

A Rare Early Fall Case of Non-Tropical Tornadic Supercells in North Alabama

Brian Carcione, David Nadler, and Andy Kula
National Weather Service, Huntsville, AL
Saturday, March 24, 2007



Photo taken 22 Sept 2006 near Albertville (Marshall County) - courtesy Jessica Rutherford (Union Grove)

Overview

- Event Summary: 22 September 2006
- Fall Tornado Climatology
- Synoptic Pattern
- Model Output
- Mesoscale Analysis
- Brief Examination of Radar Data
- Storm Photography and Interpretation
- Conclusions/Lessons Learned



SOUTHEAST SEVERE STORMS SYMPOSIUM



Event Summary: 22 Sept 2006

The map displays the path of a storm system across northeast Alabama on September 22, 2006. Three favored tracks are circled in white and labeled 1, 2, and 3. Track 1 passes through the area around Birmingham, track 2 through the area around Huntsville, and track 3 through the area around Oneonta. Various weather events are marked on the map, including Funnel Clouds (F), F0, F1, and F2 Tornadoes, and 0.75" Hail. A visible satellite image in the top right shows the storm system's structure at 2115 UTC on 9/22/06.

- Multiple supercells along 3 favored tracks
- 7 confirmed tornadoes, ranging from F-0 to F-2; all F-1 and F-2 tornadoes struck northeast Alabama
- Two tornadoes struck small cities directly (Oneonta and Albertville)

SOUTHEAST SEVERE STORMS SYMPOSIUM

Tennessee Valley Tornado Climatology

Data compiled by Kurt T. Weber

Tornadoes Spawned by Non-Tropical Systems Affecting the HUN CWA: 1950 - 2006

A bar chart showing the monthly frequency of tornadoes spawned by non-tropical systems affecting the Huntsville County Warning Area (HUN CWA) from 1950 to 2006. The x-axis represents the months from January to December, and the y-axis represents the number of tornadoes, ranging from 0 to 80. The highest frequency occurs in April (approximately 75 tornadoes), followed by May (approximately 68). A downward-pointing arrow is positioned above the September bar, which shows a count of approximately 5. The chart also includes a small image of a rocket on the left side.

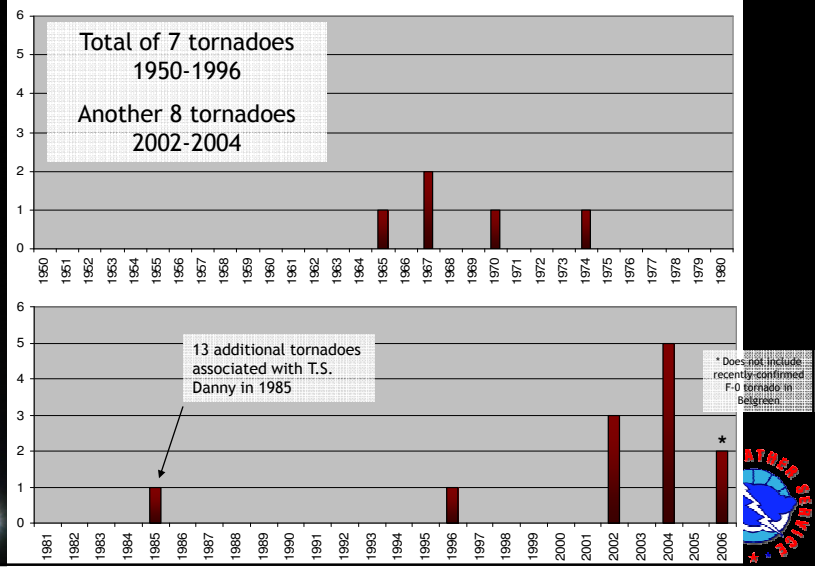
Month	Number of Tornadoes
Jan	13
Feb	21
Mar	42
Apr	75
May	68
Jun	17
July	12
Aug	4
Sept	5
Oct	8
Nov	34
Dec	7

SOUTHEAST SEVERE STORMS SYMPOSIUM

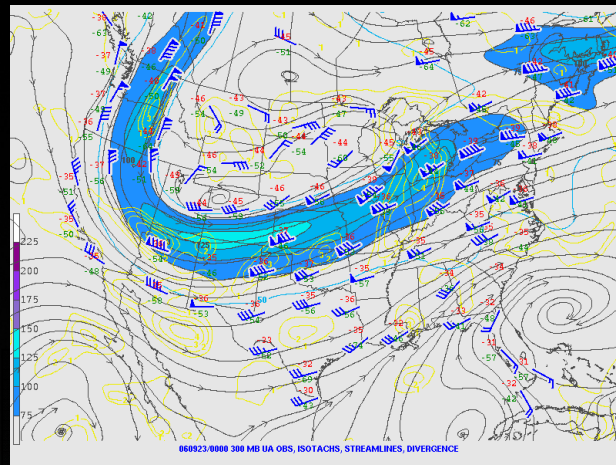
Early Fall Non-Tropical Tornado Climatology

