Anthony C. Didlake, Jr.

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Education

2012 **Ph.D. Atmospheric Sciences,** The University of Washington, Seattle, WA

2009 **M.S. Atmospheric Sciences,** The University of Washington, Seattle, WA

2006 **B.S. Geology and Geophysics,** Yale University, New Haven, CT

Professional Appointments

2022 – present **Associate Professor,** Department of Meteorology and Atmospheric Science, The Pennsylvania State University, University Park, PA

2016 – 2022 **Assistant Professor,** Department of Meteorology and Atmospheric Science, The Pennsylvania State University, University Park, PA

2013 – 2016 **Postdoctoral Fellow,** Mesoscale Atmospheric Processes Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD

2006 – 2012 **Graduate Research Assistant,** Department of Atmospheric Sciences, The University of Washington, Seattle, WA

Publications

(* indicates a supervised student)

1. Laurencin*, C. N., **A. C. Didlake Jr.,** J. Y. Harrington, and A. A. Jensen, 2022: Evaluating an Ice Crystal Trajectory Growth (ICTG) model on a quasi-idealized simulation of a squall line. *J. Adv. Model. Earth Syst.,* **14,** e2021MS002764, doi:10.1029/2021MS002764.

2. Barron*, N. R., **A. C. Didlake Jr.,** and P. D. Reasor, 2022: Statistical analysis of convective updrafts in tropical cyclone rainbands observed by airborne Doppler radar. *J. Geophys. Res. Atmos.,* **127,** e2021JD035718, doi:10.1029/2021JD035718.

3. Yu*, C.-L., **A. C. Didlake Jr.,** and F. Zhang, 2022: Updraft maintenance and axisymmetrization during secondary eyewall formation in a model simulation of Hurricane Matthew (2016). *J. Atmos. Sci.,* **79,** 1105–1125, doi:10.1175/JAS-D-21-0103.1.

4. Yu*, C.-L., **A. C. Didlake Jr.,** J. D. Kepert, and F. Zhang, 2021: Investigating axisymmetric and asymmetric signals of secondary eyewall formation using observations-based modeling of the tropical cyclone boundary layer. *J. Geophys. Res. Atmos.,* **126,** e2020JD034027, doi:10.1029/2020JD034027.

5. Homeyer, C. R., A. O. Fierro, B. A. Schenkel, **A. C. Didlake Jr.,** G. M. McFarquhar, J. Hu, A. V. Ryzhkov, J. B. Basara, A. M. Murphy, and J. Zawislak, 2021: Polarimetric signatures in landfalling tropical cyclones. *Mon. Wea. Rev.,* **149,** 131–154, doi:10.1175/MWR-D-20-0111.1.

6. Yu*, C.-L., **A. C. Didlake Jr.,** F. Zhang, and R. G. Nystrom, 2021: Asymmetric rainband processes leading to secondary eyewall formation in a model simulation of Hurricane Matthew (2016). *J. Atmos. Sci.,* **78**, 29–49, doi:10.1175/JAS-D-20-0061.1.

7. Laurencin*, C. N., **A. C. Didlake Jr.,** S. D. Loeffler, M. R. Kumjian, and G. M. Heymsfield, 2020: Hydrometeor size sorting in the asymmetric eyewall of Hurricane Matthew (2016). *J. Geophys. Res. Atmos.,* **125,** e2020JD032671, doi:10.1029/2020JD032671.

8. Yu*, C.-L., and **A. C. Didlake Jr.,** 2019: Impact of stratiform rainband heating on the tropical cyclone wind field in idealized simulations. *J. Atmos. Sci.,* **76,** 2443–2462, doi:10.1175/JAS-D-18-0335.1.

9. **Didlake, A. C., Jr.,** and M. R. Kumjian, 2018: Examining storm asymmetries in Hurricane Irma (2017) using polarimetric radar observations. *Geophys. Res. Lett.,* **45,** 13,513–13,522, doi:10.1029/2018GL080739.

10. Wunsch*, K. E. D., and **A. C. Didlake Jr.,** 2018: Analyzing tropical cyclone structures during secondary eyewall formation using aircraft in-situ observations. *Mon. Wea. Rev.,* **146,** 3977–3993, doi:10.1175/MWR-D-18-0197.1.

