

## P1.4 THE DOWNTOWN ATLANTA, GEORGIA, EF-2 TORNADO OF 14 MARCH 2008

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### 1. INTRODUCTION

A historic, but not unprecedented tornado struck downtown Atlanta, Georgia on the evening of 14 March 2008. The tornado, rated EF-2, caused significant damage to the most densely-populated portion of downtown, but was certainly not the first tornado to strike a central business district of a large urban area. Indeed, 23 “downtown tornadoes” have been observed since 1871 in the United States and an increasing trend in their frequency has been noted since 1993 (Edwards and Schaefer 2008).

This paper will discuss the history of Atlanta tornadoes, the chronology and impacts of the 14 March 2008 tornado, and the response to the warning and aftermath of the tornado.

### 2. HISTORY OF ATLANTA TORNADOES

Only 4 tornadoes prior to the 14 March 2008 tornado have been recorded within the present-day city limits of Atlanta, Georgia since 1884 (Table 1). This matches well with observed tornado frequency in the region, given the 132.4 mi<sup>2</sup> (343 km<sup>2</sup>) area within the city limits and that 3.7 tornadoes per 100 mi<sup>2</sup> have occurred on average in Georgia over a 100 year period extrapolated from data collected between 1953 to 2004 (NCDC 2005). The 14 March tornado was the first to strike the downtown Atlanta.

The most notable of the tornadoes in Table 1 is the “Governor’s Tornado” of 24 March 1975 which caused 3 fatalities, 152 injuries, and \$56.5M in damage. The tornado formed from a supercell ahead of a line of thunderstorms. It touched down in west Atlanta and moved northeast across west and north Atlanta damaging many structures including the Governor’s Mansion located in the Buckhead district of north Atlanta.

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Date	Location	Notes
15 April 1884	Sandtown district	10 fat.
13 March 1913	east Atlanta / DeKalb county	8 fat.
10 January 1972	southeast Atlanta	1 fat., 9 inj.
24 March 1975	west and north Atlanta	3 fat., 152 inj.
14 March 2008	Downtown and east Atlanta	1 fat., 30 inj.

**Table 1:** Dates and locations of tornadoes within the 2008 Atlanta city limits from 1884 to 2008.

### 3. CHRONOLOGY OF THE DOWNTOWN ATLANTA TORNADO

Tornadoes were generally not expected in north Georgia on the afternoon and evening of 14 March 2008 as a cool, moist airmass in the boundary layer appeared to indicate high static stability. The temperature and dewpoint temperature at the Fulton County and Atlanta-Hartsfield ASOS stations were 13.9C/13.3C (57F/56F) and 15.6C/13.3C (60F/56F), respectively, at 0100 UTC. A thermodynamic profile obtained from the Peachtree City rawinsonde at 0000 UTC, however, indicated moderate instability with mixed layer CAPE around 875 J kg<sup>-1</sup>. Strong unidirectional shear was also present on the sounding with significant storm-relative helicity, approximately 150 m<sup>2</sup> s<sup>-2</sup> in the surface to 1km layer, for storms moving right of the mean wind (Figure 1).

Two supercell thunderstorms developed in northeast Alabama in the afternoon and traveled east-southeast into north Georgia in the evening. As the east-most supercell moved through southern Cobb county, or about 10 mi (17 km) west-northwest of downtown Atlanta at 0126 UTC, rotational velocity in the storm increased to 38 kts. Research later done by Trostel et al. (2008) also showed that a drop in total lightning flashes was observed prior to the tornado, followed by a jump. A tornado warning was issued for central Fulton county, including downtown Atlanta at 0130 UTC (Figure 2).

The tornado touched down in west Atlanta at 0138 UTC near Simpson and Burbank streets west of downtown and continued east-southeast through downtown directly affecting the Georgia

World Congress Center, the Georgia Dome, the CNN/Omni hotel complex, Philips Arena, the Equitable Bank tower, the Westin Peachtree Plaza Hotel, and the Cabbagetown district, including the Cotton Mill Lofts condominiums. Damage continued into far western DeKalb county after which the tornado lifted around 0150 UTC. A map of the tornado intensity and track is shown in Figure 3.

