

June 6-7, 2020 Tornadoes in Orange, Volusia & Lake Counties

Including Straight-Line Wind Damage in Lake and Volusia Counties

Event Summary

Conditions became favorable for severe weather in central Florida due to enhanced winds aloft on the far eastern periphery of Tropical Storm Cristobal, which was moving north over the central Gulf of Mexico. On June 6, scattered to numerous severe thunderstorms developed across Lake, Orange, Seminole, and Volusia counties in the late afternoon and evening hours. These storms produced a combination of damaging winds, and several tornadoes and waterspouts over inland lakes. The next day, June 7, two severe thunderstorms in Lake County produced a tornado and a waterspout that became a tornado.

In total there were 4 tornadoes and 2 straight-line wind events on June 6, and 2 tornadoes on June 7. The most significant was the EF-1 Orlando Ferncreek Tornado on June 6, which caused approximately \$955,700 of damage along a 5.1-mile path from Lake Conway to Thornton Park.

List of June 6, 2020 Tornadoes and Wind Damage

Tornado #1 | 33rd Street Industrial Park Tornado-Landspout

- Weak tornado (landsput) occurred just south of the 33rd Street Industrial Park, in the area of Interstate 4 and Mall-at-Millenia.
- The landspout-tornado quickly dissipated and no damage occurred.
- Time: 6:07 PM
- Path Length: 0.01 miles
- Path Width: 10 yards

Tornado #2 | Lake Ellenor Tornado-Landspout

- Weak tornado (landsput) developed near Lake Ellenor, lasting approximately 30-45 seconds before dissipating. No damage occurred.
- Time: 6:40 PM
- Path Length: 0.01 miles
- Path Width: 20 yards

Tornado #3 | Orlando Ferncreek Tornado (EF-1)

- A waterspout/tornado moved north along a 5.12-mile path from Lake Conway to Thornton Park. The peak intensity was estimated at 100-105 mph.
- Time: 7:20 PM to 7:32 PM
- Path Length: 5.12 miles
- Path Width: 350-500 yards
- Injuries: 0 | Fatalities: 0
- Damages: Approximately \$955,748 (according to Orange County Property Appraiser)

Tornado #4 | Lake Monroe - Enterprise Waterspout-Tornado (EF-0)

- A large waterspout that developed on Lake Monroe, which then came onshore briefly along the north shore of the lake as a rapidly weakening tornado.
- Only minor damage to trees near the lakefront in Enterprise, thus peak winds were estimated between 45-55 mph.
- Time: 8:27 PM to 8:34 PM
- Path Length: 2 miles
- Path Width: 100-200 yards
- Injuries: 0 | Fatalities: 0

Straight-Line Wind Event #1 | Grand Island (55-60 mph)

- Straight-line winds estimated between 55-60 mph resulted in several fences blow over, small trees toppled, medium tree branches downed, and loose backyard items tossed into adjacent properties.
- Time: 10:10 PM

Straight-Line Wind Event #2 | Daytona Flea Market (55-65 mph)

- Straight-line winds estimated at 55-65 mph impacted the Daytona Flea and Farmers Market in Daytona Beach. Roof debris was blown downwind 100 yards onto adjacent portions of Interstate 95, causing the roadway to be closed for several hours.
- No other damage was noted in the area and there were no injuries or fatalities.
- Time: 10:15 PM

List of June 7, 2020 Tornadoes

Tornado #1 | Emeraldal Marsh Tornado (EF-0)

- A brief tornado touchdown in the Emeraldal Marsh Conservation Area just north of Lisbon. The tornado was on the ground less than one-minute west of Emeraldal Island Road between Lake Griffith and Lake Yale.
- The tornado produced no damage.
- Time: 3:40 PM
- Path Length: 0.01 miles
- Path Width: 25 yards

Tornado #2 | Lake Dora-Tavares Tornado (EF-0)

- A waterspout on Lake Dora came onshore in Tavares as a brief tornado before quickly dissipating. Peak winds are estimated between 60-65 mph.
- Time: 6:41 PM to 6:42 PM
- Path Length: 0.50 miles
- Path Width: 20 yards

