

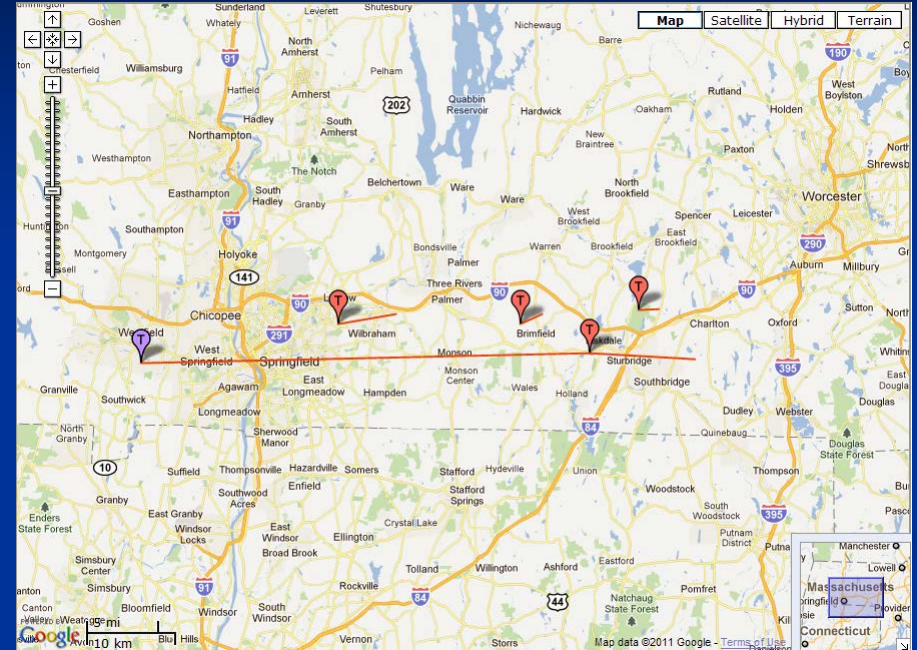
The Massachusetts Tornado Outbreak of June 1, 2011



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Event Overview

- 4 tornadoes
 - Long-track EF3
 - Two EF1s
 - One EF0
- 4 fatalities, 72 injuries
- \$175 million in damage
- Damage to 1400 houses and 78 businesses
- 10,000 acres of woodlands destroyed

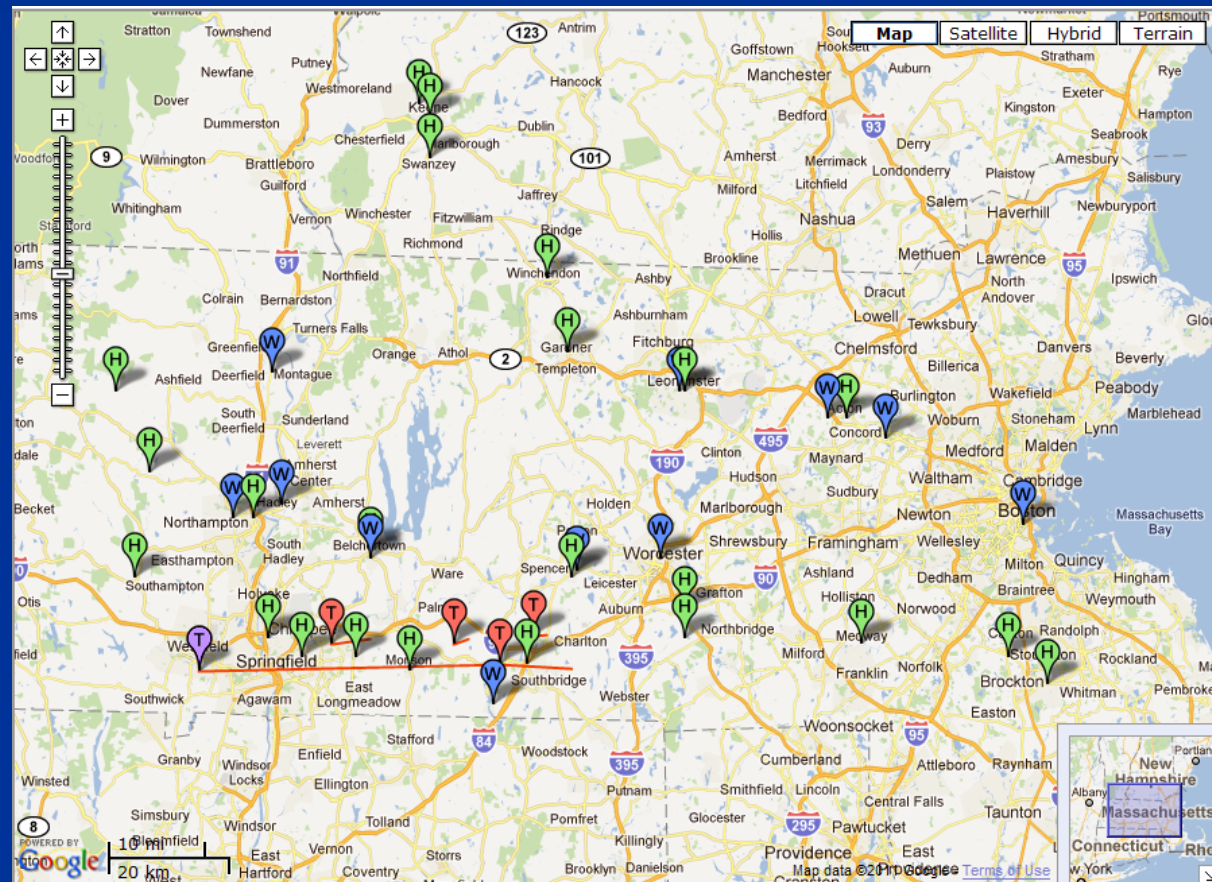


Event Overview

- Tornadoes were part of a larger severe weather outbreak in a high CAPE, high shear environment

