Confirmed Tornado
Florence, Ontario
August 7, 2003

Date- Local: Thursday, August 7, 2003
UTC: Thursday, August 7, 2003
Time- Local: 1600
UTC: 2000
Location: Florence
Region: Windsor-Chatham-Essex-Kent
Classification: Confirmed Tornado
Category: A
Casualties: None
Track Length: 1000 m
Width: 50 m
Motion: 225 degrees
Damage Estimate: None available
F-Scale Rating: F0
Code: SS
Damage Survey: David Sills, MSC King Radar
Spotter Reports: None
Other Documents:
Storm damage survey by David Sills

sjs

Meteorological Service of Canada
4905 Dufferin Street, ARMP
Downsview, Ontario M3H 5T4
CANADA

Tornado F-Scale Assessment

Sarah J. Scriver
Tornado Data Production Assistant, Environment Canada
July 14th, 2004

Classification: Confirmed Tornado
Date: Thursday, August 7th, 2003
Location: Florence, Windsor-Chatham-Essex-Kent Region

Assessment: F0
F-Code: SS
Explanation of Assessment: Some shingles knocked off an old shed.

SJS

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Storm Damage Survey - 7 August 2003

- Florence -

Investigator

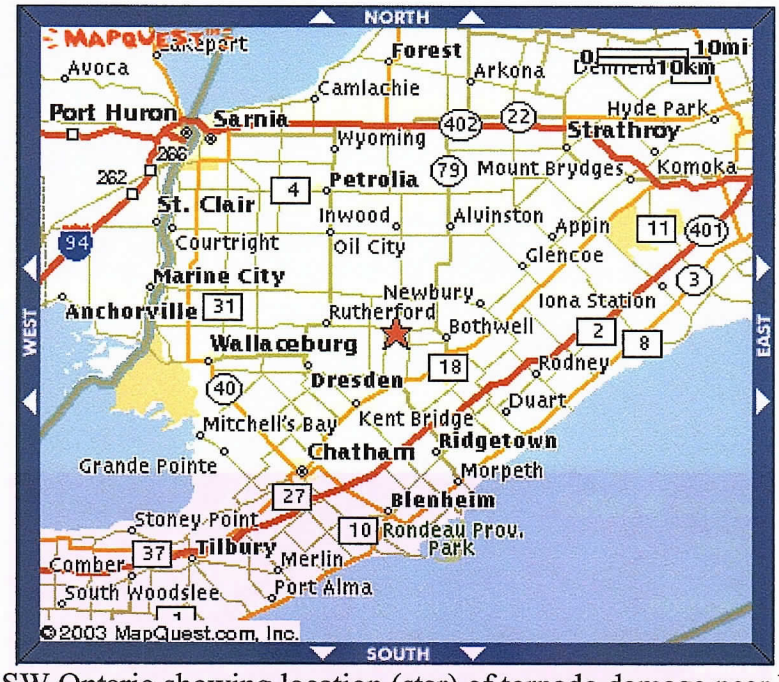
David Sills, MSC King Radar

Quick Facts

Severe Weather Type	Tornado
Location	Florence (Chatham-Kent)
Time	Between 4:00 pm and 4:30 pm EDT
Duration	Roughly 5 minutes
Magnitude	F0
Path Length	Approx. 1 km
Direction of Motion	From approx. 225°
Lat / Long	Start: 42.63569, 81.97949
Path Width	Roughly 50 m
Rotation	Cyclonic
Significant Damage	Shingles removed from shack, branch down, slight crop damage
Damage Estimate (Source)	$ 100 (DS)

Introduction

Farmer Hilco Tamminga videotaped a tornado on August 7 that appeared on the New PL news later that night. After seeing the video evidence, a ground investigation was carried out on August 8 to determine the characteristics of this tornado. A map of the location of the tornado is provided below.



Map of SW Ontario showing location (star) of tornado damage near Florence

The Tornado and Damage Investigation

The following video capture shows the tornado with a funnel cloud protruding from cloud base and dirt / debris revealing the lower part of the vortex. There is little evidence of a lowering commonly associated with supercell tornadoes. Mr. Tamminga recalled that the vortex was rotating cyclonically. Further careful inspection of his video supports this.