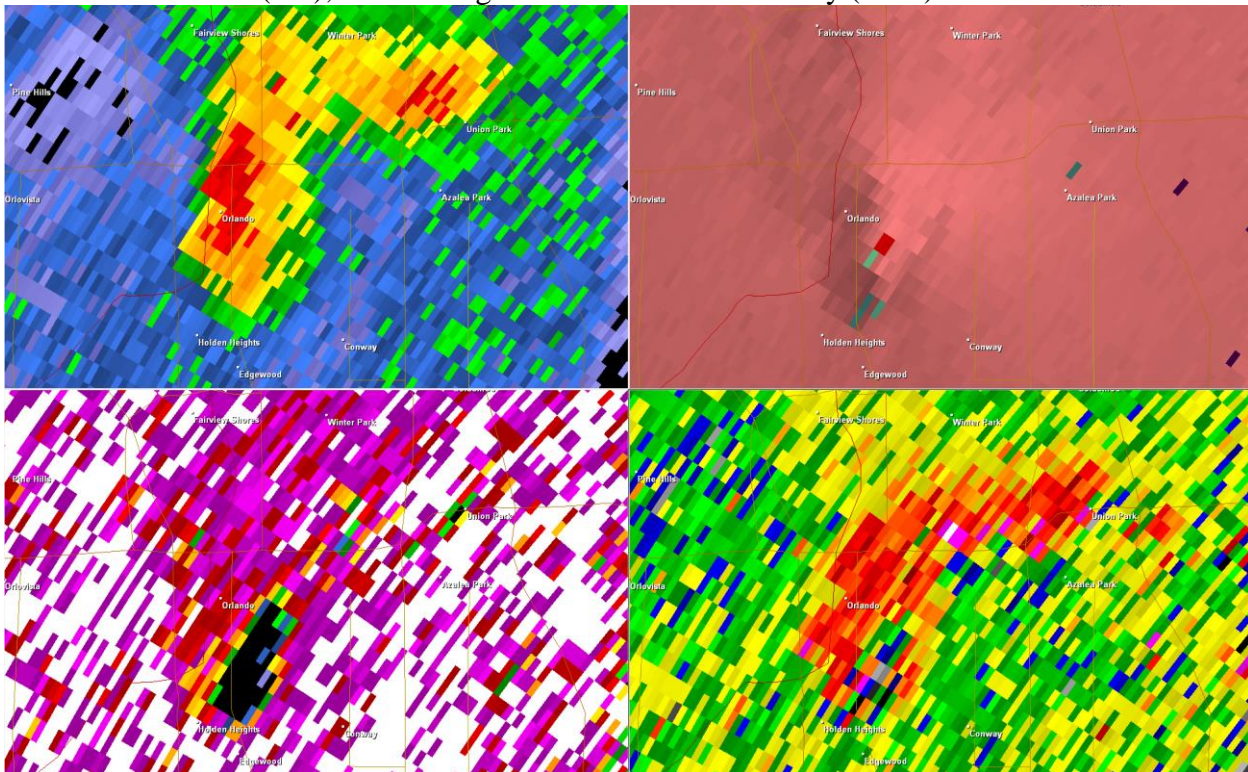
Fast Facts

- The last time tornadoes occurred in back-to-back days within the NWS Melbourne County Warning areas was July 24-25, 2014.
- The EF-1 Orlando Ferncreek Tornado tracked 5.12 miles just east of Downtown Orlando. As of June 7, 2020, this is the longest tracked tornado in the NWS Melbourne area of responsibility since an EF-0 tornado tracked 7.34 miles from Viera to Patrick Air Force Base on January 22, 2010.

Radar Reflectivity

Below are several 4-Panel displays from the KMLB Doppler Radar of the supercell that produced the EF-1 tornado in Orlando and the Lake Monroe-Enterprise Waterspout-Tornado.

- Top Left: Reflectivity; Top Right: Storm-Relative Velocity; Bottom Left is Correlation Coefficient (CC); Bottom Right: Differential Reflectivity (ZDR)



Tornado Debris Signature seen on the Melbourne radar at 7:26 PM (June 6, 2020). At this point the tornado had been ongoing for several minutes, and the radar likely captured the uplift of debris as the tornado moved over Ferncreek Avenue.

