

Southeastern Pennsylvania Supercell Of 02 May 2002

*by
Richard H. Grumm
National Weather Service
State College, PA 16801*

1. Introduction

A line of thunderstorms formed ahead of a fast moving cold front in central Pennsylvania during the afternoon hours of 2 May 2002. The initial storms almost immediately began to rotate, but were unable to develop tall enough and maintain themselves long enough to attain supercell status. The shear was extremely strong in the 0 to 6 km layer. The strong shear may have reduced the ability of the storms sustain themselves.

In southeastern Pennsylvania, the air was unstable and several large storms developed and were able to push 50-70 dBZ cores above 23kft. The largest and most persistent storm of the day developed in Adams County and moved across York, southern Lancaster, and Chester Counties in Pennsylvania as well as Harford and Cecil counties in Maryland. This storm produced an F2 tornado with a path length of 4.5 miles and a maximum path width of 160 yards long in Cecil County. The tornado damages several homes and barns as well as downing numerous trees. This was the only confirmed tornado with the storm.

Over the KCTP County warning area (CWA) the KLWX radar provided the best view of the storm operationally. However, the terminal Doppler weather radar (TDWR) located south of KBWI may have provided the best clues as to the intensity and character of this storm.

This paper will examine the radar data associated with this storm and the value

of using TDWR data in real-time. Clearly, for the KCTP CWA, the KLWX radar is an important tool with which to interrogate storms in the three southeastern most counties.

2. Method

All data were collected and archived in real-time. The Weather Event Simulator (WES) was used to play back the radar, satellite and other observational data. Model imagery was archived locally and displayed using GrADS.

The WES case will be used to train forecasters who did not work the event to build operational experience.

In addition to the WES data sets, some raw archive II radar data was available for this case. At this time, none of that data is shown here.

KBWI TDRW data were provided by the Washington DC forecast office.

3. Overview

Not developed. See select images below in the appendix. These images show the deep cyclone passing to the northwest, the strong low-level southwesterly jet, and high precipitable water values over the region.

4. Radar Images

The radar image of the storm around 2024 UTC on 2 May from the State College radar (KCCX) is shown in Figure 1. These data show the supercell, of nominal intensity and

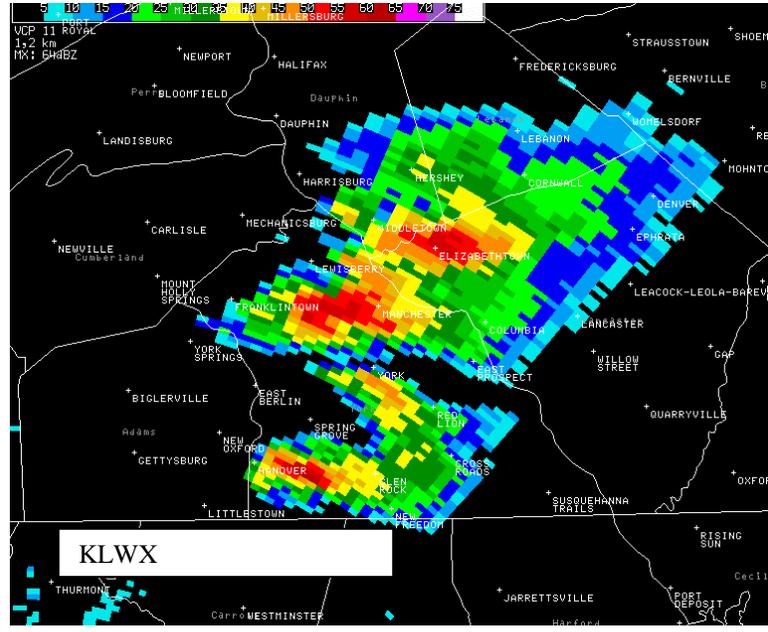
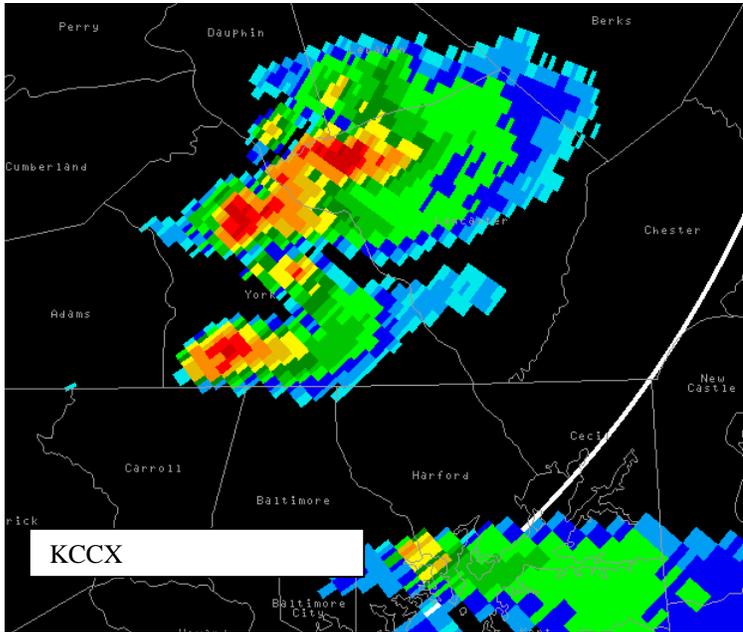