Video capture of tornado as shown on the New PL courtesy of Ben Fuller.

An eyewitness that saw the tornado from his residence roughly 200 m north of the tornado's path said that the tornado tore shingles off on an old shack and tore through the crops on the east side of the road, moving in a northeasterly direction for about 1 km. The shack, shown below, did have sections of shingles removed. Shingles were found on the ground both to the west and the east of the shack and up to 20 m away. A tree branch was found on the ground on the east side of the road. It had been broken off a maple tree close by. There was little crop damage along the tornado's track. A few stalks of corn were torn out and there was one area of beans that appeared to be flattened. It is surprising that damage was so light considering the dirt and debris churned up by the tornado, as shown in the video capture and even more clearly in the video. In any case, such damage is consistent with a rating of F0 on the Fujita scale (Fujita 1981).

Shack with shingle damage facing NNE. The tornado moved over the shack and into the bean fields shown at the right side of the photograph.

Shack and shingles on ground facing NE.

In addition ,the tornado was also seen by witnesses as far away as Thamesville. Mr. Tamminga also reported that there was no rain at the time of the tornado though there had been a few large drops about 10 minutes before it occurred. He also relayed reports of 3.5 inches of rain in one half hour and large hail from two concessions over.

Meteorology

Southern Ontario was under the influence of a upper-level cut-off low. There was very little shear but instability was moderate. Lake breeze fronts were active. In fact, the tornado's parent storm appeared to be initiated where the Lake St. Clair, Lake Erie and Lake Huron lake breeze fronts interacted. The atmospheric conditions on this day, with a cut-off low present and little shear, make it very unlikely that the parent thunderstorm was a supercell. Inspection of Exeter Doppler radar data shows that there was no organized rotation present at mid-levels of the parent thunderstorm before the tornado occurred. However, there is evidence of weak but organized rotation at the lowest elevation angles (0.3° and 0.5°) that moves slowly toward the northeast. This first appears at 2040 UTC. This shear is reflected at higher elevation angles (1.5° and 3.5°) starting at 2050 UTC, though the pattern is not as well defined. This clearly suggests that tornadogenesis occurred within the boundary layer.

An interesting observation is that the radial velocity couplet (and the tornado) moved toward the northeast, presumably tracking along the Lake Erie lake breeze front.

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Various images describing the meteorology are provided below (radar loops are also included with the web version).

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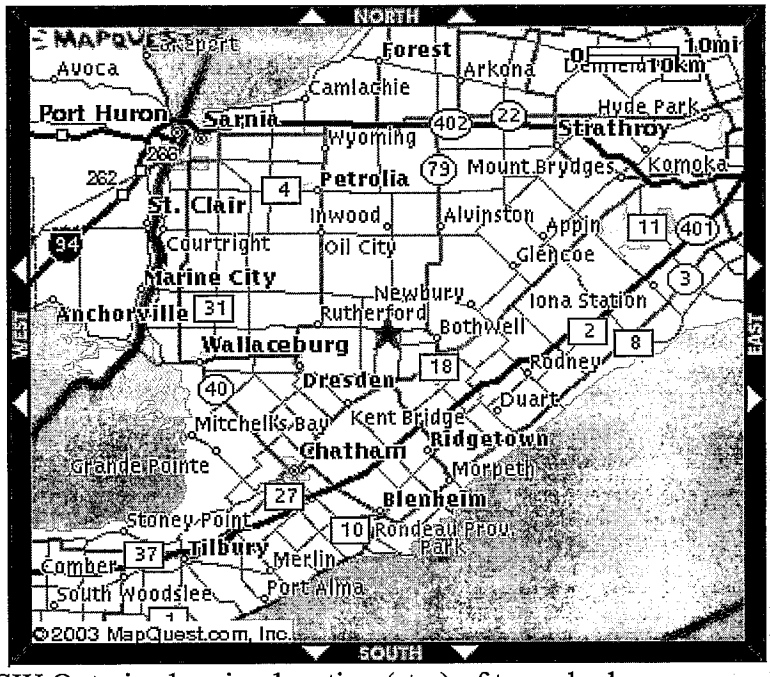

