**孟智勇**

北京大学物理学院大气与海洋科学系教授、博士生导师

国家杰出青年基金获得者，美国气象学会会士

**研究方向**

中尺度气象学。长期专注于中小尺度系统及相关灾害性天气（包括局地强降水、雷暴大风、龙卷等）的机理、数值模拟、资料同化和可预报性研究。共发表论文63篇。Web of Science 被引1116次，h指数15，曾做邀请报告90余次，曾组织或联合组织国际学术会议13次。

**教育经历**

2003.8－2007.6 美国Texas A&M大学, 大气科学系, 博士

1991.9－1994.6 中国气象科学研究院，硕士

1987.9－1991.7 北京大学，地球物理系，学士

**工作经历**

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| --- | --- |
| 2019.6－2017.8－2014.10－2019.92014.6－2017.72008.6－2014.6 | 北京大学物理学院副院长北京大学物理学院大气与海洋科学系，教授北京大学物理学院大气与海洋科学系副主任北京大学物理学院大气与海洋科学系，长聘副教授北京大学物理学院大气与海洋科学系，百人计划研究员 |
| 2010.1－2010.7 | 美国宾夕法尼亚州立大学气象系，访问学者 |
| 2007.6－2008.5  | 美国Texas A&M大学, 大气科学系, 博士后 |
| 2004.6 | 美国国家大气研究中心，访问学者 |
| 2001.10－2003.8 | 中国气象科学研究院灾害性天气研究中心，副研究员 |
| 1995.1－3  | 日本气象厅数值预报室，访问学者 |
| 1994.7－2001.9 | 中国气象科学研究院灾害性天气研究中心，助理研究员 |

**学术奖励**

2020 美国气象学会会士

2014 国家杰出青年基金

2014 美国气象学会Monthly Weather Review 编委奖

2013 中国青年女科学家奖

**主要学术职务**

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| --- | --- |
| 2014－ | 世界气象组织World Weather Research Project (WWRP) on Predictability, Dynamics and Ensemble Forecasting (PDEF) 委员会委员 |
| 2014－ | 《气象》编委会常务编委 |
| 2018－ | Advances in Atmospheric Sciences编委 |
| 2013－ | Frontiers in Atmospheric Science (SWISS)编委 |
| 2011－ | 中国气象学会数值预报委员会委员 |
| 2010－ | 中国气象学会台风委员会委员 |
| 2018 | 美国气象学会杂志Monthly Weather Review 副编委 |
| 2013－16 | Atmospheric and Oceanic Science Letters (AOSL) 编委 |
| 2015－16 | 世界气象组织热带气象研究工作组季风强天气专家组联合主席 |
| 2013.8 | 第15届美国气象学会中尺度过程会议研究生报告评奖委员会委员 |
| 2012－18 | 美国气象学会中尺度天气过程委员会委员 |
| 2011－14 | 世界气象组织热带气象研究工作组季风强天气专家组委员 |
| 2007－14 | 美国气象学会杂志Monthly Weather Review 副编委 |

**主持或参加的科研项目：**

(1) 国家自然科学基金委，面上项目，41875051，登陆热带气旋中龙卷和超级单体的时空分布和发生发展环境特征，2019-01至2022-12，68万元，在研，主持.

(2) 国家自然科学基金委，杰青项目，41425018，强对流灾害性天气的机理和可预报性，2015-01至2019-12，400万元，已结题，主持.

(3) 国家自然科学基金委，国际(地区)合作与交流项目，41461164006，华南前汛期（台湾梅雨季）强对流引发暴雨之研究，2015-01至2017-12，200万元，已结题，主持.

(4) 国家自然科学基金委，面上项目，41375048，北京“7.21”极端暴雨中暖区对流、龙卷性超级单体、飑线的发生机理及其可预报性研究，70万元，已结题，主持.

(5) 国家科技部，国家基础研究计划 (973)，2013CB430104，突发性强对流天气演变机理和监测预报技术研究，2013-01至2017-12，负责经费126万元，已结题，课题组长，负责第四课题“突发性强对流天气系统的触发机制和可预报性”.

