

Research Interests

My research primarily focuses on the development, optimization, and application of global storm-resolving models, also known as convection-permitting models. Specifically, my research interests include:

- Investigating the predictability of extreme events.
- Improving physical parameterizations (e.g., cloud microphysics, cumulus) in models.
- Enhancing model completeness and computational efficiency.

I am dedicated to contributing to the development of global high-resolution atmospheric models, which I hope will become a vital tool to protect us in an increasingly warming and chaotic world.

Education

University of Science and Technology of China

Ph.D. in Geophysics, GPA: 3.82/4.3

Hefei, China

Aug. 2020 – Jun. 2025

University of Science and Technology of China

B.S. in Atmospheric Science, GPA: 3.42/4.3

Hefei, China

Aug. 2016 – Jun. 2020

Research Experience

Fudan University

Postdoctoral Research Scientist

Shanghai, China

Dec. 2025 – Dec. 2027

University of Science and Technology of China

Postdoctoral Research Scientist

Hefei, China

Jul. 2025 – Dec. 2025

Selected Publications

- [J1] **The Impact of ERA5 Assimilation-Window Discontinuities on Convection-Permitting Forecasts of Extreme Precipitation: A Case Study of the July 2023 North China Heavy Rainfall**
Jun Gu, Chun Zhao, Jiawang Feng, Mingyue Xu, Zhaojun Tang, Gudongze Li
Environ. Res. Lett., 2026, DOI: 10.1088/1748-9326/ae9d97
- [J2] **Pronounced Advance on Typhoon Track Forecast with Global Convection-Permitting Model**
Jun Gu, Chun Zhao, Gudongze Li, Jiawang Feng, Mingyue Xu, Qiuyan Du, Zihan Xia, Yubin Li, Guanghua Chen, Xiaoyu Hao, Junshi Chen, Hong An
Sci. Bull., 2025, DOI: 10.1016/j.scib.2025.01.032
- [J3] **Fast Warming over the Mongolian Plateau a Catalyst for Extreme Rainfall over North China**
Jun Gu, Chun Zhao, Mingyue Xu, Yuanyuan Ma, Zhiyuan Hu, Chen Jin, Jianping Guo, Tao Geng, Wenju Cai
Geophys. Res. Lett., 2025, DOI: 10.1029/2024GL113737
- [J4] **Global Convection-Permitting Model Improves Subseasonal Forecast of Plum Rain around Japan**
Jun Gu, Chun Zhao, Mingyue Xu, Jiawang Feng, Gudongze Li, Yongxuan Zhao, Xiaoyu Hao, Junshi Chen, Hong An
Environ. Res. Lett., 2024, DOI: 10.1088/1748-9326/ad71e2
- [J5] **Establishing a Non-Hydrostatic Global Atmospheric Modeling System at 3-Km Horizontal Resolution with Aerosol Feedbacks on the Sunway Supercomputer of China**
Jun Gu, Jiawang Feng, Xiaoyu Hao, Tao Fang, Chun Zhao, Hong An, Junshi Chen, Mingyue Xu, Jian Li, Wenting Han, Chao Yang, Fang Li, Dexun Chen
Sci. Bull., 2022, DOI: 10.1016/j.scib.2022.03.009
- [J6] **Establishing a Modeling System in 3-Km Horizontal Resolution for Global Atmospheric Circulation Triggered by Submarine Volcanic Eruptions with 400 Billion Smoothed Particle Hydrodynamics**
Shenghong Huang, Junshi Chen, Ziyu Zhang, Xiaoyu Hao, Jun Gu, Hong An, Chun Zhao, Yan Hu, Zhanming Wang, Longkui Chen, Yifan Luo, Jineng Yao, Yi Zhang, Yang Zhao, Zhihao Wang, Dongning Jia, Zhao Jin, Changming Song, Xisheng Luo, Xiaobin He, Dexun Chen
Proc. Int. Conf. High Perform. Comput. Netw. Storage Anal. 2023, New York, NY, USA, DOI: 10.1145/3581784.3627045
- [J7] **swMPAS-a: Scaling MPAS-a to 39 Million Heterogeneous Cores on the New Generation Sunway Supercomputer**
Xiaoyu Hao, Tao Fang, Junshi Chen, Jun Gu, Jiawang Feng, Hong An, Chun Zhao
IEEE Trans. Parallel Distrib. Syst., 2023, DOI: 10.1109/TPDS.2022.3215002