Environmental Analysis (Mesoanalysis)

Environmental conditions over central Florida were favorable for tornadoes as Tropical Storm Cristobal moved north through the central Gulf of Mexico. Observed soundings from Cape Canaveral,

Tampa Bay, Miami, and Jacksonville showed elongated, curved hodographs and a deep tropical air mass across the state of Florida. While conditions were clouded over for much of the day on June 6th, cloud breaks allowed for daytime heating in the afternoon as temperatures climbed into the mid 80s across the Orlando Metro area into Lake and Volusia counties. The combination of higher temperatures and high humidity with dew points in the upper 70s contributed to growing instability.

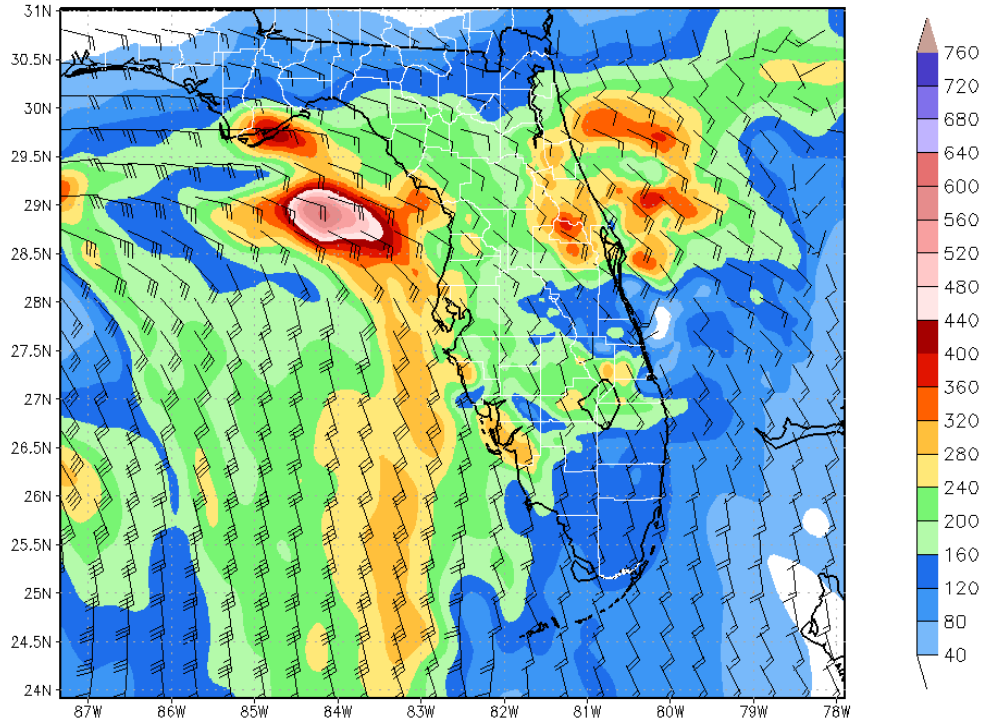
The tornadoes developed in the late afternoon and evening as a pseudo warm front lifted north generally along a line from Tampa to Cape Canaveral. Along the front, rapidly veering winds resulted in high low-level storm-relative helicity (SRH) values. Local ADAS analysis indicated peak 0-1 km SRH of 350-400 m²/s² at the time of the tornadoes. Surface observations from Tampa to Orlando to Daytona Beach showed surface winds backed to the southeast, which is historically indicative of environments supportive of tornadoes. In addition, the June 6 18Z TBW Upper Air Sounding, which was taken as the warm front was crossing the Tampa area, observed 0-1km SRH at 266 m²/s², 0-3km SRH at 328 m²/s², 0-1km Shear at 34 knots, and MLCAPE of 765 J/kg. Later that evening, the June 7 00Z Cape Canaveral Upper Air Sounding showed greater instability had developed (due to daytime heating) while the high shear profile remained.

A slightly augmented environment on June 7 still supported strong to severe storms capable of producing tornadoes. Deep tropical moisture remained in place as greater daytime heating and instability occurred. Strong helicity and shear values were present with Tropical Storm Cristobal nearing landfall along the northern Gulf coast. Morning Upper Air Soundings from Tampa and Cape Canaveral showed 0-1km SRH between 150-250 m²/s², 0-1km Shear between 25-40 knots, and strong instability with SBCAPE values between 2500-4000 J/kg. Overall winds were southerly across the central peninsula, indicating slightly reduced tornado probabilities compared to the previous day.

