

# HUSILE BAI

Assistant Professor of the Practice

Earth & Environmental Sciences, Vanderbilt University

husile.bai@vanderbilt.edu | <https://husilebai.github.io>

## RESEARCH INTERESTS

Atmospheric dynamics, climate dynamics and variability, regional and global climate modeling, Earth system modeling, surface-atmosphere interactions, cloud microphysics, hydroclimate, cryosphere

## PROFESSIONAL EXPERIENCE

2024 - **Assistant Professor of the Practice**, Vanderbilt University  
Department of Earth and Environmental Sciences

2023-2024 **Postdoctoral Research Fellow**, University of Utah  
Department of Geography

## EDUCATION BACKGROUND

2018-2022 **Ph.D. University of Utah, Department of Atmospheric Sciences**  
Advisor: Dr. Courtenay Strong  
Dissertation project: *Teleconnection mechanisms associated with ecologically-relevant climate dipoles*

2015-2018 **M.S. University of Chinese Academy of Sciences, Institute of Earth Environment**  
Advisors: Dr. Guohui Li and Dr. Yu Liu  
Thesis project: *Impact of the ice nuclei on the development of the cumulus clouds over the North China Plain*

2011-2015 **B.S. Lanzhou University, College of Atmospheric Sciences**  
Advisor: Dr. Yi Yang  
Capstone project: *Numerical weather simulation and analysis of a heavy rainstorm*

## PUBLICATIONS

1. **Husile Bai**, Olivia Mondlock, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Probabilistic theory for episodic ecological events. (*accepted*)
2. **Husile Bai**, Summer Rupper, and Courtenay Strong. Glaciers matter for getting the weather and climate right. (*submitted*)
3. **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, Ivy V. Widick, and Benjamin Zuckerberg. A North American climate-masting-irruption teleconnection and its change under global warming, *Science of The Total Environment*, 948, 174473, <https://doi.org/10.1016/j.scitotenv.2024.174473>
4. Jalene M. LaMontagne, Courtenay Strong, **Husile Bai**, Jessie J. Forest, Andrew Hacket-Pain, Mark Schulze, and Benjamin Zuckerberg, Atmospheric waves synchronize and desynchronize mast seeding at a hemispheric scale, (*submitted*)
5. Luke Stone, Courtenay Strong, **Husile Bai**, Thomas Reichler, Greg McCabe, and Paul D. Brooks (2023). Atlantic Ocean influence on western U.S. hydroclimate and water resources, *npj Climate and Atmospheric Science*, 6, 139, <https://doi.org/10.1038/s41612-023-00471-7>

6. **Husile Bai** and Courtenay Strong (2023). Atmospheric modeling study on convection-triggered teleconnections driving the summer North American dipole, *Journal of Climate*, 36, 6991–7003, <https://doi.org/10.1175/JCLI-D-23-0015.1>
7. **Husile Bai**, Courtenay Strong, and Benjamin Zuckerberg (2023). Drivers of an ecologically relevant summer North American dipole, *Journal of Climate*, 36, 2387–2399, <https://doi.org/10.1175/JCLI-D-22-0542.1>
8. **Husile (胡思乐)**, Liu Yu, Li Guohui (2019). Impact of ice nuclei on the development of cumulus clouds over the North China Plain, *Journal of Earth Environment*, 10(3):257-266 (in Chinese) <https://doi.org/10.7515/JEE182078>
9. **Husile (胡思乐)**, Li Yan, Fang Congxi, Chen Zhihong (2018). The relationship between Ural blocking, Siberian high, and East Asian winter monsoon, *Journal of Lanzhou University (natural sciences)*, 54(4):440-452 (in Chinese) <https://doi.org/10.13885/j.issn.0455-2059.2018.04.003>
10. Yu Liu, Weiyuan Ta, Qiang Li, Huiming Song, Changfeng Sun, Qiufang Cai, Han Liu, Lu Wang, **Hu Sile**, Junyan Sun, Wenbiao Zhang, Wenzhu Li (2018). Tree-ring stable carbon isotope-based April-June relative humidity reconstruction since AD 1648 in Mt. Tianmu, China, *Climate Dynamics*, 50, 1733–1745, <https://doi.org/10.1007/s00382-017-3718-6>
11. Yu Liu, Han Liu, Huiming Song, Qiang Li, George S. Burr, Lu Wang, and **Hu Sile** (2017). A monsoon-related 174-year relative humidity record from tree-ring  $\delta^{18}\text{O}$  in the Yaoshan region, eastern central China, *Science of the Total Environment*, 593: 523-534, <https://doi.org/10.1016/j.scitotenv.2017.03.198>

## PUBLICATIONS IN PREPARATION

1. **Husile Bai**, Jonathan Maurer, Summer Rupper, and Daniel Shapero. Modeling study of the dynamic and momentum balance of mountain glaciers.

