

Strategies for Teaching Severe Weather in the Classroom – An Active Learning Approach

Jonathan Ariel Forest Byrne
American Meteorological Society
Boston, Massachusetts

After the extreme weather of the previous winter, the spring of 2011 followed with record severe weather outbreaks across the lower Great Plains and the southeastern U. S. especially during the month of April. A persistent upper level trough over the nation's mid-section, coupled with an active polar jet stream, was largely responsible for this unusual pattern. This workshop will explore exciting methods to teach the physical concepts that underlie severe weather through an active learning model that emphasizes hands-on activities and making connections to real world phenomena. The core of the presentation will consist of examining both real time and historic data (including from the Spring of 2011) as well as activities such as "tornado in a bottle" and experiments in fluid dynamics using a dishpan and water.

PRESENTER'S BIO

Jonathan Byrne, a former forecaster, is currently a writer, artist and science educator. Jonathan was also a contributing author to the AMS monograph Life Cycles of Extratropical Cyclones, and has presented at numerous meteorology conferences including the Northeast Storm Conference. Jonathan holds a B. S. in physics and atmospheric science from Boston University where he completed a successful internship at WBZ TV, Boston with Chief Meteorologist Bruce Schwoegler, and an M. S. in secondary science education under the mentorship of Professor Arthur Eisenkraft, founder of Active Physics and Chemistry.

Performing a NWS Damage Survey in New York City

Gary Conte
NOAA / National Weather Service
Upton, NY

A severe weather outbreak occurred in New York City on Thursday, September 16, 2010. A line of severe thunderstorms produced 2 tornadoes and a macroburst that resulted in \$27 million dollars in property damage and 1 death. Learn about the challenges of performing a damage survey on Yom Kippur, Friday September 17; from arranging a police escort to coordinating aerial and ground surveys that ended with a significant press conference. And yes, the meteorology will also be discussed:

http://www.erh.noaa.gov/okx/SOO/case_studies/09162010.html

PRESENTER'S BIO

Gary Conte, Warning Coordination Meteorologist, will deliver this presentation. He has worked as a Meteorologist for the National Weather Service (NWS) since 1979, for more than 30 years. Since 1993, he has held the position of Warning Coordination Meteorologist at the NWS New York NY Office, located in Upton, at Brookhaven National Lab on Long Island. Gary leads and manages the local warning and service programs for more than 18 million people. This includes advance notifications to and coordination with key customers and partners of potential high impact weather events that require preparation to save lives, protect property and enhance the national economy. As the local NWS Customer Service Representative, Gary is the "main" contact for Outreach. He also serves as a liaison to the local media and works forecast shifts.

Wild Winters a Sign of a New Climate Regime? Will this be Another? How Long Range Forecasts Benefit Commercial Users

Joe D'Aleo
Icecap.us & WeatherBell Analytics, LLC
New York City, NY

Joe Bastardi
WeatherBell Analytics, LLC
New York City, NY

Joe and Joe will present a recap on the recent wild winters (and briefly summers) and the outlook for the upcoming winter and decade. They will talk about the global factors that drive the weather and climate. They will also address how these forecasts on all time scales can be used by the agriculture, energy, insurance and retail markets.

PRESENTERS' BIOS

Joseph D'Aleo is a partner at WeatherBell and has been with the company since its inception. Mr. D'Aleo has a deep understanding of global oscillations and historical weather patterns. He uses an advanced statistical approach in applying this knowledge to weather and climate forecasting, specifically for the agriculture industry.

Mr. D'Aleo has over 35 years experience in professional meteorology. He was the first Director of Meteorology at the The Weather Channel. Mr. D'Aleo was Chief Meteorologist at WSI Corporation where he spent 17 years and created "Dr. Dewpoint" for WSI's popular Intellicast.com web site. He is a former college professor of Meteorology at Lyndon State College. He has authored a book and peer reviewed papers on how ENSO, when combined with other atmospheric and oceanic phenomena, has made skillful seasonal forecasts possible and the roles cycles in the sun and oceans have played in climate change.

Mr. D'Aleo is a Certified Consultant Meteorologist and was elected a Fellow of the American Meteorological Society (AMS). He has served as a member and chairman of the AMS Committee on Weather Analysis and Forecasting and has co-chaired national conferences for both the AMS and the National Weather Association. He is a graduate of the University of Wisconsin and holds a Bachelors and Masters of Science and did his doctoral studies at NYU.

Formerly the Chief Long Range Forecaster at Accuweather, **Joe Bastardi** is an institution in the science of weather prediction. Many companies across a multitude of industries, from energy to retail, have profited from his forecasts. His exceptional skills are rooted in a comprehensive understanding of global oscillations and in-depth analysis of historical weather patterns. Mr. Bastardi's analog approach, which finds similarities between current and historical weather patterns, allows him to make an accurate forecast, sometimes in defiance of computer model consensus.