August through October, 1950-2006

Data compiled by Kurt T. Weber



Synoptic Pattern - 300MB

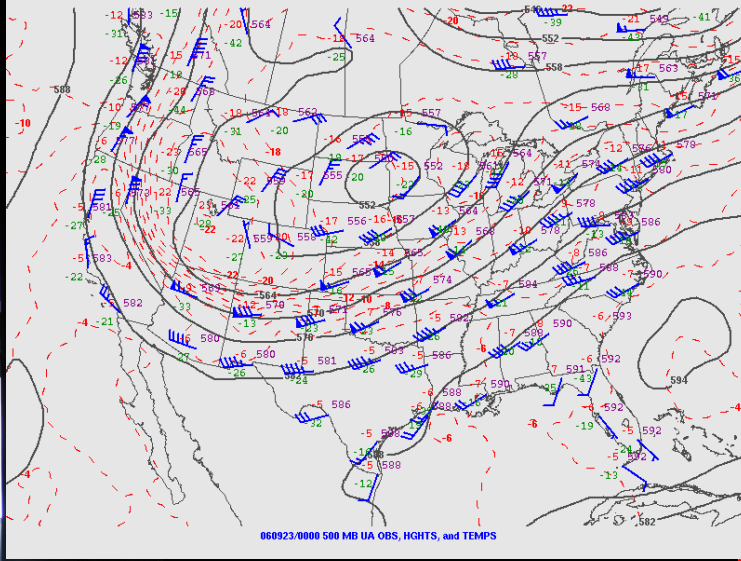


1200 UTC 22 Sept and 0000 UTC Sept 23
300 MB Analysis

SOUTHEAST SEVERE STORMS SYMPOSIUM



Synoptic Pattern - 500MB

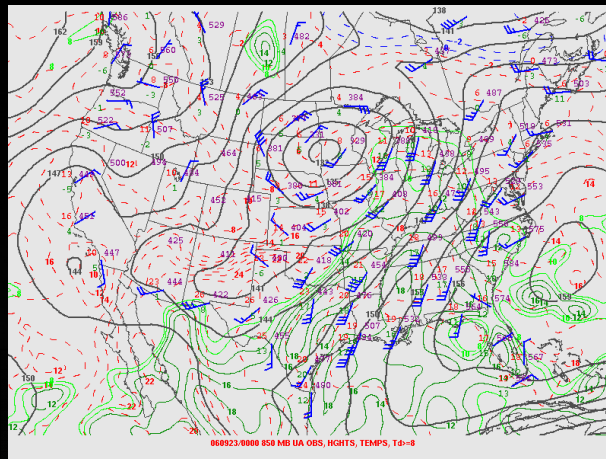


500 MB Analysis: 1200 UTC 22 Sept and 0000 UTC Sept 23

SOUTHEAST SEVERE STORMS SYMPOSIUM



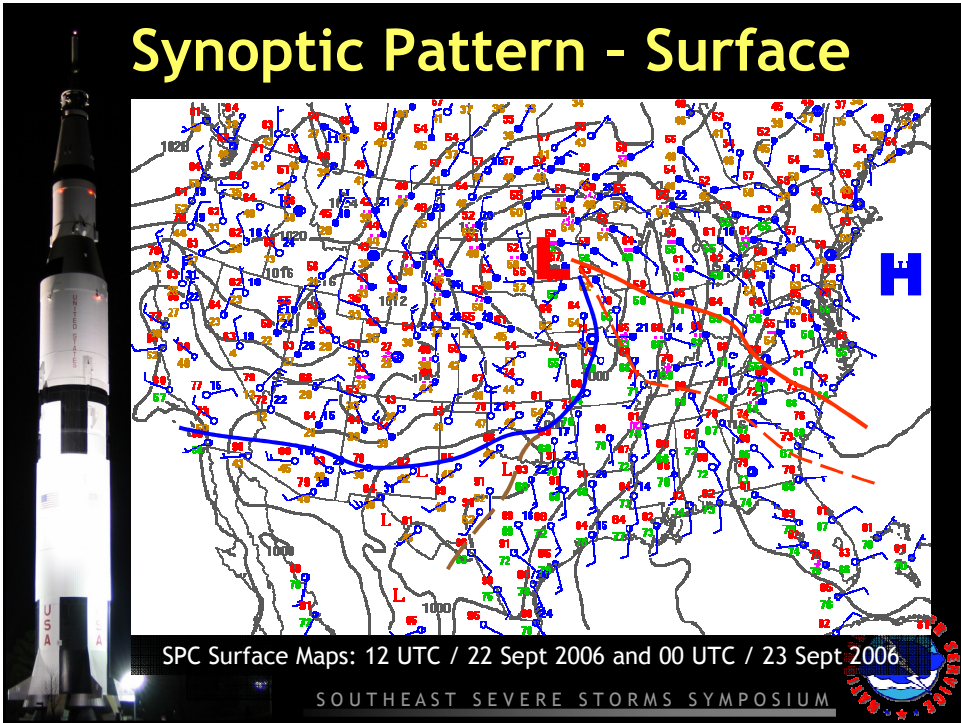
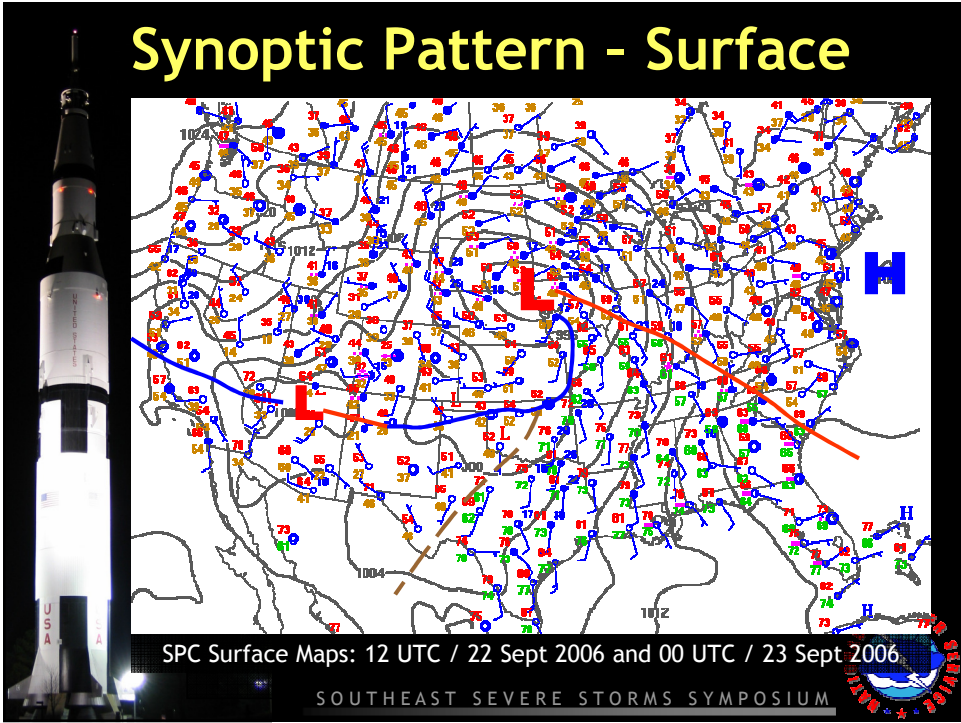
Synoptic Pattern - 850MB



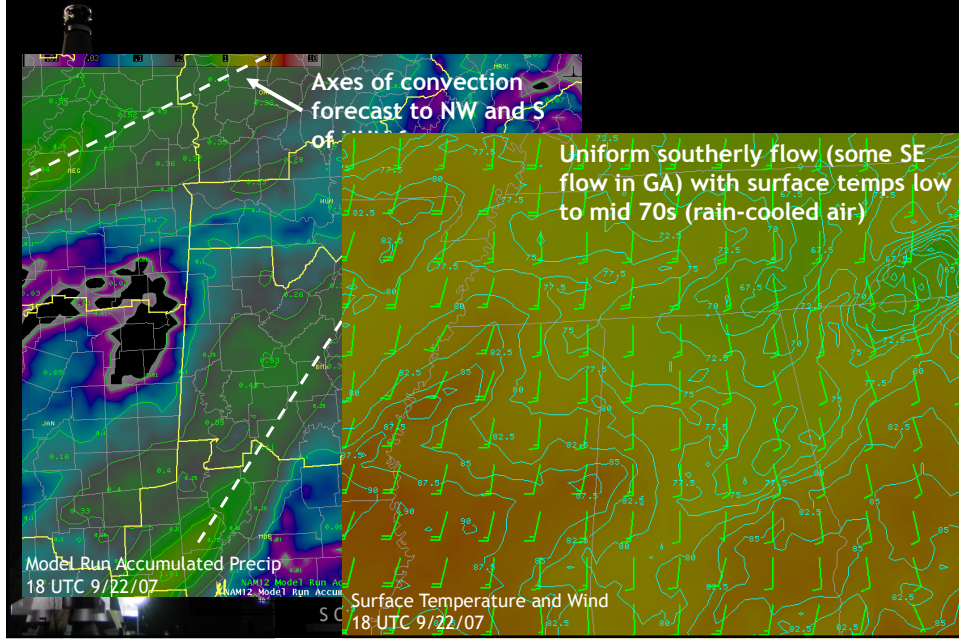
1200 UTC 22 Sept and 0000 UTC Sept 23
850 MB Analysis