Figure 0. KCCX (left) and KLWX radar at 2024 UTC 2 May 2002. Both images show the supercell thunderstorm in southwestern York County.

without a true hook and only the hint of a weak appendage on the echo. The KLWX image, valid at the same time shows a slightly stronger storm with the hint of a hook in the lower intensity reflectivity data on the southwestern flank of the storm.

The KBWI TDWR data at the same time, showed a classic hook echo in southern York County. This image

shows that the storm was near the range limits of the radar. However, the radar does provide a lower scan of storm on portions of southeastern Adams, southern York, and southern Lancaster Counties than the two WSR-88D's.

A few other images, including the KBWI velocity and the KLWX Z/SRM are in the appendix.

4. Conclusions:

The supercell storm of 2 May in southern Adams, York and Lancaster counties produced mainly hail and some wind damage. This storm was a classic supercell thunderstorm when examined using the KBWI TDWR data. The storm also had some classic signatures, including a well-developed mesocyclone in the KLWX radar. Due to the beam height, the KCCX radar was not as effective at diagnosing this storm.

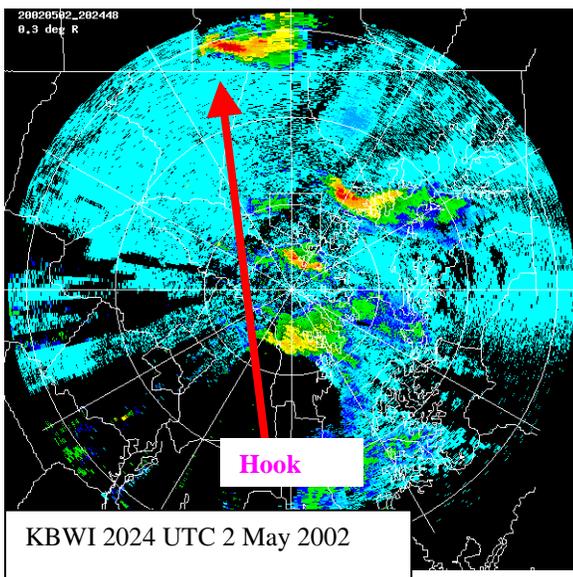
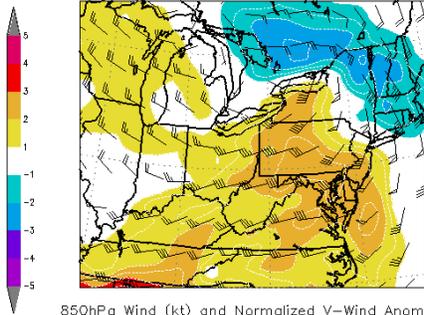
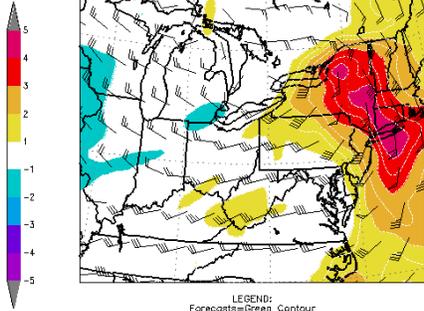