His reputation for making bold and accurate forecasts has landed him on major television programs including Fox News Live, ABC World News, The O'Reilly Factor, The Colbert Report, CBS' The Early Show, Imus in the Morning, and several others.

Mr. Bastardi graduated from Pennsylvania State University and holds a Bachelor's Degree in Meteorology.

The 2011 Super Outbreak: A Huntsville Perspective and Implications for Future Events

Chris Darden
NOAA / National Weather Service
Huntsville, Alabama

On April 27, 2011, a tornado outbreak unprecedented in modern times occurred across a large portion of the Deep South and Tennessee Valley regions. By the time the event was over, April 27th had become the deadliest tornado day in the United States since the infamous Tri-State Outbreak of March 18, 1925. For this presentation, I will focus on the events as they unfolded across the Weather Forecast Office (WFO) Huntsville (HUN), AL County Warning Area (CWA). WFO Huntsville covers 11 counties in north Alabama and 3 counties in southern Tennessee.

An analysis of the forecasts and outlooks leading up to the event, along with a review of the tornado climatology for the Huntsville region will be conducted. However, much of the time will be spent covering the outbreak itself from the planning and decision support phase, to the critical warning decision making process, to the days following the outbreak. As the events of April 27th unfolded, three separate and very different episodes of severe weather impacted the region. Each of these “episodes” produced tornadoes, and the timing and “back to back” nature of these events complicated many facets of community planning and decision making such as dismissal policies for schools and businesses. To put some context into how these separate severe weather episodes impacted the region from the pre-dawn hours until late in the evening on the 27th, WFO HUN issued a total of 92 tornado warnings with an average lead time in excess of 20 minutes. In addition, power outages and infrastructure issues related to the early morning and midday storms played a key role in how the public received warnings for the afternoon severe weather and also impacted their decision making.

We will explore how the use of enhanced wording in warnings and statements, communications with emergency managers and media before and during the event, the influx of reports via our ham radio and spotter network along with real-time video of the tornadoes occurring led to optimal situational awareness and a constant flow of accurate and up to date information. An overview of the operational staff planning and strategy, along with a detailed analysis of the strong and violent tornadoes in the HUN CWA will be provided. The Hackleburg, Alabama to Huntland, Tennessee violent EF-5 was on the ground for 132 miles and, unfortunately, killed at least 70 people. This tornado will go down as the deadliest tornado of the entire outbreak and the deadliest single tornado to ever strike Alabama. However, it is important to note there were an additional 5 destructive EF-4 rated tornadoes that day across the area with at least 9 tornadoes having a path length of over 20 miles. In all, 31 tornadoes have been confirmed to date in the CWA from April 27th.

In the days and weeks that followed the outbreak, WFO Huntsville forecasters, along with the assistance of researchers and graduates students from University of Alabama in Huntsville, spent a tremendous amount of resources conducting storm surveys and assessments, handling media requests, and just being there for the community in their time of need. Much of this critical survey period following the outbreak was conducted “literally in the dark” as the majority of north Alabama was without power for 5 to 7 days. An overview of the survey process will be conducted including strategies employed to cover many different damage paths given the logistical problems, lessons learned for future events, and unique stories discovered along the way. I will conclude with some personal reflections on the event and how it has impacted the office, our staff, and our community.

PRESENTER’S BIO

Chris Darden has been meteorologist-in-charge of the National Weather Service office in Huntsville since May, 2011. Prior to being selected as the MIC, Chris served as the office’s Science and Operations Officer for 7 years. Chris first came to the Huntsville office in the spring of 2002 after being selected as both senior forecaster and NASA liaison forecaster.

Prior to arriving in Huntsville, Chris served as a forecaster at both the Memphis, TN and Lubbock, TX offices and as a meteorological intern at Nashville, TN and Burlington, VT. Chris began his NWS career in the summer of 1994 as a student trainee in Taunton, MA.

Chris is a current member of the American Meteorological Society and a member of the AMS Atmospheric Electricity Committee. Professional awards include:

2010: Co-recipient of the AMS Francis W. Reichelderfer Award

2010: NASA/NWS Group Achievement Award for Technology Transfer

2004: NASA/NWS Group Achievement Award for Technology Transfer

2003: Co-recipient National Isaac Cline Award in Meteorology

Chris resides in Madison, AL, with his wife Kay and 10 year old daughter Chloe.