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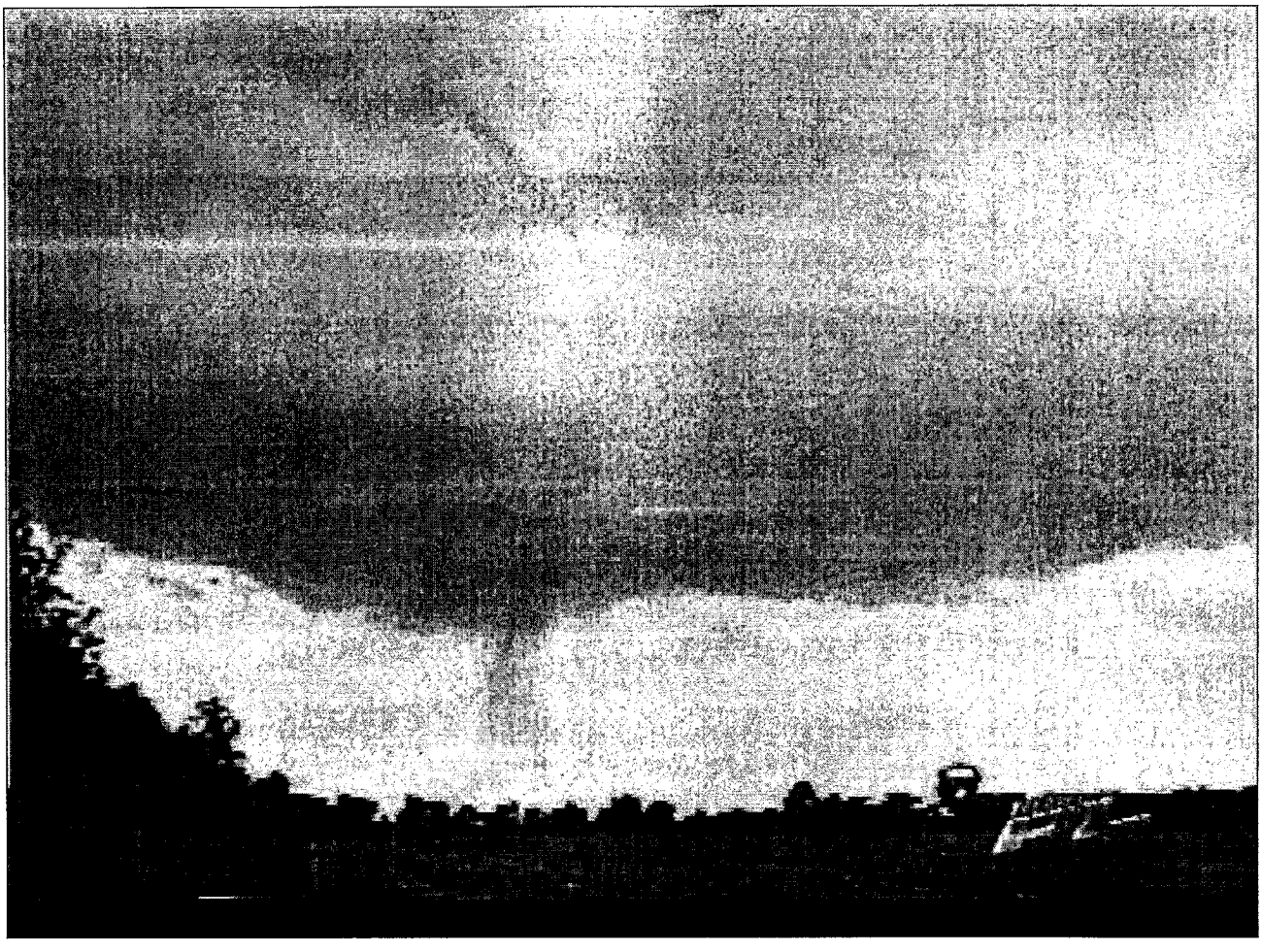