(6) 国家科技部，公益性行业（气象）科研专项，201306004，华南季风强降水外场试验与研究，2013-01至2015-12，负责经费20万元，已结题，参加.

(7) 国家自然科学基金委，面上项目，41075031，我国飑线的发生发展统计特征和数值模拟，2011-01至2013-12，48万元，结题，主持.

(8) 国家科技部，国家基础研究计划 (973)，2009CB421504，台风登陆前后异常变化及机理研究，2009-01至2013-12，负责经费38万元，已结题，参加.

(9) 国家自然科学基金委，国际(地区)合作与交流项目，40921160380，梅雨锋面中尺度对流系统的机理分析及可预报性研究，负责经费62万元，已结题，参加.

(10) 国家自然科学基金委，主任专项，40730948，中尺度集合卡尔曼滤波资料同化中多参数化集合模式误差估计方法的机理和应用研究，2007-01至2007-12，16万元，已结题，主持.

**主要论著**--5篇 （\*通讯作者，斜体：指导的研究生）

(1) *Huang, Yipeng*; **Meng, Zhiyong**\*; Li, Wanbiao; *Bai, Lanqiang*; Meng, Xuefeng, 2019: General Features of Radar-Observed Boundary Layer Convergence Lines and Their Associated Convection Over a Sharp Vegetation-Contrast Area , Geophysical Research Letters, 46(5): 2865−2873.

(2) *Bai, Lanqiang*; **Meng, Zhiyong**\*; *Huang, Yipeng*; *Zhang, Yunji*; Niu, Shuzhen; Su, Tao, 2019: Convection Initiation Resulting From the Interaction Between a Quasi-Stationary Dryline and Intersecting Gust Fronts: A Case Study , Journal of Geophysical Research-Atmospheres, 124(5): 2379−2396.

(3) *Zhang, Murong*; **Meng, Zhiyong**\*; *Huang, Yipeng*; Wang, Dongyong, 2019: The Mechanism and Predictability of an Elevated Convection Initiation Event in a Weak-Lifting Environment in Central-Eastern China , Monthly Weather Review, 147(5): 1823−1841.

(4) **孟智勇**\*, 张福青, 罗德海, 谈哲敏, 方娟, 孙建华, 沈学顺, 张云济, 汪曙光, 韩威, 赵坤, 朱磊, 胡永云, 薛惠文, 马亚平, 张丽娟, 聂绩, *周瑞琳, 李飒, 刘泓君, 朱宇宁*, 2019: 新中国成立70年以来的中国大气科学研究: 天气篇.*中国科学: 地球科学*, 49 (12), 1875−1918.

(5) *Bai, L.*, **Z.Meng**\*, L.Huang, L.Yan, Z. Li, X. Mai, *Y.Huang,* D.Yao, X.Wang, 2017: [An Integrated Damage, Visual, and Radar Analysis of the 2015 Foshan, Guangdong EF3 Tornado in China Produced by the Landfalling Typhoon Mujigae (2015).](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2017BAMS._Foshan_Tornado.pdf) Bulletin of the American Meteorological Society, 98.2619−2640.

**所有论著**

**论文**

(\*: corresponding author, ***Italic***：Supervised graduate students)

**64.** 白兰强, **孟智勇**\*, SUEKI Kenta, 陈桂兴，周瑞琳，2020: 中国热带气旋龙卷的气候统计特征(2006~2018) ,*中国科学*，50（5），619-634.<https://doi.org/10.1360/SSTe-2020-0041>.

**63**. Zhang, L., M. Fu\*, H. Tian, Y. Ma, J-P. Chen, T-C. Tsai, **Z. Meng**, X. Yang, 2020: Anthropogenic Aerosols Significantly Reduce Mesoscale Convective System Occurrences and Precipitation over Southern China in April. [(Supporting\_Information)](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2020GRL_Aerasol_Supporting_Information), *Geophysical Research Letters*, accepted.