Hail up to 2" in diameter

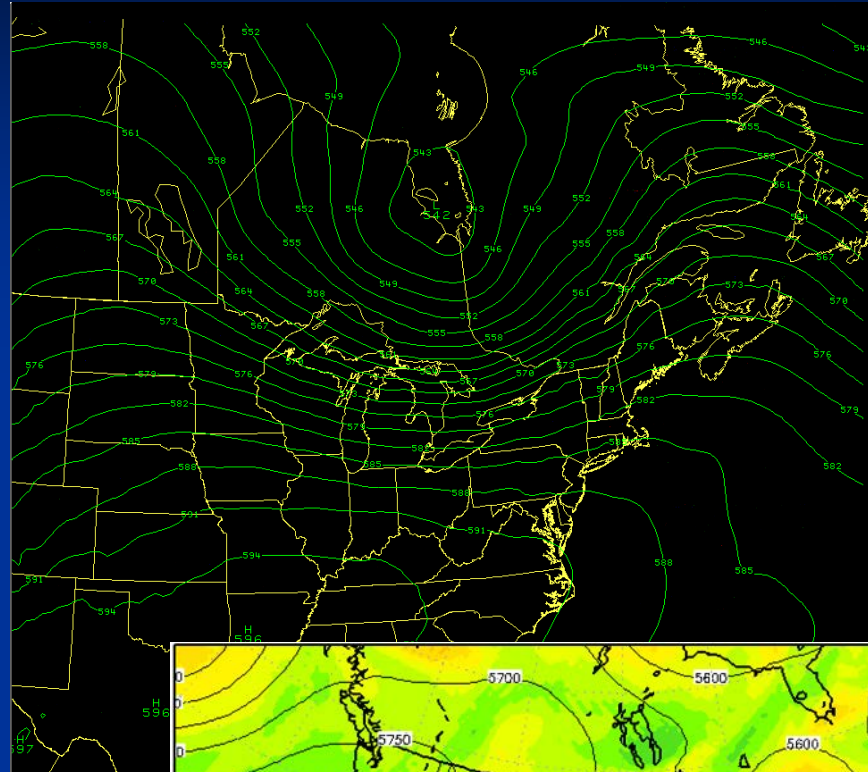
Scattered reports of wind damage



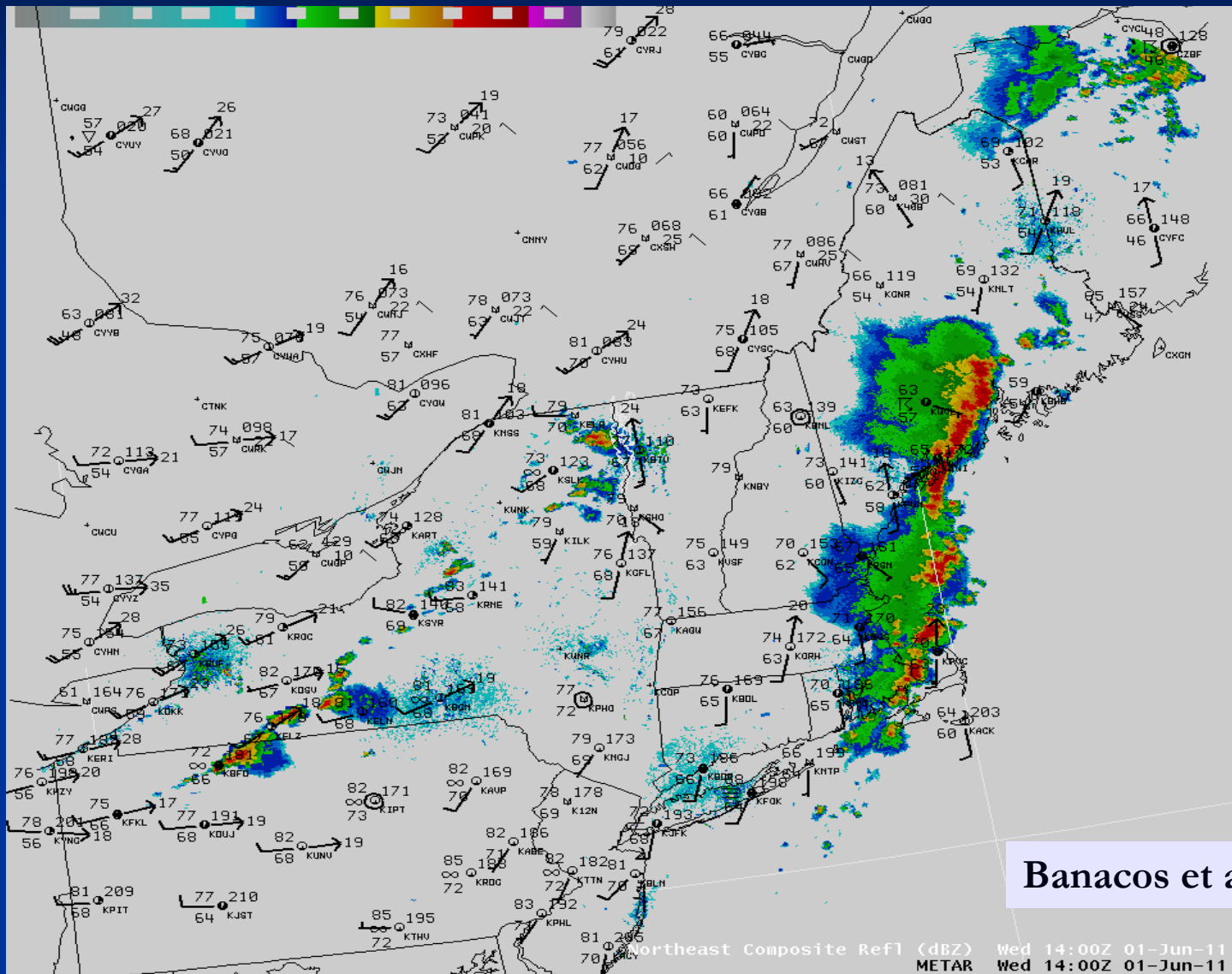
Synoptic Environment

500 mb closed low
in southern Canada

Shown to be
associated with
most New England
tornadoes
(WFO BOX local study)

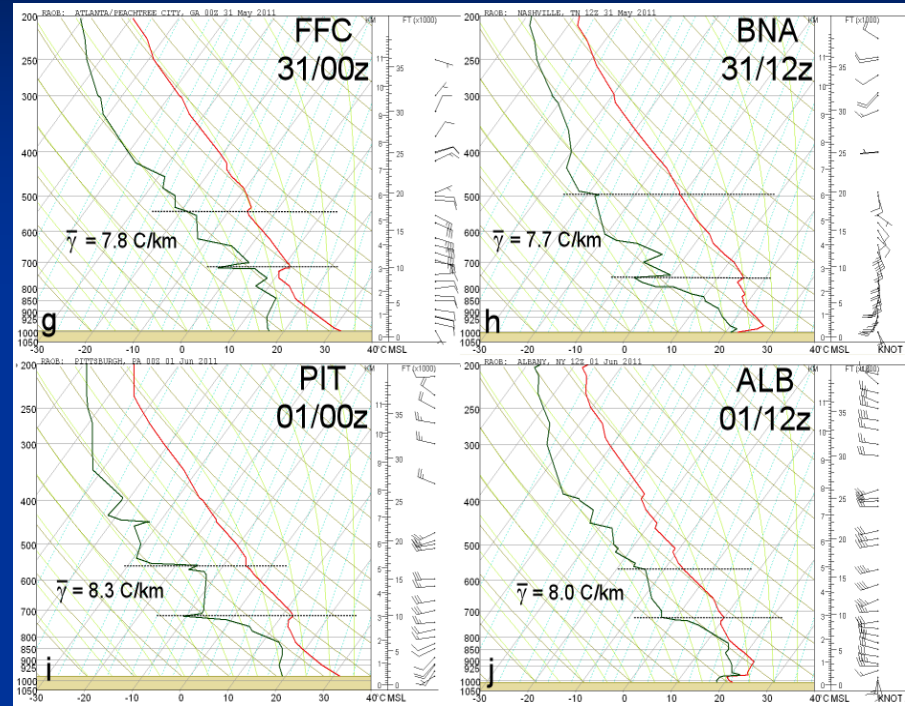
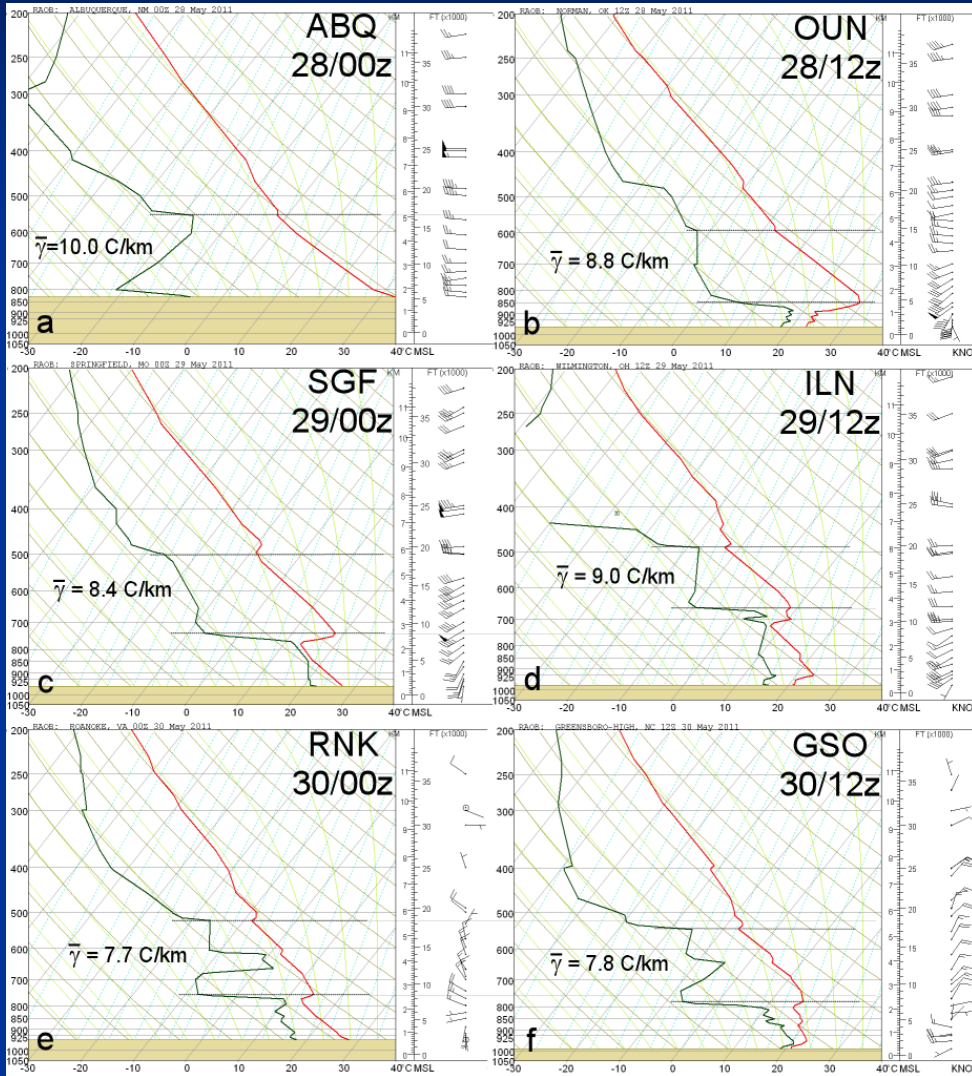


