

## Yue (Michael) Ying

Researcher

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### Educational Background

2018: Ph.D. Meteorology, Computational Science (minor), Pennsylvania State University

*Dissertation*: “Ensemble data assimilation for the analysis and prediction of multiscale tropical weather systems”. *Committee chair*: 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
- Studying the dynamics and predictability of complex systems and identifying key physical processes
- Improving the numerical simulation and prediction of complex dynamical systems

### Professional Experiences

#### Research

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.

## Honors and Awards

2018: Al and Betty Blackadar Scholarship, Pennsylvania State University.

2018: Best Student Presentation, 22<sup>nd</sup> AMS Conference on IOAS-AOLS.

2011: DHC Software Co. Scholarship, Peking University.

## Publications

**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

**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

**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

**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

**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

**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

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

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

**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

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

- 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
- 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

- Ying, Y.**, J. Anderson, and L. Bertino, “*A multiscale alignment method for ensemble filtering applied to hurricane and sea ice models*”, EnKF Workshop, June 9, 2021.
- Ying, Y.**, “*How to handle nonlinearity in multiscale problems: pushing the frontier of data assimilation methodology*”, Penn State Meteorology Colloquium, March 10, 2021.
- Ying, Y.**, “*Ensemble filtering with displacement errors*”, NERSC Seminar, Feb 12, 2020.
- Ying, Y.**, “*Developing data assimilation algorithms for multiscale dynamical systems*”, Fudan University Guanghua International Forum for Young Scholars, Dec 26, 2019.
- Ying, Y.**, “*Developing data assimilation algorithms for the analysis and prediction of geophysical flows across many scales*”, MMM Seminar Series, NCAR, June 6, 2019.
- Ying, Y.**, “*Developing a scale-aware scheme for the ensemble filtering of geophysical flows*”, Second ADAPT Symposium, December 16-18, 2018.
- Ying, Y.**, “*Developing scale-aware algorithms for the ensemble filtering of geophysical flows*”, Boulder Fluid and Thermal Sciences Seminar Series, November 13, 2018.
- Ying, Y.**, and F. Zhang: “*An idealized assimilation experiment of satellite-based observations for the analysis and prediction of tropical multiscale weather systems*”. 6<sup>th</sup> AMS Symposium on the JCSDA, January 10, 2018.
- Ying, Y.**, F. Zhang and J. Anderson: “*On the selection of localization radius in ensemble filtering for multiscale quasi-geostrophic dynamics*”. 22<sup>nd</sup> AMS Conference on IOAS-AOLS, January 9, 2018.
- 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). 6<sup>th</sup> AMS Symposium on the MJO, January 8, 2018.
- Ying, Y.**, and F. Zhang: “*Design of a satellite-based observing system for the analysis and prediction of multi-scale weather and convectively-coupled tropical waves using EnKF*” (Poster). 28<sup>th</sup> WAF / 24<sup>th</sup> NWP Conference, January 26, 2017.
- Ying, Y.**, and F. Zhang: “*Observing system design, observation impact and predictability for Madden-Julian Oscillation and tropical weather*”, 7<sup>th</sup> EnKF Data Assimilation Workshop, May 27, 2016.

**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*”, 27<sup>th</sup> WAF/ 23<sup>rd</sup> NWP Conference, June 30, 2015.

Sun, Y., **Y. Ying**, F. Zhang, S. Wang, and R. Johnson: “*Equatorial 2-day waves and diurnal variations during DYNAMO: Observation vs. simulation*” (Poster). 19<sup>th</sup> AMS Conference on AOFD, June 20, 2013.

**Ying, Y.,** and Q. Zhang: “*A model study on tropical cyclone structural changes in response to ambient moisture variations*”, 30<sup>th</sup> AMS Conference on Hurricanes and Tropical Meteorology, April 18, 2012.

**Ying, Y.,** and Q. Zhang: “*A model study on tropical cyclone motion and intensification in an asymmetric moisture field*”, 8<sup>th</sup> ICMCS, March 8, 2011.

## **Memberships**

Since 2021: European Geosciences Union.

Since 2017: Chi Epsilon Pi National Meteorology Honors Society.

Since 2012: American Meteorological Society.

Since 2018: American Geophysical Union.

## **Other Activities**

Since 2020, AMS annual meetings, IOAS-AOLS session submitter and organizer, “Advances in ensemble-based data assimilation methodologies for highly nonlinear and large-dimensional systems”

Since 2016: Reviewer of manuscripts for *Monthly Weather Review*, *Quarterly Journal of the Royal Meteorological Society*, and *Climate Dynamics*.

2009-2011: part-time High-Performance Computer system administrator, Dept. of Atmospheric and Oceanic Sciences, Peking University.

2011: Guest lecturer and Co-organizer of *Survival Kits* (an introductory lecture series for incoming atmospheric science students), Peking University.