Tao Sun

Dept. of Earth and Atmosphere Sciences
Science & Research Bldg #1, Univ. of Houston
Houston, TX, 77204
Tel: 832-205-3645 (mobile)
Email: tsun9@central.uh.edu; or tao.sun@nasa,gov

▪ Education

Ph.D in Stable Isotope Geochemistry 2011
Louisiana State University, Advisor: Dr. Huiming Bao
Dissertation: *Non-Mass Dependent isotope Fractionation: an Application in a Hyper-arid Environment and a Set of Experiments on Thermal Diffusion*

M.S in Organic Geochemistry 2006
University of Kentucky, Advisor: Dr. Ana.M.Carmo
Thesis: *Molecular and Stable Isotopic Study of Organic Matter in the Upper Devonian-lower Mississippian Black Shales of the Appalachian Basin: Deciphering Biochemical Controls on Organic Carbon Cycling*

B.S in Petrology 2003
University of Science and Technology of China, Advisor: Dr. Xiaoyong Yang
Thesis: *The study on Mylonite from Tenacity Shear Zone: the Behavior of Rare Earth Elements*

▪ Positions held

Research Associate, Univ. of Houston 2014 to present
Research Scientist, JSC-LSU 2013 to 2014
NASA Postdoctoral Fellow, Johnson Space Center, 2011 to 2013
Graduate Research Assistant, Louisiana State University, 2006 to 2011
Teaching Assistant, Louisiana State University, summer, 2010
Graduate Research Assistant, Kentucky Transportation Center, summer, 2006
Teaching Assistant, University of Kentucky, 2003 to 2006

▪ Publications

- **Sun T,** Thibodeaux L.J., Birdwell J.E., *Culling's Continuity Equation–Revisiting and Revising the Legacy Landscape Model after 50 years*, in prep, 2015
- **Sun T**, Bao H.M, Reich M, Hemming S, *More than Ten Million Years of Hyper-aridity Revealed by Multiple Isotope Signatures of Sulfate in a Deep Gravel Profile in the Atacama Desert, Geology*, under review, 2015
- **Sun T**, Socki R.A, Bish D.L, Harvey R.P, Tonui E, Niles P.B, Bao H.M. *Lost Antarctic Desert Inferred from Unusual Sulfate Formation and Isotope Signatures*, Nature Communications, Volume 6, Article 7579, DOI: 10.1038/ncomms8579, 2015
  Featured by U.S. Antarctic Program News, The Antarctic Sun: *The Lost Dry Valleys of the Polar Plateau* (http://antarcticsun.usap.gov/science/contenthandler.cfm?id=4184)
- Huang J, Feng L.J, Lu D.B, Zhang Q.R, **Sun T** and Chu X.L, *Multiple Climate Cooling prior to Sturtian Glaciations: Evidence from Chemical Index of Alteration of Sediments in South China*, Scientific Reports, v.4. doi:10.1038/srep06868, 2014
- Huang J, Chu X.L, Lyons T.W, **Sun T**, Feng L.J, Zhang Q.R, Chang H.J, *The Sulfur Isotope Signatures of Marinoan Deglaciation captured in Neoproterozoic Shallow-to-deep Cap Carbonate from South China*, Precambrian Research, v.238, p. 42-51, 2013
- **Sun T**, Niles P.B, Socki R.A, Bao H.M, Liu Y, *Non-Mass-Dependent Isotope Fractionation Under a Thermal Gradient*, 44th Lunar and Planetary Science Conference, 2013
- Socki R.A, Niles P.B, Cabiran M, Rossi C, **Sun T**, *In-situ Water Vapor Probe for a Robot-Arm Mounted, Compact Water Vapor Analyzer: Preliminary Results*, 44th Lunar and Planetary

