Jun Gu

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"Protect us with advanced model in a warming world"

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 includes:

- **Investigating the predictability of extreme events.**
- **Improving cloud microphysics parameterization 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 — *Hefei, China*
Ph.D. in Geophysics, GPA: 3.82/4.3 — *Aug. 2020 - Jun. 2025*

University of Science and Technology of China — *Hefei, China*
B.S. in Atmospheric Science, GPA: 3.42/4.3 — *Aug. 2016 - Jun. 2020*

Research Appointments

University of Science and Technology of China — *Heife, China*
Postdoctoral Research Scientist — *Jul. 2025 - Dec. 2025*

Key publications

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
Science Bulletin, 2025, DOI: 10.1016/j.scib.2025.01.032

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
Geophysical Research Letters, 2025, DOI: 10.1029/2024GL113737

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
Environmental Research Letters, 2024, DOI: 10.1088/1748-9326/ad71e2

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
Science Bulletin, 2022, DOI: 10.1016/j.scib.2022.03.009

Presentation

Pronounced Advance on Typhoon Track Forecast with Global Convection-permitting Model — *Chiba, Japan*
Japan Geoscience Union Meeting. (**Oral**) — *May, 2025*

Global convection-permitting model improves subseasonal forecast of plum rain around Japan — *Washington, D.C., USA*
AGU Fall Meeting. (**eLightning**) — *December. 2024*

Insights from global convection-permitting model on forecasting the typhoon track — *Pyeongchang, South Korea*
AOGS Annual Meeting. (**Oral**) — *June. 2024*

Insights from global convection-permitting model on forecasting the typhoon track — *San Francisco, USA*
AGU Fall Meeting. (**Poster**) — *December. 2023*

Development and application of global kilometer-scale atmospheric model (in Chinese) — *ShenZhen, China*
invited by National Supercomputing Center in Shenzhen. (**Oral**) — *July. 2022*

A study of global 3km atmospheric physics-chemistry coupled model simulation (in Chinese) *Guiyang, China*
7th Young Scientist Forum of Earth Science. (**Oral and OSPA**) *July. 2021*

Honors & Awards

2025 **Outstanding Doctoral Dissertation Award**, USTC *Hefei, China*
2025 **First Prize**, Jiaolong Scholarship (80,000 CNY) *Hefei, China*
2025 **President Award**, Chinese Academy of Sciences *Hefei, China*
2025 **Dean Award**, School of Earth and Space Sciences, USTC *Hefei, China*
2023 **Finalist**, ACM Gorden Bell Prize for Climate Modelling *Denver, USA*
2022 **National Scholarship for Graduate Students**, Ministry of Education, China *Hefei, China*
2020 **Outstanding Undergraduate Dissertation Award**, USTC *Hefei, China*

Academic services

Reviewer

2024 - Present

- Atmospheric Chemistry and Physics (1)
- Journal of Geophysical Research: Atmospheres (1)
- Journal of Open Source Software (2)
- Environmental Research Letters (2)

Teaching Assistant

- Electrodynamics, 2019 Spring at USTC

Skills

Atmospheric Models 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, InkSpace, Zotero

Co-authored publications

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
Atmospheric Chemistry and Physics, 2025, DOI: 10.5194/acp-25-12051-2025

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 Climate and Atmospheric Science, 2025, DOI: 10.1038/s41612-025-00916-1

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
Geoscientific Model Development, 2025, DOI: 10.5194/gmd-18-5373-2025

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
Atmospheric Chemistry and Physics, 2025, DOI: 10.5194/acp-25-8831-2025

Seasonal Characteristics of Forecasting Uncertainties in Surface PM2.5 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
Advances in Atmospheric Sciences, 2024, DOI: 10.1007/s00376-023-3060-3

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
Journal of Geophysical Research: Atmospheres, 2024, DOI: 10.1029/2024JD041180

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
Journal of Advances in Modeling Earth Systems, 2023, DOI: 10.1029/2023MS003636

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 Transactions on Parallel and Distributed Systems, 2023, DOI: 10.1109/TPDS.2022.3215002

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

Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2023, New York, NY, USA, DOI: 10.1145/3581784.3627045

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 Climate and Atmospheric Science, 2023, DOI: 10.1038/s41612-023-00392-5

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

Environmental Research Communications, 2023, DOI: 10.1088/2515-7620/accfec

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, Xuantong 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

National Science Review, 2023, DOI: 10.1093/nsr/nwad069

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

Journal of Geophysical Research: Atmospheres, 2021, DOI: 10.1029/2021JD034823