Patrick T. Marsh

Curriculum Vitae
April 2022

NOAA/NWS Storm Preadiction Center
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Education

2013	**Ph.D.**	University of Oklahoma
2007	**M.S. Meteorology**	University of Oklahoma
2005	**B.S. (Honors) Physics & Mathematics**	University of Arkansas

Employment

2019–	**Chief, Science Support Branch**	NOAA/NWS Storm Prediction Center
2016–2019	**Warning Coordination Meteorologist**	NOAA/NWS Storm Prediction Center
2013–2016	**Techniques Development Meteorologist**	NOAA/NWS Storm Prediction Center
2010–2013	**Hazardous Weather Testbed Liaison**	OU/CIMMS & NOAA/OAR NSSL
2009 & 2011	**Adjunct Professor**	Mid-America Christian University
2006–2013	**Graduate Research Assistant**	University of Oklahoma
2005–2009	**Graduate Teaching Assistant**	University of Oklahoma
2005	**Laboratory Instructor**	University of Arkansas

Select Appointments

2022–	Graduate Faculty Status	**Central Michigan University**
2021–	Executive Board	**OU CIWRO**
2021–	Fellow	**OU CIWRO**
2019–2021	Executive Board	**OU CIMMS**
2015–2021	Fellow	**OU CIMMS**

Other Positions

2009 & 2010	**Manager**	VORTEX2 Operations Center
11–15 June 2012	**Convective Storms Expert**	European Severe Storms Laboratory Testbed
Summer 2012	**Forecaster/Nowcaster**	Deep Convective Cloud Chemistry Experiment
2007–2008	**Lead Forecaster/Nowcaster**	Collaborative Adaptive Sensing of the Atmosphere IOP 1

Honors and Awards

2018	**NOAA Administrator's Award**	National Oceanic & Atmospheric Administration
2015	**NOAA/NWS Isaac Cline Award (Local)**	NOAA/NWS Storm Prediction Center
2012–2013	**Outstanding Service Award**	University of Oklahoma School of Meteorology
2007–2008	**Outstanding Teaching Assistant**	University of Oklahoma School of Meteorology
2007	**Outstanding Service During IOP 1**	Collaborative Adaptive Sensing of the Atmosphere
2006–2007	**Outstanding Service Award**	University of Oklahoma School of Meteorology
2006	**Summer Policy Colloquium Fellowship**	American Meteorological Society
2004	**Young Scientist Travel Award**	European Meteorological Society
2004–2005	**Undergraduate Research Fellowship**	University of Arkansas Honors College
2004–2005	**Robert D. Maurer Research Scholarship**	University of Arkansas Physics Department
2004	**Faculty Scholarship**	University of Arkansas Physics Department
2003–2004	**Undergraduate Research Fellowship**	University of Arkansas Honors College
2001–2005	**Chancellor's Scholarship**	University of Arkansas

Cash Awards

2021	**Merit-Based**	NOAA/NWS Storm Prediction Center
2020	**Merit-Based**	NOAA/NWS Storm Prediction Center
2018	**Merit-Based**	NOAA/NWS Storm Prediction Center
2017	**Merit-Based**	NOAA/NWS Storm Prediction Center
2016	**Merit-Based**	NOAA/NWS Storm Prediction Center
2015	**Merit-Based**	NOAA/NWS Storm Prediction Center
2014	**Merit-Based**	NOAA/NWS Storm Prediction Center
2013	**Merit-Based**	NOAA/NWS Storm Prediction Center
2010	**Running VORTEX2 Operations Center**	NOAA/OAR National Severe Storms Laboratory

Research

- Authored or co-authored 18 refereed publications, 3 currently submitted or in-press, and more than 16 non-refereed publications.
- Given oral and poster presentations at dozens of scientific conferences, both in and out of my primary discipline of Meteorology.
- Interests lie in the communication, climatology, forecasting, and verification of high-impact weather, data mining, data visualization, statistical learning, and the transition of science from research to operations.
- Additional interests lie in the interface between scientific research, operations, and information technology systems. Specifically, how to develop and maintain a robust infrastructure to be resilient to multiple failure modes, yet nimble enough to move forward, all within a secure computing environment.
- Current research projects include severe weather hazard and impact modeling, severe weather climatologies, and Hazardous Weather Testbed initiatives.