Timeline of Main Supercell on June 6, 2020

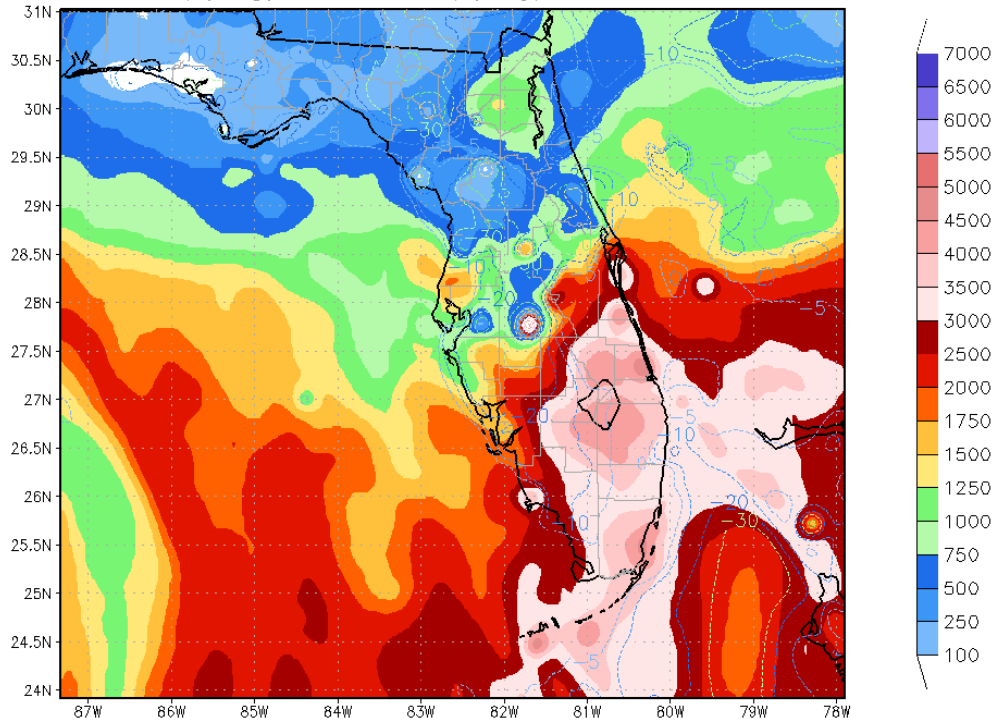
- This supercell produced the Orlando Ferncreek (EF-1) Tornado and the Lake Monroe-Enterprise Waterspout-Tornado (EF-0)
- 6:30 PM - A single storm develops near Saint Cloud
- 7:02 PM - As storm intensifies, mid-level mesocyclone detected by KMLB at ~8500 ft AGL near Meadow Woods
- 7:14 PM - A subtle low-level mesocyclone detected by KMLB at ~3,900 ft AGL
- 7:20 PM - Strong low-level mesocyclone detected by KMLB at ~4,100 ft AGL
- 7:20 PM - Waterspout forms over Lake Conway
- 7:22 PM - Tornado Debris Signature detected by KMLB; tornado most likely between Little Lake Conway and south end of Ferncreek Avenue
- 7:32 PM - Tornado lifts over Thornton Park
- 8:27 PM - Waterspout forms on Lake Monroe
- 8:34 PM - Waterspout comes onshore in Enterprise as weakening tornado, quickly dissipates after coming onshore
- 8:40 PM - Strong mesocyclone still present over DeLand
- 10:30 PM - Storm merges with incoming QLCS and moves offshore near Flagler Beach

