"A Wild Weather Day" Historic April 27th 2011 Super Tornado Outbreak: Impact, Damages and Tornado Tracks Over Northern Alabama and Southern Middle Tennessee

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ABSTRACT

Many large-scale natural disasters have occurred over the Southern United States region, but not many have been as impressive in scale or intensity as the April 27th, 2011 Super Tornado Outbreak. 292 tornadoes reports over 16 states caused an estimated of 317 fatalities, damages exceeding $10 billion and thousands of injured. This severe weather event led catastrophic destruction in its wake, especially across the state of Alabama. This research focuses on the impacts and damage, and to develop a better depiction of tornado tracks in Geographic Information System (ArcGIS) form. The specific dataset used include the 40 tornadoes, from the historic April 27th, Super Outbreak, that impacted 10 counties from Northern Alabama and 3 counties from Southern Middle Tennessee. 106 fatalities, 879 injured, damages exceeding $52 million, a total of 515.22 miles of affected area, were the results of two massive EF5, four violent EF4, eight EF2, twenty-one EF1 and five EF0 tornadoes in a period of less than 24 hours across the Huntsville Forecast Area. All 40 tornado tracks were plotted and at least 26 tornado tracks were used to indicate specific damage swaths within the tornado track using ArcGIS© and Paint® programs. This was done to detail the impacts and damages caused by the 40 tornadoes. Undoubtedly, the April 27, 2011 Super Tornado Outbreak will rewrite Alabama history, being closely compared to the April 3rd, 1974 Super Tornado Outbreak. This research opens the doors to future studies and analysis of the impacts of this violent weather system that affected Northern Alabama and Southern Middle Tennessee.

INTRODUCTION

During April 25-28, 2011 a large portion of United States was affected by a violent Tornado Outbreak, with April 27th being the worst day. Roughly 292 tornado reports over 16 states occurred on this day with Alabama being worst hit. All total, 317 people lost their lives with thousands injured. On an economic level, total damages exceeded $10 billion. This powerful weather system had a strong cold front with several areas of low pressure that moved from Texas Hill Country to the lower Ohio Valley. Significant low level moisture emanating off the Gulf of Mexico combined with a potent upper level system to produce the widespread severe weather. The cold front was the focal point of numerous supercells that caused the touchdown of at least 23 - EF3, 11 - EF4 and 4 - EF5 tornadoes across the Southeast.

TORNADO OUTBREAK IMPACT AND DAMAGES

According to the Alabama Hospital Association an estimate of 2,677 people were injured in Alabama and 879 of the injuries occurred in Northern Alabama. Also the association doesn’t have injury numbers for 3 counties (Cullman, Jackson and Lawrence) of the Northern region, so the total number of injured people would have probably been higher.

BRIEF SEVERE WEATHER OVERVIEW

The Huntsville County Warning Forecast Area (CWFA) was affected by three severe waves of severe weather in an ~18 hour time period.

First Round: During early morning hours between 2 am-8 am A very prominent quasi-convective system (QLCS) with damaging winds (~ 70 MPH) and isolated tornadoes rumbled across portions of northern Alabama. Tornado and Severe Thunderstorm warnings were issued in Northern Alabama.

Second Round: During late morning to early afternoon Another QLCS produced significant wind damage along with several tornadoes across northeast and north central Alabama.

Third Round: “The match of the supercells”. The most violent tornadoes occurred during this afternoon hours, beginning around 2:30 PM and lasting until 9 PM CDT. Supercells began to line up to the southwest of central Alabama. Particularly Dangerous “Tornado Watch” was in effect for the Huntsville CWFA. Numerous supercell, thunderstorms produced setting to violent tornadoes, including 4 EF4 and 2 EF5 tornadoes which were ultimately reported in the list, coming from as the cold front pushed east of northern Alabama.

RESULTS

The Worst Tornado To Date:

Range: EF5 - Affected Counties: Marion, Franklin, AL, Lawrence, Limestone, Madison and Franklin, TN / Path Length: 106.9 miles / Max Width: 1.25 miles / Peak Wind: 210 mph / Spent Time: 1:30 pm / Ending Time: 5:20 pm / Killed 7 tornado, 71 fatalities

Damage photographs were taken with the exact coordinates of where pictures were taken. The obtained data was processed using Google Earth and a locally developed software program. In the picture above, an actual tornado track, each point represents a picture taken of specific damage. Damage photographs were analyzed and rated using the Tornado Enhanced Fujita Intensity Scale (EF-scale). Intensities of each damage picture along with specific coordinates were entered into an excel spreadsheet and saved as a comma-delimited file. Excel data were added into a topographic map using the ArcGIS program. Displayed X and Y coordinate data were differentiated assigning different colors to each point according to damage intensity.

CONCLUSION

By detailing the impacts and damage caused by the 40 tornadoes across North Alabama and Southern Middle Tennessee, results will prove useful to Alabama citizens, researchers and meteorologists, and also other first response agencies such as, AEMA, AFC, among others. Alabama has experienced violent tornado events of the past, like the Super Outbreak of April 1974 that killed 265 with 1,177 injured and economic losses of around $50 million. However, the April 27th, 2011 Super Tornado Outbreak, to Northern Alabama alone, will go down as one of the worst weather-related disasters to ever hit the state of Alabama. The 27 April 2011 Super Tornado Outbreak, left 104 dead, at least 809 injured with economic losses exceeding $52 million after 40 tornadoes ripped across the area. Weather forecaster and meteorologists and emergency managers must continue to work together to have a better understanding of these weather events and also in develop plans that will mitigate loss of life and property.

ACKNOWLEDGEMENTS

I appreciate the help and support from the staff of the National Weather Service Warning Forecast Office at Huntsville, AL. Thanks to Brian Carrienne (Science & Operations Officer) who helped me further understand the impact of the severe weather and David Nadler (Warning Coordination Meteorologist) and Chris Doolin (Meteorologist in Charge) who supervised the development of this interesting and important research. I express my thanks and gratitude toward the staff at NWS Huntsville for making me feel part of the office during the Summer of 2011.

MAIN REFERENCES: NWS WFO Huntsville, AL (22 September 2011) April 27th, 2011 Tornado Outbreak.

Map showing the location of affected counties from the April 27, 2011 tornado outbreak in the United States.