SOUTHEAST SEVERE STORMS SYMPOSIUM

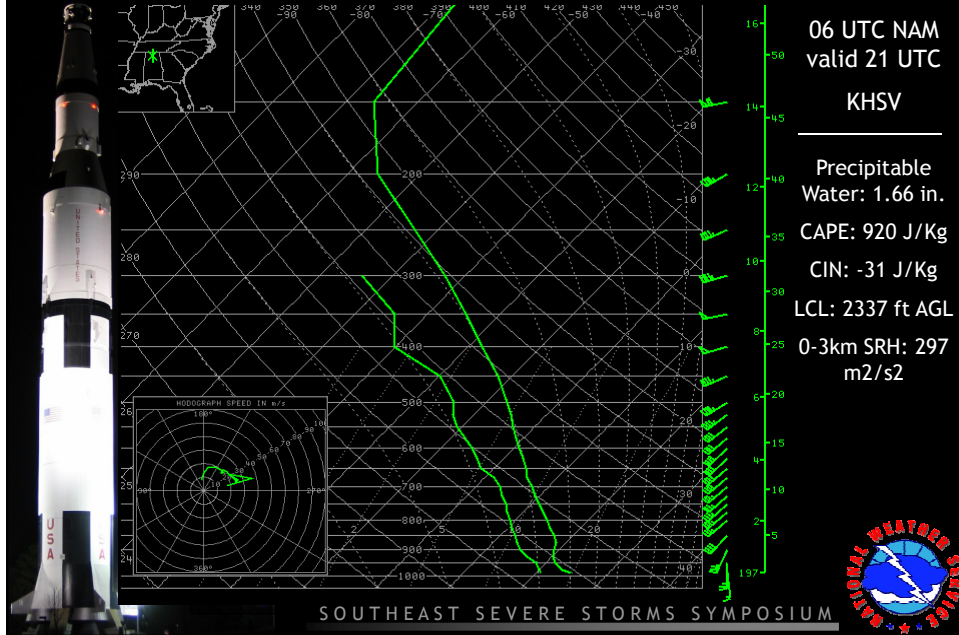


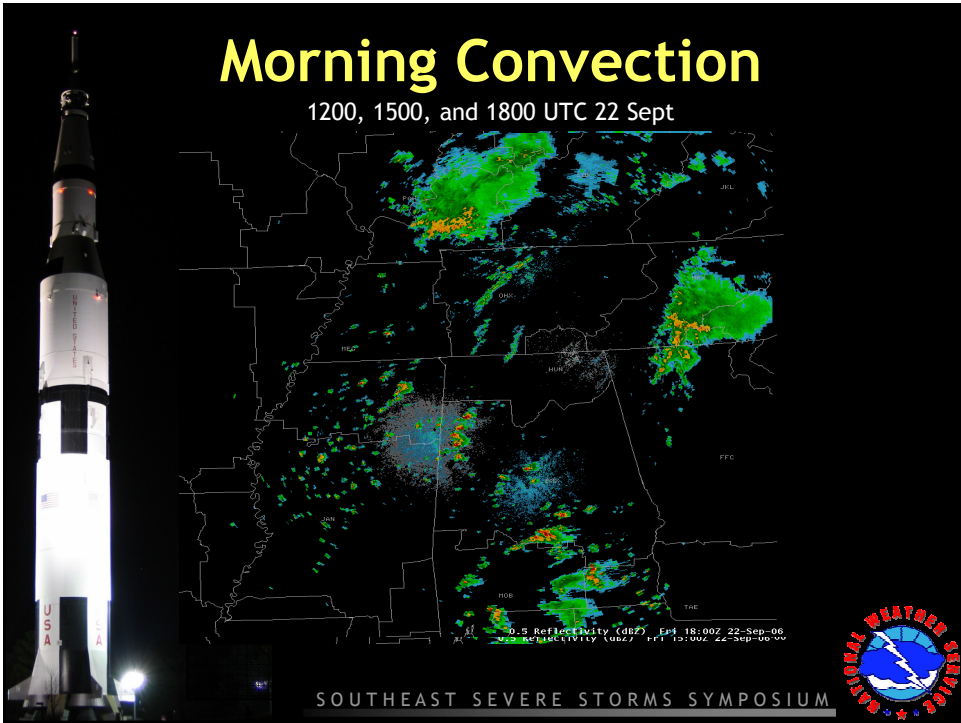
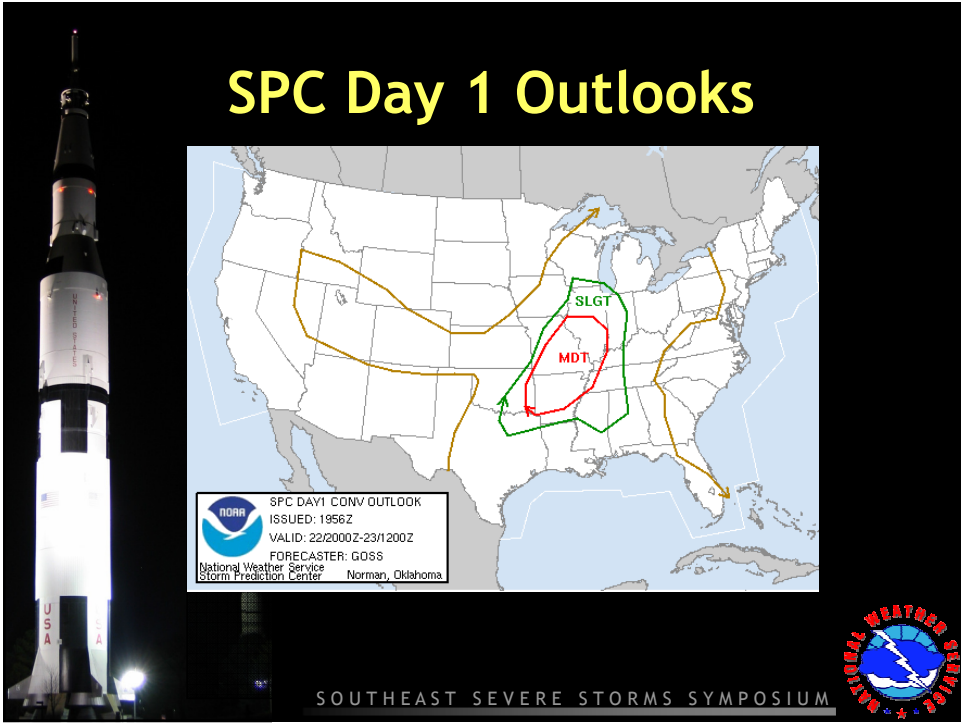