#### **4. IMPACT**

While the tornado only affected an area roughly 6 mi (10 km) long and 200 yards (90 m) wide, the impact was severe. Thirty injuries, many minor, and one fatality were reported. Besides the 50 homes damaged, numerous large towers and commercial buildings were heavily damaged. Broken glass from hundreds of windows blown out from the towers were strewn in the streets, requiring safety officials to close most streets and restrict traffic to first responders.

The tornado occurred on a Friday evening and most offices, normally filled with thousands of employees, were empty. However, many downtown restaurants and hotels were near or at capacity due to two large sporting events that evening. The second round of the NCAA Men's Southeastern Conference (SEC) basketball tournament between Mississippi State University and the University of Alabama was being played in the Georgia Dome with nearly 40,000 in attendance. An NBA game between the Atlanta Hawks and the Los Angeles Clippers was also taking place in nearby Philips Arena. Fortunately, the track of the most intense tornadic winds did not cause serious damage to the Georgia Dome or Philips Arena, as shown in Figure 3. No injuries were reported at either venue, although it is unknown how many of the injuries were sustained by fans who were in town to attend other SEC tournament games.

The Martin Luther King Jr. Metro Atlanta Rapid Transit Authority (MARTA) station near the Oakwood district was heavily damaged which caused MARTA rail traffic to be rerouted. The only fatality of the event occurred when a wall adjacent to the MARTA station collapsed on a homeless individual.

The following day, many large events were cancelled, postponed or relocated. The Atlanta Home Show was cancelled when the Georgia World Congress Center suffered heavy damage from both the tornado and flooding from a broken water supply line. The St. Patrick's Day

parade held each year in downtown Atlanta was rescheduled. The remainder of the NCAA SEC basketball tournament was relocated to the much smaller Alexander Memorial Coliseum at Georgia Tech. Only players' families, media, and officials were allowed to attend.

#### **5. RESPONSE**

Response by emergency officials to the tornado warning and aftermath was prompt and decisive. While the city of Atlanta does not operate outdoor warning sirens in downtown, fire response vehicles were dispatched after the warning was issued to sound their air horns and sirens to warn residents. After the tornado struck, first responders searched for victims, secured the area, called in units from adjacent departments, and established the incident command system. One firefighter received a minor injury.

Officials at the Georgia Dome, who were hosting the NCAA SEC Basketball tournament, also received the warning and implemented their emergency plan. Fans were notified that severe weather was in the area and to remain in their seats about the time of tornado. Immediately following the tornado, fans continued to be advised to remain in the building until the severe weather subsided. The game was postponed for about an hour before resuming. One of the unique aspects of the Georgia Dome response was that the game was broadcast live on television with a large number of viewers when the tornado occurred. The video clearly shows players and fans unaware of the tornado until the roar of the wind and the minor damage occurred. Later, the video and photographs showed the safety instructions prominently displayed on large screens in the dome (Figure 4).