Grants

2022	PI	**NOAA WPO**: Evaluating Alternative Risk Communication Strategies for the Storm Prediction Center's Convective Outlook	$489,820
2014	PI	**NOAA HWT**: Objective Probabilistic Guidance for Severe Weather Outbreaks	$51,300
2011	Co-PI	**Korean Meteorological Administration**: Forecaster Training	$105,440
2003	PI	**Roland S. Boreham Grant**: Proposal to Provide Free Pagers to Volunteer Emergency Responders	$20,000

Fundraising and Development

- Established the Forrest W. Johns Memorial Meteorology Scholarship at the University of Oklahoma for outstanding contributions to the Oklahoma Weather Laboratory (Spring 2006)
- Worked with Forecast Weather and Research Network (FORWARN), a not-for-profit organization, to raise money to provide severe weather alert pagers to emergency managers (February 2004)

Professional Development

June 2006	American Meteorological Society Summer Policy Colloquium
April 2006	Weather and Society Integrated Studies (WAS*IS)

Consulting

July 2011	**Korean Meteorological Administration**	Heavy Precipitation Forecasting Short Course
Fall 2006	**Professor Lance Leslie**	Develop a method for estimating theoretical observed maximum wind speeds of tropical cyclones from coarse resolution numerical models

Software

A listing of open-source software projects that I have started or to which I have contributed.

- Founder & initial developer of **SHARPpy**, a Python port of the SPC's SHARP sounding analysis program. Available at `https://github.com/sharppy/SHARPpy`.
- Bug fixes for **Matplotlib**, a visualization software package written in Python. Source code available at `https://github.com/matplotlib/matplotlib`
- Added ability to plot county boundaries to the Matplotlib Toolkit library, **Basemap**. Basemap is a toolkit addon to the Matplotlib software package that allows for plotting of geographic and political boundaries as well as plotting other datasets onto said geographic and political boundaries. The sotware is written in a mixture of both compiled and scripting languages, but is designed to be utilized in Python. Source code available at `https://github.com/matplotlib/basemap`

Select Invited Seminars & Presentations

05 April 2019	**My Journey**	University of North Dakota Senior Night Banquet Keynote. Grand Forks, North Dakota, United States
23 March 2018	**Coming Soon to a Storm Prediction Center Near You!**	22nd Annual NWA Severe Storms & Doppler Radar Conference. Ankeny, Iowa, United States
22 March 2018	**Everything but the Locusts: A Storm Prediction Center Perspective of High-Impact Weather Events of 2017**	22nd Annual NWA Severe Storms & Doppler Radar Conference. Ankeny, Iowa, United States
02 April 2017	**A Day at the Storm Prediction Center**	Southeast Severe Weather Symposium. East Mississippi Chapter of the AMS/NWA. Starkville, Mississippi, United States
07 November 2013	**Using Python in the Atmospheric Sciences**	Student Chapter of the AMS/NWA at Iowa State. Ames, Iowa, United States
22 October 2013	**Severe Weather Warnings: Past, Present, Future**	North Texas Chapter of the AMS/NWA. Fort Worth, Texas, United States
6 January 2013	**Developing Your Skill Set**	93rd AMS Annual Meeting. 1st Conference for Young Professionals. Austin, Texas, United States
June 2012	**Mesoscale Convective Systems**	Week 4 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria
June 2012	**Severe Weather Forecasting: With Emphasis on Tornado Forecasting**	Week 2 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria
June 2012	**'Heavy Precipitation Forecasting: Large Scale Patterns & Ingredients**	Week 2 Expert Lecture, First Annual European Severe Storms Laboratory Testbed. Wiener Neustadt, Austria
05 April 2012	**Tornado Warnings: Past, Present, and Future**	Atmospheric Science Department, University of Alabama—Huntsville. Huntsville, Alabama, United States

Select Media

18 May 2017	"Are high-risk thunderstorm forecasts becoming more frequent? A Q&A with SPC.". Interview with the Capital Weather Grang (Washington Post)
2016–Present	Regular video and print interviews regarding upcoming, ongoing, or recent severe weather events
22 March 2015	Guest on The Weather Channel's *WxGeeks* program
20-21 May 2013	Multiple National and International News Agencies regarding the EF-5 Moore, OK Tornado on 20 May 2013
March 2013 – Present	Various print, radio, and television interviews regarding forecast and ongoing severe weather events
September 2012	NBC Affiliate WVIT in Connecticut: Skype interview from eye of Hurricane Isaac during radar deployment
May 2010	Central OK Press Conference regarding 10 May 2010 tornado outbreak, specifically VORTEX 2's operations
February 2010	National Public Radio's All Things Considered: Snow on the ground in all 50 states simultaneously
Spring 2007	The Weather Channel: Featured as an up-and-coming meteorologist, aired during Severe Weather Awareness Week
Various	The Weather Channel: Multiple interviews regarding upcoming significant severe weather events