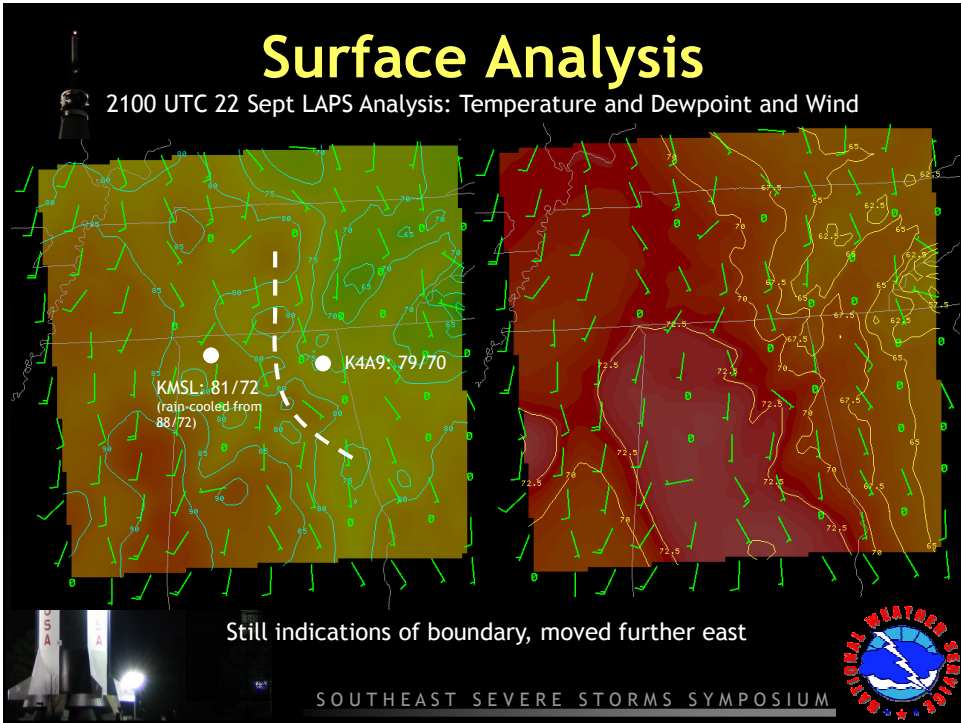
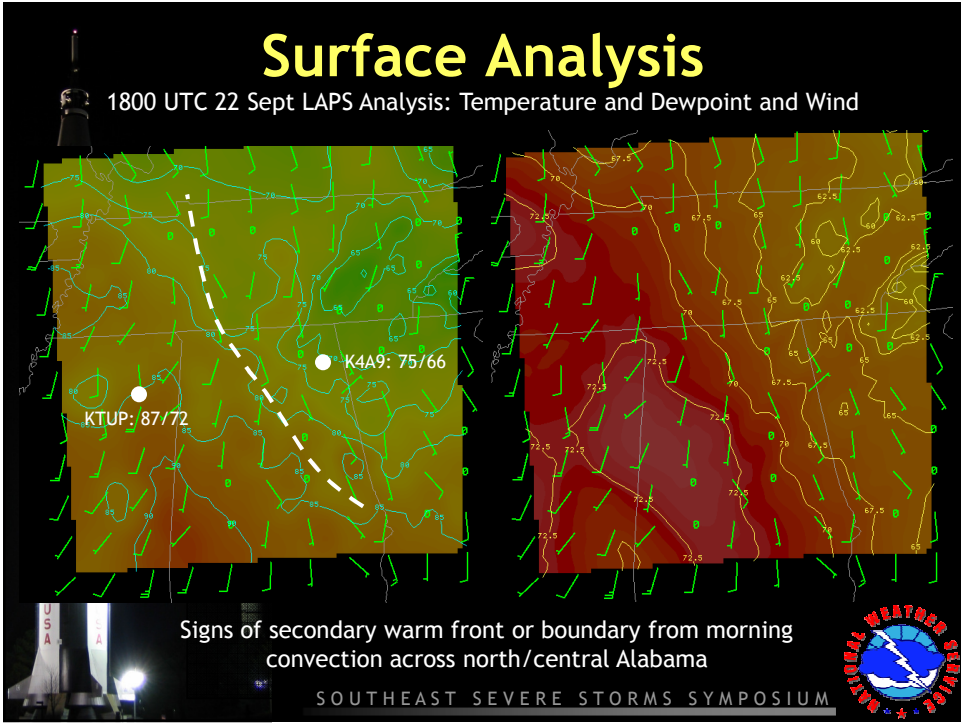
Model Data: 06UTC 12km NAM-WRF

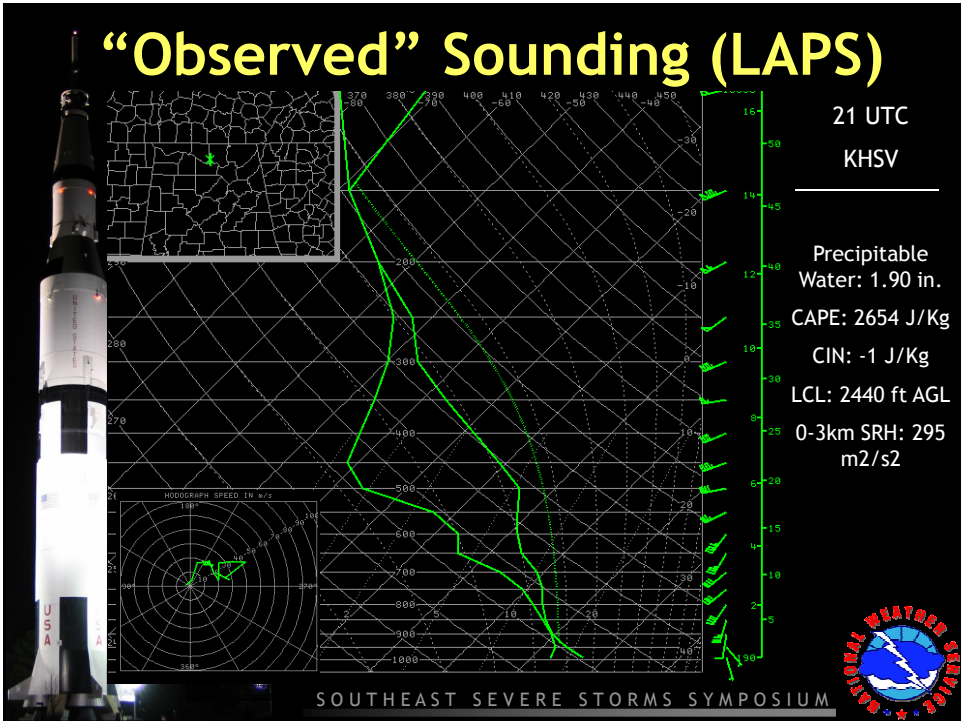
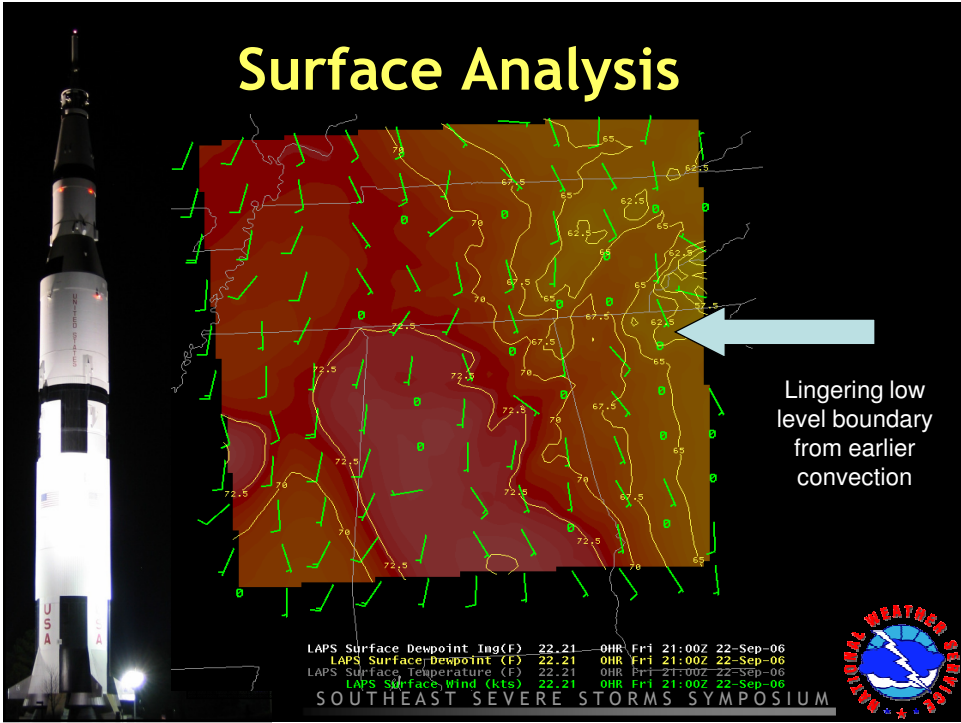