## PRESENTATIONS

### Invited talks

2024

- Global radiative heat balance, *Earth and Environmental Sciences*, **Vanderbilt University**
- Unexpected control of hydroclimate variability, *Civil and Environmental Engineering Graduate Seminar*, **Rutgers University**
- Unexpected control on climate variability. *Geography Research of the Week*, University of Utah

2023

- Dynamics of mountain glaciers in the changing climate. MAGIC workshop, Lamont-Doherty Earth Observatory, **Columbia University**

### Poster & oral presentation

2024

- **Husile Bai**. From data to delight: exploring Earth & climate through interdisciplinary visualization and programming, *Lightning talk*, Spatial Utah Data Science Lightning Talk Series, Salt Lake City
- **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, Ivy V. Widick, and Benjamin Zuckerberge. A North American climate-masting-irruption teleconnection and its change under global warming. *Poster*, Macrosystems PI Annual Meeting, Virtual

2023

- **Husile Bai**, Summer Rupper, Courtenay Strong. Effect of glaciers on orographic and synoptic-scale atmospheric circulations. *Poster*, AGU Fall Meeting, San Francisco

- **Husile Bai**, Summer Rupper, and Courtenay strong. Downscaling with glacier-adjusted WRF in the Karakoram region. Oral presentation, NASA HiMAT workshop, Salt Lake City

2022

- **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Summer North American dipole driven by stationary Rossby waves associated with tropical and monsoonal convection. Poster, AGU Fall Meeting, Chicago

2021

- **Husile Bai**, Courtenay Strong, Benjamin Zuckerberg, and Jalene M. LaMontagne. Continental-scale climate dipoles driven by pan-Pacific waves. Poster, AGU Fall Meeting, New Orleans
- **Husile Bai**, Courtenay Strong, Benjamin Zuckerberg, and Jalene M. LaMontagne. Global teleconnections of west-east pine siskin irruption mode. Poster, at Macrosystems PI Annual Meeting, Virtual

2017

- **Husile**, Liu-Yu, Li-Guohui. Impact of ice nuclei on the development of cumulus clouds over the North China Plain. Oral presentation, AGU Fall Meeting, New Orleans

### Contributed presentations

2024

- Jalene M. LaMontagne, Courtenay Strong, **Husile Bai**, Jessie J. Forest, Andrew Hacket-Pain, Mark Schulze, and Benjamin Zuckerberg, Atmospheric waves synchronize and desynchronize mast seeding at a hemispheric scale. Poster, Macrosystems PI Annual Meeting, Virtual
- Zoe Exelbert, Courtenay Strong, **Husile Bai**. Climate Vulnerability Assessment of the Great Salt Lake on Migration Patterns. Poster, Research Day on the Hill, Salt Lake City

2023

- Zoe Exelbert, Courtenay Strong, **Husile Bai**. Hydroclimate Variability Assessment of the Great Salt Lake on Bird Migratory Patterns. Poster, Wilkes Climate Summit, Salt Lake City

2022

- Ivy Widick, **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Climate Dipoles entrain ecological dipoles: irruption dynamics of boreal finches. Oral presentation, AGU Fall Meeting, Chicago
- Kevin Anthony Mendoza, Alysha Armstrong, Sam Bagge, **Husile Bai**, Eric Humphrey, Chantelle Kiessner, Emily Hope Chunningham, Monique Maria Holt, Jory Lerback, Gabriela St. Pierre. *“Student Resiliency and Advancement of DEI Objectives Through Leadership Change and Pandemic Uncertainties: Perspectives from Inclusive Earth”*. Lighting Talk, AGU 2022 Fall Meeting, Chicago

### TRAINING AND WORKSHOPS

- DELPHI Natural Language Processing (NLP) with applications to clinical data science workshop, March 2024, University of Utah Health, Salt Lake City, UT
- MAGIC AI/ML workshop, February 2024, University of Utah, Salt Lake City, UT
- European Geosciences Union (EGU) Peer Review Training, September- October, 2023, *Virtual*
- Weather Research & Forecasting (WRF) tutorial, July 2023, NCAR Foothills Laboratory, Boulder, CO
- MAGIC workshop, June 2023, Lamont-Doherty Earth Observatory, Columbia University, New York, NY
- NASA HiMAT workshop, June 2023, University of Utah, Salt Lake City, UT

