

Research Goals

Objectives from our proposal:

1. To investigate the relationship between the tornado and its parent circulation. More specifically:
 - To examine the relationship between the intensities of the mesocyclone and tornado and attendant surface damage intensity.
 - To examine the causes of nonlinear surface damage patterns such as trochoidal and scalloping marks, left and right turns, and sinusoidal patterns.
2. To better understand the structural relationship between the visual characteristics of the tornado, associated damage, and high-resolution radar-detected features within the hook echo such as single and dual-Doppler velocity features, multi-parameter signatures, weak echo eyes, and debris rings.
3. To examine the relationship between radar-detected wind speeds with observed damage estimates based on the EF scale.

Our objectives require tornadic supercell data sets

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What objectives can we test with the 2009 data set?

1. To investigate the relationship between the tornado and its parent circulation. More specifically:

- To examine the relationship between the mesocyclone, tornado, and attendant surface damage intensities, and the visual characteristics of the wall cloud and tornado.

- This objective can partially be tested with the 5 June, 2009 data set.

- Paper #1 integrating photogrammetry with dual-Doppler – Atkins lead author, collaborating with CSWR

- To examine the causes of nonlinear surface damage patterns such as trochoidal and scalloping marks, left and right turns, and sinusoidal patterns.

- This objective can not be tested with the 5 June, 2009 data set

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What objectives can we test with the 2009 data set?

2. To better understand the structural relationship between the visual characteristics of the tornado, associated damage, and high-resolution radar-detected features within the hook echo such as single and dual-Doppler velocity features, multi-parameter signatures, weak echo eyes, and debris rings.

- Aside from the damage, we can examine this objective with the DSLR imagery, DOW5,6,7, and possibly NOXP and UMASS XPOL from 5 June, 2009.

- Paper #2 - integrate photogrammetry, single-Doppler, reflectivity, and possibly multi-parameter radar data. Wakimoto lead author, collaborating with CSWR

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What objectives can we test with the 2009 data set?

3. To examine the relationship between radar-detected wind speeds with observed damage estimates based on the EF scale.

This objective can not be tested with the 5 June data set.

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At a minimum, what data sets are needed in 2010 to meet our research objectives?

1. EF2-5 tornado lofting debris that is visible from our deployment sites and is scanned by a dual-pol radar.
2. EF4-5 tornado with suction vortices that create damage patterns that are visible from the air and impacts a large number of EF scale damage indicators.