# Yue (Michael) Ying

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## Education

2018 Ph.D. Meteorology, Computational Science (minor), Pennsylvania State University
*Dissertation*: "Ensemble data assimilation for the analysis and prediction of multiscale tropical weather systems"
*Advisor*: Dr. Fuqing Zhang

2012 M.S. Meteorology, Peking University
*Thesis*: "Tropical cyclone structural changes in response to ambient moisture perturbations"
*Advisor*: Dr. Qinghong Zhang

2009 B.S. Atmospheric Sciences, Peking University

## Research Interests

- Advancing data assimilation methodologies for multiscale dynamical systems
- Dynamics and predictability of complex systems and identifying key physical processes
- Improving the numerical simulation and prediction of complex dynamical systems

## Professional Experiences

### ***Research***

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|---|---|---|
| 2020-present | Researcher | Data Assimilation group, NERSC |
| 2018-2020 | Postdoctoral Fellow | Advanced Study Program, NCAR |
| 2012-2018 | Graduate Research Assistant | Pennsylvania State University |
| 2009-2012 | Graduate Research Assistant | Peking University |

### ***Teaching***

| | | |
|---|---|---|
| 2021 | Guest Lecturer of Crash Course on Ensemble Data Assimilation | NERSC |
| 2018 | Lead Instructor of Data Assimilation (Meteo 597) | Pennsylvania State University |
| 2016-2017 | Guest Lecturer of Data Assimilation (Meteo 597) | Pennsylvania State University |
| 2011 | Teaching Assistant for Computer Algorithms and Data Structure | Peking University |
| 2011 | Guest Lecturer for Scientific Data Visualization | Peking University |

### ***Others***

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| 2009-2011 | Part-time High-Performance Computer system administrator for Dept. of Atmospheric and Oceanic Sciences | Peking University |

## Honors and Awards

| | | |
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| 2018 | Al and Betty Blackadar Scholarship | Pennsylvania State University |
| 2018 | Best Student Presentation | 22nd AMS Conference on IOAS-AOLS |
| 2011 | DHC Software Co. Scholarship | Peking University |

# Project Management

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| 2018-2020 | Advancing ensemble data assimilation through adaptive methodologies for state and parameter estimation of multiscale dynamical systems | Project leader | NCAR/Advanced Study Program |

# Academic Services

## ***Peer Reviews***

Manuscript reviewer for *Monthly Weather Review*, *Journal of Advances in Modeling Earth Systems*, *Quarterly Journal of the Royal Meteorological Society*, *Nonlinear Processes in Geophysics*, *Climate Dynamics*, *Geoscientific Model Development*, and *The Cryosphere*.

## ***Organization of Meetings***

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| 2020-2022 | AMS annual meetings | IOAS-AOLS session convener | "Advances in ensemble-based data assimilation methodologies for highly nonlinear and large-dimensional systems" |
| 2022 | IAMES Annual Conference | Session co-convener | "Data assimilation and weather forecast" |

# Membership and Network

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| Since 2021: | European Geosciences Union (EGU) |
| Since 2017: | Chi Epsilon Pi National Meteorology Honors Society |
| Since 2012: | American Meteorological Society (AMS) |
| Since 2018: | American Geophysical Union (AGU) |

# Publication

1. **Ying, Y.**, S. Leroux, A. Korosov, E. Ólason, P. Rampal, 2023: Intrinsic and practical predictability of sea ice kinematic features estimated from neXtSIM ensemble forecasts. in prep.

2. **Ying, Y.**, J. L. Anderson, and L. Bertino, 2023: Improving vortex position accuracy with a new multiscale alignment ensemble filter. *Mon. Wea. Rev.*, 151, 1387-1405. doi:10.1175/MWR-D-22-0140.1.

3. Korosov, A., P. Rampal, **Y. Ying**, E. Ólason, and T. Williams, 2023: Towards improving short-term sea ice predictability using deformation observations. *The Cryosphere*, 17, 4223-4240. doi:10.5194/tc-17-4223-2023.

4. Tao, D., P. J. van Leeuwen, M. Bell, and **Y. Ying**, 2022: Dynamics and predictability of tropical cyclone rapid intensification in ensemble simulations of Hurricane Patricia (2015). *J. Geophys. Res. Atmos.*, 127, e2021JD036079. doi:10.1029/2021JD036079.