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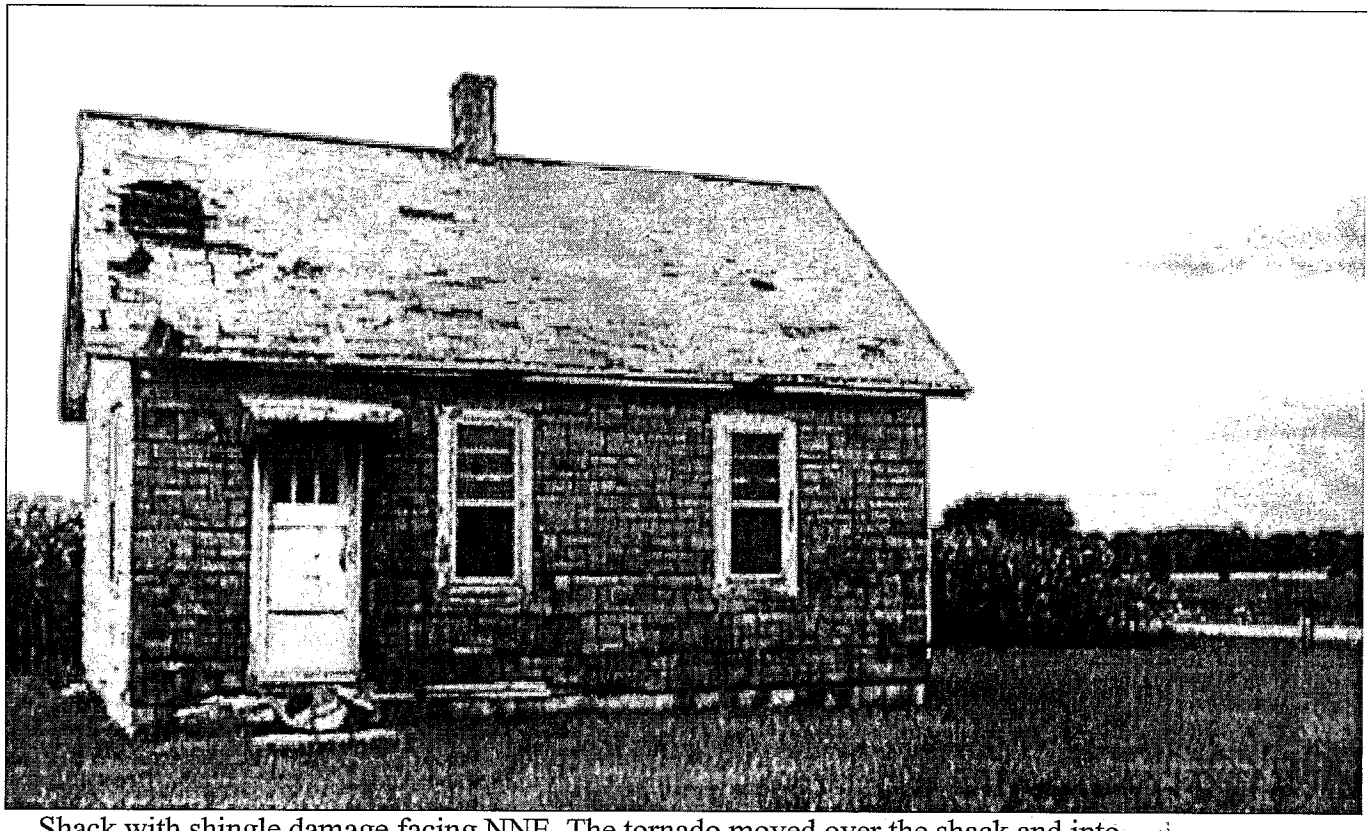