**62**. Wu\*, N., X. Zhuang, J. Min, **Z. Meng**, 2020:, [Practical and Intrinsic Predictability of a Warm-sector Torrential Rainfall Event in the South China Monsoon Region](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2020JGR_Rainfall.pdf),*Journal of Geophysical Research: Atmospheres*, https://doi.org/10.1029/2019JD031313.

**61**. **孟智勇**\*, 张福青, 罗德海, 谈哲敏, 方娟, 孙建华, 沈学顺, 张云济, 汪曙光, 韩威, 赵坤, 朱磊, 胡永云, 薛惠文, 马亚平, 张丽娟, 聂绩, ***周瑞琳, 李飒, 刘泓君, 朱宇宁***. 2019: [新中国成立70年以来的中国大气科学研究: 天气篇.](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2019SC_70years_SynopticMeteorology_Chinese.pdf)*中国科学: 地球科学*, 49 (12), 1875-1918, https://doi.org/10.1360/SSTe-2019-0175

**60**. **Meng**\* **Z**, Zhang F, Luo D, Tan Z, Fang J, Sun J, Shen X, Zhang Y, Wang S, Han W, Zhao K, Zhu L, Hu Y, Xue H, Ma Y, Zhang L, Nie J, ***Zhou R, Li S, Liu H, Zhu Y***. 2019： Review of Chinese atmospheric science research over the past 70 years: Synoptic meteorology.Science China Earth Sciences, 62 (12), 1946-1991, https://doi.org/10.1007/s11430-019-9534-6

**59**. Wu, N., L. Lin, X. Ding, Z. Wen\*, **Z. Men**g, G. Chen, and J. Min, 2019: Contrasting the Frontal and Warm-sector Heavyrainfalls over South China during the Early-Summer Rainy Season. *Atmospheric Research*, 235. https://doi.org/10.1016/j.atmosres.2019.104693.

**58.** ***Zhang, M***., and **Z. Meng**\*, 2019: [Warm-Sector Heavy Rainfall in Southern China and its WRF Simulation Evaluation: A Low-Level-Jet Perspective.](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2019MWR_Rain_LLJ.pdf) Monthly Weather Review,147, 4461-4480.

**57.** He, J., F. Zhang\*, X. Chen, X. Bao, D. Chen, H. M.Kim, H.W. Lai, R. Leung, X. Ma,**Z. Meng**, T. Ou, Z. Xiao, E. G. Yang, K. Yang, 2019: Development and Evaluation of an Ensemble-based Data Assimilation System for Regional Reanalysis over the Tibetan Plateau and Surrounding Regions. *Journal of Advances in Modeling Earth Systems*, 11, 2503–2522. https://doi.org/10.1029/2019MS001665.

**56.** ***Bai, L.***, **Z. Meng**\*, K. Sueki, and ***R. Zhou***, 2019: Climatology of Tropical Cyclone Tornadoes in China from 2006 to 2018.*Science China Earth Sciences*,  62. https://doi.org/10.1007/s11430-019-9391-1.

**55.** ***Zhang, M.***, **Z. Meng**\*, ***Y. Huang***, and D. Wang, 2019: [The Mechanism and Predictability of an Elevated Convection Initiation Event in a Weak-Lifting Environment in Central Eastern China.](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2019MWR_FuningCI.pdf) *Monthly Weather Review*, 147, 1823-1841.

**54. *Yao, D***., **Z. Meng**\*, M. Xue, 2019: [Genesis, Maintenance and Demise of a Simulated Tornado and the Evolution of its preceding Descending Reflectivity Core (DRC).](http://www.phy.pku.edu.cn/~zymeng/Page_paper/MengZhiyong_2019Atmosphere_721Tornado.pdf)*Atmosphere*, 10(5), 236; https://doi.org/10.3390/atmos10050236

**53**. ***Huang, Y.*, Z. Meng\***, W. Li, ***L. Bai***，and X. Meng, 2019: General features of radar-observed boundary layer convergence lines and their associated convection over a sharp vegetation-contrast area. *Geophysical Research Letters*, in press.