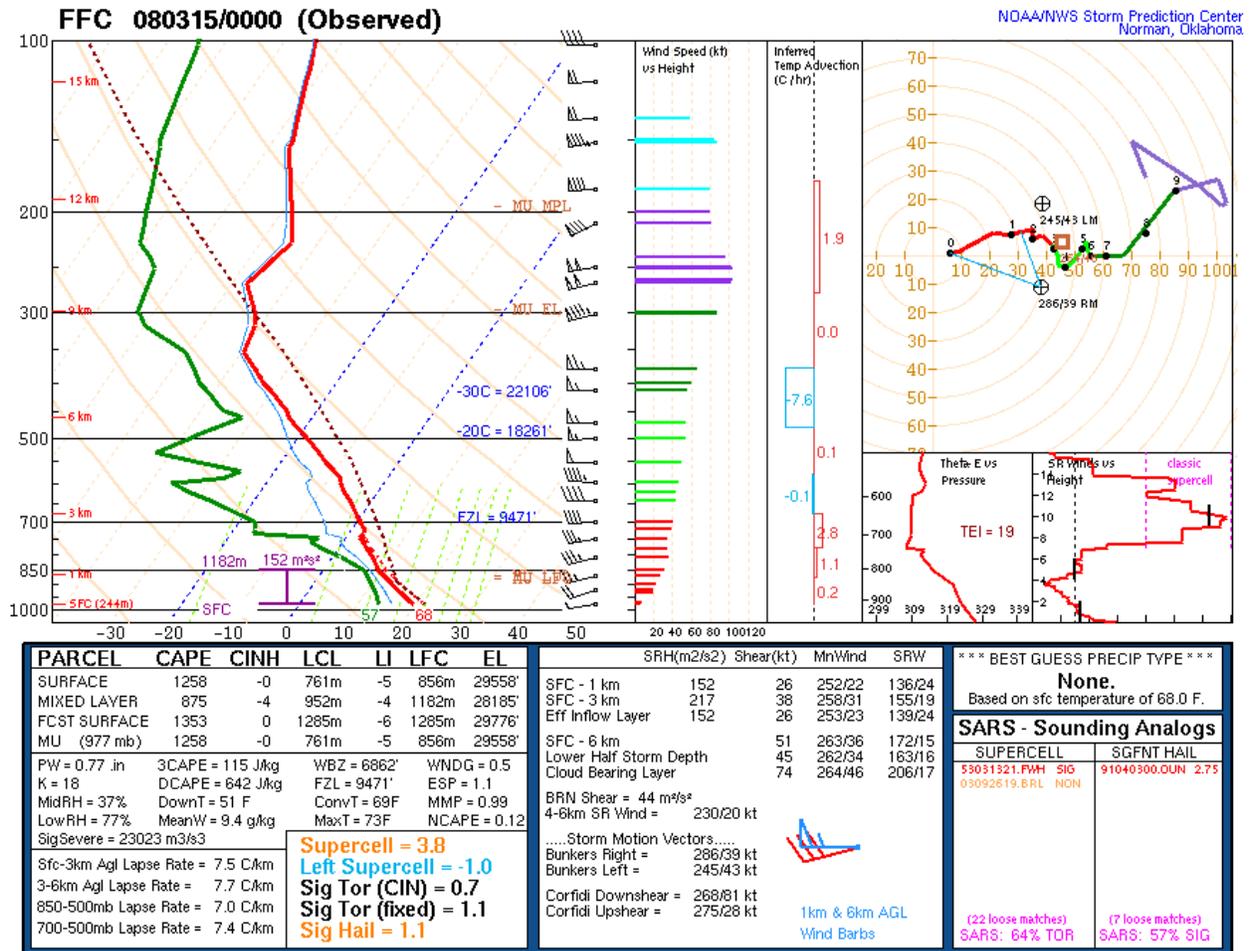
#### **6. CONCLUSION**

The downtown Atlanta tornado of 14 March 2008 caused significant damage and several injuries, but overall, a relatively modest amount, considering the density of structures and population. A phrase often quoted after the event by emergency officials and the media was "it could have been worse". Indeed, the list of downtown tornadoes compiled by Edwards and Schaefer (2008) shows that while several U.S. central business districts in large urban areas have been hit by tornadoes, few fatalities have occurred. While this may be due to sufficiently