11. **Didlake, A. C., Jr.,** P. D. Reasor, R. F. Rogers, and W.-C. Lee, 2018: Dynamics of the transition from spiral rainbands to a secondary eyewall in Hurricane Earl (2010). *J. Atmos. Sci.,* **75,** 2909–2929, doi:10.1175/JAS-D-17-0348.1.

12. Wu, D., K. Zhao, M. R. Kumjian, X. Chen, H. Huang, M. Wang, **A. C. Didlake Jr.,** Y. Duan, and F. Zhang, 2018: Kinematics and microphysics of convection in the outer rainband of Typhoon Nida (2016) revealed by polarimetric radar. *Mon. Wea. Rev.,* **146,** 2147–2159, doi:10.1175/MWR-D-17-0320.1.

13. Munsell, E. B., F. Zhang, S. A. Braun, J. A. Sippel, and **A. C. Didlake Jr.,** 2018: The inner-core temperature structure of Hurricane Edouard (2014): Observations and ensemble variability. *Mon. Wea. Rev.,* **146,** 135–155, doi:10.1175/MWR-D-17-0095.1.

14. **Didlake, A. C., Jr.,** and M. R. Kumjian, 2017: Examining polarimetric radar observations of bulk microphysical structures and their relation to vortex kinematics in Hurricane Arthur (2014). *Mon. Wea. Rev.,* **145,** 4521–4541, doi:10.1175/MWR-D-17-0035.1.

15. **Didlake, A. C., Jr.,** G. M. Heymsfield, P. D. Reasor, and S. R. Guimond, 2017: Concentric eyewall asymmetries in Hurricane Gonzalo (2014) observed by airborne radar. *Mon. Wea. Rev.,* **145,** 729–749, doi:10.1175/MWR-D-16-0175.1.

16. Guimond, S. R., G. M. Heymsfield, P. D. Reasor, and **A. C. Didlake Jr.,** 2016: The rapid intensification of Hurricane Karl (2010): New remote sensing observations of convective bursts from the Global Hawk platform. *J. Atmos. Sci.,* **73,** 3617–3639, doi:10.1175/JAS-D-16-0026.1.

17. Tian, L., G. M. Heysmfield, **A. C. Didlake Jr.,** S. R. Guimond, and L. Li, 2015: Velocity azimuth display analysis of Doppler velocity for HIWRAP. *J. Appl. Meteor. Climatol.,* **54,** 1792–1808, doi:10.1175/JAMC-D-14-0054.1.

18. **Didlake, A. C., Jr.,** G. M. Heymsfield, L. Tian, and S. R. Guimond, 2015: The coplane analysis technique for three-dimensional wind retrieval using the HIWRAP airborne Doppler radar. *J. Appl. Meteor. Climatol.,* **54,** 605–623, doi:10.1175/JAMC-D-14-0203.1.

19. **Didlake, A. C., Jr.,** and R. A. Houze Jr., 2013: Dynamics of the stratiform sector of a tropical cyclone rainband. *J. Atmos. Sci.,* **70,** 1891–1911, doi:10.1175/JAS-D-12-0245.1.

20. **Didlake, A. C., Jr.,** and R. A. Houze Jr., 2013: Convective-scale variations in the inner-core rainbands of a tropical cyclone. *J. Atmos. Sci.,* **70,** 504–523, doi:10.1175/JAS-D-12-0134.1.

21. **Didlake, A. C., Jr.,** and R. A. Houze Jr., 2011: Kinematics of the secondary eyewall observed in Hurricane Rita (2005). *J. Atmos. Sci.,* **68,** 1620–1636, doi:10.1175/2011JAS3715.1.

22. **Didlake, A. C., Jr.,** and R. A. Houze Jr., 2009: Convective-scale downdrafts in the principal rainband of Hurricane Katrina (2005). *Mon. Wea. Rev.,* **137,** 3269–3293, doi:10.1175/2009MWR2827.1.

23. Davis, C., C. Snyder, and **A. C. Didlake Jr.,** 2008: A vortex-based perspective of eastern Pacific tropical cyclone formation. *Mon. Wea. Rev.,* **136,** 2461–2477, doi:10.1175/2007MWR2317.1.