Science Conference, 2013

- Socki R.A, **Sun T,** Niles P.B, Harvey R.P, Bish D.L and Tonui E, *Antarctic Mirabilite Mounds as Mars Analogs: The Lewis Cliff Ice Tongue Revisited*, 43rd Lunar and Planetary Science Conference, 2012
- **Sun T** and Bao H.M., *Thermal-Gradient Induced Non-Mass-Dependent Isotope Fractionation*, Rapid Communication in Mass Spectrometry, v.25 p.765-773, 2011
  Highlighted by Editor's Choice, Science, v.332, 2011
- **Sun T** and Bao H.M., *Non-mass-dependent 17O Anomalies Generated by a Superimposed Thermal Gradient on a Rarefied O_2 Gas in a Closed System*, Rapid Communication in Mass Spectrometry, v.25 p.20-24, 2011
- Bao H.M, **Sun T**, Kohl I, Peng Y.B, *Comment on "Early Archaean Microorganisms Preferred Elemental Sulfur, Not Sulfate"***,** Science, March 2008: 1336
- Elswick E.R, Hower J.C, Carmo A.M, **Sun T**, Mardon S.M, "*Sulfur and Carbon Isotope Geochemistry of Coals and Derived Combustion By-products: An Example From an Eastern Kentucky Power Plant",* Applied Geochemistry, v. 22, p. 2065-2077, 2007

Selective Skills

- Extensive experience in designing, building, maintaining and operating isotope fluorination systems for multiple oxygen isotope analysis of terrestrial and extraterrestrial samples, i.e. BrF_5 laser fluorination for silicates, sulfates, metal oxides and phosphates, CoF_3 fluorination for H_2O, thermal fluorination for CO_2.
- Extensive experience on the operation, maintenance and troubleshooting of gas source Isotope Ratio Mass Spectrometers (Thermo Scientific MAT 253/Delta V/IsoPrime100), pyrolysis-Gas Chromatography-DSQ Mass Spectrometer (Thermo Scientific / Varian Saturn 2200), Temperature Conversion-Elemental Analyzer (Thermo Scientific), Ion Chromatography (Dionex, ICS-90, ICS 1100, ICS-3000), Laser Spectroscopy (LGR DLT-100), Gas bench interface.
- Extensive experience on analyzing source rocks (e.g. black shale), including but not limited to extraction of kerogen, isolation of organic compounds, molecular analysis using GC-MS and GC-QQQ-MS and compound specific carbon/hydrogen/nitrogen/sulfur isotope analysis using pyrolysis-GC-C-MS-IRMS.
- Operation and maintenance of Liquid/ Solid Nuclear Magnetic Resonance (Varian Gemini 400/600 MHz), X-ray crystallography (Bruker/Siemens D5000), Scanning Electron Microscope (JOEL 7600F), Thermal Electron Microscope.
- Wet chemistry laboratory skills.

Professional Memberships

AAPG, AGU, IAGC, TSOP

Honors and Awards

- NASA Postdoctoral Fellowship, 2011-2013
- Distinguished Dissertation Award, College of Science, Louisiana State University, 2011
- Economic Development Assistantship, Board of Regents of Louisiana, 2006-2010
  (4-year Fellowship for outstanding graduate student)
- Pirtle Award for Student of Geosciences, University of Kentucky, 2004
- Outstanding Student Scholarship, University of Science and Technology of China, 2002

Grants

- Co-I NASA Solar System Workings, 2015, Pending, $232,556 (UH share)
  Multiple Stable Isotope Analysis of Sulfate Minerals from Shergottites and Nakhlites as Probe to Martian Atmosphere, Hydrosphere and Lithosphere
- Co-I NASA Habitable Worlds, 2015-2018, $91,007 (UH share)

Evaluating Aqueous Martian Environments through Coordinated Analysis of Carbonates in Martian Meteorite EETA 79001

- PI NASA Postdoctoral Fellowship, 2011-2013, $126,000
  Non-Mass-Dependent Fractionation under Thermal Gradient on Rarefied CO_2 Gas
- PI International Association of Geochemistry, 2009, $2000
  Multiple Sulfate Isotopic Evidence of the Formation of Oxide Copper Ore at Spence, Atacama Desert, Chile

Professional Services

- Reviewer for *NSF Antarctic Earth Science program, Science, Proceedings of National Academy of Science, Geochimica et Cosmochimica Acta, Rapid Communication on Mass Spectrometer, Precambrian Research*
- Session convener and chair for AGU Volcanology, Geochemistry and Petrology program, and Atmosphere program
- Vice President, AAPG, Department of Geology and Geophysics, Louisiana State University
- Director, Publicity Department, Student Union, College of Earth and Space Sciences, University of Science and Technology of China