Mingzhe Dai

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EDUCATION

School of Earth Science and Engineering, Nanjing university Aug 2018- Present

B.S. in Geochemistry (expected), Overall GPA: 4.58/5.0 (91.6), Ranking: 1/26

TOEFL: 105 (Reading 29, Listening 30, Speaking 25, Writing 21)

RESEARCH INTERESTS

Isotope Geochemistry; Stable isotope; Astrobiology; Planetary Evolution; Climate Changing

PUBLICATIONS AND WORKING PAPERS

- **Mingzhe Dai**, Bin Zhou (Under review, 2021). *Climate and landform favoring early rice agriculture and appreciable human impact: evidence from $\delta^{13}C$ in eastern China.* (Submitted to) Quaternary International
- **Mingzhe Dai**, Bin Zhou. (2021) *The advancement of charcoal reflectance and its applications in archeology and environmental research (in Chinese with English abstract).* The 24th Forum of Sciences & Arts of Nanjing University
- YuanFeng Hu, Bin Zhou, Yuehan Lu, Jianping Zhang, Siyu Min, **Mingzhe Dai** (2019). *Abundance and morphology of charcoal in sediments provide no evidence of massive slash-and-burn agriculture during the Neolithic Kuahuqiao culture, China.* PLOSONE [https://doi.org/10.1371/journal.pone.0237592]

CONFERENCES

American Geophysical Union 2021 Fall Meeting (AGU21) 13-17 December 2021

Abstract:

- Climate and landform favoring early rice agriculture and human impact in eastern China (Abstract ID: 811536)
  submitted to Session PP013: Human Responses to Late Quaternary Paleoenvironmental Change
- Water content in Angrite Sahara 99555 and its implication: New data from FTIR (Abstract ID: 885665)
  submitted to Session DI011: Multidisciplinary perspectives on the formation and early evolution of terrestrial worlds

RESEARCH EXPERIENCES

Constrain CH_4 emission in LA | California Institute of Technology Jun 2021 - Present

Advisor: Yuk L. Yung, Professor, Division of Geological and Planetary Sciences

- Proposed to apply 'tracer-to-tracer' method to satellite remote sensing and test its robustness.
- Fitted correlation of CH_4 and CO enhancement retrieved by WFMD scientific algorithm in SWIR band of TROPOMI.
- Corrected impacts of albedo, elevation, and averaging kernel by fitting and modelling.
- Tested the applicability of the correlation from satellite data by comparison with data from ground sites using direct solar spectrum (TCCON), reflected sunlight (CLARS-FTS), and laser (NOAA/ESRL and Megacity Carbon Project).
- Indicated different regional sensitivities in algorithm retrieval and background selection that undermine this method.

Retrieve water in Early Inner Solar System | Nanjing University Oct 2020 - Aug 2021

Advisor: Hejiu Hui, Professor, School of Earth Sciences and Engineering

- Initiated to illuminate the water delivery in the evolution of early inner planets by measuring OH in nominally anhydrous minerals in one of the oldest achondrite, Angrite Sahara 99555, with the help of FTIR
- Calculated water contents in Sahara 99555 primitive melt and water in Angrite Parent Body mantle, based on batch melting model and precise partition coefficients refined by our EPMA major elements data.
- Suggested dry planetesimals in early solar system, inferring later-veneer of water is necessary for Earth to reach to the water inventory that can support life.

Reconstruct paleoenvironment in Eastern China | Nanjing University Dec 2018 - Sept 2020

Advisor: Bin Zhou, Associate Professor, School of Earth Sciences and Engineering

- Initiated to offer well-rounded carbon geochemical proxies in one of the earliest rice agriculture sites, Kuahuqiao.
- Reestablished the local climate, landform and human impact by TOC, BC, $\delta^{13}C_{TOC}$, $\delta^{13}C_{BC}$, C/N in 11,860~5,820 aBP.
- Demonstrated the landform of estuarine wetland and hotter and drier climate favored early rice agriculture
- Proved no large-scaled fire use in early rice agriculture and human impact on vegetation was obvious as early as the onset of agriculture.
- Provided model of initiation of rice agriculture that can be extrapolated to explain other sites.

AWARD

- 2021 The First Grade All-in-one-card for China Merchant Bank Scholarship | Nanjing University
- 2021 The First Grade Award for Thesis | The 24th Forum of Sciences & Arts of Nanjing University
- 2020 National Scholarship | Ministry of Education of P. R. China
- 2020 Excellent Student | Nanjing University
- 2020 Zheng-Gang Scholarship for Study Abroad | Nanjing University Zheng-Gang Fund
- 2020 The Second Grade Award for Thesis | The 23rd Forum of Sciences & Arts of Nanjing University
- 2019 Chou-Tai-Fook Scholarship | The Chou Tai Fook group
- 2018 The Star of Department | Student Union of Nanjing University

SKILLS

Programming Languages: MATLAB, C/C++ Apparatus Skill: FTIR, EPMA, EI-MS, photometer

Office Applications: CorelDRAW, Photoshop, Microsoft Office Scientific Software: Gaussian, ArcGIS

STUDENT JOBS

Permanent Lecturer | Li Si-guang Honored Lecture Team | Nanjing University Jul 2020 - Present

- Starred in the talk show of 14th Geoscience Festival of Nanjing University on climate change, with above 1.3w viewers
- Lectured online about the climate impact on human evolution for popular science

Freshmen Mentor | School of Earth Science and Engineering | Nanjing university Sept 2020 - Sept 2021

- Helped 5 freshmen with questions on study and campus life during their first year in university
- Gave lecture on study abroad and navigated three sophomores into their undergraduate academic research career