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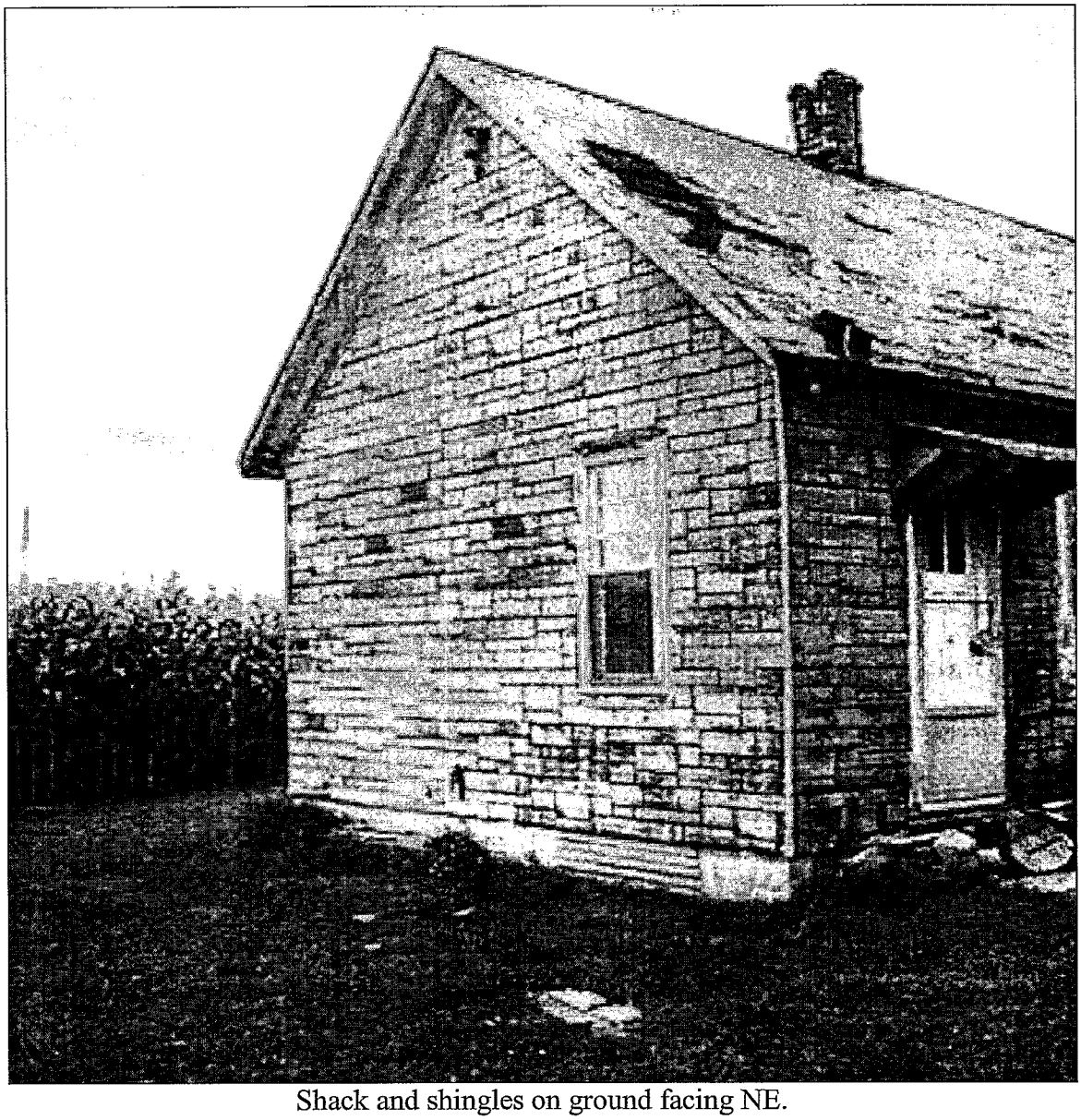

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Conclusions

On 7 August 2003, a tornado occurred with a path length of about 1 km and a path width of about 50 m. Damage consisted of removed shingles, a downed tree branch and minor crop damage and was rated at F0.

Synoptic-scale conditions were not suitable for supercell thunderstorm development. Indeed, Exeter Doppler radar indicated that there was no mid-level mesocyclone present before the tornado occurred. Weak rotation appeared at the lowest scan angles first then later at higher elevation angles. Thus, it is concluded that this was a non-supercell or "landspout" type tornado. As such, it is believed that this is the first non-supercell tornado in Canada to be confirmed using Doppler radar.

References

Fujita, T.T. 1981. Tornadoes and Downbursts in the Context of Generalized Planetary Scales. *J. Atmos. Sci.***38**: 1511-1534.