Winter Storms of Dec. 26-27,2010 and Jan. 12, 2011

Joseph Dellicarpini
NOAA / National Weather Service
Taunton, MA

The winter of 2010-2011 featured above average snowfall in southern New England and will be remembered for a number of significant snowstorms within a six week period beginning just after Christmas. Two of these storms will be discussed, not only because of their impact, but due to differences in their predictability.

The first storm on December 26-27, 2010 brought heavy snow to much of the East Coast. Winds gusted to over 60 mph across parts of southern New England where near blizzard conditions were observed. This was a high impact storm which disrupted air, rail, and road travel at the end of the Christmas weekend. Airlines canceled over 300 flights in the busy Northeast Corridor. Despite being a significant snowstorm, differences in computer model forecasts led to low confidence in snowfall totals until almost 24 hours before the snow began. Another winter storm followed on January 12, 2011 and dumped up to two feet of snow in a 24 hour period. Strong winds combined with the heavy snow along the coast and brought down trees and wires, resulting in over 100,000 homes without power. Logan International Airport closed for several hours during the storm. In contrast to the December snowstorm, forecasters had a much higher level of confidence due to more consistent forecasts from computer models. This presentation will briefly review both storms, including the predictability issues associated with each of them.

PRESENTER'S BIO

Joseph Dellicarpini is the Science and Operations Officer at the National Weather Service in Taunton, MA. He is a native of the New York City area and received a Bachelor of Science degree in Meteorology from the State University of New York at Oswego.

His career with the National Weather Service began as a Student Trainee in Boston before going to the Binghamton, NY Weather Forecast Office (WFO) as a Meteorologist Intern. He returned to southern New England in 1996 as a Hydrologic Forecaster at the Northeast River Forecast Center in Taunton, before heading back to the WFO as both a General Forecaster and Senior Forecaster. One of Joe's interests includes aviation meteorology. He is also involved with several regional and national teams related to aviation forecasting, and assists with training at the NWS Center Weather Service Unit at the Boston Air Route Traffic Control Center in Nashua, NH. Joe and his wife Kelly have two children, Jessica and Jason. They live in Norwood, MA.

The Winter Storms of 2010 and 2011, From the Viewpoint of the Massachusetts Emergency Management Agency

Kurt N. Schwartz
Massachusetts Emergency Management Agency
Framingham, Massachusetts

The major winter storms of December 2010 and January 2011 will be discussed with a focus on impacts dealt with by the Massachusetts Emergency Management Agency.

PRESENTER'S BIO

Kurt N. Schwartz serves as the Undersecretary for Homeland Security and Emergency Management in the Executive Office of Public Safety and Security (EOPSS). Mr. Schwartz, who was first appointed as an Undersecretary by Governor Patrick in 2007, provides strategic leadership to the Massachusetts National Guard, the Department of Fire Services, the Commonwealth Fusion Center, and EOPSS's Homeland Security Division. Mr. Schwartz also serves as the Director of the Massachusetts Emergency Management Agency where he oversees a staff of 80 people and an \$8M operating budget. Mr. Schwartz also serves as the state's Homeland Security Advisor and member of the Governors Homeland Security Advisors Council under the umbrella of the National Governors Association.

Prior to serving as the Undersecretary for Homeland Security and Emergency Management, Mr. Schwartz served in the Patrick administration as the Undersecretary for Law Enforcement and Fire Services, where he provided strategic leadership to the Massachusetts State Police, Department of Fire Services, Office of Grants & Research, Massachusetts Emergency Management Agency, Municipal Police Training Committee and Department of Public Safety.

Mr. Schwartz has also worked as a full-time police officer in Massachusetts, and as an emergency medical technician. He is a graduate of Boston College Law School and Wesleyan University.

The Winter Storms of 2010/2011: Transportation Impacts

Jeffrey B. Mullan
Former Secretary & CEO, Massachusetts Dept. of Transportation
Boston, MA

The major winter storms of December 2010 and January 2011 will be discussed with a focus on the impacts dealt with by the Massachusetts Department of Transportation.

PRESENTER'S BIO

Jeff Mullan is the former Secretary and CEO of the Massachusetts Department of Transportation (MassDOT) which was launched on November 1, 2009. Appointed by Governor Deval Patrick, Jeff was a key architect of the reform plan to create MassDOT, a new, unified transportation organization focused on customer service and safety. During his tenure as Secretary, Jeff brought a business-like approach to state transportation, developing its first strategic plan, reducing costs, setting measurable performance objectives, and working to improve workplace culture.

Jeff has been involved in Massachusetts transportation issues for more than 20 years. Prior to being named Secretary, he served as the Executive Director of the former Massachusetts Turnpike Authority, and as Undersecretary, Chief Operating Officer, and General Counsel at the former Executive Office of Transportation and Public Works (EOT). Both of those organizations are now a part of MassDOT.