Presentation

Pronounced Advance on Typhoon Track Forecast with Global Convection-permitting Model Japan Geoscience Union Meeting (Oral)	<i>Chiba, Japan</i> May. 2025
Global convection-permitting model improves subseasonal forecast of plum rain around Japan AGU Fall Meeting (eLightning)	<i>Washington, D.C., USA</i> Dec. 2024
Insights from global convection-permitting model on forecasting the typhoon track AOGS Annual Meeting (Oral)	<i>Pyeongchang, South Korea</i> Jun. 2024
Insights from global convection-permitting model on forecasting the typhoon track AGU Fall Meeting (Poster)	<i>San Francisco, USA</i> Dec. 2023
Development and application of global kilometer-scale atmospheric model (in Chinese) Invited talk, National Supercomputing Center in Shenzhen	<i>Shenzhen, China</i> Jul. 2022
A study of global 3km atmospheric physics-chemistry coupled model simulation (in Chinese) 7th Young Scientist Forum of Earth Science (Oral and OSPA)	<i>Guiyang, China</i> Jul. 2021

Honors & Awards

2025	Outstanding Doctoral Dissertation Award , USTC	<i>Hefei, China</i>
2025	First Prize , Jiaolong Scholarship (80,000 CNY)	<i>Hefei, China</i>
2025	President’s Award , Chinese Academy of Sciences	<i>Hefei, China</i>
2025	Dean’s Award , School of Earth and Space Sciences, USTC	<i>Hefei, China</i>
2023	Finalist , ACM Gordon Bell Prize for Climate Modelling in SC’23	<i>Denver, USA</i>
2022	National Scholarship for Graduate Students , Ministry of Education, China	<i>Hefei, China</i>
2020	Outstanding Undergraduate Dissertation Award , USTC	<i>Hefei, China</i>

Grants & Funding

Principal Investigator:		
• Mechanism of Reanalysis-Assimilation-Window Discontinuity in Convection-Permitting Extreme Precipitation Forecasting and Predictability Evaluation National Natural Science Foundation of China (NSFC), Young Scientists Fund (C), Grant No. 42605001 (300,000 CNY)		<i>Jan. 2027 – Dec. 2029</i>
Participant:		
• Methods and Software for High-Resolution Atmosphere–Ocean Numerical Modeling Chinese Academy of Sciences (CAS), Strategic Priority Research Program (B), Grant No. XDB0500303 (2,630,000 CNY)		<i>Sep. 2023 – Aug. 2026</i>

Academic Services

Reviewer	<i>2024 – Present</i>
• Atmospheric Chemistry and Physics (1)	
• Journal of Geophysical Research: Atmospheres (1)	
• Journal of Open Source Software (3)	
• Environmental Research Letters (2)	
• Theoretical and Applied Climatology (1)	
Teaching Assistant	<i>Spring 2019</i>
• Electrodynamics, USTC	

Skills

Atmospheric Models	ICON, MPAS, WRF, CESMv1.x
Programming Languages	Fortran, NCL, Python, Shell Script, C
Parallel Programming	MPI, OpenMP, OpenACC
Platform	Linux, Windows, macOS
Languages	Mandarin, English
Software	Git, Vim, Markdown, Microsoft Office, $\LaTeX$, GIMP, InkScape, Zotero, Slurm