Figure 2. KBWI TDWR of the York storm. Note the well-defined hook in southwestern York County at 2024 UTC 2 May 2002.

12Z02MAY2002 Eta 3hr Forecast Valid 15Z02MAY2002 (Thu)
850hPa Wind (kt) and Normalized U-Wind Anomaly

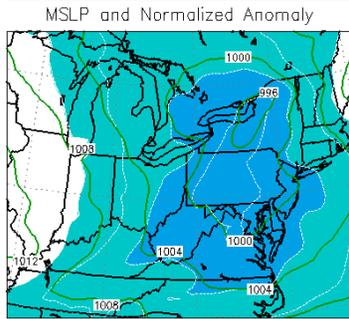
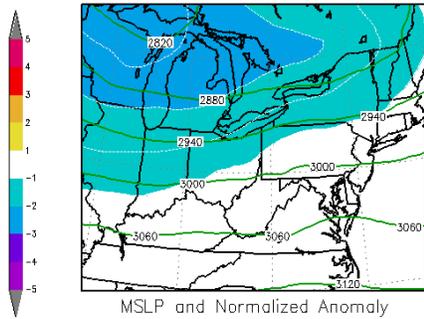


850hPa Wind (kt) and Normalized V-Wind Anomaly



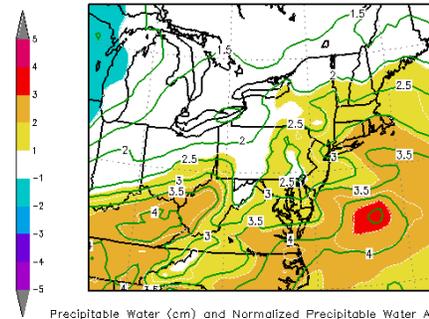
LEGEND:
Forecasts=Green Contour
Departure from 02MAY normal (± 1Std Dev)=Shading, White Contour

18Z02MAY2002 Eta 0hr Forecast Valid 18Z02MAY2002 (Thu)
700hPa Height and Normalized Anomaly

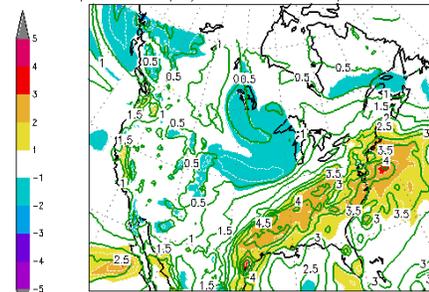


LEGEND:
Forecasts=Green Contour
Departure from 02MAY normal (± 1Std Dev)=Shading, White Contour

18Z02MAY2002 Eta 0hr Forecast Valid 18Z02MAY2002 (Thu)
Precipitable Water (cm) and Normalized Precipitable Water Anomaly



Precipitable Water (cm) and Normalized Precipitable Water Anomaly



LEGEND:
Forecasts=Green Contour
Departure from 02MAY normal (± 1Std Dev)=Shading, White Contour

Anomaly Extremes
[20-50N, 85-95W]
Max +: +3.39
Max -: -2.09

Appendix I- Select Forecast Products

