kinetic Modeling, and Application
Advisor: Ethan Grossman

B.S., Geology *with honor* — **School of Earth Sciences and Engineering, Nanjing University** — 2013—2017
Thesis: Geochemical Features of Carbonates from Gaoyuzhuang Formation and Tieling Formation of North China: Implications for the Redox Conditions of Paleo-Ocean
Advisor: Hong-Fei Lin

Professional Experience

Graduate Assistant Researcher in Clumped Isotope Geochemistry — 2017—2024
Department of Geology and Geophysics, Texas A&M University
Advisors: Ethan Grossman, William Defliese (Co-advisor)

Research Internship in Metal Isotope Geochemistry — 2016
Department of Earth and Planetary Sciences, Yale University
Advisors: Noah Planavsky, Xiangli Wang (Co-advisor)

Publications (*Denotes Equal Contribution)

Accepted and Published

[3] **Sun, Z.***, Perez-Beltran, S.*, Zaheer, W.*, Defliese, W. F., Banerjee, S., and Grossman, E. L.: Clumped isotope reordering kinetics in strontianite and witherite: experiments and first-principles simulations, *Earth and Planetry Science Letters* 624, p. 118467, 2023. DOI: 10.1016/j.epsl.2023.118467.

[2] Perez-Beltran, S.*, Zaheer, W.*, **Sun, Z.***, Defliese, W. F., Banerjee, S., and Grossman, E. L.: Density functional theory and ab initio molecular dynamics reveal atomistic mechanisms for carbonate clumped isotope reordering, *Science Advances* 9, eadf1701, 2023. DOI: 10.1126/sciadv.adf1701.

[1] **Sun, Z.**, Wang, X., and Planavsky, N.: Cr isotope systematics in the Connecticut River estuary, *Chemical Geology* 506, pp. 29–39, 2019. DOI: 10.1016/j.chemgeo.2018.12.034.

Presentations

Conference Submissions

[7] **Sun, Z.**, Perez-Beltran, S., Defliese, W. F., Banerjee, S., and Grossman, E. L.: Reassessment of calcite clumped isotope preservation using water-facilitated clumped isotope resetting, Oral, in: *Goldschmidt*, Chicago, IL, USA, Aug. 2024.

[6] **Sun, Z.**, Perez-Beltran, S., Defliese, W. F., Banerjee, S., and Grossman, E. L.: Revisiting clumped isotope resetting in calcites with internal water and organic matter, Oral, in: *International Clumped Isotope Workshop*, Long Island, NY, USA, Aug. 2024.

[5] **Sun, Z.**, Maupin, C. R., Perez-Beltran, S., Zaheer, W., Defliese, W. F., Banerjee, S., and Grossman, E. L.: The role of internal water in carbonate clumped isotope resetting, Oral, in: *GSA Connects 2023 Meeting*, Pittsburgh, PA, USA, Oct. 2023.

[4] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Poster, in: *AGU Fall Meeting*, New Orleans LA, USA, Dec. 2021.

[3] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Poster, in: *GSA Connects 2021 Meeting*, Portland, OR, USA, Oct. 2021.

[2] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Flash Talk, in: *Goldschmidt*, Lyon, France (Virtual), July 2021.

[1] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: Reconstructing thermal histories of the Oklahoma, Illinois and Moscow basins using clumped isotopes of mid-Carboniferous brachiopods, Poster, in: *International Clumped Isotope Workshop*, Los Angeles, CA, USA, Jan. 2019.

Honors and Awards

[6] **Student Research Award (2nd Place)** 2024
Geology and Geophysics Graduate Society Symposium, TAMU

[5] **ConocoPhillips/HEEP Endowed Graduate Fellowship** 2022
Department of Geology and Geophysics, TAMU

[4] **Petroleum and Sedimentary Systems Scholarship** 2018
Berg-Hughes Center, TAMU

[3] **Honor of Outstanding Graduate** 2017
Nanjing University (NJU)

[2] **Pandeng Earth Sciences Scholarship** 2015
NJU and Institute of Geology and Geophysics, Chinese Academy of Sciences

[1] **Qihang Earth Sciences Scholarship** 2014
School of Earth Sciences and Engineering, NJU

Teaching Experience

Teaching Assistant

[2] Preparing the lab session handout, explaining the principle of the IRMS and the carbonate device, and training students to perform carbonate clumped isotope analysis.
Course: GEOL 648 Stable Isotope Geology (Spring 2024 and 2022, Fall 2018), TAMU
Project: Clumped Isotope of Modern Benthic Foraminifera (Spring 2024)

[1] Preparing class and lab materials, addressing student questions, guiding experimental design and instrument use, tutoring data analysis and visualization with Julia language, and supporting project presentations.
Course: GEOL 450 Geology Senior Project & GEOS 405 Environmental Geosciences (Spring 2023), TAMU
Project: Impact of Gas Stove Usage on Indoor Air Quality and Health

Professional Experience, Engagement and Activities

Reviewer

[1] *Science Advances* (1), *Chemical Geology* (1), *Palaeo3* (1) 2024

Field Trips

[2] Permian Reef Complex and Guadalupe Mountain, USA 2018

[1] Late Ordovician Outcrops, Cincinnati Arch region, USA 2018

Outreach

[4] Geology and Geophysics Undergraduate Summer School, TAMU 2024
"*How to give an oral presentation and academic conference experiences*"

[3] Chemistry Open House for students, kids, and families 2019, 2018
"*Thermometer in the shell*"

[2] Ions@WORK Mass Spectrometry Symposium 2018

[1] Mass Spectrometry for Isotopic Analysis Subunit Open House 2018

Skills

Instrument Techniques Including operation, troubleshooting, maintenance, and training

[1] Thermo Scientific™ 253Plus IRMS

[2] Thermo Scientific™ Kiel IV Carbonate Device with customized PPQ Trap

[3] Field Emission SEM, CL Microscopy, FTIR Microscopy

[4] High Temperature Conversion Elemental Analyzer

[5] Manual Glass Vacuum Line

Programming Julia, Python, MATLAB®

Doctoral Program Courses

[9]	CHEM 648 Principles of Quantum Mechanics	Fall 2019
[8]	OCNG 641 Inorganic Aquatic Geochemistry	Spring 2019
[7]	GEOL 648 Stable Isotope Geology	Fall 2018
[6]	CHEM 621 Chemical Kinetics	Spring 2018
[5]	GEOL 658 Earth Systems Through Deep Time: Global Change, Paleoclimate, and Life	Spring 2018
[4]	OCNG 689 Cenozoic Paleoclimate	Spring 2018
[3]	OCNG 655 Experimental Design and Analysis in Oceanography	Fall 2017
[2]	OCNG 640 Chemical Oceanography	Fall 2017
[1]	GEOL 681 Stable Isotope Methods and Research: Clumped Isotope	Fall 2017

Referees

Ethan Grossman | Professor and Michel T. Halbouty Chair
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Sarbajit Banerjee | Professor and Davidson Chair in Science
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Yige Zhang | Professor
Guangzhou Institute of Geochemistry, Chinese Academy of Sciences
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