**52**. **Meng\*, Z.,*X. Tang, J. Yue, L. Bai,*** *and* ***L. Huang***, 2019: Impact of EnKF surface and rawindsonde data assimilation on the simulation of the extremely heavy rainfall in Beijing on 21 July 2012. *Acta Scientiarum Naturalium Universitatis Pekinensis (in Chinese with English Abstract)*, in press.

**51**. ***Bai, L.*, Z. Meng\*, *Y. Huang, Y. Zhang***, S. Niu, and T. Su, 2019: Convection initiation resulting from the interaction between a PBL confluence line and gust fronts: A case study. *Journal of Geophysical Research: Atmospheres*, in press.

**50**. ***Zhang, M.*,** and **Z. Meng\*,** 2018: Impact of synoptic-scale factors on rainfall forecast in different stages of a persisitent heavy rainfall event in South China. *Journal of Geophysical Research: Atmospheres*, **123 (7)**, 3574–3593.

**49**. **Meng\*, Z., *L. Bai , M. Zhang***, Z. Wu, Z. Li, M, Pu, Y. Zheng, X. Wang, D. Yao, M. Xue, K. Zhao, Z, Li, S. Peng, and L. Li, 2018: The deadliest tornado (EF4) in the past 40 years in China. *Weather and Forecasting*, **33**, 693–713.

**48**. Deng, X., H. Xue\*, and **Z. Meng,** 2018: The effect of ice nuclei on a deep convective cloud in South China. *Atmospheric Research*, **206**, 1–12.

**47**. Luo\*, Y., R. Zhang, Q. Wan, B. Wang, W.K. Wong, Z. Hu, B. J. Jou, Y. Lin, R.H. Johnson, C. Chang, Y. Zhu, X. Zhang, H. Wang, R. Xia, J. Ma, D. Zhang, M. Gao, Y. Zhang, X. Liu, Y. Chen, H. Huang, X. Bao, Z. Ruan, Z. Cui, **Z. Meng**, J. Sun, M. Wu, H. Wang, X. Peng, W. Qian, K. Zhao, and Y. Xiao, 2017:The southern China monsoon rainfall experiment (SCMREX). *Bull. Amer. Meteor. Soc.*, **98**, 999–1013.

**46**. Chen, L., **Z. Meng**\*, and C. Cong, 2017: An overview on the research of typhoon rainfall distribution. *Journal of Marine Meteorology.(in Chinese with English Abstract)*, **37(4)**,1–7.

**45**. ***Bai, L.*, Z. Meng\*, *L. Huang***, L. Yan, Z. Li, X. Mai, *Y. Huang*, ***D. Yao***, and X. Wang, 2017: An integrated damage, visual, and radar analysis of the 2015 Foshan, Guangdong EF3 tornado in China produced by the landfalling Typhoon Mujigae (2015). *Bulletin of the American Meteorological Society*, **98**.2619–2640.

**44**. ***Zhu, L.*, Z. Meng\***, F. Zhang, and P. Markowski, 2017: The influence of sea- and land-breeze circulations on the diurnal variability of precipitation over a tropical island (2015). *Atmospheric Chemistry and Physics*, **17**, 13213–13232.

**43**. ***Huang, Y.*, Z. Meng,**J. Li, W. Li\*, ***L. Bai, M. Zhang***, and X. Wang, 2017: Distribution and variability of satellite-derived signals of isolated convection initiation over central Eastern China *Journal of Geophysical Research: Atmospheres*, **122**, 11357–11373.

**42**. Bao, X.,Y. Luo\*, J. Sun, **Z. Meng,**and ***J. Yue***, 2017: Assimilating Doppler radar observations with an ensemble Kalman filter for convection-permitting prediction of convective development in a heavy rainfall event during the pre-summer rainy season of South China, *Science China Earth Sciences*, **60**, 1866–1885.

