

## 2004 YEAR IN TORNADES: WHAT A YEAR IT WAS!

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### 1. INTRODUCTION

2004 will be known as the biggest tornado year since recordkeeping began in 1950. The sheer numbers of tornadoes were unprecedented: 1,819. This number eclipsed the previous record of 1,424, set in 1998 (Fig. 1).

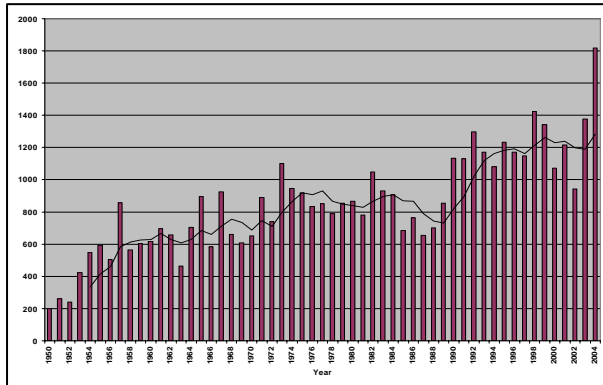


Figure 1: Tornadoes by Year 1950-2004.

Once again, another year passed without a tornado resulting in F5 damage. The May 3, 1999, tornado that heavily damaged parts of southern Oklahoma City continues to remain the last tornado to cause such devastation. In 2004, there were 1,688 weak tornadoes (F0 and F1 damage), 126 strong tornadoes (F2 and F3 damage), and 5 tornadoes that caused F4 damage.

The tornadoes of 2004 occurred within 190 tornado days (Fig. 2). This is slightly above normal and strongly indicates an above-average number of tornadoes each tornado day.

Monthly records were also set (Fig. 3). The numbers in May were impressive once again with over 500 tornadoes. The number of tornadoes in August and September were incredible when 300 tornadoes occurred over the Southeastern and parts of the Eastern States, spun by tropical weather.

Impressive for the year also was the relatively low ratio of fatalities from killer tornadoes. Thirty-five deaths were attributed to tornadoes, 20 fatalities below the annual average.

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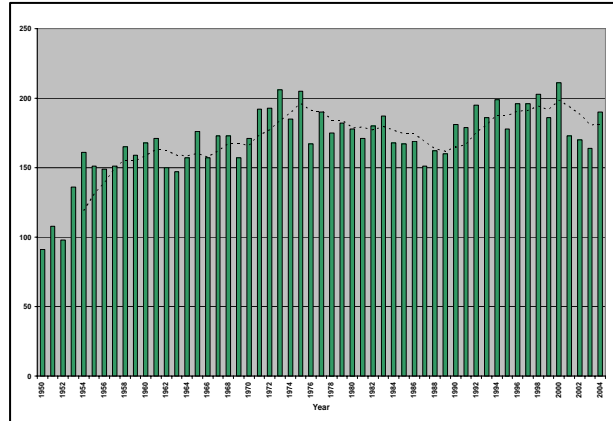


Figure 2: Tornado Days by Year 1950-2004.

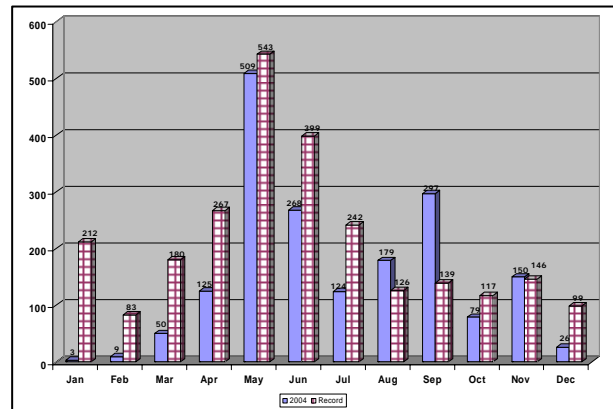


Figure 3: Tornadoes by month in 2004 compared to the record number of tornadoes for each month.

### 2. HIGHLIGHTS

#### 2.1 April 20

A warm front was moving northward across central Illinois during the afternoon. South of this boundary, across eastern Missouri into Illinois, temperatures were in the upper 70s with dew points in the upper 50s, indicative of a moderately unstable air mass. Temperatures north of the boundary were twenty degrees cooler (Fig. 4).

Notice the dew point at Springfield, IL, of 60 degrees. There is a ribbon of moisture streaming from the east-southeast along the warm front. A favorable shear profile existed over central Illinois

underneath the exit region of the upper level jet (not shown).

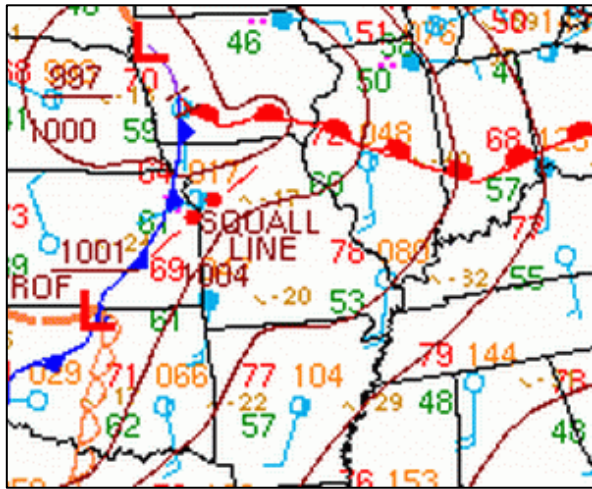


Figure 4: Synoptic setting 20 April 2004.