Co-authored Publications

[J8] Investigating Climate Change Impacts on the 2020 Extreme Meiyu through Global Variable-Resolution Ensemble Subseasonal Hindcasts Mingyue Xu, Chun Zhao, Jun Gu , Jiawang Feng, Gudongze Li, Ziyu Zhang, Shenfu Lin, Yuanyuan Ma, Fei Liu, Zhiyuan Hu <i>J. Geophys. Res. Atmos.</i> , 2026, DOI: 10.1029/2025JD045982
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- [J9] **Impacts of Lake on Diurnal Evolution of Surface PM_{2.5} Concentrations around a Typical Megacity of China**
Zining Yang, Qike Yang, Chun Zhao, Zihan Xia, Qiuyan Du, Gudongze Li, Mingyue Xu, Zhiyuan Hu, Renmin Yuan, Jiawang Feng, **Jun Gu**, Yubin Li
Atmos. Chem. Phys., 2026, DOI: 10.5194/acp-26-7867-2026
- [J10] **Simulating Martian Atmospheric Processes and Local Dust Events with a Global Variable-Resolution Model (iAMAS-mars)**
Yongxuan Zhao, Chun Zhao, Lulu Li, Li Dong, Jiawang Feng, **Jun Gu**, Gudongze Li, Chao Wang, Qi Chen
Adv. Atmos. Sci., 2026, DOI: 10.1007/s00376-026-5694-4
- [J11] **Dust Impacts on the Indian Summer Monsoon: Chaotic or Physical Effect?**
Jiawang Feng, Chun Zhao, **Jun Gu**, Gudongze Li, Mingyue Xu, Shengfu Lin, Jie Feng
Atmos. Chem. Phys., 2025, DOI: 10.5194/acp-25-12051-2025
- [J12] **Excessive Equatorial Light Rain Causes Modeling Dry Bias of Indian Summer Monsoon Rainfall**
Gudongze Li, Chun Zhao, **Jun Gu**, Jiawang Feng, Mingyue Xu, Xiaoyu Hao, Junshi Chen, Hong An, Wenju Cai, Tao Geng
Npj Clim. Atmos. Sci., 2025, DOI: 10.1038/s41612-025-00916-1
- [J13] **Comprehensive Evaluation of iAMAS (v1.0) in Simulating Antarctic Meteorological Fields with Observations and Reanalysis**
Qike Yang, Chun Zhao, Jiawang Feng, Gudongze Li, **Jun Gu**, Zihan Xia, Mingyue Xu, Zining Yang
Geosci. Model Dev., 2025, DOI: 10.5194/gmd-18-5373-2025
- [J14] **Modeling Urban Pollutant Transport at Multiple Resolutions: Impacts of Turbulent Mixing**
Zining Yang, Qiuyan Du, Qike Yang, Chun Zhao, Gudongze Li, Zihan Xia, Mingyue Xu, Renmin Yuan, Yubin Li, Kaihui Xia, **Jun Gu**, Jiawang Feng
Atmos. Chem. Phys., 2025, DOI: 10.5194/acp-25-8831-2025
- [J15] **Seasonal Characteristics of Forecasting Uncertainties in Surface PM_{2.5} Concentration Associated with Forecast Lead Time over the Beijing-tianjin-hebei Region**
Qiuyan Du, Chun Zhao, Jiawang Feng, Zining Yang, Jiamin Xu, **Jun Gu**, Mingshuai Zhang, Mingyue Xu, Shengfu Lin
Adv. Atmos. Sci., 2024, DOI: 10.1007/s00376-023-3060-3
- [J16] **Modeling across Scales of Heavy Precipitation with a Global Variable-Resolution Model: A Case Study of a Catastrophic Event in China**
Mingyue Xu, Chun Zhao, Gudongze Li, **Jun Gu**, Jiawang Feng, Ziyu Zhang, Jianping Guo
J. Geophys. Res. Atmos., 2024, DOI: 10.1029/2024JD041180
- [J17] **Simulating Atmospheric Dust with a Global Variable-Resolution Model: Model Description and Impacts of Mesh Refinement**
Jiawang Feng, Chun Zhao, Qiuyan Du, Mingyue Xu, **Jun Gu**, Zhiyuan Hu, Yu Chen
J. Adv. Model. Earth Syst., 2023, DOI: 10.1029/2023MS003636
- [J18] **Southern Himalayas Rainfall as a Key Driver of Interannual Variation of Pre-Monsoon Aerosols over the Tibetan Plateau**
Weichen Liu, Chun Zhao, Mingyue Xu, Jiawang Feng, Qiuyan Du, **Jun Gu**, L. Ruby Leung, William K. M. Lau
Npj Clim. Atmos. Sci., 2023, DOI: 10.1038/s41612-023-00392-5
- [J19] **Appropriately Representing Convective Heating Is Critical for Predicting Catastrophic Heavy Rainfall in 2021 in Henan Province of China**
Mingyue Xu, Chun Zhao, **Jun Gu**, Jiawang Feng, Gudongze Li, Jianping Guo
Environ. Res. Commun., 2023, DOI: 10.1088/2515-7620/accfec
- [J20] **Toward Earth System Modeling with Resolved Clouds and Ocean Submesoscales on Heterogeneous Many-Core HPCs**
Shaoqing Zhang, Shiming Xu, Haohuan Fu, Lixin Wu, Zhao Liu, Yang Gao, Chun Zhao, Wubing Wan, Lingfeng Wan, Haitian Lu, Chenling Li, Yanfei Liu, Xiaojing Lv, Jiayu Xie, Yangyang Yu, **Jun Gu**, Xuanton Wang, Yan Zhang, Chenhui Ning, Yunlong Fei, Xiuwen Guo, Zhaoying Wang, Xue Wang, Zhenming Wang, Binglin Qu, Mingkui Li, Haoran Zhao, Yingjing Jiang, Guang Yang, Hong Wang, Hong An, Xin Zhang, Yu Zhang, Wentao Ma, Fujiang Yu, Jing Xu, Xueshun Shen
Natl. Sci. Rev., 2023, DOI: 10.1093/nsr/nwad069
- [J21] **Convection-Permitting Hindcasting of Diurnal Variation of Mei-Yu Rainfall over East China with a Global Variable-Resolution Model**
Mingyue Xu, Chun Zhao, **Jun Gu**, Jiawang Feng, Samson Hagos, L. Ruby Leung, Yali Luo, Jianping Guo, Rui Li, Yunfei Fu
J. Geophys. Res. Atmos., 2021, DOI: 10.1029/2021JD034823