

CV- Huiming Bao

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PROFESSIONAL PREPARATION

Peking University, P. R China	Palaeontology & Stratigraphy	B. Sc.	1982-1986
Nanjing Institute of Geology and Paleontology, Academia Sinica	Calcareous Algae & carbonate sedimentology	M.Sc.	1986-1989
Princeton University	Stable isotope geochemistry	Ph. D	1993-1998
University of California San Diego	Atmospheric chemistry & Stable isotopes	Postdoc	1998-2001

APPOINTMENTS

2007- Associate professor in Geology and Geophysics, Louisiana State University
2001-2007 Assistant professor in Geology and Geophysics, Louisiana State University
1998-2001: Postdoctoral Research Chemist, University of California San Diego
1996-1997: Research Scientist, University of California, Santa Cruz (in absentia from Princeton University)
1993-1998: Assistant in Instruction/Research, Princeton University
1989-1993: Assistant Researcher, Nanjing Institute of Geology and Palaeontology, Academia Sinica

RESEARCH INTERESTS

Multiple stable isotopic systems; Earth systems evolution

COURSES TAUGHT

Physical Geology and *Earth System History* for undergraduate students;
Stable Isotope Geochemistry and *Carbonate Geochemistry and Petrology* at the graduate levels;
and Research seminars: *Atmospheric signatures in rock records* and *Multi-dimensional Stable Isotopes*.

PUBLICATIONS

2009

*Peng, Y., **Bao, Huiming**, and Yuan, X-L, 2009, New morphological observations for Paleoproterozoic acritarchs from the Chuanlinggou Formation, North China, *Precambrian Research*, 168, 223-232.

Bao, Huiming, Ian J. Fairchild, Peter M. Wynn, and Christoph Spötl, 2009, Stretching the Envelope of Past Surface Environments: Neoproterozoic Glacial Lakes from Svalbard, *Science*, 323, 119-122; DOI: 10.1126/science.1165373

2008

Bao, Huiming, Jim Lyons, and Chuanming Zhou, May 2008, Triple oxygen isotope evidence for elevated CO₂ levels after a Neoproterozoic glaciation, *Nature*, 453 (7194), 504-506; DOI: 10.1038/nature06959.

Bao, Huiming, Sun, T., Kohl, I., and Peng, Y.-P., 2008, Comments on “Early Archaean microorganisms preferred elemental sulfur, not sulfate”, *Science*, v. 319 (5868), p. 1336.

Bao, Huiming, Jaime D. Barnes, Zach D. Sharp, and David R. Marchant, 2008, Two chloride end-members in soils of the McMurdo Dry Valleys, Antarctica. *Journal of Geophysical Research, D: Atmospheres*, 113, D03301, doi:10.1029/2007JD008703.

Farquhar, J., Canfield, D. E., Masterson, A., **Bao, H.**, and Johnston, D., 2008, Sulfur and oxygen isotope study of sulfate reduction in experiments with natural populations from Fællestrand, Denmark, *Geochimica et Cosmochimica Acta*, 72, 2805-2821.

Bing Shen, Shuhai Xiao, Alan J. Kaufman, **Huiming Bao**, Chuanming Zhou, Haifeng Wang, Stratification and mixing of a post-glacial Neoproterozoic ocean: Evidence from carbon and sulfur isotopes in a cap dolostone from northwest China, 2008, *Earth and Planetary Science Letters*, 265 (102), 209-228.

Socki, R. A., Harvey, R. P., Bish, D. L., Tonui, E., **Bao, Huiming**, 2008, Stable isotope systematics of cryogenic evaporite deposits from Lowis Cliff ice tongue, Antarctica: A Mars analog, *Lunar and Planetary Science Conference* (NASA, Houston, 2008), Vol. XXXIX, pp. 1964.

2007

Bao, Huiming, Rumble III, D., Lowe, D. R., 2007, The five stable isotope compositions of the Fig Tree barites: Implications on sulfur cycle in an early Archean ocean. *Geochimica et Cosmochimica Acta*, doi: 10.1016/j.gca.2007.05.032.

Schiffbauer, J. D., Yin, L.-M., Bondnar, R. J. Kaufman, A. J., Meng, F.W., Hu, J., Shen, B., Yuan, X.-L., **Bao, H. M.**, and Xiao, S. H., 2007, Ultrastructural and geochemical characterization of Archean–Paleoproterozoic graphite particles: Implications for recognizing traces of life in highly metamorphosed rocks. *Astrobiology*, 7(4), 684-704, DOI: 10.1089/ast.2006.0098.