Sixteen tornadoes occurred across Illinois just north of the warm front, including the killer tornado that hit Utica, IL. Eight people died after taking cover in the Milestone Tavern, a 117-year-old building with a sandstone foundation supported by railroad-tie beams (Fig. 5).



Figure 5: The remains of the Milestone Tavern in Utica, IL, where eight persons died.

## 2.2 May 21-31

Where the year 2003 made numerous headlines with continued outbreaks in early May, the month of May 2004 waited until the last 10 days. After May 20<sup>th</sup>, 389 of the month's 509 tornadoes occurred, most of them in Kansas, Nebraska, Iowa, Missouri, and Illinois. The most notable tornado was the Hallam, NE, tornado on May 22<sup>nd</sup>. This tornado caused F4 damage, but is most notable for being the widest tornado since recordkeeping began in 1950. The maximum path

width is listed at 2.5 miles (Fig. 6). Amazingly, only one fatality occurred with this tornado.

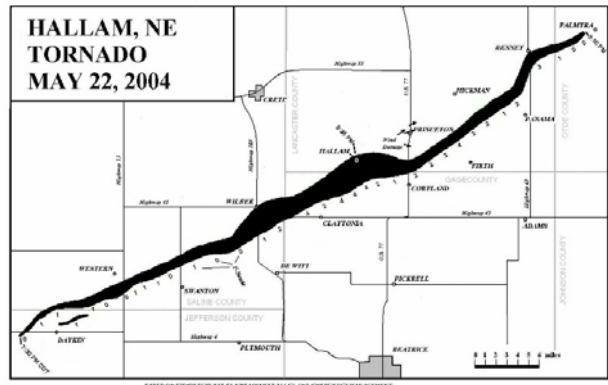


Figure 6: Schematic of the path of the Hallam, NE, tornado by Brian Smith, Warning Coordination Meteorologist, Valley, NE NWS WFO.

## 2.3 Tropical Tornadoes

The year was headlined by the active tropical storm season across the Southern United States into the Middle Atlantic area. Tropical Storm Bonnie and Hurricanes Charley, Frances, Gaston, Ivan, and Jeanne teamed up to produce 300 tornadoes from Florida northward into Maryland and Virginia, unprecedented for any year on record (Fig. 7). Hurricane Ivan alone produced 117 tornadoes, tying a record set by Hurricane Beulah across Texas in 1967.

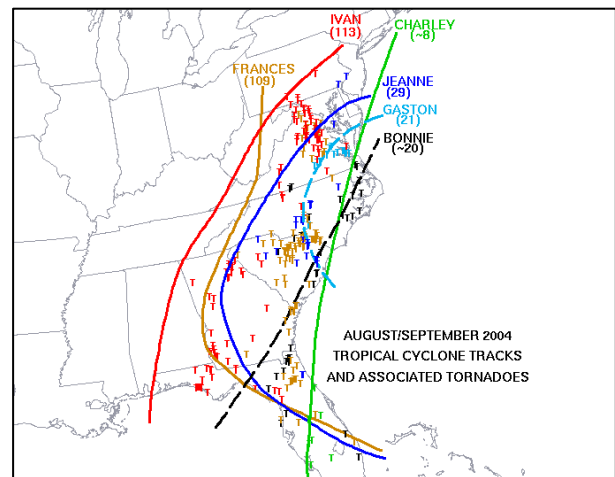


Figure 7: Estimated tracks of tropical cyclones and tornado reports from T.S. Bonnie and Hurricanes Charley, Frances, Ivan, and Jeanne.

## 2.4 The Second Season

Tornadoes in November and December added to what was already a major year. The mean flow across the United States brought storm systems

from the Southern Plains eastward into the Tennessee Valley and Gulf Coast States due to a large ridge over the northern Pacific Ocean. Thunderstorms then tracked from Texas into Mississippi and Alabama, producing over an additional 100 tornadoes. By early December, the main storm track ran from California eastward into the South Central United States sending a negatively-tilted trough across the Tennessee Valley. Once again, Mississippi took the brunt of this activity with tornadoes across the central parts of the state.

On the third to last day of December, an El Niño-like pattern was established with a trough off the central California coast. One half-dozen tornadoes occurred across southern California on the 29<sup>th</sup>. In fact, this would run over into January 2005 with an additional 14 tornado reports.

The autumn tornado season added 176 more tornadoes to the annual count including 54

tornadoes across parts of Texas, 35 in Mississippi, 25 in Alabama, and 21 in Louisiana.

### **3. SUMMARY**

2004 will be known more for the number of tornadoes rather than its overall severity. Tropical cyclones produced 300 tornadoes in August and September across the Southeast and East Central United States. Even without these tornadoes, 1,519 tornadoes occurred which would have still eclipsed the old record of 1,424 tornadoes in 1998. To the credit of the Outlook-Watch-Warning system in partnership with the media and emergency management, only 35 lives were lost with the over 1,800 tornadoes recorded. This is 36% below the annual average tornado fatality rate.