Currently, Jeff works as an attorney at Foley Hoag LLP. Prior to 2007, he worked at Foley Hoag LLP for 14 years, where he was a partner and the co-chair of the firm's administrative law practice. Before joining Foley Hoag, Mullan worked at the former Massachusetts Department of Public Works as Right of Way Manager on the Central Artery/Tunnel Project. He is a Worcester native and now lives in Milton.

How Did the December 26 -27, 2010 Nor'easter Measure Up?

Joseph E. Pelczarski
Massachusetts Office of Coastal Zone Management (CZM)
Executive Office of Energy and Environmental Affairs (EEA)
Boston, Massachusetts

Tidal heights, storm surge, wave heights, wind strength and direction, and the damages of the December 26-27 Nor'easter will be compared to past storms affecting the east facing coast of Massachusetts.

PRESENTER'S BIO

Joe Pelczarski is the CZM and EEA Emergency Management Liaison to the Massachusetts Emergency Management Agency. Joe has been in the position since 1991, coordinating the environmental agencies' response to notable storms like Hurricane Bob and the No-Name Nor'easter. Over the years, Joe has been activated to the State Emergency Operations Center for many nor'easters, several flooding events, a few hurricanes, Y2K, 9/11, the anthrax scare, and the red tide outbreak in 2005.

Media Blizzard Coverage

Matt Noyes
New England Cable News (NECN)
Newton, Massachusetts

In an age of 24-hour news cycles – and at New England Cable News, a 24-hour regional news station that covers weather-centric New England – weather rules when a storm bears down. Some may cry hype; others profess to be disgusted by the coverage – but the bottom line is that weather brings viewers. Continuous coverage of weather events, however, doesn't have to be all about hype and cliches – rather, it can be an opportunity for scientific analysis and discussion...or at least in-depth weather discussion...IF you have producers and a management who allow it. Thankfully, at NECN, we have that liberty!

PRESENTER'S BIO

Matt Noyes is the primetime weeknight meteorologist and Executive Producer of Meteorology for New England Cable News (NECN), the nation's largest and most honored 24-hour regional news network, broadcasting to nearly four million households in all six New England states. He began as the weekend meteorologist at NECN in 2002, and served as weekday morning meteorologist from 2004 until 2010.

Matt holds a Bachelor of Science degree in Meteorology from Cornell University, and is a member of both the American Meteorological Society and the National Weather Association. Matt enjoys making the weather interesting and accessible to all, speaking at various weather conferences and keeps the network's weather team on the cutting edge of forecast and presentation technology. Noyes has traveled across the nation serving as a consultant for TV weather graphics, served as sole media representative on a national panel for the Climate Prediction Center and has worked closely with the Northeast River Forecast Center in evaluation of operational forecast products.

In addition to his forecasting experience, Noyes was an instructor of Introductory Meteorology at the college level in Binghamton, NY, and has traveled across New England to bring the science of meteorology into school classrooms, visiting 10,000 school children per year, and receiving a commendation from the Massachusetts State Senate for his educational efforts with children.

Matt's community dedication also earned him the Massachusetts State Police Public Service Award for assisting the organization in preparation for a major hurricane strike to New England, and he provided street level weather forecasting and analysis to the State Police Integrated Command Center during the Democratic National Convention in Boston in 2004.

Noyes also conducts private forecasting for aviators, providing forecasts that have led to national victories in races requiring no use of instrumentation during flight, and to private mariners.

Before joining the NECN family, Matt was the Morning Meteorologist at NewsChannel 34 in Binghamton, NY, and a meteorologist at NewsChannel 9 in Syracuse, NY.

Extreme Weather on Top of New England

Jeff DeRosa
Mount Washington Observatory
Mount Washington, New Hampshire

Few places on Earth experience the combination of high winds, heavy icing and extreme cold as frequently as the summit of New England's highest mountain. Remarkably, since 1932, there has been one organization responsible for recording these often record-breaking conditions: the Mount Washington Observatory. Weather observation, however, is not the Observatory's only mission – a mission that also includes education. As a result, in this talk Jeff will discuss the work of the Observatory, how they function in such extreme conditions, and the global impact of the Observatory's important work.

PRESENTER'S BIO

Jeff DeRosa is the Outreach Coordinator for the Mount Washington Observatory; a private, non-profit scientific and educational institution responsible for observing meteorological conditions at the "Home of the World's Worst Weather."