Professional Society Memberships

2013–	National Weather Association
2013–2019	American Meteorological Society
2013–2015	American Geophysical Union
2012–2020	European Severe Storms Laboratory
2011–2015	Society for American Baseball Research

Student Society Memberships

2011–2013	American Geophysical Union
2007–2013	National Weather Association
2004–2013	American Meteorological Society
2004–2005	Mortar Board
2004–2005	Pi Mu Epsilon
2001–2005	Society of Physics Students

Professional Leadership & Service

2017–2019	**Co-Chair**, National Tornado Summit Executive Program Committee
2014–2015	**Co-Chair**, National Weather Association's 2015 Annual Meeting Program Committee
2014–2016	**Chair**, National Weather Association's Publications Committee
2014–2020	**Member**, AMS EIPT Scientific & Technological Activities Commission
2013–2015	**Member**, NWA IT Committee
2012–2013	**Student Member**, AMS EIPT Scientific & Technological Activities Commission
6–10 January 2013	**Session Co-Chair**, Quasi-operational Systems: Products you can use now: 29th EIPT Conference at 93rd AMS Annual Meeting
2012–2019	**Member**, AMS EIPT Program Committee
2011–2014	**Member**, Spotter Network Advisory Committee
2010–2013	**Member**, National Severe Weather Workshop Program Committee
2010–2013	**Member**, National Weather Center REU Selection Committee
12–17 July 2010	**Instructor & Counselor**, Extreme Weather and the Environment Summer Camp, William J Clinton Presidential Library and Museum, Little Rock, Arkansas
2008–2009	**Student Member**, AMS SLS Scientific & Technological Activities Commission
2008–2013	**WxChallenge Manager**, University of Oklahoma
2007–2009	**EduTech Committee**, College of Atmospheric & Geographic Sciences, University of Oklahoma
2007–2009	**Chair**, Student Affirs Committee, School of Meteorology, University of Oklahoma
2004–2005	**Chief Justice**, Associated Student Government Judiciary, University of Arkansas
2004-2005	**President**, Society of Physics Students, University of Arkansas

Community Leadership & Service

2015–2020	**Volunteer**, Pottawatomie County Oklahoma Emergency Management
2010–2014	**Member**, Norman NEXT
2010–2014	**Member**, Norman Chamber of Commerce
29 June – 04 July 2007	**On-site Meteorologist**, US Youth Soccer Southern Regional Championships, Oklahoma City, Oklahoma
03–07 May 2007	**Event Meteorologist**, Norman May Fair
February 2004	**Coms Expert**, Weapons of Mass Destruction Drill, Western Arkansas District
Summer 2003	**Bioterrorism Table Top Exercise**, Western Arkansas District
2003–2008	**ARES / RACES / SKYWARN Volunteer**, Crawford County, Arkansas
2000–2003	**Hazardous Materials Responder – Level 1**
2000–2008	**ARES / RACES / SKYWARN Volunteer**, Sebastian County, Arkansas
2000–	**Amateur Radio Operator – KD5LKH**

Courses Taught, Co-Taught, or Assisted

Fall 2008, 2012	**Synoptic Meteorology Laboratory** (Assisted)	University of Oklahoma
Fall 2009–2011	**Synoptic Meteorology Laboratory** (Co-Taught)	University of Oklahoma
Spring 2009, 2011	**Mathematical Modeling** (Taught)	Mid-America Christian University
Spring 2009, 2011	**Differential Equations** (Taught)	Mid-America Christian University
Spring 2008, 2009	**Introduction to Meteorology II Laboratory** (Taught)	University of Oklahoma
Summer 2007	**Introduction to Meteorology II** (Taught)	University of Oklahoma
Fall 2005, 2007	**Introduction to Meteorology I Laboratory** (Taught)	University of Oklahoma
Spring 2006	**Severe and Unusual Weather** (Taught)	University of Oklahoma
Spring 2005	**Honors University Physics I Laboratory** (Co-Taught)	University of Arkansas

