RADAR CHARACTERISTICS OF THE JULY 2008 NEW HAMPSHIRE TORNADO: PRECURSOR AND TORNADOGENESIS STAGES

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On 24 July 2008, a long-lived tornado raced across eastern New Hampshire. The 52 mi (84 km) path was the longest continuous tornado track ever recorded in New England. This path length eclipsed other well known historical New England storms such as the Worcester, Great Barrington and Stockbridge tornadoes. One death occurred and hundreds of homes were damaged by the rain wrapped EF-2 (Enhanced Fujita Scale) tornado. Detailed storm track information and storm damage photos can be viewed at http://www.erh.noaa.gov/er/gyx/.

An anomalously vigorous (three standard deviations from the atmospheric mean), cut-off, upper level low pressure system and strong low level winds provided favorable dynamics to produce the tornadic storm. Tornadogenesis occurred despite modest atmospheric instability and limited cloud to ground lightning. Rather, a series of storm scale interactions likely enhanced the evolving tornadic cell, which was evident in radar animations.

High resolution radar products from the National Weather Service WSR-88Ds in Brookhaven, New York, Taunton, Massachusetts and Gray, Maine were collected to further examine storm morphology. The imagery revealed two unique stages to the convective lifecycle of the storm, which will be defined as a “precursor stage” and a “tornadogenesis stage”.

The “precursor stage” was associated with storm scale dynamics that preceded the development of the tornadic cell. This period was initially characterized by a pulse of inbound velocities approaching Long Island, New York early on 24 July. Subtle, but distinct cell mergers occurred as this storm entered Connecticut. Radar reflectivity images showed this enhanced convection triggered the formation of a bowing segment which propagated to the right of the mean atmospheric flow.

During the formative “tornadogenesis stage,” the convective cell which eventually produced the tornado evolved. A circulation formed near the apex of the bow echo. Rotation increased as the cell intersected the junction of the Merrimack Valley and surrounding hill towns and continued to fluctuate as the storm traversed northeast at 40 kts across complex terrain. A final cell merger was then coincident with the development of a second bow echo and a rapid increase in low-level shear. A tornado touchdown soon followed.

Radar animations detailing the storm morphology which produced the long-lived tornado will be presented. A conceptual diagram will be displayed to demonstrate that complex and discrete storm scale interactions accompanied the organized convection and tornadogenesis.

From WBZ – Boston, MA

On July 24th, 2008, a severe storm cut a path of destruction through central New Hampshire. The damage was so extensive that most assumed a tornado must be to blame, yet no one reported seeing a circulation. Although survivors recalled the loud roar of a train, no one saw a tornado. Perhaps only straight line winds were at fault? Or could it have been that New England's variable topography, thickly forested landscape, and heavy rains during the storm had hidden the truth? There was a mystery to solve.

On the morning of July 25th, I joined NWS (Gray, ME) Warning Coordination Meteorologist John Jensenius at the start of his field survey to determine the nature of the damaging winds. This story is an exclusive look at John's analysis and the initial discovery that, in fact, a tornado had a hand in all of the destruction.

PRESENTERS' BIOS

John Cannon grew up in Maine and upstate New York. He received a Bachelor of Science in Meteorology from the State University of New York at Oswego, where he enjoyed researching lake effect snowstorms. He is currently a senior forecaster at the National Weather Service in Gray, Maine and has also worked at the NWS Albany office. John can be reached by phone at (207) 688-3216 or by email at **john.w.cannon@noaa.gov**

Mish Michaels has worked as a meteorologist in Boston since 1992, first for WHDH, then for a show called Atmospheres on The Weather Channel, and then for WBZ. Mish has a BS in Meteorology from Cornell University and a MEd from Harvard. She is a contributor to Weatherwise magazine and published an article with John Jensenius in the current September/October issue titled--"CSI New Hampshire: Hunting for Tornado Clues."

Dr. Bill Minsinger has recently retired from a 26 year practice of Orthopedic surgery. He remains as President of the Blue Hill Observatory and Science Center, having held the position since 1980. He has long been interested in the weather and has authored 5 books on New England hurricanes/floods as well as numerous articles on historic weather events and the history of the Blue Hill Observatory. He has been instrumental in establishing the non-profit corporation which now runs all aspects of research, teaching, and programming at Blue Hill Observatory. This includes the initiation of the award-winning Women in Natural Science (WINS) program which is now in its 9th year at Blue Hill. This program serves underprivileged, inner-city girls, ages 12-17. He also led the campaign to designate Blue Hill as a National Historic Landmark. It was declared as such in 1989. Besides weather, his interests include Civil War history with an emphasis on Vermont's participation in the Civil War, Vermont History, railroading, and Civil War re-enacting.