Radar and Surface Plot: 14 UTC



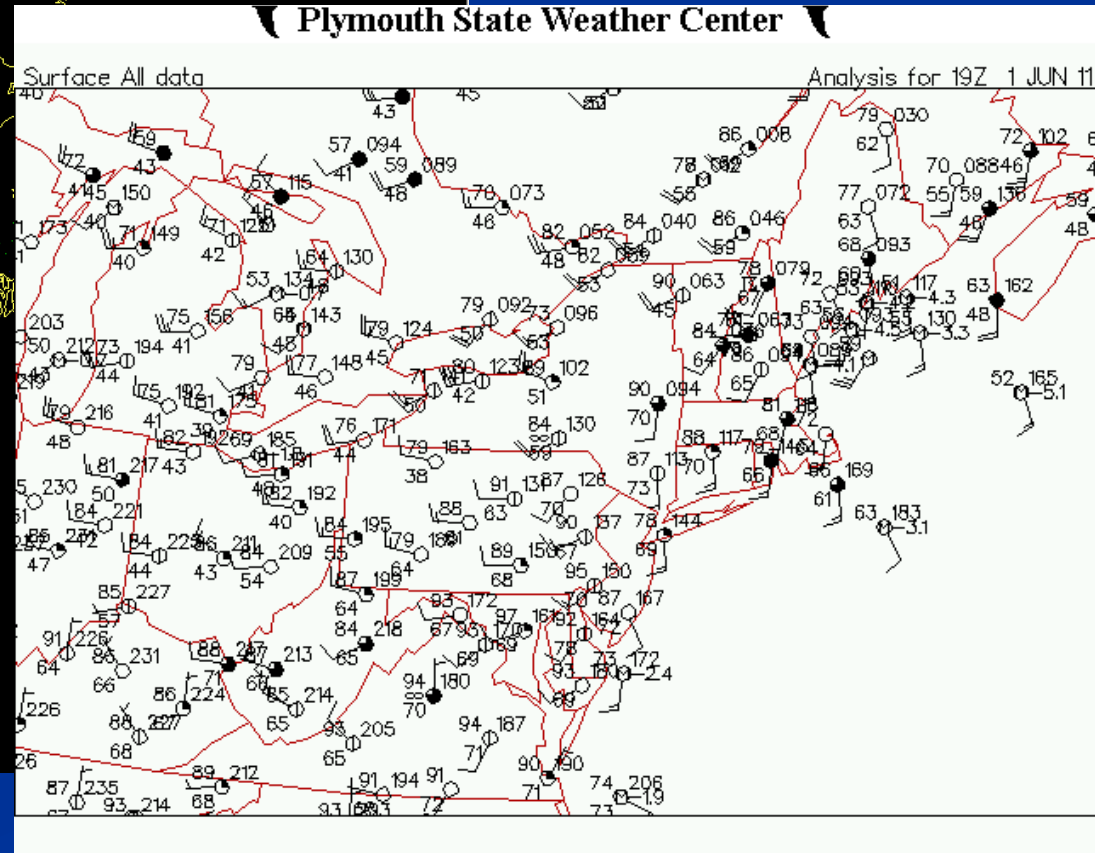
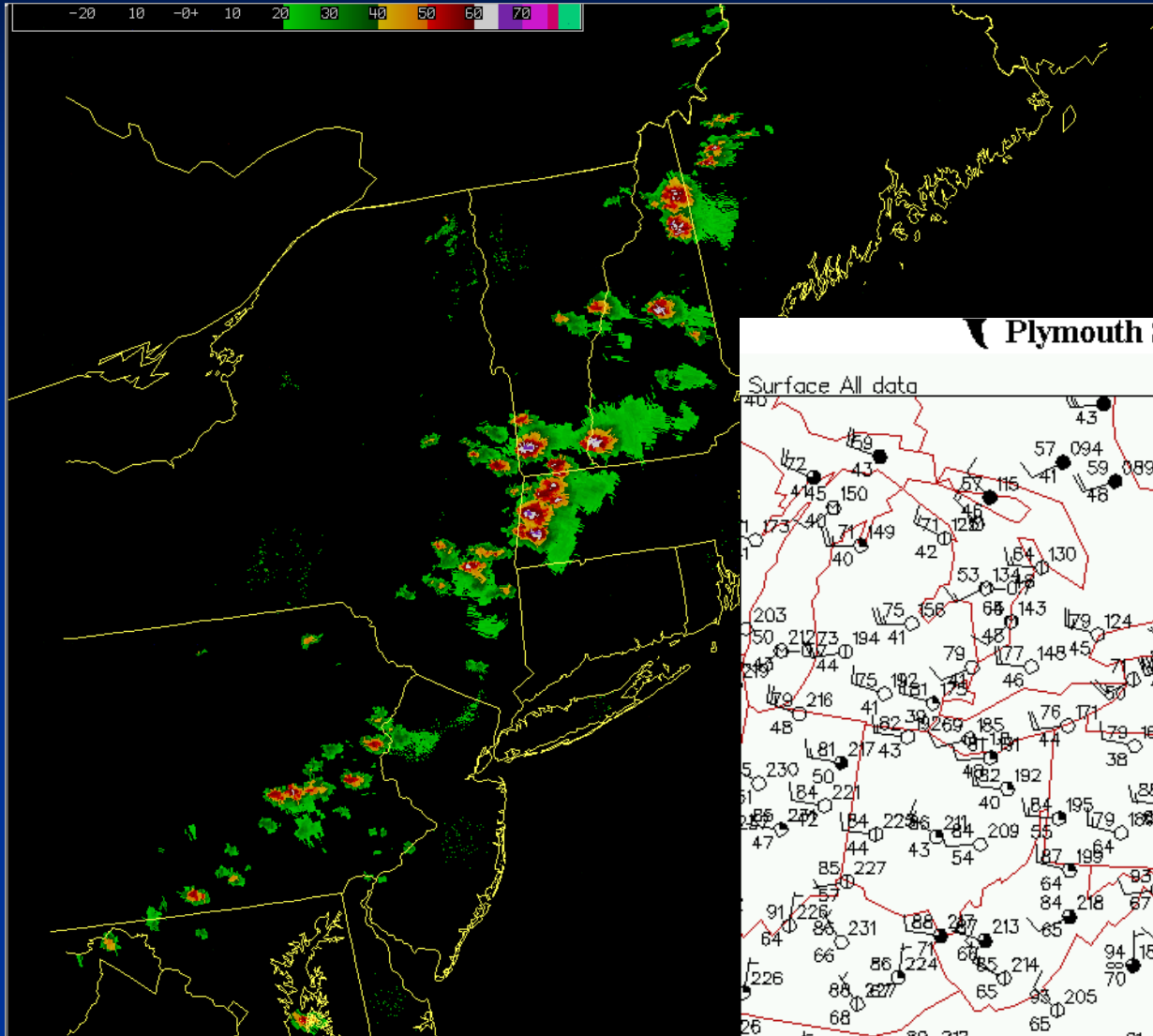
Banacos et al 2011