Helicity (m^2/s^2) and Low Level Winds (knots) 20200606 2300



NWS Melbourne — www.weather.gov/melbourne

CAPE (J/kg) and CIN (J/kg) 20200606 2300

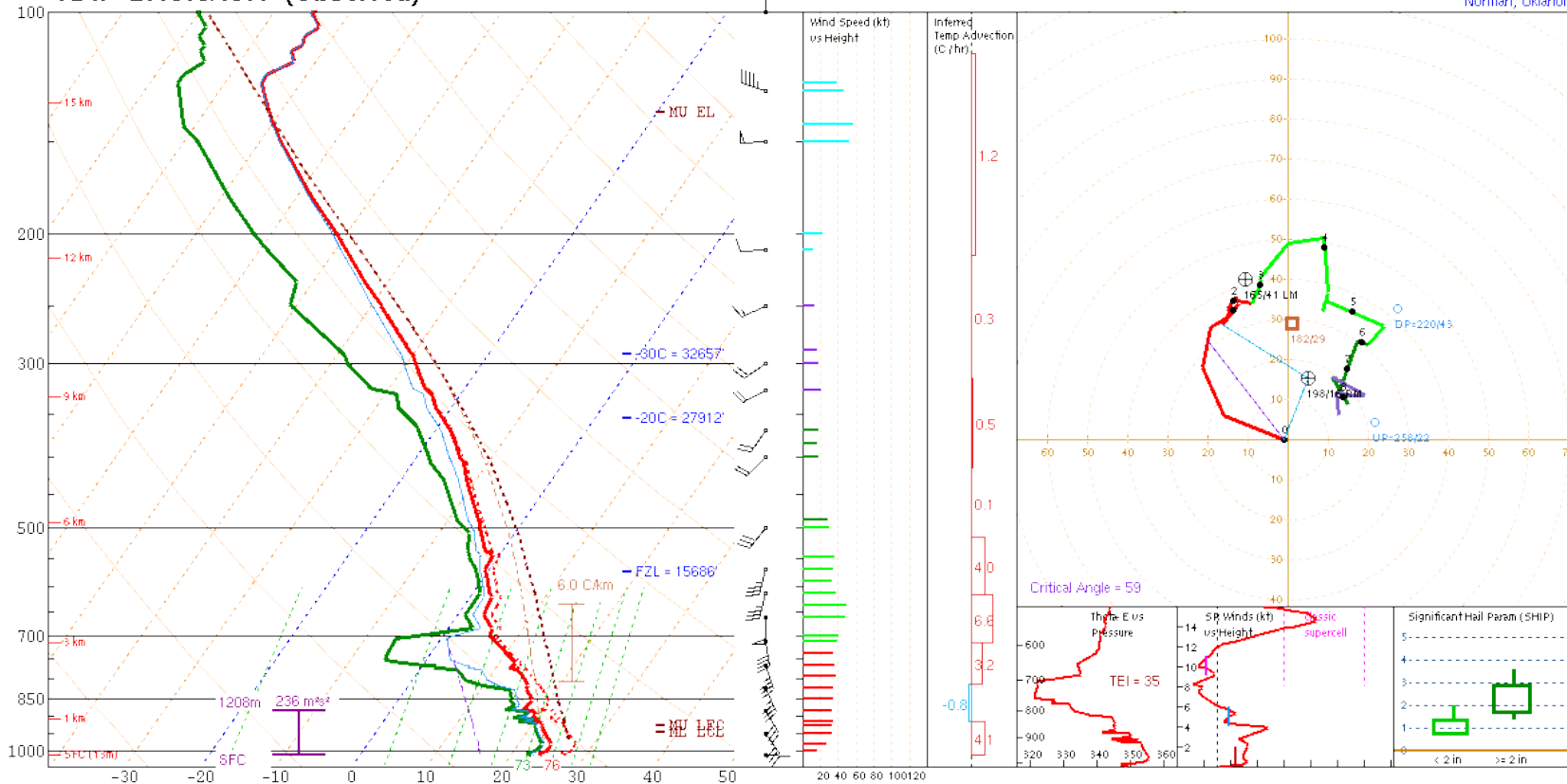


NWS Melbourne — www.weather.gov/melbourne

Local ADAS Analysis at 23 UTC (7 PM) on June 6th

TBW 200606/1800 (Observed)

NOAA/NWS Storm Prediction Center
Norman, Oklahoma



PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	397	-70	180m	-1	1816m	26273'
MIXED LAYER	765	-16	629m	-3	1257m	38723'
FCST SURFACE	1815	0	1098m	-4	1098m	49941'
MU (978 mb)	1534	-3	472m	-4	805m	48831'