**41. *Yu, H.***, H. Wang, **Z. Meng\***, M. Mu, X. Huang, and X. Zhang, 2017: [A WRF-based tool for forecast sensitivity to initial perturbation: the conditional non-linear optimal perturbations versus the first singular vector method and comparison to MM5,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2017JTECH_CNOP.pdf) *Journal of Atmospheric and Oceanic Technology*, **34**, 187–206.

**40.** ***Yue, J.*, Z. Meng\***, C. Yu, and L. Cheng, 2017: [Impact of coastal radar observability on the forecast of track and rainfall of Typhoon Morakot (2009) using a WRF-based EnKF data assimilation,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2017AAS_EnKF.pdf) *Advances in Atmospheric Sciences*, **34(1)**, 66–78.

**39.** ***Yue, J.*, and Z. Meng\***, 2017: [Impact of assimilating Taiwan coastal radar radial velocity on the forecast of Typhoon Morakot (2009) in southeastern China using a WRF-based EnKF,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2017SCES_EnKF.pdf) *Science China Earth Sciences for publication*, 60(2), 315–327.

**38.** He, Z., Q. Zhang\*, ***L. Bai***, and **Z. Meng**, 2016: [Characteristics of mesoscale convective systems in central East China and their reliance on atmospheric circulation patterns,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2016IntJC_MCS.pdf) *International Journal of Climatology*, **12**.

**37**. Zheng\*, Y., W. Zhu, D. Yao, **Z. Meng**, M. Xue, K. Zhao, Z. Wu, X. Wang, and Y. Zheng, 2016: Wind Speed Scales and Rating of the Intensity of the 23 June 2016 Tornado in Funing County, Jiangsu Province, *Meteorological Monthly*, **42**(11),1289–1303. (in Chinese with English Abstract)

**36.** ***Ai, Y.***, W. Li,**Z. Meng**, and J. Li\*, 2016: [Life cycle characteristics of MCSs in middle east China tracked by combining geostationary satellite and precipitation estimations,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2016MWR_Satellite.pdf) *Monthly Weather Review*, **144**, 2517–2530.

**35. *Zhang, Y.***,**Z. Meng**, P. Zhu, T. Tao, and G. Zhai\*, 2016: [Mesoscale modeling study of severe convection over complex terrain,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2017AAS_CI.pdf) *Advances in Atmospheric Sciences*, **33(11)**, 1259–1270.

**34. *Yu, H.*,** and **Z. Meng\*,** 2016: [Key synoptic-scale features influencing the high-impact heavy rainfall in Beijing, China on 21 July 2012,](http://www.tellusa.net/index.php/tellusa/article/view/31045) *Tellus A*, **68**,31045.

**33.** Zheng**\***, Y., F. Tian, **Z. Meng**, M. Xue, ***D. Yao***, ***L. Bai***, X. Zhou, X. Mao, and M. Wang, 2016: Survey and Multi-scale Characteristics of Wind Damage Caused by Convective Storms in the Surrounding Area of the Capsizing Accident of Cruise Ship “ Dongfangzhixing”, *Meteorological Monthly*, **42**(1), 1–13. (in Chinese with English Abstract)

**32. Meng\*, Z., *D. Yao, L. Bai***, Y. Zheng, M. Xue, X. Zhang, K. Zhao, F. Tian, and M. Wang, 2016:[Wind estimation around the shipwreck of the "Oriental Star" based on field damage survey and radar observaions,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2016CSB_Downburst.pdf) *Science Bulletin*, **61(4)**, doi:10.1007/s11434-016-1005-2.

**31.** ***Zhang, Y.***, F. Zhang, D. Stensrud, and **Z. Meng\***, 2016: [Intrinsic predictability of the 20 may 2013 tornadic thunderstorm event in Oklahoma at storm scale,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2016MWR_Supercell_predictability2.pdf) *Monthly Weather Review*, **144**, 1273–1298.