Elevated Mixed Layer

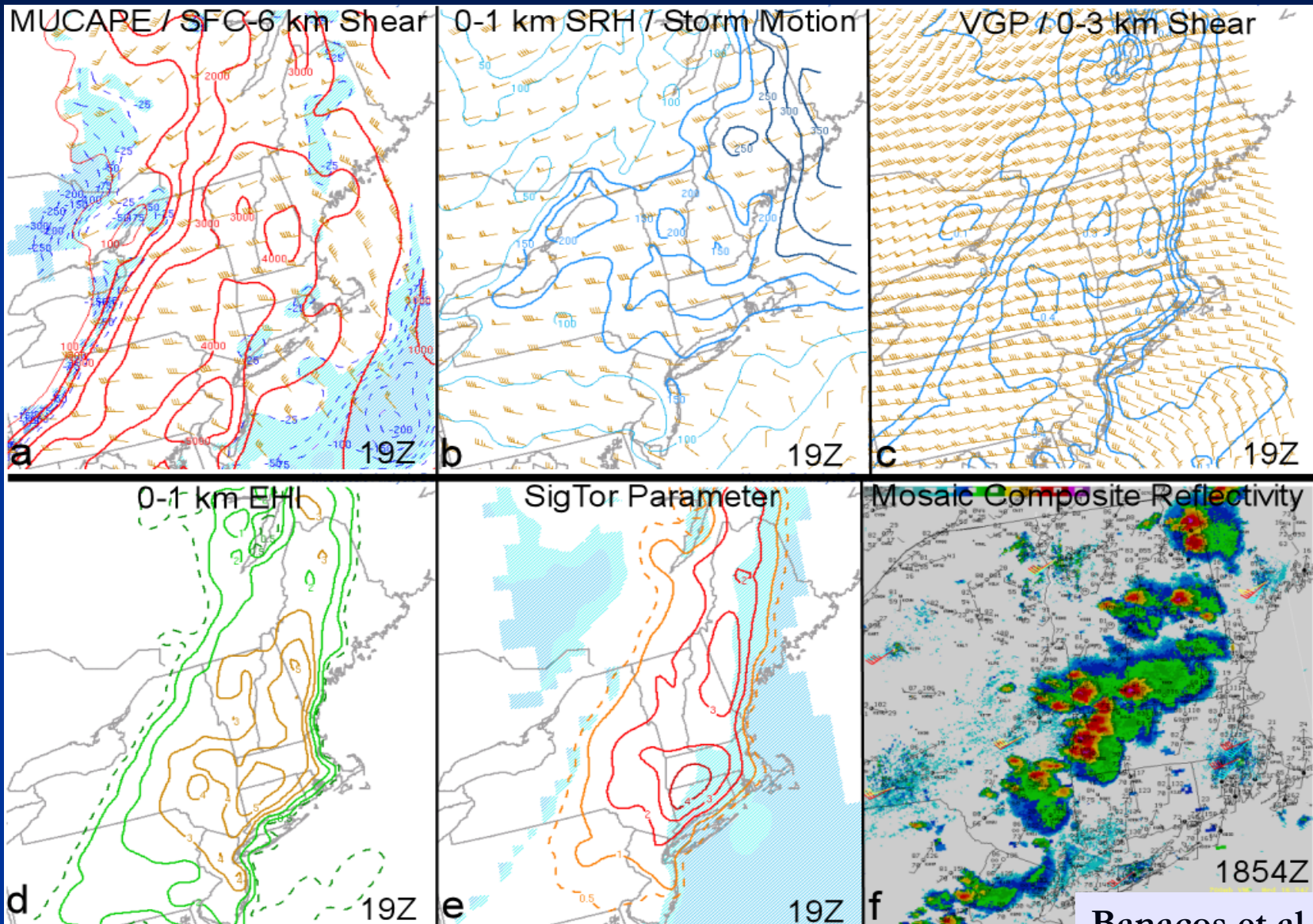


Banacos et al 2011

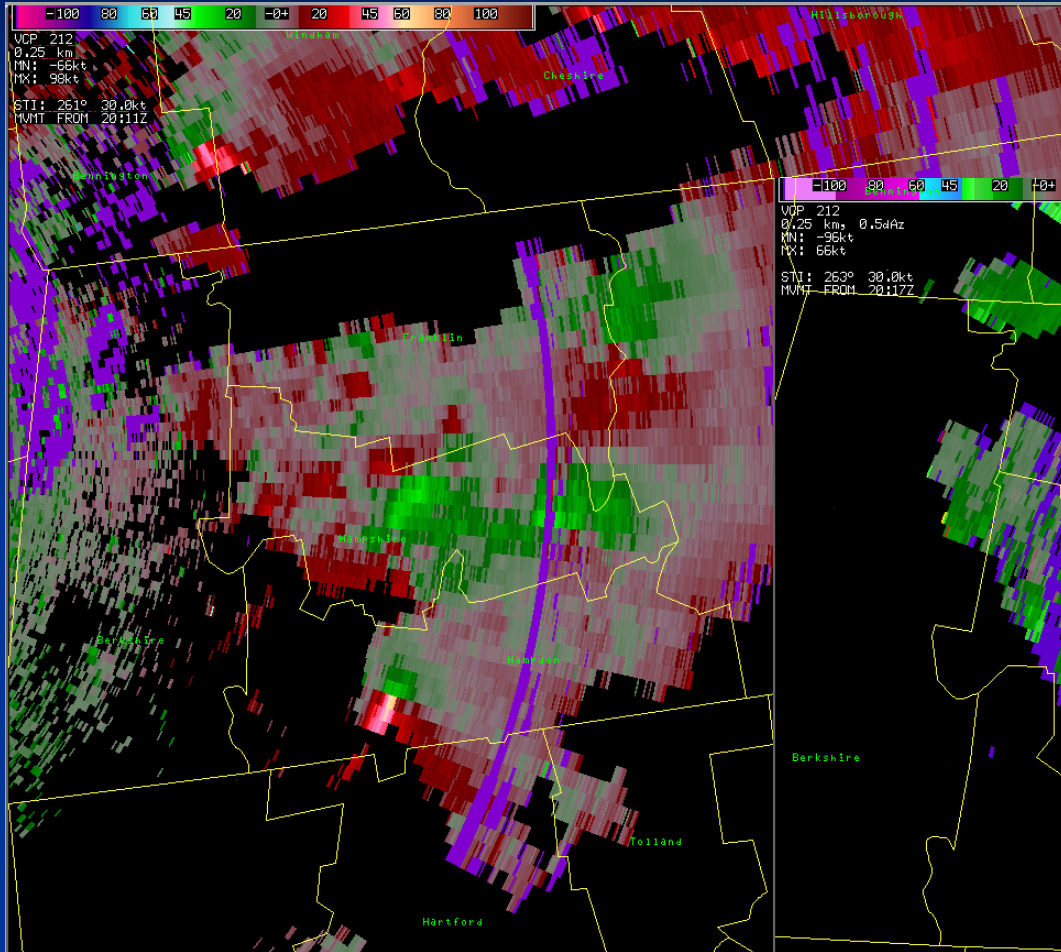
Radar and Surface Plot: 19 UTC



SPC Mesoanalysis: 19 UTC



KENX/KBOX 0.5 SRM: 2015 UTC



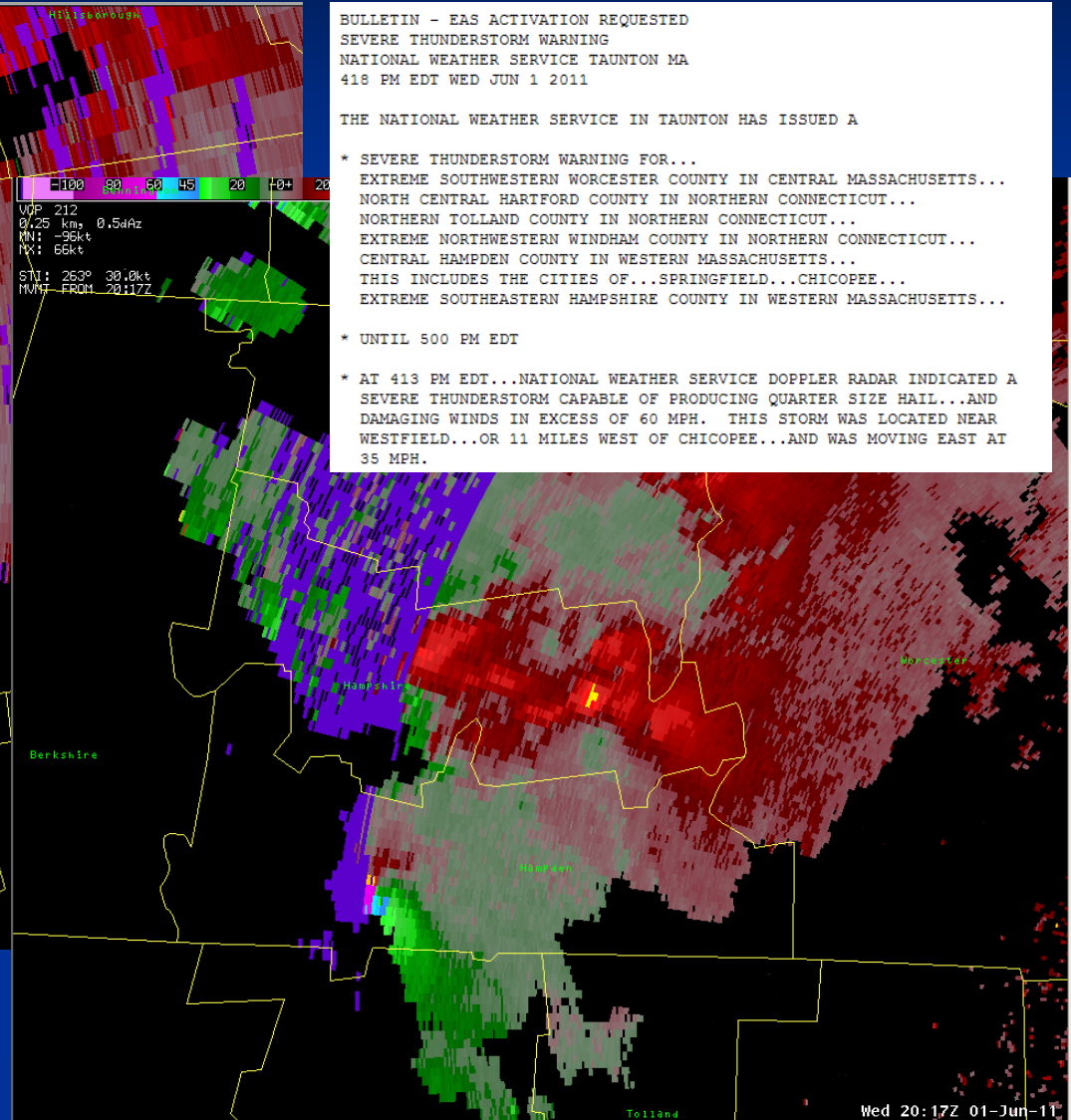
BULLETIN - EAS ACTIVATION REQUESTED
SEVERE THUNDERSTORM WARNING
NATIONAL WEATHER SERVICE TAUNTON MA
418 PM EDT WED JUN 1 2011

THE NATIONAL WEATHER SERVICE IN TAUNTON HAS ISSUED A

- * SEVERE THUNDERSTORM WARNING FOR...
EXTREME SOUTHWESTERN WORCESTER COUNTY IN CENTRAL MASSACHUSETTS...
NORTH CENTRAL HARTFORD COUNTY IN NORTHERN CONNECTICUT...
NORTHERN TOLLAND COUNTY IN NORTHERN CONNECTICUT...
EXTREME NORTHWESTERN WINDHAM COUNTY IN NORTHERN CONNECTICUT...
CENTRAL HAMPDEN COUNTY IN WESTERN MASSACHUSETTS...
THIS INCLUDES THE CITIES OF...SPRINGFIELD...CHICOPEE...
EXTREME SOUTHEASTERN HAMPSHIRE COUNTY IN WESTERN MASSACHUSETTS...

* UNTIL 500 PM EDT

- * AT 413 PM EDT...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING QUARTER SIZE HAIL...AND DAMAGING WINDS IN EXCESS OF 60 MPH. THIS STORM WAS LOCATED NEAR WESTFIELD...OR 11 MILES WEST OF CHICOPEE...AND WAS MOVING EAST AT 35 MPH.



Wed 20:17Z 01-Jun-11

Importance of NWSChat

(4:03:51 PM) media-nick.a.bannin: getting some funnel reports in northampton and a funnel report in granby 1 minute ago