2006

Bao, Huiming, and D. R. Marchant (2006), Quantifying sulfate components and their variations in soils of the McMurdo Dry Valleys, Antarctica, *Journal of Geophysical Research, D: Atmosphere*, 111, D16301, doi:10.1029/2005JD006669.

*Howell, K. J. and **Bao, Huiming**, 2006, Caliche as a geological repository of atmospheric sulfate, *Geophysical Research Letters*, 33, L13816, doi: 10.1029/2006GL026518.

*Jenkins, K. A. and **Bao, Huiming**, 2006, Multiple oxygen and sulfur isotope characterization of total atmospheric sulfate deposition in Baton Rouge, Louisiana, USA, *Atmospheric Environment*, 40, 4528-4537.

Bao, Huiming, 2006, Purifying synthetic barite for oxygen isotope measurement by dissolution and reprecipitation in a chelating solution. *Analytical Chemistry*, 78(1): 304-309.

2005

Airieau, S.A., Farquhar, J., Thiemens, M.H., Leshin, L.A., **Bao, H.**, and Young, E., 2005, Planetsimal sulfate and aqueous alteration in CM and CI carbonaceous chondrites: *Geochim. Cosmochim. Acta*, v. 69, p. 4166-4171.

Loope, D. B., Mason, J. A., **Bao, H.**, et al., 2005, Deformation structures and an alteration zone linked to deposition of volcanogenic sulfate in an ancient playa (Oligocene of Nebraska, USA). *Sedimentology*, 52, 123-139.

Bao, Huiming, 2005, Sulfate in modern playa settings and in ash beds in hyperarid deserts: Implication on the origin of ^{17}O -anomalous sulfate in an Oligocene ash bed. *Chemical Geology*, 214 (1-2), 127-134.

2004

Bao, Huiming and Gu, Baohua, 2004, Natural perchlorate has a unique oxygen isotope signature. *Environmental Science and Technology*, 38(19): 5073-5077.; [10.1021/es049516z](https://doi.org/10.1021/es049516z)

Bao, Huiming, Jenkins, K.A., Khachatryan, M. and Chong-Díaz, G., 2004. Different sulfate sources and their post-depositional migration in Atacama soils. *Earth & Planetary Science Letters*, 224 (3-4), 577-587.

Shuhai Xiao, **Huiming Bao**, Haifeng Wang, Alan J. Kaufman, Chuanming Zhou, Guoxiang Li, Xunlai Yuan, and Hongfei Ling, 2004, The Neoproterozoic Quruqtagh Group in eastern Chinese Tianshan: Evidence for a post-Marinoan glaciation. *Precambrian Research*, 130 (1-4), 1-26.

2003

Bao, Huiming, and Reheis, M.C., 2003. Multiple oxygen and sulfur isotopic analyses on water-soluble sulfate in bulk atmospheric deposition from the southwestern United States. *Journal of Geophysical Research, D: Atmosphere*, 108(D14): 4430; [10.1029/2002JD003022](https://doi.org/10.1029/2002JD003022).

Bao, Huiming, Thiemens, M.H., Loope, D.B. and Yuan, X.-L., 2003. Sulfate oxygen-17 anomaly in an Oligocene ash bed in mid-North America: Was it the dry fogs? *Geophysical Research Letters*, 30(16): 1843; [10.1029/2003GL016869](https://doi.org/10.1029/2003GL016869).

2002 (A publication gap: Building Oxy-Anion Stable Isotope Center at LSU)

2001

Bao, Huiming, Thiemens, M. H., and Heine, K., 2001, Oxygen-17 excesses of the central Namib gypcretes: Spatial distribution. *Earth & Planetary Science Letters* 192. 125-135.

Farquhar, J., **Bao, Huiming** & Thiemens, M. H. et al., 2001, Questions regarding Precambrian sulfur isotope fractionation – Response. *Science*, 292 (5524), U6-U7.

Thiemens, M. H., Savarino, J., Farquhar, J., **Bao, Huiming**, 2001, Mass-independent isotopic compositions in terrestrial and extraterrestrial solids and their Applications. *Accounts of Chemical Research*, 34(8), 645-652.

Bao, Huiming, Greg Michalski, and Mark H. Thiemens, 2001, Sulfate oxygen-17 anomalies in desert varnishes. *Geochim. Cosmochim. Acta* 65 (13), 2029-2036.

2000

Bao, Huiming, Douglas A. Campbell, James G. Bockheim, Mark H. Thiemens, 2000, Origin of sulfate in Antarctic Dry Valley soils as deduced from anomalous ^{17}O compositions. *Nature* 407, 499-502.