Graduate Students Supervised

2021–	**Cameron J. Nixon** (Ph.D. Committee Member)	Central Michigan University

Undergraduate Students Supervised

Summer 2021	**Robert "Bobby" Saba** (Co-Mentor)	NOAA Hollings
Summer 2019	**Rebekah Cheatham** (Primary Mentor)	NOAA Hollings
Summer 2014	**Matthew Brothers** (Primary Mentor)	NOAA Hollings
Summer 2014	**Matthew Flournoy** (Co-Mentor)	NOAA Hollings
Summer 2014	**Christopher McCray** (Co-Mentor)	NOAA Hollings
Summer 2013	**Felicia Guarriello** (Co-Mentor)	NOAA Hollings
Summer 2013	**Joshua Crittenden** (Co-Mentor)	NWC Research Experience for Undergraduates
Summer 2012	**Burkely Tweist** (Co-Mentor)	NOAA Hollings
Summer 2011	**Alicia Klees** (Co-Mentor)	NOAA Hollings
Summer 2010	**Stacey Hitchcock** (Primary Mentor)	NWC Research Experience for Undergraduates
Summer 2009	**Preston Carter** (Co-Mentor)	NOAA Hollings

Publications

Theses

1. **Marsh, Patrick T.**, 2005: *Modern technology and its application in severe weather information dissemination*. Undergraduate Honors Thesis. University of Arkansas.
2. **Marsh, Patrick T.**, 2007: *An assessment of the severe weather environment of North America simulated by a climate model*. Masters Thesis. University of Oklahoma.
3. **Marsh, Patrick T.**, 2013: *A method of calibrating probabilistic forecasts*. Doctoral Thesis. University of Oklahoma.

Lead Authored Refereed Papers

1. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: Assessment of the severe weather environment in North America simulated by a global climate model. *Atmospheric Science Letters*, **8**, 100–106.
2. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2009: Preliminary investigation into the severe thunderstorm environment of Europe simulated by the Community Climate System Model 3. *Atmospheric Research*, **93**, 607–618.
3. **Marsh, Patrick T.** and H. E. Brooks, 2012: Comments on "Tornado Risk Analysis: Is Dixie Alley an Extension of Tornado Alley?" *Bulletin of the American Meteorological Society*, **93**, 405–407.
4. **Marsh, Patrick T.**, J. S. Kain, V. Lakshmanan, A. J. Clark, N. M. Hitchens, and J. Hardy, 2012: A method for calibrating deterministic forecasts of rare events. *Weather and Forecasting*, **27**, 531–538.

Co-Authored Refereed Papers

1. Brooks, H. E., **P. T. Marsh**, A. M. Kowaleski, P. Groenemeijer, T. E. Thompson, C. S. Schwartz, C. M. Shafer, A. Kolodziej, N. Dahl, and D. Buckey, 2011: Evaluation of European Storm Forecast Experiment (ESTOFEX) forecasts. *Atmospheric Research*, **100**, 538–546.
2. Clark, A. J., J. S. Kain, **P. T. Marsh**, J. Correia Jr., M. Xue, and F. Kong, 2012: Forecasting tornado path lengths using a three-dimensional object identification algorithm applied to convection-allowing forecasts. *Weather and Forecasting*, **27**, 1090–1113.
3. Clark, A. J., S. J. Weiss, J. S. Kain, I. L. Jirak, M. C. Coniglio, C. J. Melick, C. Siewert, R. A. Sobash, **P. T. Marsh**, A. R. Dean, et al., 2012: An overview of the 2010 hazardous weather testbed experimental forecast program spring experiment. **93**, 55–74.
4. Purpura, J. K., S. Cobb, **P. T. Marsh**, and M. J. Hudson, 2012: The NWS and VORTEX2: Facilitating real-time communication between research and warning operations. *Electronic Journal of Operational Meteorology*, **13**, 108–119.
5. Clark, A. J., J. Gao, **P. T. Marsh**, T. Smith, J. S. Kain, J. Correia Jr., M. Xue, and F. Kong, 2013: Tornado path length forecasts from 2010–2011 using ensemble updraft helicity. *Weather and Forecasting*, **28**, 387–407.

6. Coniglio, M. C., J. Correia Jr., **P. T. Marsh**, and F. Kong, 2013: Verification of convection-allowing WRF model forecasts of the planetary boundary layer using sounding observations. *Weather and Forecasting*, **28**, 842–862.

7. Kain, J. S., M. C. Coniglio, J. Correia Jr., A. J. Clark, **P. T. Marsh**, C. Z. Ziegler, V. Lakshmanan, S. D. Miller, S. R. Dembek, S. J. Weiss, F. Kong, M. Xue, R. A. Sobash, A. R. Dean, I. L. Jirak, and C. J. Melick, 2013: A feasibility study for probabilistic convection initiation forecasts based on explicit numerical guidance. *Bulletin of the American Meteorological Society*, **94**, 1213–1225.