(4:13:16 PM) media-nick.a.bannin: any confirmed visuals of a tornado/funnel other than viewer reports?

(4:20:49 PM) nwsbox-wtb: Nick...No confirmed reports as of yet...nothing aside from what you passed on to us a few minutes ago.

(4:26:02 PM) nwsbot: WESTFIELD/BARNES,MA (BAF) ASOS reports Tornado KBAF 012024Z 30005KT 1 1/4SM R20/4500VP6000FT FC +TSRA BKN024 BKN030 OVC065 26/22 A2984 RMK FUNNEL CLOUD B23 E24 AO2 LTG DSNT NW-E TSB1958RAB00 P0023

(4:31:02 PM) nwsbot: BOX issues Tornado Warning for Hampden, Hampshire, Worcester [MA] and Hartford, Tolland, Windham [CT] till 5:15 PM EDT ...* AT 426 PM EDT...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING A TORNADO NEAR WEST SPRINGFIELD...OR 6 MILES WEST OF SPRINGFIELD...MOVING EAST AT 40 MPH.

(4:31:13 PM) NECN-matt.royes: Funnel is Westfield MA from our viewers

(4:33:58 PM) nwsbot: BOX: Westfield [Hampden Co, MA] law enforcement reports TORNADO at 04:30 PM EDT -- possible tornado touchdown in shaker road area.

(4:34:26 PM) media-nick.a.bannin: tornado on ground in West Springfield on our live skycam

(4:36:14 PM) nwsbox-eleanor.v-t: Folks...getting several reports of tornado on ground in Springfield...heading toward downtown. Ham radio operator sees it on the ground at the moment.