PW = 2.11 in	3CAPE = 126 J/kg	WBZ = 15202'	WNDG = 0.0
K = 28	DCAPE = 849 J/kg	FZL = 15686'	ESP = 0.0
MidRH = 55%	DownT = 61 F	ConvT = 85F	MMP = 0.06
LowRH = 91%	MeanW = 17.3 g/kg	MaxT = 88F	NCAPE = 0.11
SigSevere = 12172 m/s/3			

	SRH(m2/s2)	Shear(kt)	MnWind	SRW
SFC - 1 km	266	34	143/26	104/22
SFC - 3 km	328	39	153/31	123/23
Eff Inflow Layer	236	32	144/27	108/22
SFC - 6 km	31	168/31	142/19	
SFC - 8 km	18	172/29	147/16	
LCL - EL (Cloud Layer)	31	172/30	148/17	
Eff Shear (EBWD)	20	171/29	145/17	

BRN Shear = 52 m/s²
4-6km SR Wind = 210/20 kt
..... Storm Motion Vectors.....
Bunkers Right = 198/16 kt
Bunkers Left = 165/41 kt
Corfidi Downshear = 220/43 kt
Corfidi Upshear = 258/22 kt

*** BEST GUESS PRECIP TYPE ***

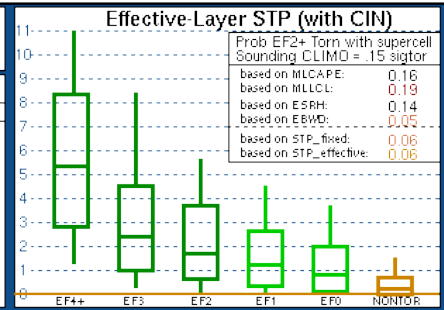
Rain.
Based on sfc temperature of 75.9 F.