Prior to serving as the Outreach Coordinator, Jeff spent three years at the organization's mountaintop weather observatory where he frequently recorded winds in excess of 100 MPH and a temperature as cold as -45 °F. Deciding this was not cold enough, Jeff left the organization to serve as the Chief Weather Observer for the United States Antarctic Program's Amundsen-Scott South Pole Station. During nearly two years at this location, Jeff saw the thermometer dip to -108 °F (Wind Chill = -160 °F).

After Antarctica, Jeff served as a fill-in weather broadcaster for WGME-TV in Portland, Maine and then departed for the United Kingdom. While in England, Jeff attended Newcastle University and earned an M.A. in International Relations with a focus on the politics of climate change and geoengineering.

A native of Bath, Maine, Jeff now resides in Conway, New Hampshire.

How Weather Works: FOX25 Bringing Weather Into the Classroom

Cindy Fitzgibbon and A.J. Burnett
FOX25 TV
Dedham, Massachusetts

The science of weather can be a difficult topic to grasp for teachers and students alike. Weather/Meteorology appears on MCAS exams beginning in Grade 5 and basic concepts of weather can be drawn upon in understanding more advanced scientific concepts in later years. FOX25 Meteorologists Cindy Fitzgibbon and A.J. Burnett will share some fun and interactive experiments that can be used in the classroom to understand basic weather principles. They will also highlight some of the valuable Internet resources for gathering weather data and observations, as well as some of the various computer models used in forecasting.

PRESENTER'S BIOS

Cindy Fitzgibbon is a four-time Emmy nominated meteorologist for FOX25 Morning News in Boston, and has been since the show debuted back in 2003. Cindy is celebrating her sixteenth year of broadcast meteorology! Cindy originally joined FOX25 as weekend meteorologist in February 2002.

A native New Englander, Cindy loves being able to forecast the weather where she grew up, and where her passion for the science began. Before coming to Boston, she was sharpening her tropical forecasting skills at WBBH in Fort Myers, FL. Prior to that, Cindy spent more than four years as morning meteorologist at WPTZ in Plattsburgh, NY/Burlington, VT. She got her start in broadcasting at KXMB-TV in Bismarck, ND- a long, long way from home!

Cindy earned her B.S. in Meteorology from Lyndon State College in Vermont; a small school nationally recognized for its meteorology program. She holds the AMS Seal of Approval for excellence in television weather casting, and is both a member of the AMS (American Meteorological Society) and the NWA (National Weather Association).

During the school year Cindy reaches out to hundreds of school children each month, most recently using SKYPE technology to teach weather in the classroom with her weekly school visits. When she's not talking about the weather, Cindy loves spending time with 'her boys' - her husband and two sons, ages 5 and 3.

A.J. Burnett has been a meteorologist with FOX25 since 2000, joining the team officially in 2004. You can catch A.J. weekends on the FOX25 News at 10 (and 11 on Sundays). You will also see him frequently appearing during the week in the mornings or evenings guiding viewers through the weather forecast. In addition to weather, A.J. also handles traffic reports and works on general assignments, focused mainly on environmental and scientific reports.

A.J.'s interest in weather began at the ripe age of three, while watching the late Don Kent from his childhood home on the Cape. After graduating from Rutgers University with a degree in Meteorology, A.J. spent two years with Weather Services Corporation, presenting forecasts for local stations, including WRKO, Mix 104.1, Classical 99.5, and WMVY, as well as several stations scattered across the country and the Caribbean. He then moved to WSI, Corp., another private weather company now located in Andover. There, A.J. prepared forecasts and graphics for television clients in the U.S., Canada, Brazil, and Peru. He also appeared on FOX News Channel, as well as several local Time Warner 24-hour weather channels. While at WSI, A.J. began freelancing at FOX25 in May of 2000.

A.J. holds the American Meteorological Society's Seal of Approval and works hard to maintain that status through continuing professional development.

Away from the office, A.J. works closely with the Alzheimer's Association. An "Alzheimer's Champion," he helps raise awareness about the disease, is the Honorary Chair for the annual 'Make the Link' Golf Tournament, participates in the annual Memory Ride, moderates the Annual Awards Ceremony, and sits on the Board of Directors for the MA/NH Chapter. He volunteers his time to honor his grandmothers, both of whom were afflicted with the disease.

In his free time, A.J. can be found trying to make great photos from behind the lens of his camera (emphasize: trying), biking, or attempting to get his lawn to stay green. A.J., his wife Carrie, and their beautiful baby daughter live on the North Shore.

Basics of Dual Polarization Doppler Radar

Hayden Frank
NOAA / National Weather Service
Taunton, MA

A Dual Polarization (Dual Pol) radar is scheduled to be installed at the National Weather Service's Taunton radar site sometime next year. Hayden will discuss the many advantages that Dual-Pol technology will offer. Some of these include: a better depiction of the rain-snow line in winter storms; differentiating hail stones from rain drops; improved precipitation estimation; and even debris inside tornadoes.