8. Thompson, R. L., B. T. Smith, A. R. Dean, and **P. T. Marsh**, 2013: Spatial distributions of tornadic near-storm environments by convective mode. *Electronic Journal of Severe Storms Meteorology*, **8**, 1–22.

9. Brooks, H. E., G. W. Carbin, and **P. T. Marsh**, 2014: Increased variability of tornado occurrence in the United States. *Science*, **346**, 349–352.

10. Knupp, K., T. A. Murphy, T. A. Coleman, R. A. Wade, S. A. Mullins, C. J. Schultz, E. V. Schultz, L. Carey, A. Sherrer, E. W. McCaul Jr., B. Carcione, S. Latimer, A. Kula, K. Laws, **P. T. Marsh**, and K. Klockow, 2014: The devastating 27 April 2011 tornado outbreak: Initial scientific assessment. *Bulletin of the American Meteorological Society*, **95**, 1041–1062.

11. Smith, B. T., R. L. Thompson, A. R. Dean, and **P. T. Marsh**, 2015: Diagnosing the conditional probability of tornado damage rating using environmental and radar attributes. *Weather and Forecasting*, **30**, 914–932.

12. Blumberg, W. G., K. T. Halbert, T. A. Supinie, **P. T. Marsh**, R. L. Thompson, and J. A. Hart, 2017: SHARPpy: An open source sounding analysis toolkit for the atmospheric sciences. *Bulletin of the American Meteorological Society*, **98**, 1625–1636.

13. Nauslar, N. J., J. T. Abatzoglou, and **P. T. Marsh**, 2018: The 2017 North Bay and Southern California Fires: A Case Study. *Fire*, **1**, 1–17.

Papers in Press

1. Harrison, D. R., M. S. Elliott, I. L. Jirak, and **P. T. Marsh**, in press: Utilizing the High-Resolution Ensemble Forecast System to Produce Calibrated Probabilistic Thunderstorm Guidance. *Weather and Forecasting*.

Submitted Papers

1. Clark, A. J. et al., submitted: The 2nd Real-Time, Virtual Spring Forecasting Experiment to Advance Severe Weather Prediction. *Bulletin of the American Meteorological Society*.

2. May, R. M., K. H. Goebbert, J. E. Thielen, J. R. Leeman, M. D. Camron, Z. Bruick, E. C. Bruning, R. P. Manser, S. C. Arms, and **P. T. Marsh**, submitted: MetPy: A meteorological Python library for data analysis and visualization. *Bulletin of the American Meteorological Society*.

Refereed Conference Proceedings

1. Bass, E. J., B. Hogan, D. Rude, B. Phillips, D. Westbrook, C. League, J. Brotzge, **P. T. Marsh**, R. R., and L. Lemon, 2011: A method for investigating real-time distributed weather forecaster-emergency manager interaction. *2011 IEEE International Conference on Systems, Man, and Cybernetics*. 9–12 October 2011, Anchorage, AK, USA.

Assessments

1. Woodall, G., J. Mullikin, V. Brown, G. Carrasco, K. Harding, C. Hayes, J. Ladue, J. Levan, M. Ocana, K. Scharfenberg, C. Smallcomb, D. Sugerman, J. Trainor, D. B. Caldwell, D. C. Young, S. Romano, M. Magnus, **P. T. Marsh**, and W. Lerner, 2011: *The historic tornadoes of April 2011*. Service Assessment. National Oceanic and Atmospheric Administration's National Weather Service.

Lead Authored Informal Publications

1. **Marsh, Patrick T.**, 2000: *The makings of a 21st century weatherman*. KFSM TV-5 Almanac
2. **Marsh, Patrick T.**, 2003: *A journey into the heart of mother nature*. KFSM TV-5 Almanac

3. **Marsh, Patrick T.**, 2005: *History of tornado forecasting*. European Meteorological Society's 2005 Weather Calendar

4. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: An assessment of the severe weather environment of North America simulated by a global climate model. *Preprints, 87th Annual Meeting of the American Meteorological Society*. 13–18 January 2007, San Antonio, TX, USA.

5. **Marsh, Patrick T.**, H. E. Brooks, and D. J. Karoly, 2007: Assessment of the European severe weather environment simulated by the CCSM3. *Preprints, 4th European Conference on Severe Storms*. 10–14 September 2007, The International Centre for Theoretical Physics, Trieste, Italy.