**30.** ***Zhu, L.***, Q. Wan, X. Shen, **Z. Meng\***, F. Zhang, Y. Weng, Y. Gao, ***Y. Zhang*** and ***J. Yue***, 2016:[Prediction and predictability of a high-impact western pacific landfalling typhoon Vicente (2012) through convection-permitting ensemble assimilation of Doppler radar velocity,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2016MWR_Vicente.pdf) *Monthly Weather Review*, **144**，21–43.

**29. *Zhang Y.***, F. Zhang, D. Stensrud, and **Z. Meng\***, 2015: [Predictability of the tornadic thunderstorm event in Oklahoma on 20 may 2013: Sensitivity of convection initiation and organization to small changes in synoptic timing and topographical forcing,](http://www.atmos.pku.edu.cn/zymeng/Page_paper/Mengzhiyong_2015MWR_Supercell_predictability1.pdf) *Monthly Weather Review*, **143**, 2973–2997.

**28.** Bei**\***, N., G. Li, **Z. Meng**, Y. Weng, M. Zavala and L. Molina, 2014: [Impacts of using an ensemble Kalman filter on air quality simulations along the California-Mexico border region during Cal-Mex 2010 Field Campaign.](http://www.atmos.pku.edu.cn/zymeng/Page_paper/MengZhiyong_2014_STE_EnKF.pdf) *The Science of the total environment*, **499**, 141–153.

**27.** ***Zhang****,* ***Y.***, **Z. Meng\***, Y. Weng and F. Zhang, 2014: Predictability of tropical cyclone intensity evaluated through 5-year forecasts with a convection-permitting regional-scale Model in the Atlantic basin, *Weather and Forecasting*, **29**, 1003–1023.

**26. Meng\***, **Z.** and ***D. Yao***, 2014: Damage survey, radar and environment analyses on the first-ever documented tornado in Beijing during the heavy rainfall event of 21 July 2012, *Weather and Forecasting*, **29**, 702–724

**25. *Huang****,* ***L*.** and **Z**. **Meng\****,* 2014: Quality of the target area for metrics with different nonlinearity in a mesoscale convective system, *Monthly Weather Review*, **142**, 2379–2397.

**24. Meng\* Z.**, ***D. Yan***, and ***Y. Zhang***, 2013: General features of squall lines in East China. *Monthly Weather Review,* **141**, 1629–1647.

**23. *Wu, D***., **Z. Meng\*,** and ***D. Yan***, 2013: The predictability of a squall line in South China on 23 April 2007. *Advances in Atmospheric Sciences,* **30**, 485–502.

**22.** ***Li, Y.***, C. Zhang\*, J. Zhong, and **Z. Meng**, 2013: Case study on observation sensitive region of heavy rainfall in Beijing area. *Climatic and Environmental Research,* **18(5)**, 651–661. (in Chinese with English Abstract)

**21.** ***Wu, D.***, and **Z. Meng**\*, 2013: On the movement and mesoscale surface structure of a squall line on 23 April 2007 in Guangdong. *Journal of Natural Science of Peking University*, **49**, 463–470. (in Chinese with English Abstract)

**20. Meng\* Z**, F. Zhang, P. Markowski, ***D. Wu,*** and K. Zhao, **2012**: A modeling study on the development of a bowing structure and associated rear inflow within a squall line over South China. *J. Atmos. Sci.*, **69**, 1182–1207.

**19. Meng\*, Z.**, and ***Y. Zhang***, 2012: On the squall lines preceding landfalling tropical cyclones in China. *Monthly Weather Review*, **140**, 445–470.

**18．Meng, Z.**, and F. Zhang**\***, 2010: Limited-area ensemble-based data assimilation. *Monthly Weather Review*, **139**, 2025–2045.

**17.** Gao, S., **Z. Meng\***, F. Zhang, and L. F. Bosart, 2009: Observational analysis of heavy rainfall mechanisms associated with severe tropical storm Bilis (2006) after its landfall. *Monthly Weather Review*, **137**, 1881–1897.

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