PRESENTER'S BIO

Hayden Frank is a senior meteorologist with the National Weather Service in Taunton, MA. He is the Doppler Radar and Fire Weather Focal Points at the office. He also works on various other programs, including StormReady, research, and many different outreach projects.

Hayden was born in Philadelphia, PA and always had a love for meteorology from a very young age. He graduated from the Pennsylvania State University in 1998 with a Bachelor's Degree in Meteorology. After graduation, Hayden accepted a temporary job with the National Weather Service in Tulsa, OK. Six months later, he became a permanent National Weather Service employee with the office in Wichita, KS before transferring to Taunton in 2003. Hayden loves all kinds of weather, but always had a special interest in snowstorms, so living in New England is a perfect fit for him. In November 2008, he married Sara Vecchio Frank in Cassenovia, New York. The couple resides happily in Brookline, Massachusetts and had their first child last summer.

Delivering Drought Information Services to the Northeast and the World

Michael J. Hayes
Director, National Drought Mitigation Center
Lincoln, Nebraska

As a natural hazard, droughts affect more people within the United States and around the world than any other hazard. The National Drought Mitigation Center (NDMC), established at the University of Nebraska-Lincoln in 1995, has worked to lessen societal vulnerability to drought through a risk-based management approach.

To accomplish this goal, the NDMC conducts research on drought risk management; provides outreach through interactions with local, state, tribal, federal, and international organizations; and collaborates with and provides training for international scientists and officials. The NDMC is also involved within the National Integrated Drought Information System (NIDIS), which is an effort led by the National Oceanic and Atmospheric Administration (NOAA) to coordinate all drought-related activities, particularly at a federal-level.

Based on its activities over the years, this presentation will highlight a rich collection of lessons learned by the NDMC related to delivering drought information services across the United States and around the world.

PRESENTER'S BIO

Dr. Michael Hayes became the Director for the National Drought Mitigation Center in August 2007 and has worked at the NDMC since 1995. The NDMC now has 21 faculty, staff, and visiting scientists working on local, tribal, state, national, and international drought-, climate-, and water-related issues. He is currently a co-chair on the National Integrated Drought Information System's Program Implementation Team. Dr. Hayes received a Bachelors Degree in Meteorology from the University of Wisconsin-Madison, and his Masters and Doctoral Degrees in Atmospheric Sciences from the University of Missouri-Columbia.

Space Weather Storms: Responding to Global Concerns of a 'Space Katrina'

Bill Murtagh
NOAA Space Weather Prediction Center
Boulder, Colorado

The Space Weather Prediction Center (SWPC), one of the nine NWS National Centers for Environmental Prediction, is the nation's official source for space weather alerts and warnings. The rapid advances in the technology sector and our fast growing dependency on space-based systems have resulted in an ever-increasing vulnerability to hazardous space weather. NWS efforts to support aviation, emergency response efforts, and electric power grids, now extend to space and solar storms. Other key sectors impacted by space weather include satellite communications, and GPS applications, which pervade modern society. The concerns are growing as we begin our ascent into the next solar maximum, expected to peak in 2013.

This presentation will address the different types of space weather events and how they impact our technological infrastructure. Special emphasis will be given to the electric power grid vulnerability and the potentially catastrophic consequences of an extreme geomagnetic storm.

PRESENTER'S BIO

Bill Murtagh is the Program Coordinator for the National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center (SWPC) in Boulder, Colorado. The SWPC is the official source for space weather forecast and warning services in the United States. He is also the principal point of contact for NOAA's space weather customer and stakeholder activities. Bill works closely with private industry, national and international agencies, emergency managers, and government officials to ensure operational impacts of space weather are minimized through appropriate response and adequate preparedness plans.

Before joining NOAA, Bill was a meteorologist and space weather forecaster in the U.S. Air Force. Bill transferred to the SWPC in 1997 as a space weather forecaster and liaison between NOAA and the U.S. Air Force. He joined NOAA in 2003 after retiring from the Air Force with 23 years of service.

Bill is a regular guest speaker at universities, government agencies, and national and international conferences, and recently provided presentations in the House of Representatives in Washington D.C. and at the White House. He has provided numerous interviews to major media outlets in the U.S. and around the world, and was recently featured in the IMAX movie, *3D Sun*, which was shown in the National Air and Space Museum in Washington D.C. and in IMAX and 3D theaters around the world.