(4:39:58 PM) media-nick.a.bannin: no longer on skycam

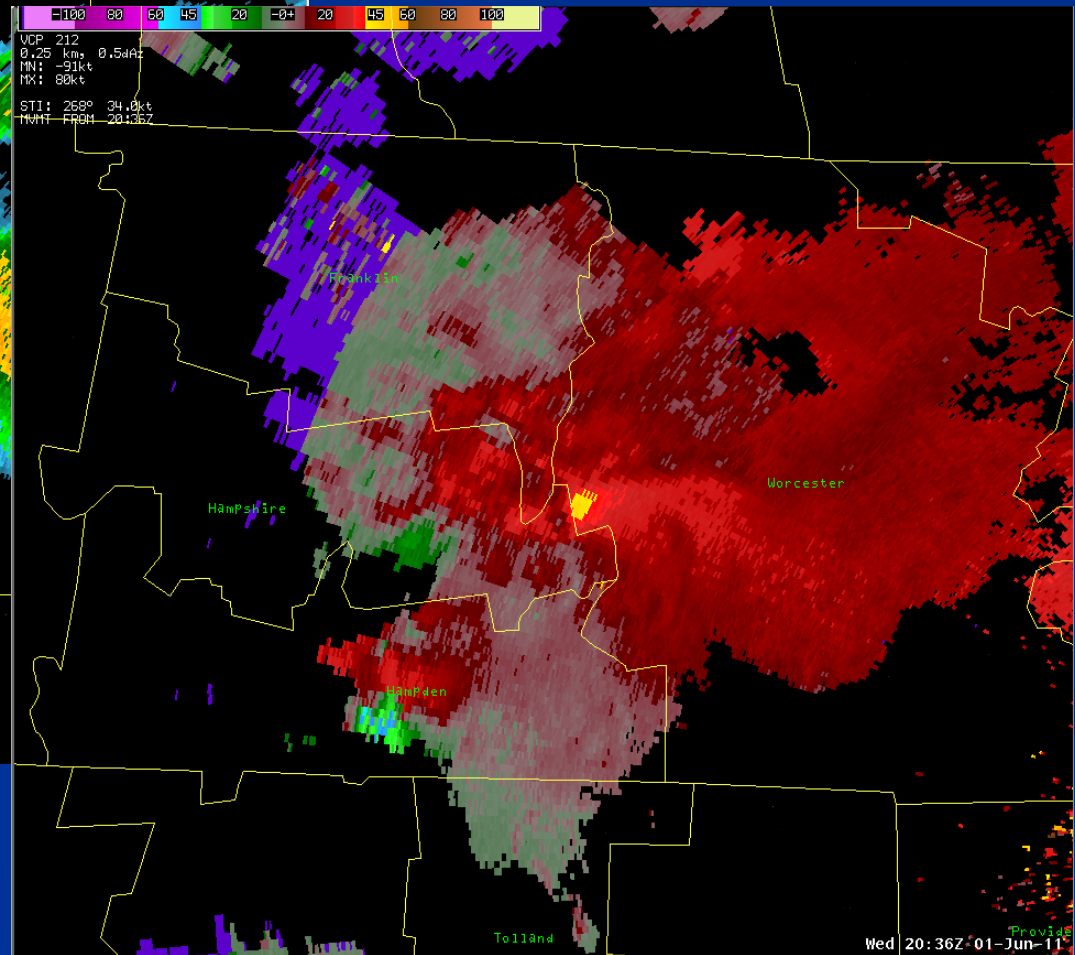
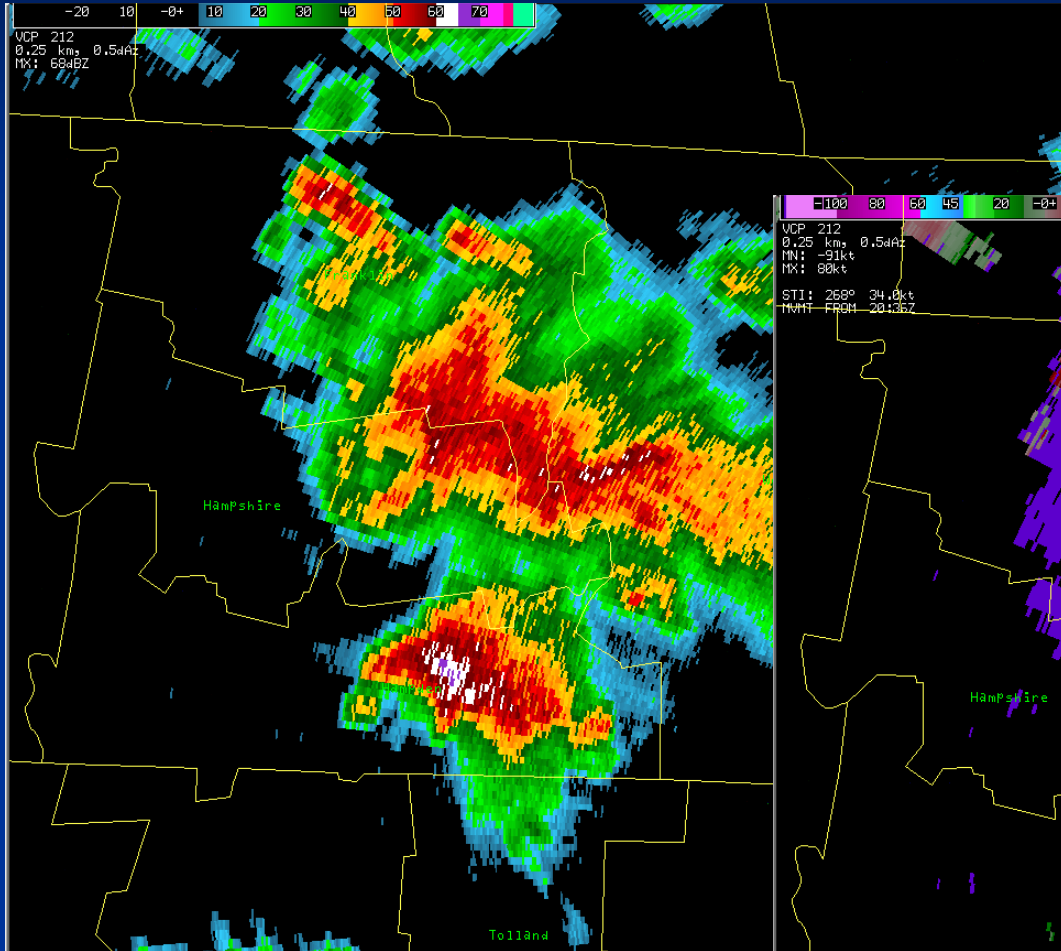
(4:40:22 PM) media-nick.a.bannin: our skycam is shooting damage right now along river front park next to Ct. River in Springfield

(4:40:40 PM) Ryan Hanrahan: Live video from WWLP had tornado with significant debris crossing 91 and the CT river