- Bao, Huiming**, Thiemens, M. H., 2000, Generation of O₂ from BaSO₄ using a CO₂-laser fluorination system for simultaneous δ¹⁸O and δ¹⁷O analysis. *Analytical Chemistry* 72(17), 4029-4032.
- Bao, Huiming et al.** 2000, Anomalous ¹⁷O compositions in massive sulphate deposits on the Earth. *Nature* 406, 176-178.
- Farquhar, J., **Bao, Huiming** & Thiemens, M. H., 2000, Atmospheric influence of Earth's earliest sulfur cycle. *Science* 289, 756-758.
- Wing, S. L.; **Bao, Huiming**; & Koch, P. L., 2000, An early Eocene cool period? Evidence for continental cooling during the warmest part of the Cenozoic. In: Huber, Brian T., editor, *Warm climates in Earth history*. Cambridge : University of Cambridge, p. 197-237.
- Bao, Huiming**, Koch, P. L., and Thiemens, M. H., 2000, Oxygen isotope composition of ferric oxides from recent soil, hydrologic, and marine environments. *Geochim. Cosmochim. Acta* 64 (11), 2221-2231.

1999

- Bao, Huiming**, Koch, P. L., and Rumble, D. III , 1999, Paleocene/Eocene climatic variation in western North America: Evidence from the δ¹⁸O of pedogenic hematite. *Geological Society of America Bulletin*. 111, 1405-1415.
- Bao, Huiming** and Koch, P. L., 1999, Oxygen isotope fractionation in ferric oxide-water systems: Low temperature synthesis. *Geochim. Cosmochim. Acta* 63, 599-613.

1998

- Bao, Huiming**, Koch, P. L. and Hepple, R., 1998, Hematite and calcite coatings on fossils. *Journal of Sedimentary Research A*, v. 68, p. 273-287.

1997 and earlier

- Shen, J.W., Yu, C.M., and **Bao, Huiming**, 1997, A Late-Devonian (Famennian) Renalcis-epiphyton reef at Zhaijiang, Guilin, South China. *Facies*, 37: p. 195-209.
- Wu, Qingyu, Mu, Xinan; and **Bao; Huiming**, 1994, Gaseous and liquid hydrocarbons produced from thermal degradation of two kinds of calcareous algae. *Acta Micropalaeontologica Sinica*, 11(1). DOI: CNKI:SUN:WSGT.0.1994-01-008
- Bao, Huiming**, 1993, Some crypt habitats and cryptobionts in Late Devonian algal mounds in Guilin, south China. *Acta Micropalaeontologica Sinica*, 10(2): 181-190.
- Jingeng, S., Linxin, Z., Hui, L., Shanhong, X. and **Bao, Huiming**, 1992, The closure age of the late Paleozoic rift in Hohxil, Qinghai. *Acta Micropalaeontologica Sinica*, 9, 177-182.
- Bao, Huiming**, 1992, Middle Devonian Rothpletzella stromatolites from Yangshuo, Guangxi (China). *Acta Micropalaeontologica Sinica*, 9(4): 397-407.

* Student authored paper

MEETINGS AND CONFERENCES

Goldschmidt Conference at Vancouver, July 2008: **Oral presentation:** Extraordinary Neoproterozoic conditions implicated by sulfate of extraordinary oxygen isotopic compositions.

AGU Annual Fall Meeting 2007 at San Francisco; **Poster:** Negative sulfate ^{17}O anomalies and an extraordinary temporal spike at the immediate aftermath of Marinoan ‘snowball’ Earth.

7th International Symposium on Applied Isotope Geochemistry, Stellenbosch, South Africa, Sept. 8-14, 2007; **Invited Keynote speaker:** Complex oxidation pathways of volcanic SO_2 recorded in ancient tuffaceous deposits.

17th Goldschmidt at Cologne, Germany, Aug. 19-24, 2007; **Poster presentation:** Negative sulfate ^{17}O anomalies as positive evidence for “snowball Earth” hypothesis.

IAVCEI (International Association of Volcanology and Chemistry of Earth's Interior, International Conference on Continental Volcanism, May 2006, Guangzhou, P. R. China; **Oral presentation:** Multiple extreme sulfate-haze events in the Cenozoic North America

Astrobiology Science Conference, NASA, Washington DC, March 2006; **Oral presentation:** Quantifying multiple sulfate components in hyperarid deserts.

Workshop on “Focus on perchlorate”-International Society of Environmental Forensics, Santa Fe, New Mexico, Sept. 2005; **Invited speaker:** Total stable isotope measurement of perchlorate.

15th Goldschmidt Conference at Moscow, Idaho, USA, April 2005; **Invited talk:** ^{17}O anomaly in terrestrial rocks: An update.

AGU Fall Meeting -San Francisco 2004: **Oral presentation:** Bao and Marchant, High-resolution sulfate oxygen and sulfur isotope profiles for soils in Antarctica Dry Valleys.