5. **Ying, Y.**, 2020: Assimilating observations with spatially correlated errors using a serial ensemble filter with a multiscale approach. *Mon. Wea. Rev.*, 148, 3397-3412. doi:10.1175/MWR-D-19-0387.1.

6. **Ying, Y.**, 2019: A multiscale alignment method for ensemble filtering with displacement errors. *Mon. Wea. Rev.*, 147, 4553-4565. doi:10.1175/MWR-D-19-0170.1.

7. **Ying, Y.**, and F. Zhang, 2018: Potentials in improving predictability of multiscale tropical weather systems evaluated through ensemble assimilation of simulated satellite-based observations. *J. Atmos. Sci.*, 75, 1675-1698. doi:10.1175/JAS-D-17-0245.1.

8. **Ying, Y.**, F. Zhang, and J. L. Anderson, 2018: On the selection of localization radius in ensemble filtering for multiscale quasi-geostrophic dynamics. *Mon. Wea. Rev.*, 146, 543–560. doi:10.1175/MWR-D-17-0336.1.

9. **Ying, Y.**, and F. Zhang, 2017: Practical and intrinsic predictability of multi-scale weather and convectively-coupled equatorial waves during the active phase of an MJO. *J. Atmos. Sci.*, 74, 3771-3785. doi:10.1175/JAS-D-17-0157.1.

10. **Ying, Y.**, and F. Zhang, 2015: An adaptive covariance relaxation method for ensemble data assimilation. *Quart. J. Roy. Meteor. Soc.*, 141, 2898-2906. doi:10.1002/qj.2576.

11. Wang, S., A. H. Sobel, F. Zhang, Y. Sun, **Y. Ying**, and L. Zhou, 2015: Regional simulation of the October and November MJO events observed during the CINDY/DYNAMO field campaign at gray zone resolution. *J. Climate*, 28, 2097-2119. doi:10.1175/JCLI-D-14-00294.1.

12. Hu, H., Q. Zhang, B. Xie, **Y. Ying**, J. Zhang, and X. Wang, 2014: Predictability of an advection fog event over North China. Part I: Sensitivity to initial condition differences. *Mon. Wea. Rev.*, 142, 1803-1822. doi:10.1175/MWR-D-13-00004.1.

13. Zhang, J., T. Zhu, Q. Zhang, C. Li, and H. Shu, **Y. Ying**, Z. Dai, X. Wang, 2012: The impact of circulation patterns on regional transport pathways and air quality over Beijing and its surroundings. *Atmos. Chem. Phys.*, 12, 5031-5053. doi:10.5194/acpd-11-33465-2011.

14. **Ying, Y.**, and Q. Zhang, 2012: A modeling study on tropical cyclone structural changes in response to ambient moisture variations. *J. Meteorol. Soc. Japan*, 90, 755-770. doi:10.2151/jmsj.2012-512.

15. Du, Y., Q. Zhang, **Y. Ying**, and Y. Yang, 2012: Characteristics of low-level jets in Shanghai during the 2008-2009 warm seasons as inferred from wind profiler radar data. *J. Meteorol. Soc. Japan*, 90, 891-903. doi:10.2151/jmsj.2012-603.

16. Xie, B., Q. Zhang, and **Y. Ying**, 2011: Trends in precipitable water and relative humidity in China: 1979-2005. *J. Applied Meteorol. Climatol.*, 50, 1985-1994. doi:10.1175/2011JAMC2446.1.

## Conference and Seminar Presentations

1. **Ying, Y.**, J. Anderson, and L. Bertino, *"Improving vortex position accuracy with a new multiscale alignment ensemble filter"*, ISDA-online, Non-Gaussian Data Assimilation, Jan 20, 2023

2. **Ying, Y.**, *"Multiscale alignment ensemble filtering technique and its application in geoscience"*, EnKF Workshop, Balestrand, May 30, 2022 (invited)

3. **Ying, Y.**, Y. Qiang Sun, and S. Wang, *"Predictability of tropical waves and the MJO"*, 35th Conf. on Hurricanes and Tropical Meteorology, Honoring Fuqing Zhang's Contribution, May 10, 2022 (invited)