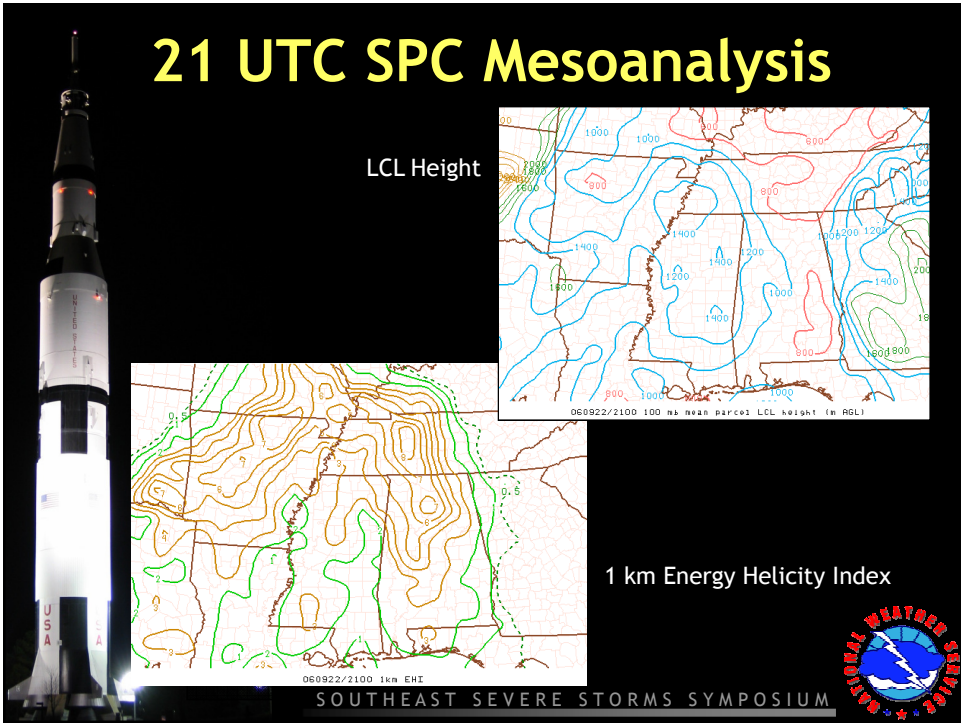
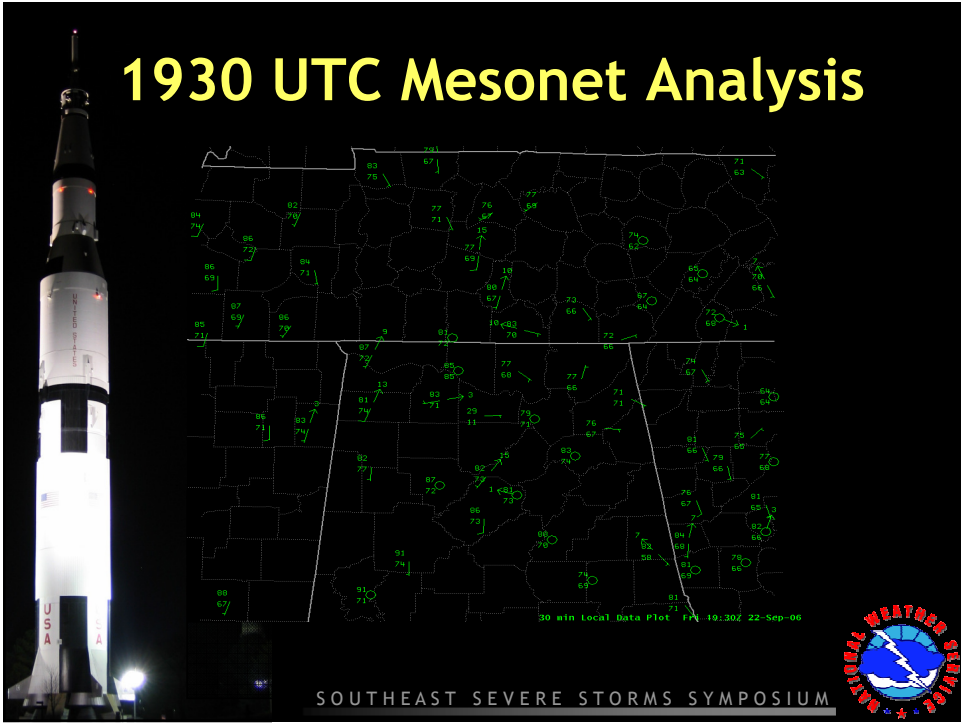
Model Data: NAM-WRF Soundings

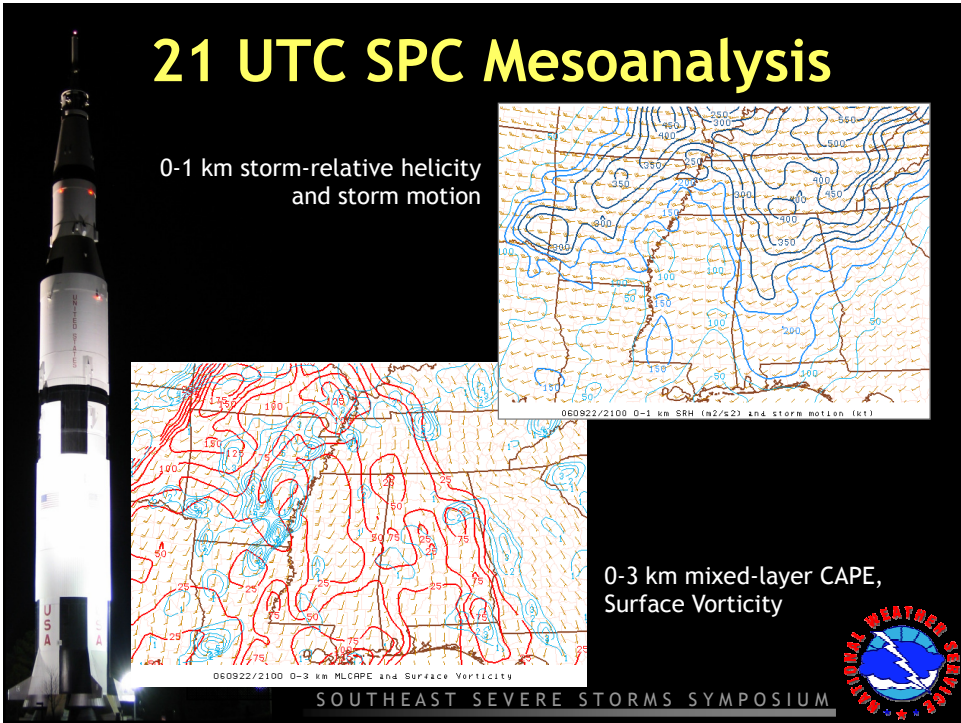
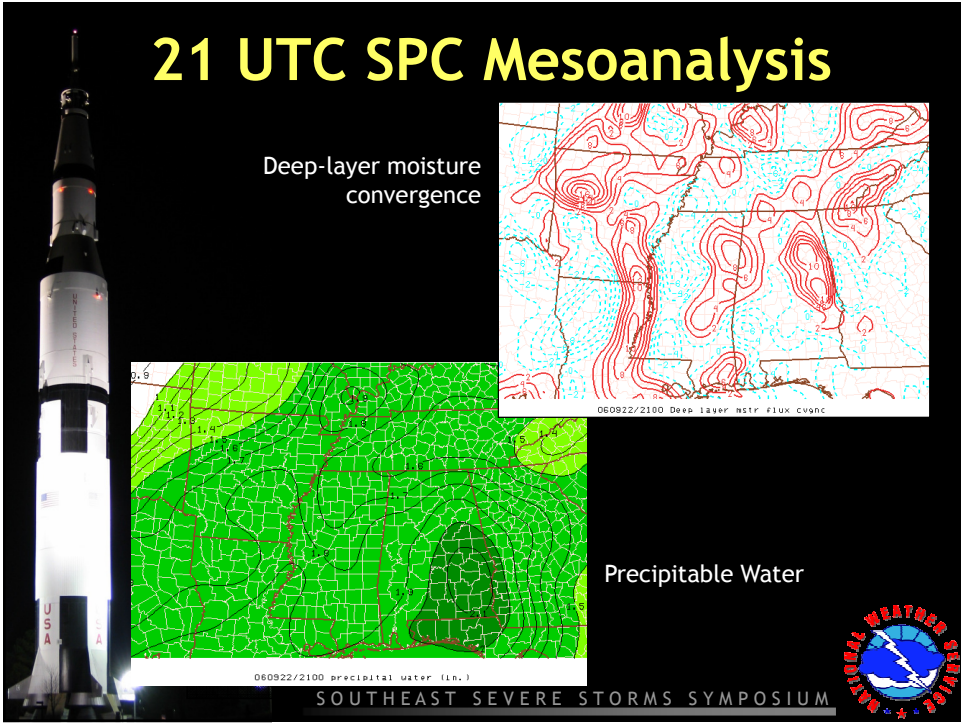