6. **Marsh, Patrick T.**, J. S. Kain, S. J. Weiss, I. L. Jirak, R. A. Sobash, F. Kong, K. W. Thomas, and M. Xue, 2010: Investigating a fundamental component of a Warn-on-Forecast system in a collaborative real-time experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.

Select Co-Authored Informal Publications

1. Brooks, H. E., **P. T. Marsh**, A. M. Kowaleski, P. Groenemeijer, T. E. Thompson, C. S. Schwartz, C. M. Shafer, A. Kolodziej, N. Dahl, and D. Buckey, 2009: Evaluation of ESTOFEX forecasts. *Preprints, 5th European Conference on Severe Storms*. 12–16 October 2009, Landshut, Germany.

2. Jirak, I. L., S. J. Weiss, C. J. Melick, **P. T. Marsh**, J. S. Kain, A. J. Clark, M. Xue, F. Kong, and K. W. Thomas, 2010: Evaluation of the performance and distribution of hourly maximum fields from storm-scale ensemble forecasts. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.

3. Melick, C. J., I. L. Jirak, S. J. Weiss, **P. T. Marsh**, J. S. Kain, M. Xue, F. Kong, and K. W. Thomas, 2010: An environmental climatology of the CAPS storm-scale ensemble forecast system during the 2010 HWT spring experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.

4. Scharfenberg, K. A., D. L. Andra Jr., **P. T. Marsh**, K. L. Ortega, and J. Brotzge, 2010: Evaluation of ESTOFEX forecasts. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.

5. Weiss, S. J., A. J. Clark, I. L. Jirak, C. Siewert, R. A. Sobash, **P. T. Marsh**, A. R. Dean, J. S. Kain, M. C. Coniglio, M. Xue, F. Kong, K. W. Thomas, J. Du, D. R. Novak, F. E. Barthold, M. J. Bodner, J. J. Levit, C. B. Entwistle, R. S. Schneider, and T. L. Jensen, 2010: An overview of the 2010 NOAA Hazardous Weather Testbed spring forecast experiment. *Preprints, 25th American Meteorological Society Severe Local Storms Conference*. 11–14 October 2010, Denver, CO, USA.

6. Harrold, M., T. L. Jensen, B. G. Brown, S. J. Weiss, **P. T. Marsh**, M. Xue, F. Kong, A. J. Clark, K. W. Thomas, J. S. Kain, M. C. Coniglio, and R. S. Schneider, 2011: Spatial verification of convective systems during the 2010 NOAA Hazardous Weather Testbed Spring Experiment. *Preprints, 91st American Meteorological Society Annual Meeting*. 23–27 January 2011, Seattle, Washington, USA.

7. Jenson, T. L., M. Harrold, S. J. Weiss, M. Xue, **P. T. Marsh**, F. E. Barthold, J. J. Levit, F. Kong, A. J. Clark, B. G. Brown, D. R. Novak, J. S. Kain, R. S. Schneider, and M. C. Coniglio, 2011: The Developmental Testbed Center objective evaluation performed during the 2010 NOAA Hazardous Weather Testbed Spring Experiment. *Preprints, 91st American Meteorological Society Annual Meeting*. 23–27 January 2011, Seattle, Washington, USA.

8. Rogers, J. W., R. L. Thompson, and **P. T. Marsh**, 2014: Potential applications of a CONUS sounding climatology developed at the Storm Prediction Center. *Preprints, 27th Conference on Severe Local Storms*. 3–7 November 2014, Madison, Wisconsin, USA.

9. Smith, B. T., R. L. Thompson, A. R. Dean, **P. T. Marsh**, R. Wagenmaker, G. Mann, M. J. Hudson, and J. T. Ferree, 2014: Demonstrating the utility of conditional probabilities of tornado damage rating in the impact-based warning era. *Preprints, 27th Conference on Severe Local Storms*. 3–7 November 2014, Madison, Wisconsin, USA.

Acronyms

NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
NCEP	National Centers for Environmental Prediction
OAR	Oceanic & Atmospheric Research
WPO	Weather Programs Office
SPC	Storm Prediction Center
HWT	Hazardous Weather Testbed
OU	University of Oklahoma
CIMMS	Cooperative Institute for Mesoscale Meteorological Studies
CIWRO	Cooperative Institute for Severe and High-Impact Weather Research and Operations
VORTEX	Verification of the Origin of Rotation in Tornadoes Experiment