GSA Annual Meeting 2004 Denver: **Oral presentation:** High spatial heterogeneity of a cap-carbonate's stable isotope signatures: a stagnant Late Neoproterozoic ocean basin.

ACS National Meeting 2004 at Philadelphia; **Invited talk:** Unique oxygen isotope composition for natural perchlorate.

AGU Annual Fall Meeting 2003 at San Francisco; **Poster:** Widespread sulfate oxygen-17 anomaly in Cenozoic ash beds in North America High Plains: What could be the cause(s)?

13th Goldschmidt Conference at Kurashiki, Japan, Sept. 2003; **Invited talk:** Increasing sulfate oxygen-17 anomaly with depth in hyperarid regolith profiles.

AGU Chapman Conference on Volcanism and the Earth's Atmosphere, Santorini, Greece, June 2002; **Talk + Poster:** Sulfur and Oxygen Isotopic Records on Atmospheric Chemistry of Volcanic Gases.

11th Goldschmidt Conference at Hot Spring, Virginia, May, 2001; **Co-chair of a session + Oral presentation:** Basal Miocene volcanic ashes in mid-North America: An isotopic mystery.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Geophysical Union (AGU) since 1995

Geochemical Society since 2001

Geological Society of America since 1994

FUNDING

(All listed \$\$ amounts were/are Bao's shares, unless specified)

Active Funding

1. PI

Oversea Scholar Collaboration Fund, Chinese NSF

Title: “**Oxygen-17 anomalies in Neoproterozoic China**” (41374-G2)

Amount: ¥200,000 (~ \$29,000)
Duration: 01-2009 to 12-2010

2. PI

Petroleum Research Fund - Type AC
Title: **“Experimental Sulfate Triple Oxygen Isotope Geochemistry”**
Amount: \$100,000
Duration: 07-2008 to 08-2010

3. PI

Economic Development Assistantship (EDA) from the State of Louisiana:
Title: **“Total isotope composition of natural perchlorate”**
Amount: \$100,000
Duration: 08-2006 to 05-2010

Expired Funding

1. PI

Petroleum Research Fund - Type G:
Title: **“The total sulfate isotope compositions of photolysis origin: Clue from the 3.2 Ga Fig Tree barites”**
Amount: \$35,000
Duration: 9-1-2004 to 8-31-2007

2. PI

LSU Faculty Research Grant program 2006-2007:
Title: **“Oxygen isotope exchange between residual sulfate and water during dissimilatory bacterial sulfate reduction”**
Amount: \$10,000
Duration: 07-01-2006 to 06-30-2007

3. PI

NSF-EAR Petrology & Geochemistry:
Award No. EAR-0408986
Title: [“Sulfate ¹⁷O Anomalies in Cenozoic Volcaniclastic Deposits in the Northern High Plains, North America”](#)
Amount: \$200,000
Duration: June 1, 2004 to May 31, 2007

4. PI

NSF IF-EAR (Instrumentation and Facility -- Earth Sciences):
Award No. EAR-0129793

Title: "[Acquisition of a CO₂-Laser Fluorination System and a Mass Spectrometer System for Multiple Stable Isotope Analyses](#)"

Amount: From NSF: \$235,919; Cost-share from LSU: \$221,035.

Duration: 2-28-2002 to 2-28-2005

5. PI

NSF OPP (Office of Polar Program); Award No. OPP-0125842

Title: "[Collaborative Research: Multiple Isotope Analyses of Soil Sulfate and Nitrate in the Antarctic Dry Valleys](#)"

Amount: \$210,838 + 12,500 (new REU award in 2004)

Duration: 4-1-2002 to 3-31-2005

6. PI

LSU Faculty Research Grant program 2004:

Title: "**Oxygen isotope measurement of perchlorate in desert soils and in contaminated groundwater**"

Amount: \$10,000

Duration: 07-01-2004 to 06-30-2005

7. Collaborator

MSTC and CAS (Chinese Academy of Science):

Title: "**Neoproterozoic-Cambrian climate and biological transitions**" Award No. G200077701 and 2003CB716805

Bao's international travel, lodging, fieldwork, and analytical expenses (~ US\$ 30,000) were covered by the project that has a total of ¥ 2,500,000 (~ US \$ 300,000).

Duration: 1-30-2002 to 1-30-2005

GRADUATE STUDENTS ADVISED

Kathryn Jenkins, M. Sc., Graduated 2005

Katie Howell, M. Sc., Graduated 2006

Issaku Kohl, Ph. D, current

Yongbo Peng, Ph. D, current

Tao Sun, Ph. D, current