The Challenge of Expressing Forecast Uncertainty for a Winter Storm in Densely Populated Southern New England

Frank Nocera and Michael Ekster
NOAA / National Weather Service
Taunton, MA

National Weather Service (NWS) forecast products such as the Hazardous Weather Outlook (HWO), Area Forecast Discussion (AFD), and Winter Storm Warnings and Watches contain probabilistic and forecaster confidence information. NWS' conference calls to emergency managers and other state and local decision makers also utilize this type of information. The purpose of providing uncertainty information is to improve decision-making, help in the assessment of risk, and reduction and loss of life and property damage, while enhancing the national and local economy. The winter storm of 10 February 2010 will be an example of the challenge the NWS and its partners (including the general public) face in expressing forecast uncertainty and associated decision making – specifically, large snowfall gradients across large population centers.

Multiple model data sets were used in the forecast process leading up to this winter storm, including probabilistic projections of snowfall amounts and precipitation type from the SREF model. These data supported the idea that the poleward edge of the heavy precipitation shield, along with the rain-snow line, would likely set up across Southern New England. In addition, deterministic snowfall forecasts from NWS Taunton and HPC conveyed a large gradient in snowfall from north to south, slicing through the densely populated Boston to Providence to Hartford corridor.

While our deterministic snowfall prediction was wrong for much of the region, the uncertainty of precipitation type and amounts were clearly documented in NWS Taunton's products days in advance and including the day of the event. This uncertainty was also communicated via conference calls to emergency managers and other state and local decision makers. However the public backlash was large and intense with a high level of outrage toward both private and public meteorologists, despite NWS Taunton providing well documented probabilistic and forecaster confidence information throughout its products. There comes a point close to an event where conveying uncertainty is not good enough, i.e., decision makers want a concrete answer. This was a challenge in this case since we were highly uncertain in the outcome right up until the event started, but still had to issue a more deterministic snowfall forecast that, for the most part, was based on a rather strong model QPF consensus -- but ultimately wrong.

PRESENTER'S BIO

Frank Nocera is a Senior Forecaster at the NWS Forecast Office in Taunton, MA. His primary duties include managing the Office Weather Event Review program and the Marine Forecast program. He received a Bachelor of Science in Meteorology from the State University of New York at Albany in 1992. He was born in Brooklyn, NY and raised in the nearby northern suburbs (Mahopac, NY) before leaving New York in 1998 for the NWS office in Taunton, MA. Frank has conducted research on a variety of topics, including: tidal flooding from extratropical cyclones, non-convective high wind events, severe weather, rip currents, marine verification and precipitation distribution in mid-latitude cyclones. Frank also serves as an instructor since 2009 at the COMET/MSU Winter Weather course in Boulder, CO. Frank resides in Cumberland, RI with his wife and three children. In his spare time he enjoys coaching youth sports, playing softball, golf and running.

Forming Meaningful, Interactive Relationships With the Media

Matt Noyes
New England Cable News (NECN)
Newton, MA

Students, teachers, professionals, and amateur weather observers have an opportunity to contribute and be publicly recognized like never before. For over a decade, I've been visiting students in classrooms across the Northeast – first in Upstate New York, and for the past ten years, here in New England. During that time, and visiting approximately 10,000 students per year, technology has afforded a wonderful new opportunity for students and teachers alike – the ability to share weather observations and reports immediately and directly with your television meteorologist.

Until recently, a telephone call or email was the only way to relay weather observations to your favorite meteorologist. Thanks to the rapid expansion of smartphones, the popularity of social networking sites like Twitter and Facebook, video sharing sites like YouTube and Vimeo, and the easy access to digital cameras and cameraphones, it's never been easier to share exactly what you're seeing, as you're seeing it. This opens a broad and exciting new door for schools and professionals, alike, and affords a much more exciting, diverse, affordable and interactive opportunity than simply having the reported conditions on your school weather instrumentation mentioned on a local newscast.

Imagine a world where the students in your class work collaboratively to gather images or video and instantly have them broadcast to nearly four million homes in six New England states – the time has come! Together, we'll examine the most effective ways to gather observations, images and video, send them to NECN, have them featured on-air – in some cases in nearly real-time - and become regular contributors to the weather analysis and operational forecast process, while gaining tremendous exposure for your school. So many folks I speak with worry that this process may be daunting or technologically challenging – it's much easier than you think – depending upon what technology you have, I'll either have you set up, or at least knowing exactly what you need to get started, by the end of this session!

PRESENTER'S BIO

Matt Noyes is the primetime weeknight meteorologist and Executive Producer of Meteorology for New England Cable News (NECN), the nation's largest and most honored 24-hour regional news network, broadcasting to nearly four million households in all six New England states. He began as the weekend meteorologist at NECN in 2002, and served as weekday morning meteorologist from 2004 until 2010.