SARS - Sounding Analogs

SUPERCCELL	SGFNT HAIL
No Quality Matches	No Quality Matches

(1 loose matches)
SARS: 100% TOR

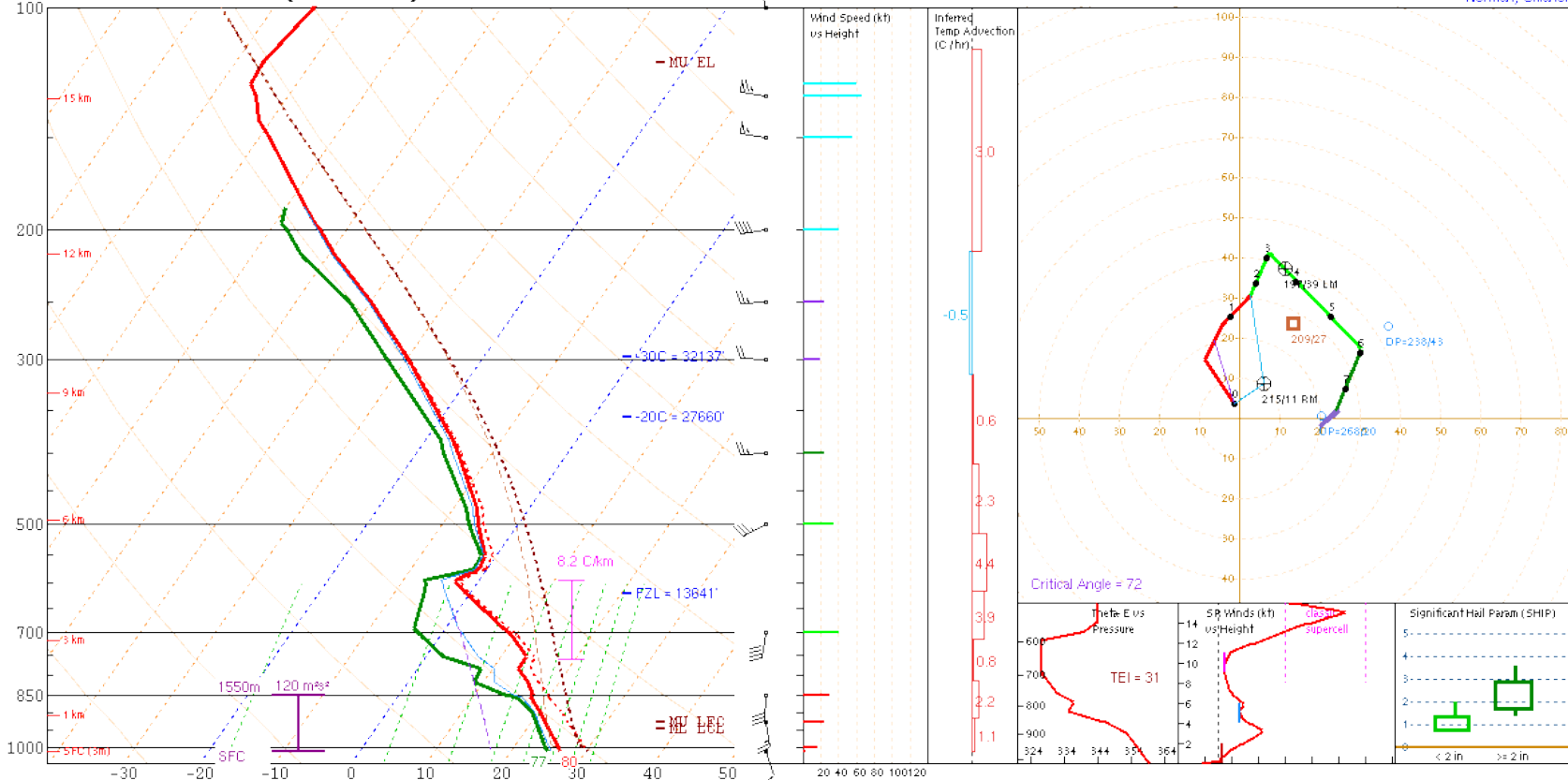
SARS: 0% SIG



Upper Air Observation from Tampa (TBW) at 18Z (2 PM) on June 6th

XMR 200607/0000 (Observed)

NOAA/NWS Storm Prediction Center
Norman, Oklahoma



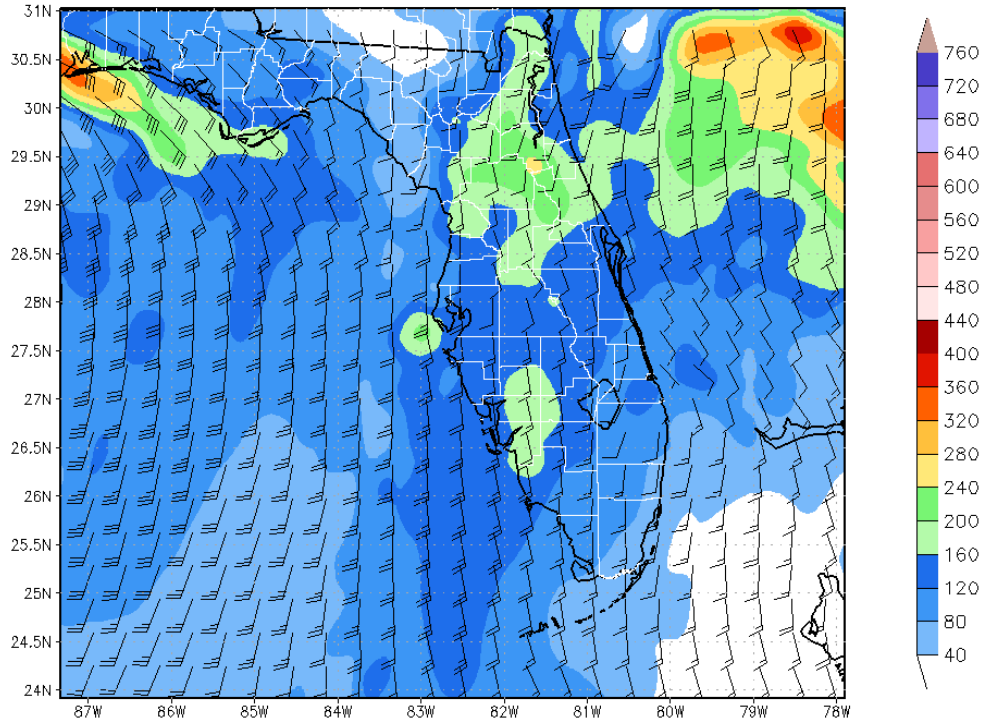
PARCEL	CAPE	CINH	LCL	LI	LFC	EL	SRH(m2/s2)	Shear(kt)	MnWind	SRW	
SURFACE	2944	-3	215m	-6	817m	51283'	SFC - 1 km	85	22	163/19	129/15
MIXED LAYER	2223	-3	641m	-5	912m	50810'	SFC - 3 km	152	37	179/27	159/19
FCST SURFACE	3452	0	1109m	-6	1109m	51283'	Eff Inflow Layer	120	27	170/22	140/16
MU (1014 mb)	2944	-3	215m	-6	817m	51283'	SFC - 6 km	34	192/28	177/19	
							SFC - 8 km	25	198/28	186/16	
							LCL - EL (Cloud Layer)	64	205/25	196/15	
							Eff Shear (EBWD)	25	197/26	186/16	
							BRN Shear = 41 m/s ²				
							4-6km SR Wind = 222/23 kt				
						 Storm Motion Vectors.....				
							Bunkers Right = 215/11 kt				
							Bunkers Left = 197/39 kt				
							Corfidi Downshear = 238/43 kt				
							Corfidi Upshear = 268/20 kt				