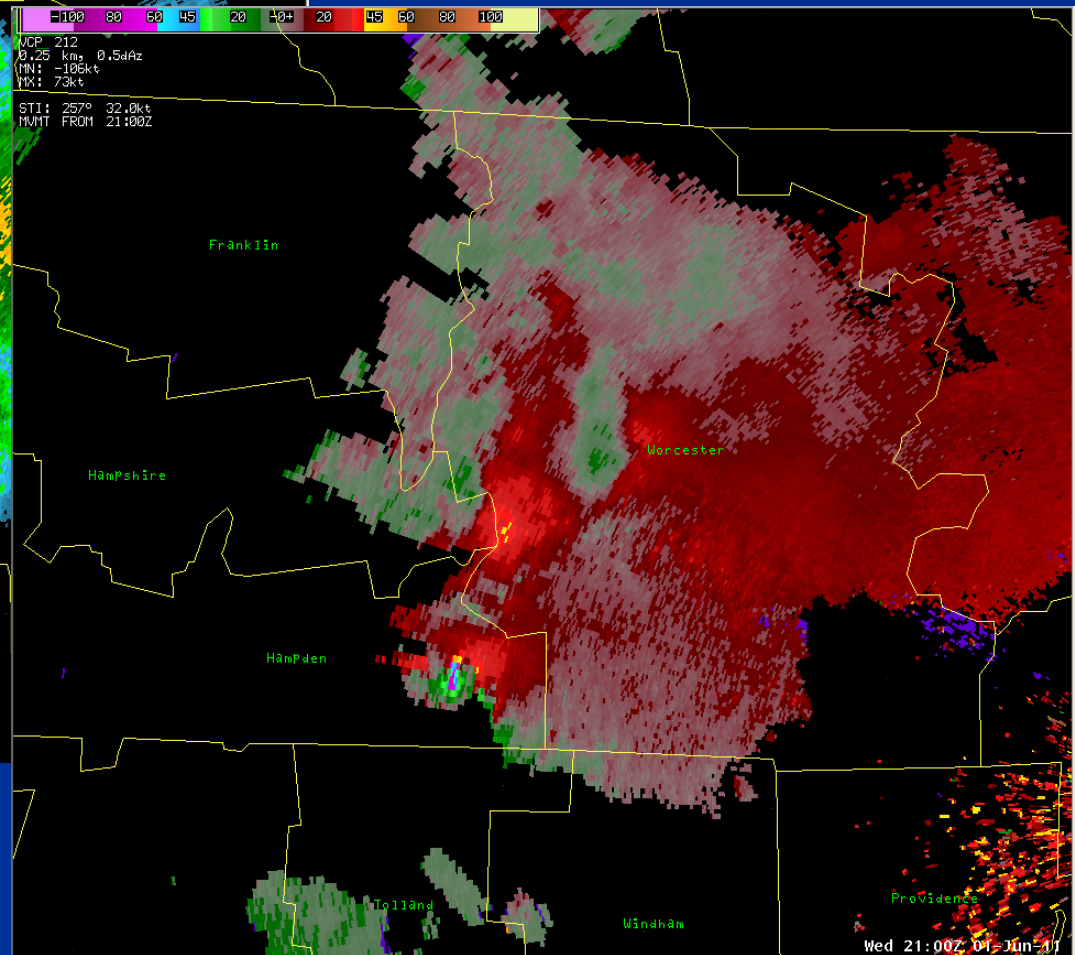
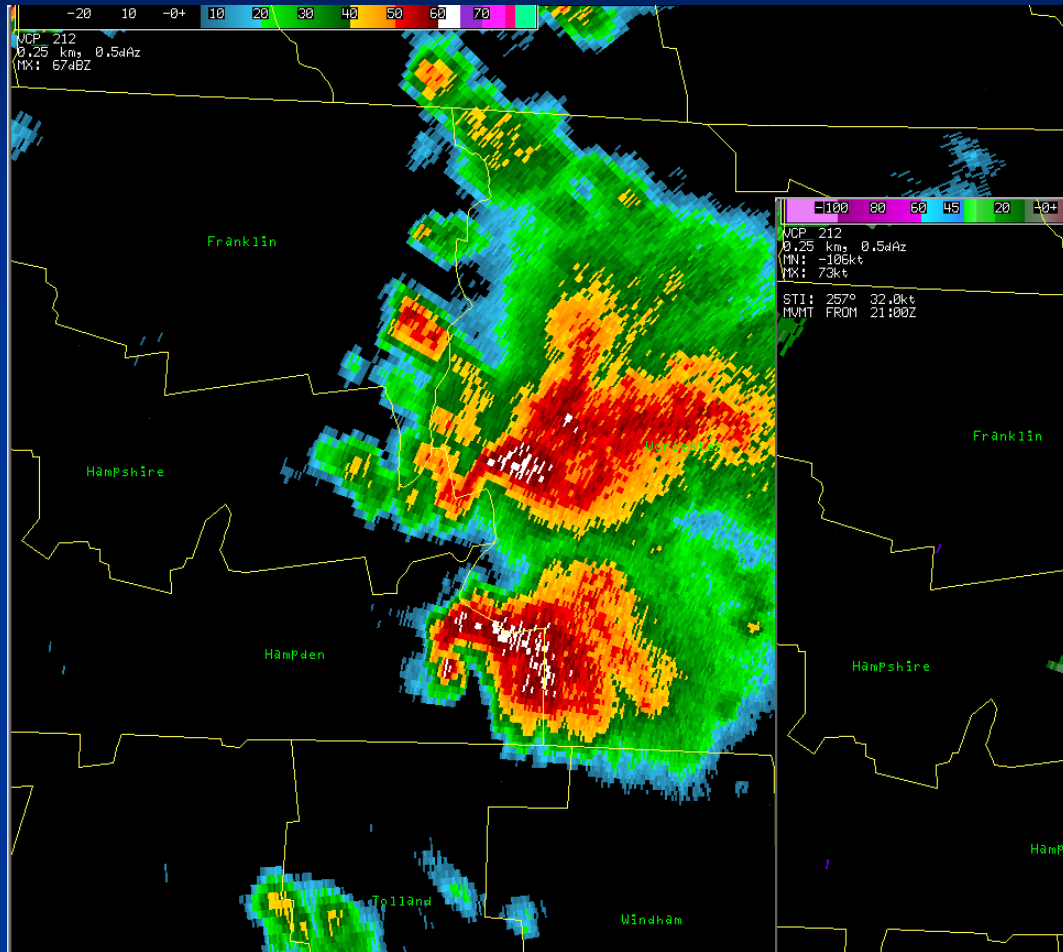


Courtesy WWLP-TV

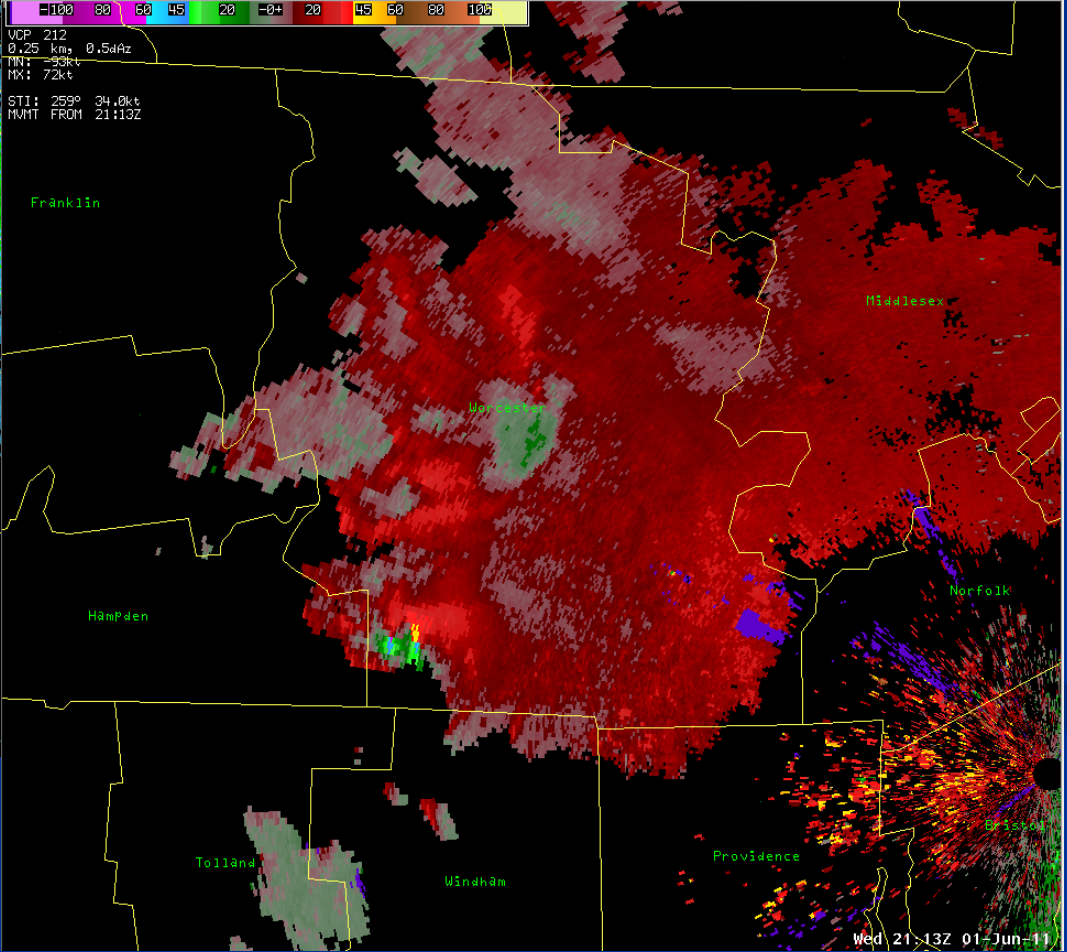
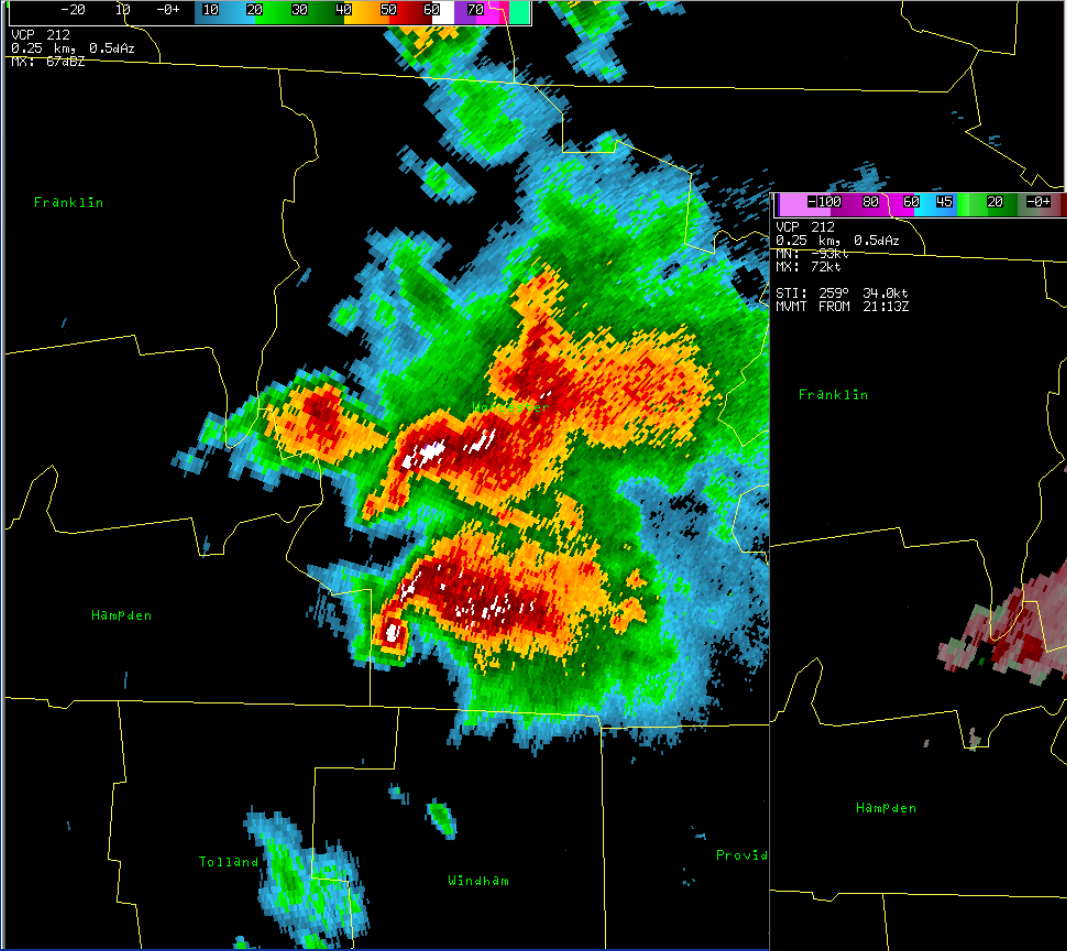
KBOX 0.5 REF/SRM: 2036 UTC