Teaching and Advising

I. courses taught

METEO 431 – Atmospheric Thermodynamics (Fall 2021)
METEO 521 – Atmospheric Dynamics (Spring 2020)
METEO 597 – Special Topics: Tropical Meteorology (Fall 2018, Fall 2020)
METEO 421 – Atmospheric Dynamics (Spring 2017, Spring 2018, Spring 2019, Spring 2021, Spring 2022)
METEO 452 – Tropical Meteorology (Fall 2016, Fall 2017, Fall 2019)

II. graduate students supervised

Katharine Wunsch, M.S., graduated 2018
Chau Lam (Chris) Yu, Ph.D., graduated 2020
Jonathan Unger, M.S., graduated 2021 (co-advised with Eugene Clothiaux)
Chelsey Laurencin, Ph.D. student (M.S. received 2019)
Nicholas Barron, Ph.D. student (M.S. received 2020)
Bruno Rojas, Ph.D. student
Katriella Tenembaum, M.S. student
Justin Stow, M.S. student
Andreas Sandino, M.S. student

Grants

I. current grants

Didlake, A. C., Jr. (PI), X. Chen, and Y. Zhang: "Understanding the Dynamics and Predictability of Tropical Cyclones Using PMM Microwave Observations," Precipitation Measurement Mission, NASA, 2022–2025.

Didlake, A. C., Jr. (Co-PI), and C. Zarzycki: "Analysis of Shear-induced Asymmetries in Tropical Cyclones in Global Climate Models," Dean's Fund for Postdoc-Facilitated Innovation, Penn State College of Earth and Mineral Sciences, 2022–2023.

Fuentes, J., D. Stensrud, X. Chen, **A. C. Didlake Jr.** (Co-I), M. Kumjian, K. Lombardo, W. Peng, and Y. Zhang: "A Cooperative Agreement for administering the Goddard Earth Sciences Technology and Research II (GESTAR II)," University of Maryland Baltimore County, NASA, 2021–2022.

Bell, M., **A. C. Didlake Jr.** (Co-PI), R. Rios-Berrios, R. Rogers, and J. Cione: "Collaborative Research: Dynamics, Thermodynamics, and Microphysics of Extreme Rainfall Observed During PRECIP," Physical and Dynamic Meteorology, NSF, 2019-2023, award AGS-1854607.

Didlake, A. C., Jr. (PI), and F. Zhang: "Examining the Dynamics of Rainbands and Secondary Eyewall Formation in Tropical Cyclones," Physical and Dynamic Meteorology, NSF, 2018-2023, award AGS-1810869.

II. completed grants

Didlake, A. C., Jr. (PI): "Examining Radar Data Collected from Unmanned Aircraft to Analyze Hurricanes," Wilson Initiation Grant, Penn State College of Earth and Mineral Sciences, 2016–2017.

Heymsfield, G., S. Guimond, and **A. C. Didlake Jr.** (Co-I): "Understanding hurricane inner-core asymmetries and their relationship to convective bursts and storm intensification using a suite of NASA data," Weather and Atmospheric Dynamics, NASA, 2017–2020, award NNX17AJ47G.

Didlake, A. C., Jr. (PI): "Examining Aircraft, Satellite, and Modeling Data from HS3 to Advance Understanding of Hurricanes," New Investigator Program in Earth Science, NASA, 2016–2020, award NNX16AI21G.

Heymsfield, G., L. Tian, M. Grecu, and **A. C. Didlake Jr.** (Co-I): "Using Airborne Radar Measurements to Improve Physical Assumptions in DPR and GMI Algorithms," Precipitation Measurement Mission, NASA, 2016–2018.