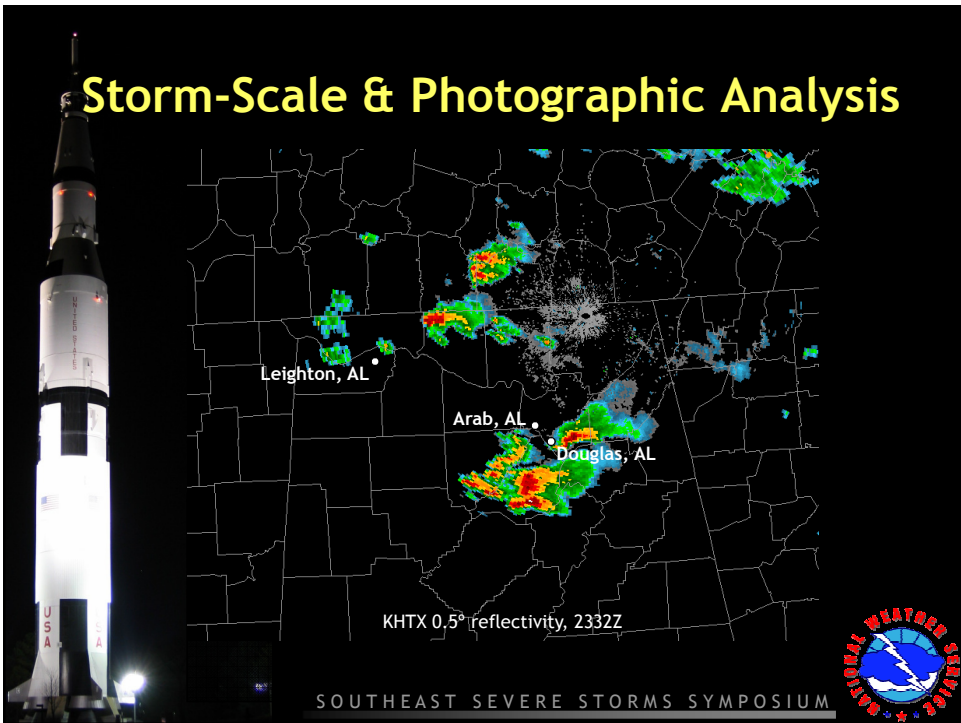




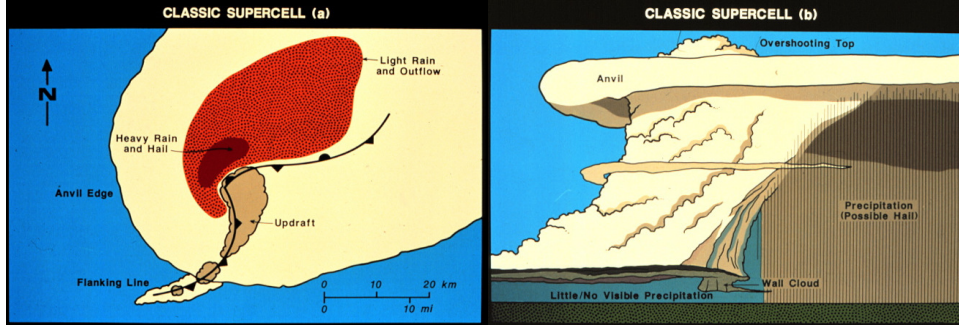








Classic Supercell Schematics

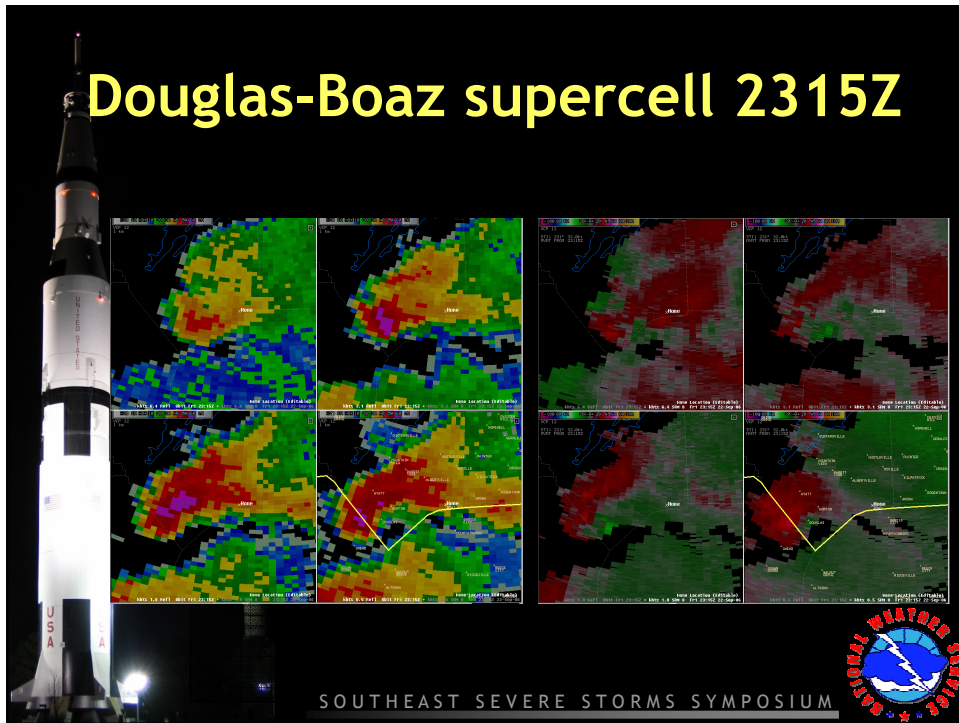