Matt holds a Bachelor of Science degree in Meteorology from Cornell University, and is a member of both the American Meteorological Society and the National Weather Association. Matt enjoys making the weather interesting and accessible to all, speaking at various weather conferences and keeps the network's weather team on the cutting edge of forecast and presentation technology. Noyes has traveled across the nation

serving as a consultant for TV weather graphics, served as sole media representative on a national panel for the Climate Prediction Center and has worked closely with the Northeast River Forecast Center in evaluation of operational forecast products.

In addition to his forecasting experience, Noyes was an instructor of Introductory Meteorology at the college level in Binghamton, NY, and has traveled across New England to bring the science of meteorology into school classrooms, visiting 10,000 school children per year, and receiving a commendation from the Massachusetts State Senate for his educational efforts with children.

Matt's community dedication also earned him the Massachusetts State Police Public Service Award for assisting the organization in preparation for a major hurricane strike to New England, and he provided street level weather forecasting and analysis to the State Police Integrated Command Center during the Democratic National Convention in Boston in 2004.

Noyes also conducts private forecasting for aviators, providing forecasts that have led to national victories in races requiring no use of instrumentation during flight, and to private mariners.

Before joining the NECN family, Matt was the Morning Meteorologist at NewsChannel 34 in Binghamton, NY, and a meteorologist at NewsChannel 9 in Syracuse, NY.

Capturing the Wind Requires Accurate Wind Forecasting

Mark Rodgers
Cape Wind
Boston, Massachusetts

Wind measurement and forecasting is crucially important for the wind energy industry. As Cape Wind's pioneering offshore wind project in Nantucket Sound unfolds, wind measurements are being constantly recorded. Cape Wind Communications Director Mark Rodgers will discuss the importance of accurate wind forecasting to the offshore wind industry in terms of site selection, site accessibility and improving the ability of wind power to contribute to electric grid reliability.

PRESENTER'S BIO

Mark Rodgers manages Cape Wind's media relations and generates Cape Wind's communications content. He has delivered over 300 public presentations on the project to a variety of stakeholder groups over the past 9 years. He is also responsible for managing Cape Wind's relationships with environmental, labor, health, and trade stakeholders to maximize their involvement. Previously, Mr. Rodgers was a Founder and Director of HealthLink, which initiated successful citizen action campaigns to reduce sources of pollution. Mr. Rodgers received a degree in Political Science from The George Washington University.

Choosing Weather Instruments for Home and School

Ridge White
President, Robert E. White Instruments, Inc.
Medfield, MA

Display: A wide sample of products for home or school, including

- Digital weather stations
- Analog weather stations
- Wind instruments, permanent and hand-held
- Barometers and barographs
- Thermometers, hygrometers and sling psychrometers
- Rain gauges

Presentation: a show-and-tell about major instrument categories, with attention paid to cost vs. benefits, and ease vs. difficulty of installation and operation.

- The advantages and disadvantages of digital vs. analog stations
- Wind instruments – many choices, large price range, mounting considerations
- Barometers and barographs – the importance of pressure; testing your barometer
- Thermometers – digital and analog; where to mount them
- Hygrometers and sling psychrometers – why humidity is important; how they work
- Rain gauges – tipping bucket and simple collectors

PRESENTER'S BIO

After 11 years of teaching 11th and 12th grade English in preparatory schools, in 1978 Ridge joined his father in his firm, Robert E. White Instruments, Inc. on Commercial Wharf in Boston. He has been with the family firm for 33 years, and since 1990 has been its president. His family has been involved in manufacturing, selling and servicing weather instruments since the 1950s. An avid sailor and motor boater, he is also a teacher of navigation with the U.S. Power Squadron. They do most of their boating between Buzzards Bay and Martha's Vineyard. He and his wife Linda publish the ELDRIDGE TIDE AND PILOT BOOK, which has appeared every year since 1875.

Robert E. White Instruments, Inc.

In the early years, the 1960s and 1970s, the business was split evenly between selling traditional marine instruments such as compasses, binoculars, and sextants, and selling weather instruments for homes, schools, and industry. Almost no one in those years concentrated on weather instruments, so the company became a widely recognized source for all kinds of wind and weather instruments and for advice about them. Most of Boston's meteorologists visited the shop or ordered from it. As time went by, weather instruments became the strongest sellers. The growth of digital instruments and comprehensive stations began slowly enough but eventually expanded rapidly, so that by the late 1980s and 1990s the proliferation of digital instruments, with mass production and low prices, made weather instruments a mass-market category. Competition appeared everywhere with the explosion of the internet. Robert E. White Instruments began to specialize and make itself known for hard-to-find instruments and higher quality.

Company contact information:

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