Honors and Awards

College of Earth and Mineral Sciences Wilson Research Initiation Grant, 2016
NASA New (Early Career) Investigator Program in Earth Science Award, 2016
NASA Postdoctoral Program Fellowship, 2012
National Defense Science and Engineering Graduate Fellowship, 2008
AMS/NSF Atmospheric Sciences Graduate Fellowship, 2006
UW Dept. of Atmospheric Sciences Top Scholar Award, 2006
Yale Geology & Geophysics Hammer Prize, 2006 (for "excellence in the oral presentation of the senior thesis")
Yale Geology & Geophysics Belknap Prize, 2006 (for "excellence in geological studies")

Field Campaign Participation

Prediction of Rainfall Extremes Campaign in the Pacific **(PRECIP)**, NSF, 2022
Preparatory Rockies Experiment for the Campaign in the Pacific **("PRE"-CIP)**, NSF, 2021
Eastern Pacific Origins and Characteristics of Hurricanes **(EPOCH)**, NASA, 2017
Sensing Hazards with Operational Unmanned Technology **(SHOUT)**, NOAA, 2015, 2016
Olympic Mountains Experiment **(OLYMPEX)**, NASA 2015
Hurricane and Severe Storm Sentinel **(HS3)**, NASA, 2013, 2014
Integrated Precipitation and Hydrology Experiment **(IPHEX)**, NASA, 2014
Genesis and Rapid Intensification Project **(GRIP)**, NASA, 2010

Presentations (* indicates a supervised student)

I. select invited presentations

Didlake, A. C., Jr., 2021: The role of asymmetric features during secondary eyewall formation in tropical cyclones. Seminar, *Department of Atmospheric Sciences, University of Washington,* Seattle, Washington, virtual.

Didlake, A. C., Jr., 2020: The role of asymmetric features during secondary eyewall formation in tropical cyclones. Seminar, *NOAA Geophysical Fluid Dynamics Laboratory,* Princeton, New Jersey, virtual.

Didlake, A. C., Jr., 2019: Asymmetric aspects of secondary eyewall formation in tropical cyclones. Seminar, *Lamont-Doherty Earth Observatory, Columbia University,* Palisades, New York.

Didlake, A. C., Jr., 2019: Asymmetric aspects of secondary eyewall formation in tropical cyclones. Seminar, *Hurricane Research Division, NOAA Atlantic Oceanographic and Meteorological Laboratory,* Miami, Florida.

Didlake, A. C., Jr., 2018: Radar applications, rainband convection, and secondary eyewall formation in tropical cyclone research. Workshop, *Training Workshop on Tropical Observations, Forecasts and Theories, Shanghai Typhoon Institute* Shanghai, China.

Didlake, A. C., Jr., 2018: Kinematic and microphysical observations of rainbands and Secondary eyewalls in tropical cyclones. Seminar, *Department of Atmospheric Sciences, University of Illinois Urbana-Champaign,* Champaign, Illinois.

Didlake, A. C., Jr., 2015: Airborne radar observations of eyewall replacement cycles in Hurricane Gonzalo. Seminar, *Department of Atmospheric and Environmental Sciences, University at Albany SUNY,* Albany, New York.

Didlake, A. C., Jr., 2014: Dynamics of inner core rainbands observed in tropical cyclones. Colloquium, *National Weather Center/University of Oklahoma,* Norman, Oklahoma.

Didlake, A. C., Jr., 2014: Dynamics of secondary eyewall formation in Hurricane Rita. Colloquium, *Department of Atmospheric Science, Colorado State University,* Fort Collins, Colorado.

Didlake, A. C., Jr., 2014: An analysis of the structures and dynamics of inner core precipitation features in a tropical cyclone. Seminar, *Department of Weather and Climate, Monash University,* Melbourne, Australia

II. select conference presentations

Didlake, A. C., Jr., 2021: Asymmetric rainband processes leading to secondary eyewall formation in a model simulation of Hurricane Matthew (2016). Talk, *14th Conference on Mesoscale Convective Systems and High-Impact Weather in East Asia (ICMCS-XIV),* Nanjing, China, virtual.

Didlake, A. C., Jr., M. Kumjian, and C. Laurencin*, 2020: Examining storm asymmetries in recent tropical cyclones using polarimetric radar observations. Talk, *AMS 99th Annual Meeting,* Boston, Massachusetts.

Didlake, A. C., Jr., and M. Kumjian, 2019: Examining asymmetries of rainbands and secondary eyewalls in tropical cyclones using polarimetric radar observations. Talk, *39th International Conference on Radar Meteorology,* Nara, Japan.