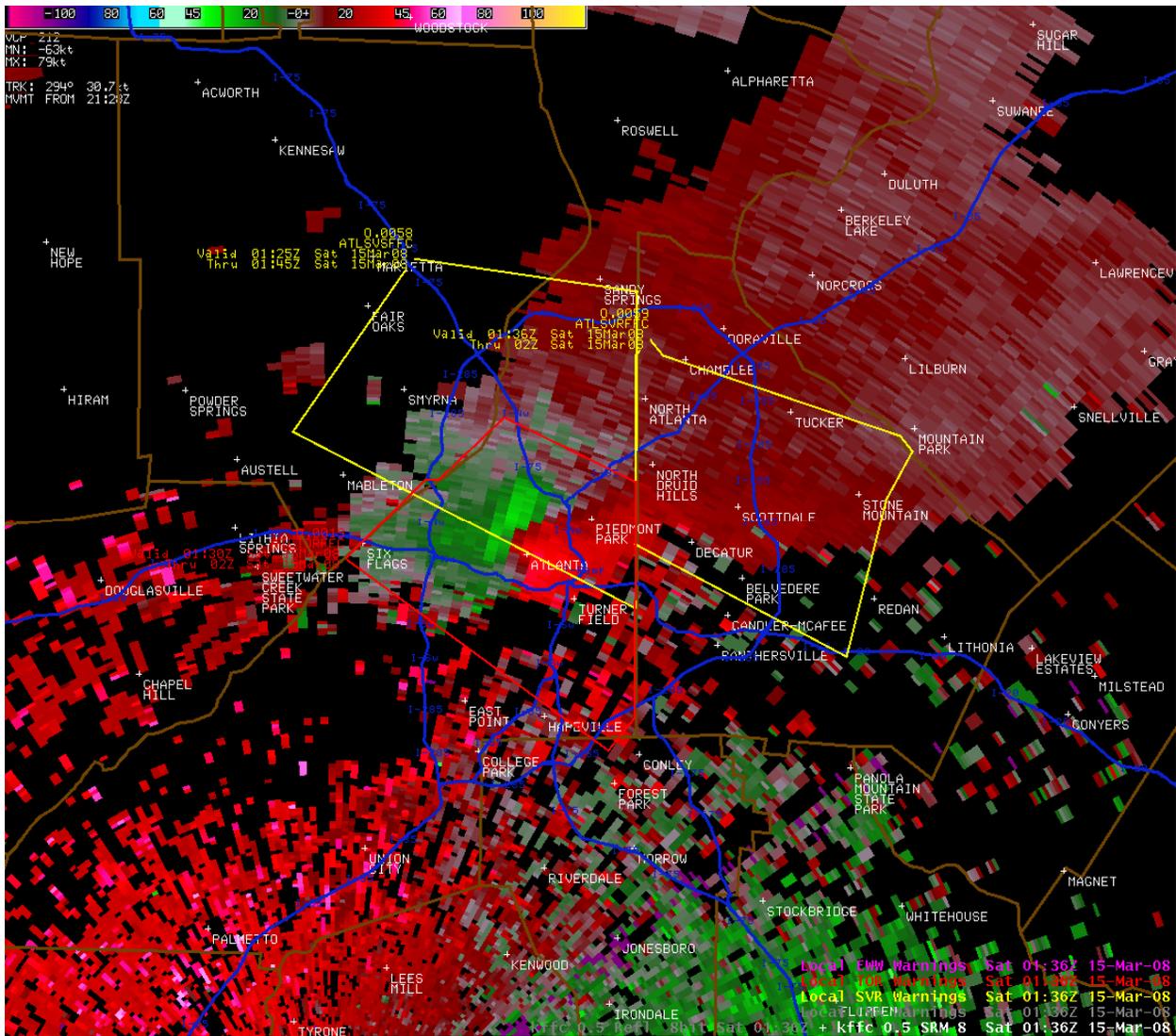
long warning lead times and favorable severe weather response plans for these events, it may be just as likely that violent and/or slow-moving tornadoes have yet to affect a downtown area of a large city. A decrease in warning lead times or poor severe weather response plans may also lead to a greater risk of numerous fatalities and injuries. Good relationships, frequent and productive communication, and thorough planning between warning decision makers and emergency response agencies, media, and large-event venue operators are critical to ensure continued safety of densely populated urban areas.