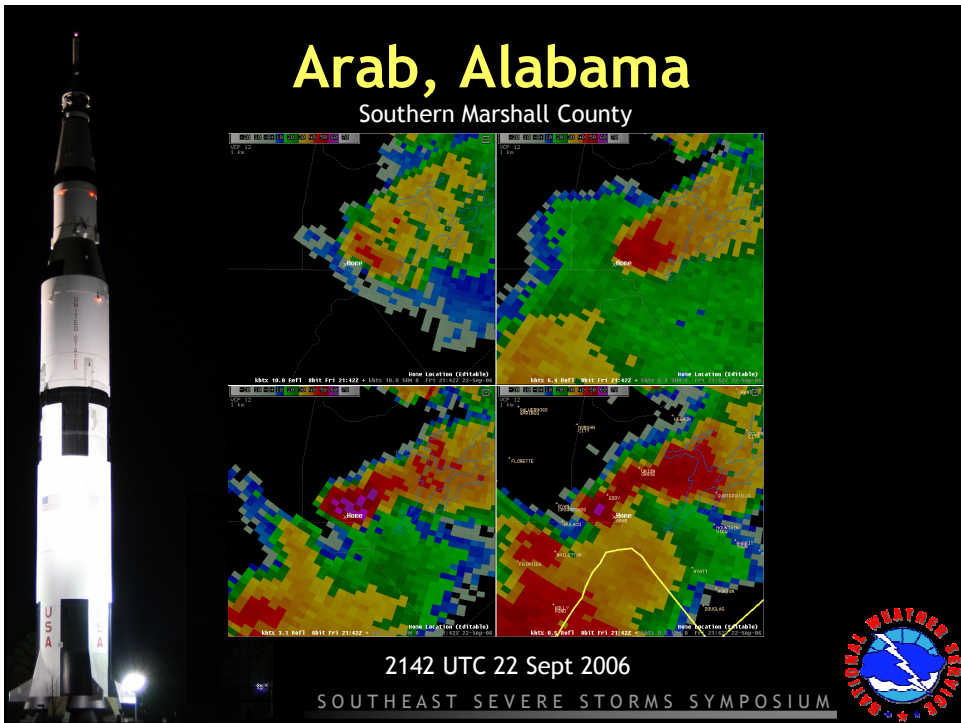
From Doswell and Burgess, 1993

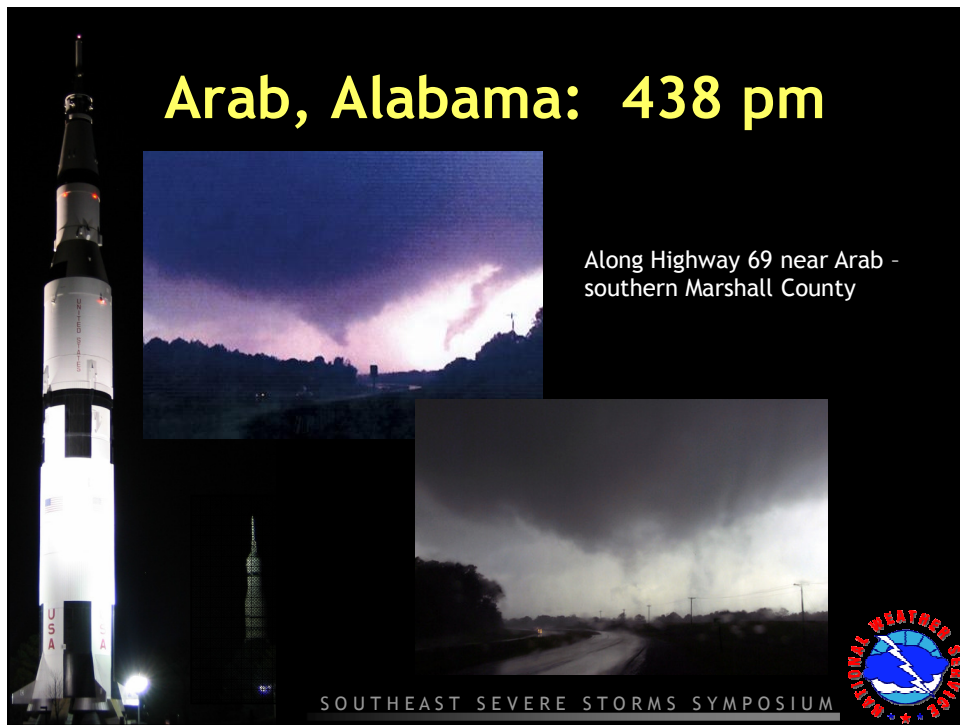
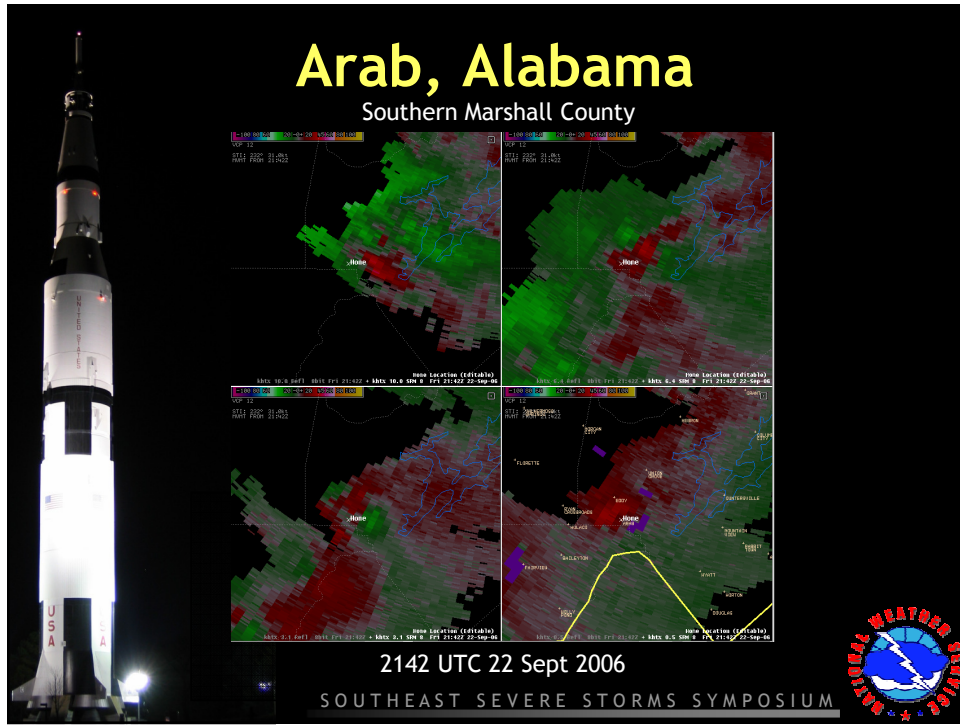
SOUTHEAST SEVERE STORMS SYMPOSIUM