- 2nd US Ice Core Open Science Meeting, May 2023, University of Washington. Seattle, WA
- *ICEPACK* glacier model training, May 2023, University of Washington, Seattle, WA
- MOOC machine learning in weather and climate training, January-April, 2023, European Centre for Medium-Range Weather Forecast (ECMWF) & International Foundation Big Data Artificial Intelligence for Human Development (IFAB), *Virtual*
- Research Mentoring training, August 2022 - March 2023, Research Education (REd), University of Utah, *Virtual*
- AGU Chapman Conference Second National Conference: Justice in Geoscience, August 2022, Washington, DC
- 12th Annual Utah Snow and Avalanche Workshop (USAW), November 2019, Utah Avalanche center, Salt Lake City, UT

## GRANT AND AWARDS

2024 Subaward to Vanderbilt University, Great Salt Lake Basin Integrated Plan - Division of Water Resources, State of Utah Department of Natural Resources(\$36k)

2023 Dr. Norihiko Fukuta Memorial Award Best Peer-Reviewed Publication, Department of Atmospheric Sciences, University of Utah (\$1.5K)

2023 Poster Evaluator, Office of Undergraduate Research, University of Utah (0.3K)

2022 AGU Chapman Conference Second National Conference travel grant (\$2.5K)

2022 Rockstars Student Service Award, Department of Geology & Geophysics, University of Utah

2021 University of Utah Graduate Student Travel Award (\$0.5K)

## MENTORING AND TEACHING

### Mentoring experience

**Michael Witherspoon**, undergraduate directed study in the Department of Earth & Environmental Sciences, Vanderbilt University, 2024 -

**Salma Elhandaoui**, undergraduate directed study in the Department of Earth & Environmental Sciences, Vanderbilt University, 2024 -

**Olivia Mondlock**, co-mentored Capstone project in the Department of Atmospheric Sciences, University of Utah, 2021-2022

**Zoe Exelbert**, co-mentored Wilkes Scholar undergraduate project in the Department of Atmospheric Sciences, University of Utah, Jan 2023 -2024

### Teaching experiences

#### **University of Utah, Department of Geography**

EES	Introduction to	2024 Fall	Instructor: teach climate studies major
2110	Climate Change		

#### **University of Utah, Department of Geography**

GEOG	Geographical	2024	Lab Instructor: Teach student statistics, design lab
3020	Analysis	Spring	sections, programming with R/Python

GEOG 5410	Paleoclimatology	2024 Spring	Guest lecture: climate pattern analysis, Teach student EOF (PCA) analysis using reanalysis data, programming with Python
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### **Salt Lake Community College, Department of Geosciences**

ATMO 1020	Climate Change	2022 Summer	Adjunct: Teach student virtually, office hours, project design
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### **University of Utah, Department of Atmospheric Sciences**

ATMOS 5400	The Climate System	2021 Fall 2020 Fall	TA: Assisted students in homeworks, hosted exam review sessions
ATMOS 6040	Environmental Statistics	2021 Spring	TA: Assisted students in software operation (Matlab and Python)

## **SERVICE AND OUTREACH**

**2024** - Advisor for Vanderbilt University Mongolian Student Association (VUMoSA), Vanderbilt University

**2023 - 2024** Serving as *Postdoc Success Chair* in the Utah Postdoctoral Association (UPDA), University of Utah

**2022** - *Observer & Member* of Board of Higher Education for 2-year College, American Meteorological Society (AMS BHE 2YC)

**Summer 2022** Volunteered to teach the Climate Change course as an *Adjunct* at the Geoscience Department in Salt Lake Community College

**2020-2022** Assisted as *committee member* in the Committee for the Advancement of Inclusion and Diversity (CAID), College of Mines and Earth Sciences, University of Utah, 2020-2022

**2021-2022** *Inclusive Earth officer* (social media promotion), College of Mines and Earth Sciences, University of Utah, 2021-2022

## **JOURNAL REVIEWER**

PLOS Climate

## **MEMBERSHIP**

American Geophysical Union (AGU) member

American Meteorological Society (AMS) member

European Geosciences Union (EGU) member

American Center for Mongolian Studies (ACMS) member

## **PROFESSIONAL SKILLS**

### **Statistical and modeling techniques:**

- Weather Research and Forecasting (WRF) model
- Global climate models (GCM), including Community Earth System model (CESM), Geophysical Fluid Dynamics Laboratory (GFDL) Climate Model, and Coupled Model Intercomparison Project phase 6 (CMIP6)
- Land Information System (LIS) Framework
- Fu-Liou radiative transfer model

- *ICEPACK* glacier dynamics model
- Programming languages: NCL, Matlab, Python, R, Fortran, IDL, JeKyll, CDO
- In addition, I am familiar with a wide range of techniques and programs for data analysis and simulation under Unix (Linux) and Mac OS environments.

**Other:**

- I am fluent in Mongolian (native), English, and Mandarin Chinese, and have given presentations and taught in all three languages.