## REFERENCES

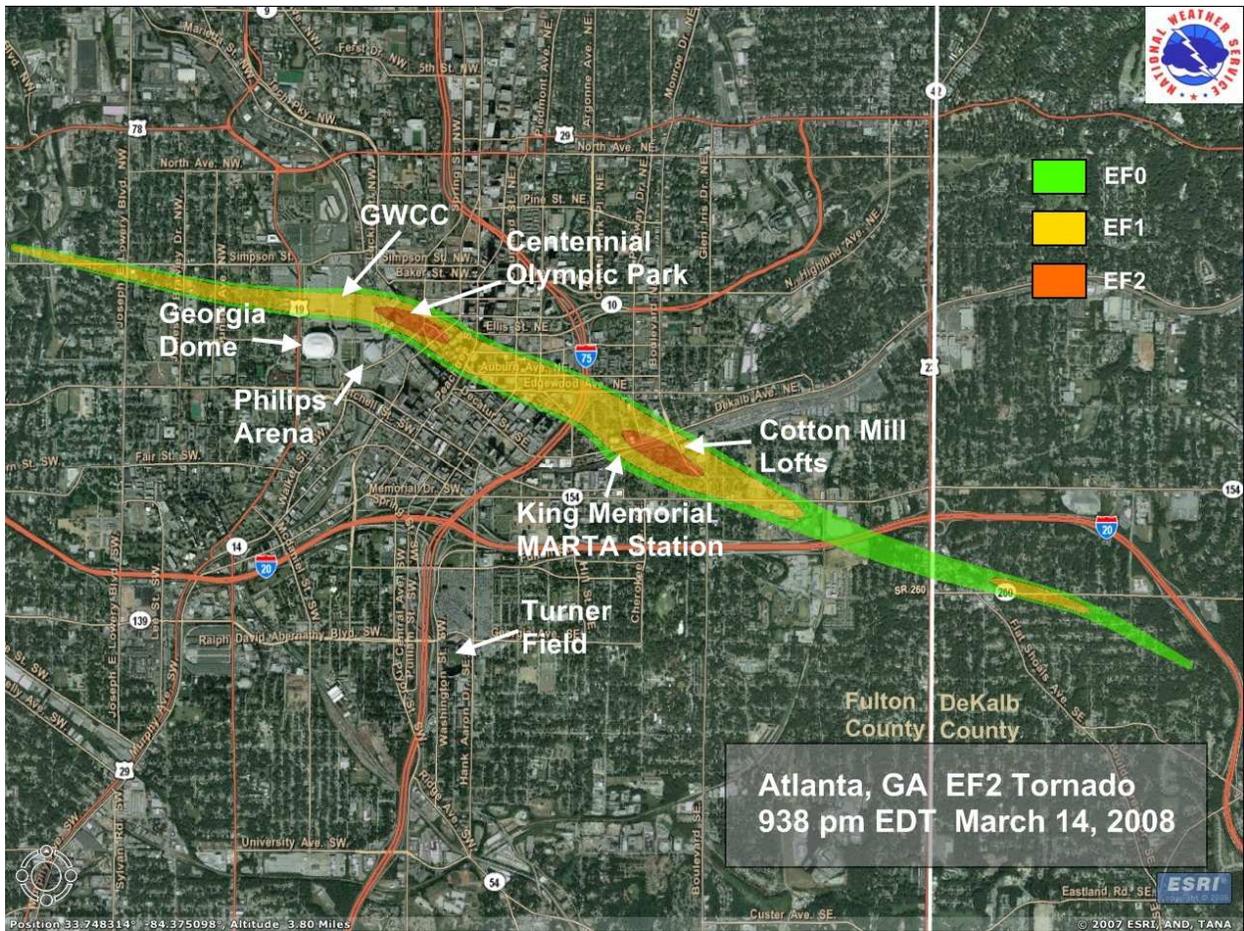
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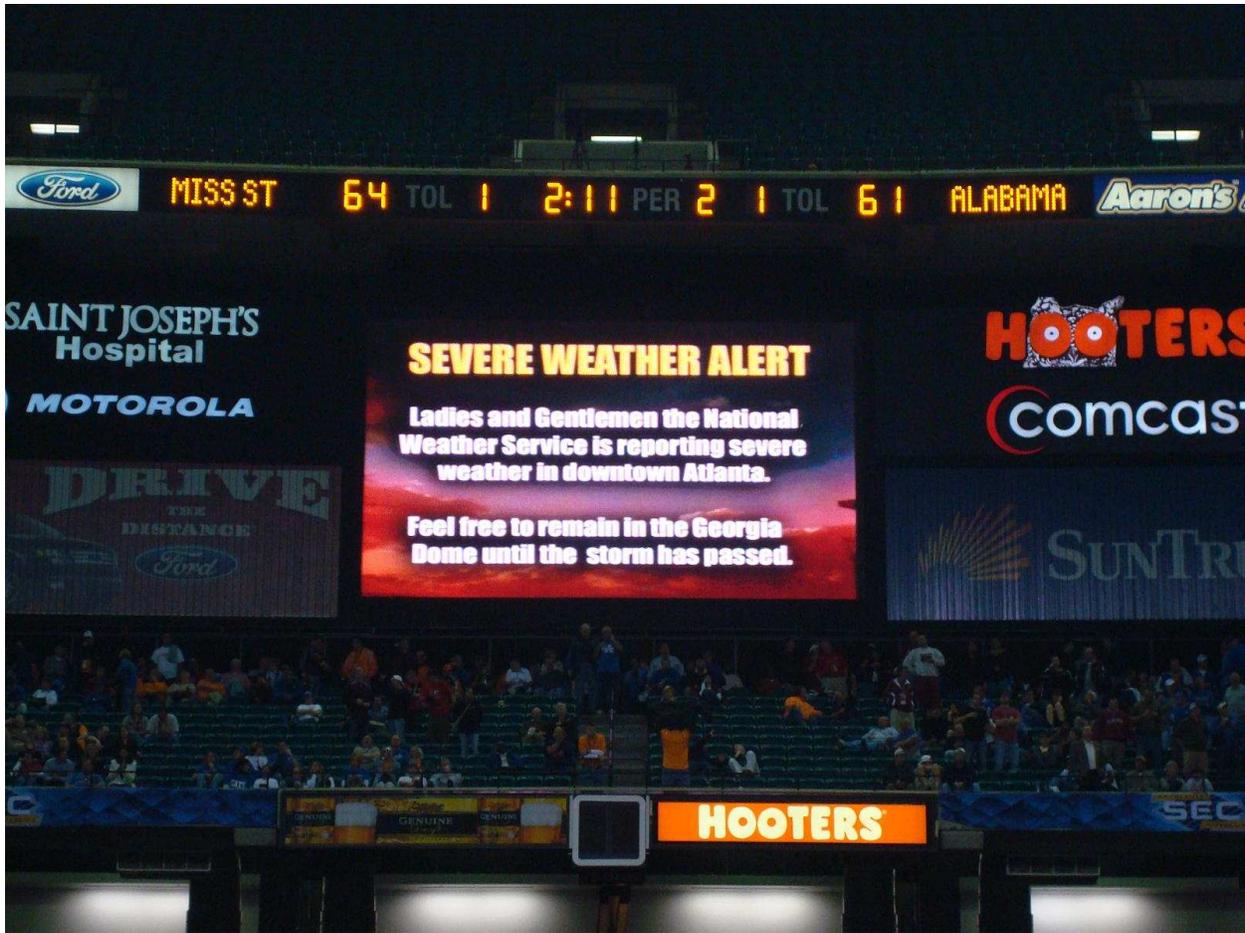
**Figure 1:** Composite plot of rawinsonde data taken at 0000 UTC 15 March 2008. Image courtesy Storm Prediction Center.



**Figure 2:** Storm-relative velocity from the 0.5° slice of the KFCC WSR-88D radar at 0136 UTC 15 March 2008, six minutes following the issuance of the tornado warning for central Fulton county. The yellow polygons are severe thunderstorm warnings. The red polygon is the tornado warning.



**Figure 3:** Track and intensity of the 14 March 2008 Atlanta, Georgia tornado. Large event venues and locations affected by the tornado are annotated. Ratings were based on an NWS damage survey.



**Figure 4:** Photograph taken immediately following the tornado at the Georgia Dome during the NCAA Men's Southeastern Conference basketball tournament game between Mississippi State and Alabama. Photo courtesy Ryan Glenn.