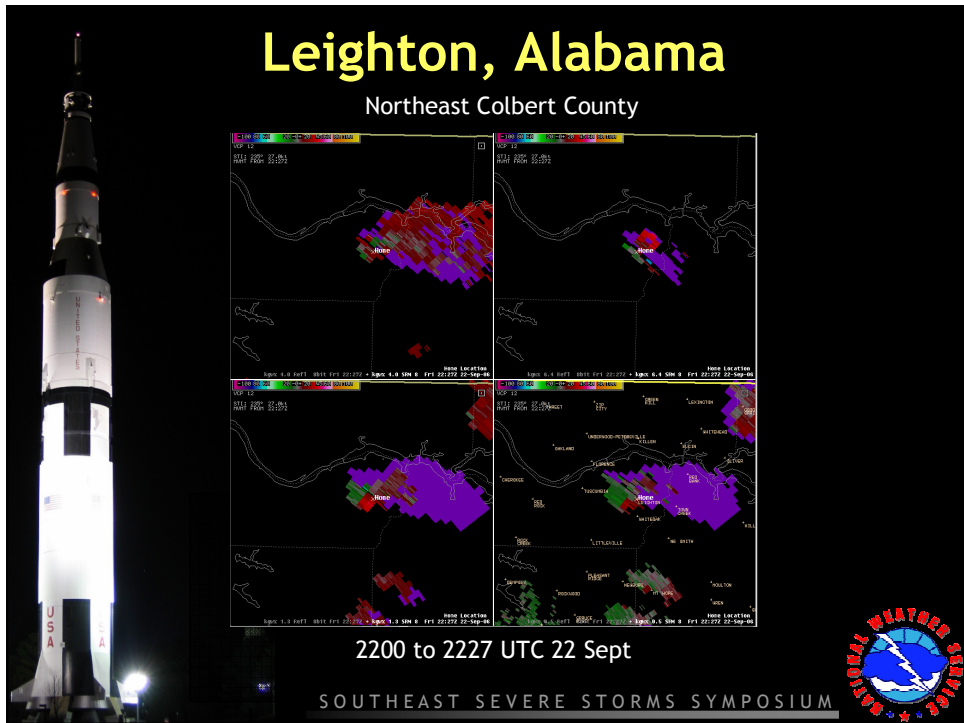
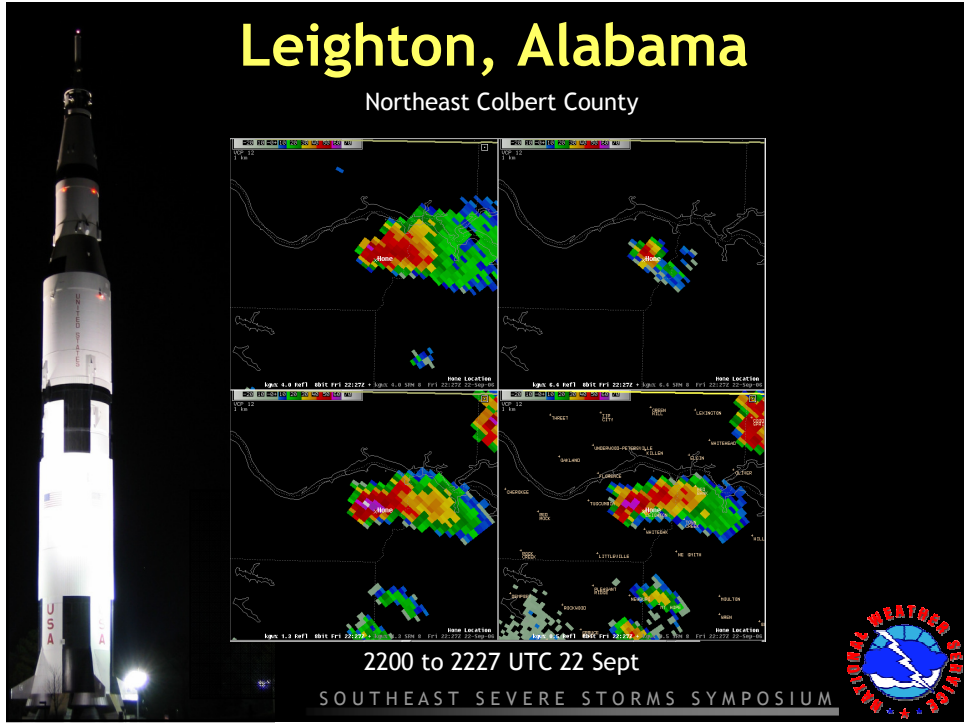


Douglas-Boaz supercell 2315Z

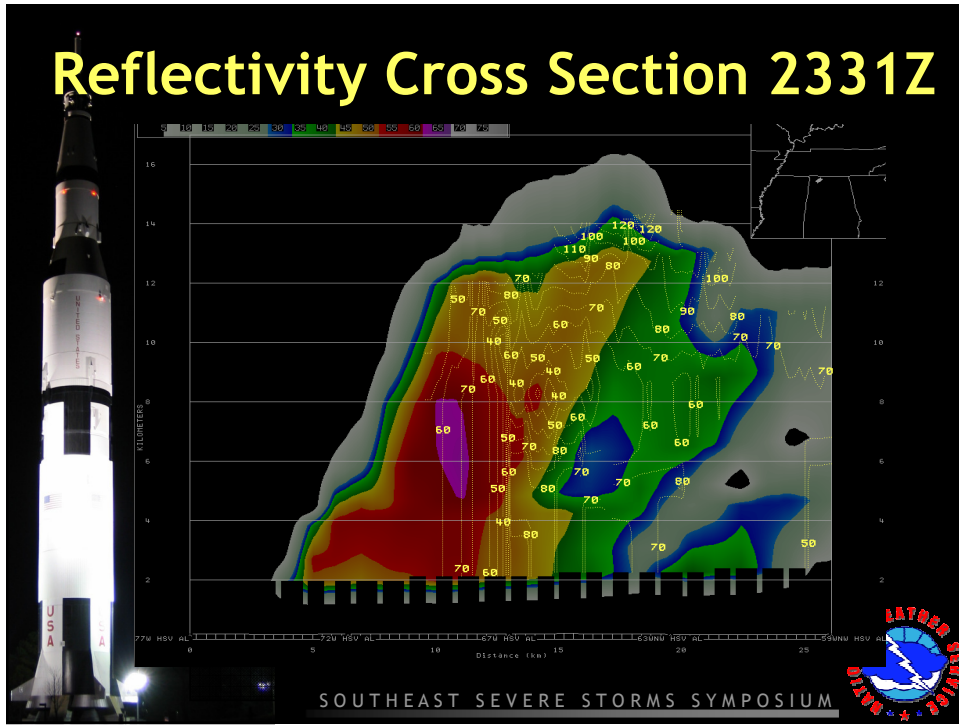








Reflectivity Cross Section 2331Z



Leighton, Alabama



Near Town Creek looking from north of Courtland, Alabama



Same storm, from Tusculumbia, AL



Conclusions & Lessons Learned

- This was an almost entirely mesoscale-driven event.
- Mesoscale model output was poor in handling a few key parameters, which happened to converge to create a higher tornado threat.
- A mesoscale boundary played a major role in enhancing streamwise vorticity across northeast Alabama, which aided in tornadogenesis (especially compared to similar cells in northwest Alabama).
- Forecasting these boundaries is very difficult, but identifying them during an event is critical.



SOUTHEAST SEVERE STORMS SYMPOSIUM