4. **Ying, Y.**, *"Correcting position errors in sea ice linear kinematic features: Application of a multiscale alignment data assimilation approach"*, AI and Data Science for the Arctic Workshop, NTNU, Sep 29, 2021 (invited)

5. **Ying, Y.**, *"Reducing displacement errors in the analysis and prediction of Hurricane Patricia (2015) using a multiscale alignment data assimilation method"*, 34th Conf. on Hurricanes and Tropical Meteorology, May 12, 2021

6. **Ying, Y.** and L. Bertino, *"Assimilating sea ice deformation observations using a multiscale alignment ensemble data assimilation method"*, EGU General Assembly, NP5.1, Apr 27, 2021

7. **Ying, Y.**, *"How to handle nonlinearity in multiscale problems: Pushing the frontier of data assimilation methodology"*, Penn State Meteorology Colloquium, Mar 10, 2021

8. Weckwerth, T., G. S. Romine, **Y. Ying**, and D. D. Turner, *"Observation impact study of wind and thermodynamic profiling data assimilation"*, AMS Annual Meetings, 25th IOAS-AOLS, Jan 14, 2021

9. **Ying, Y.**, J. Anderson, and L. Bertino, *"Multiscale alignment method for ensemble filtering applied to hurricane and sea ice models"*, AMS Annual Meetings, 25th IOAS-AOLS, Jan 13, 2021

10. **Ying, Y.**, *"A multiscale alignment method for ensemble data assimilation with displacement errors"*, AMS Annual Meetings, 24th IOAS-AOLS, Jan 13, 2020

11. **Ying, Y.**, *"Developing data assimilation algorithms for the analysis and prediction of geophysical flows across many scales"*, MMM Seminar Series, NCAR, Jun 6, 2019

12. **Ying, Y.**, *"Developing a scale-aware scheme for the ensemble filtering of geophysical flows"*, Second ADAPT Symposium, Penn State, Dec 16, 2018

13. **Ying, Y.** and F. Zhang, *"Potentials in improving predictability of multiscale tropical weather systems evaluated through ensemble assimilation of simulated satellite-based observations"*, 33rd Conf. on Hurricanes and Tropical Meteorology, Apr 17, 2018

14. **Ying, Y.**, F. Zhang and J. Anderson, *"On the selection of localization radius in ensemble filtering for multiscale quasi-geostrophic dynamics"*, AMS Annual Meetings, 22nd IOAS-AOLS, Jan 9, 2018

15. **Ying, Y.** and F. Zhang, *"Practical and intrinsic predictability of multiscale weather and convectively coupled equatorial waves during the active phase of an MJO"*(poster), AMS Annual Meetings, 6th AMS Symposium on the MJO, Jan 8, 2018

16. **Ying, Y.** and F. Zhang, *"Intrinsic versus practical predictability of multi-scale weather and convectively-coupled tropical waves during the active phase of an MJO"*, AMS Annual Meetings, 2nd Multiscale Atmospheric Predictability, Jan 25, 2017

17. **Ying, Y.** and F. Zhang, *"Observing system design, observation impact and predictability for Madden-Julian Oscillation and tropical weather"*, 7th EnKF Data Assimilation Workshop, May 27, 2016

18. **Ying, Y.**, J. Poterjoy, and F. Zhang, *"Comparison of hybrid four-dimensional data assimilation methods with and without an adjoint model for limited-area convection-permitting weather prediction: E4DVar vs. 4DEnVar"*, 27th WAF/ 23rd NWP Conference, Jun 30, 2015

19. Sun, Y., **Y. Ying**, F. Zhang, S. Wang, and R. Johnson, *"Equatorial 2-day waves and diurnal variations during DYNAMO: Observation vs. simulation"*(poster), 19th AMS Conference on AOFD, Jun 20, 2013

20. **Ying, Y.** and Q. Zhang, *"A model study on tropical cyclone structural changes in response to ambient moisture variations"*, 30th AMS Conference on Hurricanes and Tropical Meteorology, Apr 18, 2012

21. **Ying, Y.**, and Q. Zhang, *"A model study on tropical cyclone motion and intensification in an asymmetric moisture field"*, 8th ICMCS, Nagoya, Mar 8, 2011