

## **Weather Event Simulator “DUD” Case Study**

Originating Office: WFO Jacksonville FL

Date of Case: 30 November 2008

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Weather Event: Convective event, low-topped squall line.

Learning Objectives: Environment analysis, radar interpretation, risk management.

Available Data: KJAX and KVAX full radar data sets  
KTAE, KTBW, KMLB partial radar data sets  
Partial AWIPS model data sets (GFS, NAM, RUC, MSAS)  
Partial AWIPS red-book graphics (SPC outlooks)  
All AWIPS satellite imagery  
All AWIPS point data

Time Period of Case: 1230 – 1700 UTC November 30, 2008

Type of Simulation: Case review (not DRT)

Completion Time: 2 to 4 hours

### **WES Instructions for Case**

- Step 1. Start D2D (click on yellow lightning icon).
- Step 2. Choose the 2008Nov30 case. Make sure the site that appears in pop-up is JAX.
- Step 3. When D2D window appears, click on the date/time in lower-right corner, and change as described in exercise.
- Step 4. As you go through the exercise, place your answers on a blank sheet of paper.
- Step 5. When done, discuss your results with SOO, who will have an “answer key”.

## **Severe Weather WES Case Study**

**Date: November 30, 2008**

**Time: 1230 – 1700 UTC**

This exercise involves the review of AWIPS data from the November 30, 2008 convective event across northern Florida. It is provided with suggested training items for discussion between SOOs and forecasters. This exercise does not involve “displaced real time” mode of the WES, just a simple review of the data in its original format. Simply review different portions of this case, rather than having to go through every radar scan. Note that “SWA” stands for “significant weather alert” SPS product, and “CWA” stands for “county warning area”.

Write your responses on a blank sheet of paper for review with SOO.

### **PART I. Set D2D Time to 1230 UTC**

Step 1: Review the SPC Outlook. Note the Slight Risk for se GA and the FL peninsula. Also, examine the upper level feature and jet stream on water vapor imagery.

Step 2: Review the available environment data. Determine the following:

- a) Around 12z, was there ascent or subsidence across much of central and northeast Florida?
- b) Set the number of frames to 33, and loop radar imagery from KJAX or KVAX. Why does a low-topped convective line develop within a large rain shield near 1100 UTC, and what causes it to quickly fall apart in just over 1 hour?
- c) Do you think a severe weather watch is warranted at 1230 UTC for the northern FL peninsula, perhaps into far se GA? If so, what type of watch?
- d) Where is the northern extent of the deeper moisture?

### **PART II. Set D2D Time to 1355 UTC.**

Step 1: Why is there partial clearing across the northern/central FL peninsula, as well as across the eastern Gulf of Mexico, despite approaching system and strong SW flow, and what does that indicate?

Step 2: Note the development of a new band of low-topped convection across northwest FL into the eastern Gulf of Mexico. What clues suggest this band might hold together as it moves across the northern FL peninsula? Is a watch warranted ahead of this line?

Step 3: Review radar data for Suwannee County storm at 1355z. Note multiple cells with low-level rotation. What’s your warning decision for county (TOR, SVR, SWA, None)?

### **PART III. Set D2D Time to 1420 UTC.**

Step 1: Review any additional environment data. Where is the northern extent of the deeper moisture, and how has this changed since 12z?

Step 2: Review the storm approaching Columbia County by 1420z.

- a) Why is there so little CG lightning with this storm?
- b) What is your warning decision for Columbia County (TOR, SVR, SWA, None)?
- c) What is likely causing the “banded” reflectivity pattern on southern part of squall line (oriented nw-se) often seen with derecho systems? Is this a sign of an ongoing derecho?

### **PART IV. Set D2D Time to 1530 UTC**

Step 1: Review any additional environment data. Where is the northern extent of the deeper moisture? How has the squall line evolved over the past few hours?

Step 2: Storms are approaching Jacksonville, the largest metropolitan area in NWS Jacksonville's CWA. What is your warning decision for Duval County, which includes all of Jacksonville (TOR, SVR, SWA, None)? What clues support and oppose an imminent severe weather threat?

#### **PART V. Set D2D Time to 1620 UTC.**

Step 1: Review radar imagery. Note the apparent increase in storm intensity over eastern Duval County. Assuming there is no warning in effect now in Duval County, and ASOSs in western and northern Duval County measured wind peak gusts of 40-45 mph, what would be your warning decision now for the heavily populated eastern part of the county (TOR, SVR, SWA, None)?

Step 2: Focus on the portion of the segment over southern Duval County. Note rotation particularly in the slices from 1.5 to 4.0 degrees (2-6 kft above ground). Given the low-level shear in place (and high SRH values), is a tornado warning warranted for southeast Duval County? What conditions support and oppose such a warning? Given the high SRH environment, why do we not see a stronger mesocyclone?

Step 3: During the period 1555-1610 UTC, why was more CG lightning detected across north-central FL (Union Co to Alachua Co) than northeast FL (Nassau/Duval Co)?

#### **PART VI. Set D2D Time to 1650 UTC.**

Step 1: Review radar imagery. Note the bowing segment in western Marion Co, with some rotation detected. Cell is moving northeast at 50kts along eastward moving squall line. Note locally higher storm top with this cell. As it races toward Ocala, another significant population center, what would be your warning decision (TOR, SVR, SWA, None)?

Step 2: Why is there substantially greater convection occurring ahead of the initial line across central FL, while very little occurred ahead of line in northern FL earlier?

#### **PART VII. Case Conclusion**

No severe weather was reported, and no warnings were issued, across NWS Jacksonville's CWA. 25 to 40 mph winds were reported at times well ahead of the convective line, and wind gusts as high as 48 mph were measured or reported with the passage of the line. There may have been some locally higher winds and minor tree damage that was never reported to the NWS.

Step 1: Review your warning decisions in this case. Keeping in mind what actually occurred, and "risk management", what was the best product for this case?

Step 2: How would you explain the following:

- a) No severe-criteria surface winds despite 50-60kt low-level jet over the area.
- b) No hail despite deep convection in a very dynamic environment with very strong vertical shear.
- c) No tornadoes despite strong vertical shear and large 0-1km and 0-3km SRH values.

Step 3: Compare this event to other similar setups that led to severe weather outbreaks, including 3/7/08 across northeast FL/southeast GA, 3/19/08 across eastern portions of TN/KY and southwest VA, 2/17/08 across eastern AL/western GA, along with another DUD example... 2/17/08 across southern/western OH (where CG strikes were detected). What clues suggested the 11/30/08 event would be a "DUD", compared to the outbreak examples with similar patterns?