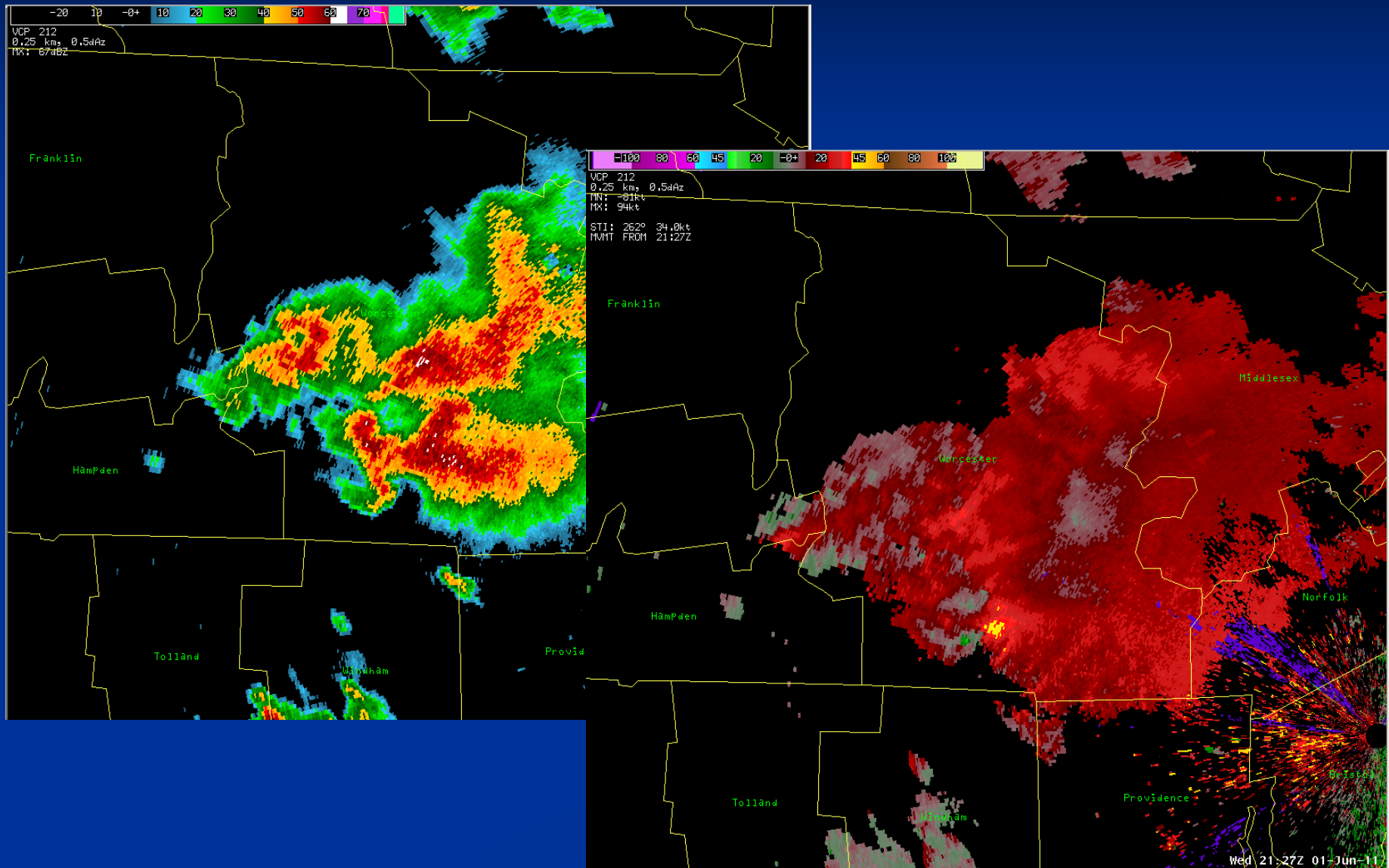
KBOX 0.5 REF/SRM: 2100 UTC



KBOX 0.5 REF/SRM: 2113 UTC



KBOX 0.5 REF/SRM: 2127 UTC



Best Practices

- Skywarn Operations
 - Provided first verified report of tornado
 - Nearly continuous reports as it was on the ground
- NWSChat
 - Continuous flow of information to and from WFO
- Live NWR Broadcast
 - 436 pm Severe Weather Statement

Challenges

- Raise forecaster awareness of higher-end tornado events
 - Follow-up Tornado Drill assigned
- Radar operations
 - New color curves for VEL/SRM
 - Proficiency in adjusting PRF
- Roles and responsibilities
 - Formal Severe Weather Operations Plan developed
- EMs, Media, and other partners
 - Focused meetings

Reference

- Banacos, P.C., M. L. Ekster, J. W. DelliCarpini, and E. J. Lyons, 2011: The New England Tornadoes of 1 June 2011. To be submitted to *The Electronic Journal of Severe Storms Meteorology*

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