Didlake, A. C., Jr., 2019: Asymmetric aspects of secondary eyewall formation in tropical cyclones. Talk, *13th Conference on Mesoscale Convective Systems and High-Impact Weather in East Asia (ICMCS-XIII),* Naha, Japan.

Didlake, A. C., Jr., R. Rogers, P. Reasor, and W.-C. Lee, 2018: Dynamics of the transition from spiral rainbands to a secondary eyewall in Hurricane Earl (2010). Talk, *33rd Conference on Hurricanes and Tropical Meteorology,* Ponte Vedra Beach, Florida.

Didlake, A. C., Jr., and M. Kumjian, 2017: Microphysical structures of Hurricane Irma observed by polarimetric radar. Talk, *AGU Fall Meeting,* New Orleans, Louisiana.

Didlake, A. C., Jr., P. Reasor, and R. Rogers, 2017: Analyzing the transition from rainbands to a secondary eyewall using airborne radar observations of Hurricane Earl (2010). Talk, *38th Conference on Radar Meteorology,* Chicago, Illinois.

Didlake, A. C., Jr., G. Heymsfield, P. Reasor, and S. Guimond, 2016: Airborne radar observations of eyewall replacement cycles in Hurricane Gonzalo. Talk, *32nd Conference on Hurricanes and Tropical Meteorology,* San Juan, Puerto Rico.

Didlake, A. C., Jr., G. Heymsfield, S. Guimond, and L. Tian, 2015: HIWRAP observations of eyewall replacement cycles in Hurricane Gonzalo. Talk, *37th Conference on Radar Meteorology,* Norman, Oklahoma.

Didlake, A. C., Jr., G. Heymsfield, L. Tian, and S. Guimond, 2014: HIWRAP observations from the HS3 campaign: Comparing retrieval techniques. Poster, *31st Conference on Hurricanes and Tropical Meteorology,* San Diego, California.

Didlake, A. C., Jr., 2013: Coplanar retrieval method for downward pointing, conically scanning airborne Doppler radar. Poster, *36th Conference on Radar Meteorology,* Breckenridge, Colorado.

Professional Service

I. PENN STATE

Graduate Academic Programs Committee, Dept. of Meteo. and Atmos. Sci., 2017–present
Graduate Program Admissions Committee, Dept. of Meteo. and Atmos. Sci., 2017–present
Organizer and moderator, First-Year Graduate Student Symposium, Dept. of Meteo. and Atmos. Sci., 2017–present
Faculty advisor, Minorities in EMS student group, College of Earth and Mineral Sciences, 2018–present
Faculty Advisory Committee, College of Earth and Mineral Sciences, 2021–present
Undergraduate Academic Programs Committee, Dept. of Meteo. and Atmos. Sci., 2016–2017

II. EXTERNAL

Associate Editor, Monthly Weather Review, American Meteorological Society, 2019–2020
Science Program Committee, 13th Conference on Mesoscale Convective Systems and High-Impact Weather in East Asia (ICMCS-XIII), 2018–2019.
Working Group on Secondary Eyewall Formation and Wind Field Expansion, 9th International Workshop on Tropical Cyclones, World Meteorological Organization, 2018
Program Organizing Committee, 33rd Conference on Hurricanes and Tropical Meteorology, American Meteorological Society, 2018

Rainfall Working Group, 8th International Workshop on Tropical Cyclones, World Meteorological Organization, 2014

Max Eaton Prize Committee, 32nd Conference on Hurricanes and Tropical Meteorology, American Meteorological Society, 2016

Landfall Processes Working Group, 5th International Workshop on Tropical Cyclones, World Meteorological Organization, 2014

Student Award Committee, 36th Radar Meteorology Conference, American Meteorological Society, 2013

Reviewer: *Journal of the Atmospheric Sciences, Monthly Weather Review, Journal of Atmospheric and Oceanic Technology, Journal of Applied Meteorology and Climatology, Bulletin of the American Meteorological Society, Quarterly Journal of the Royal Meteorology Society, Journal of Geophysical Research: Atmospheres, Eos, Journal of Operational Meteorology, Transactions on Geoscience and Remote Sensing, Geophysical Research Letters, Advances in Atmospheric Sciences, National Science Foundation, National Aeronautics and Space Administration*

Professional Memberships

American Meteorological Society

American Geophysical Union