SARS - Sounding Analogs	
SUPERCCELL	SGFNT HAIL
00060402.NFW WEAK	
00070222.RVU WEAK	
No Quality Matches	
(3 loose matches) SARS: 67% TOR	(1 loose matches) SARS: 0% SIG

Effective-Layer STP (with CIN)	
Prob EF2+ Torn with supercell Sounding CLIMD = .15 sigtor	
based on MLCAPE: 0.14	
based on MLLCL: 0.19	
based on ESRH: 0.08	
based on EBWD: 0.05	
based on STP_fixed: 0.11	
based on STP_effective: 0.12	

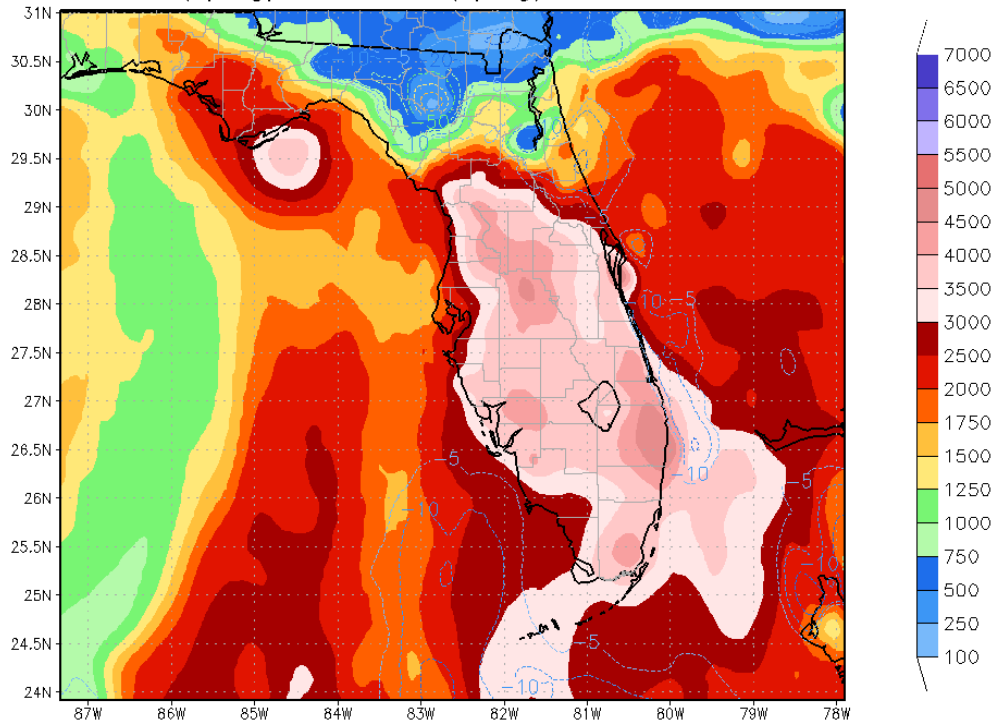
Upper Air Observation from Cape Canaveral (XMR) at 00Z on June 7th (8 PM on June 6th)

Helicity (m^2/s^2) and Low Level Winds (knots) 20200607 1900



NWS Melbourne — www.weather.gov/melbourne

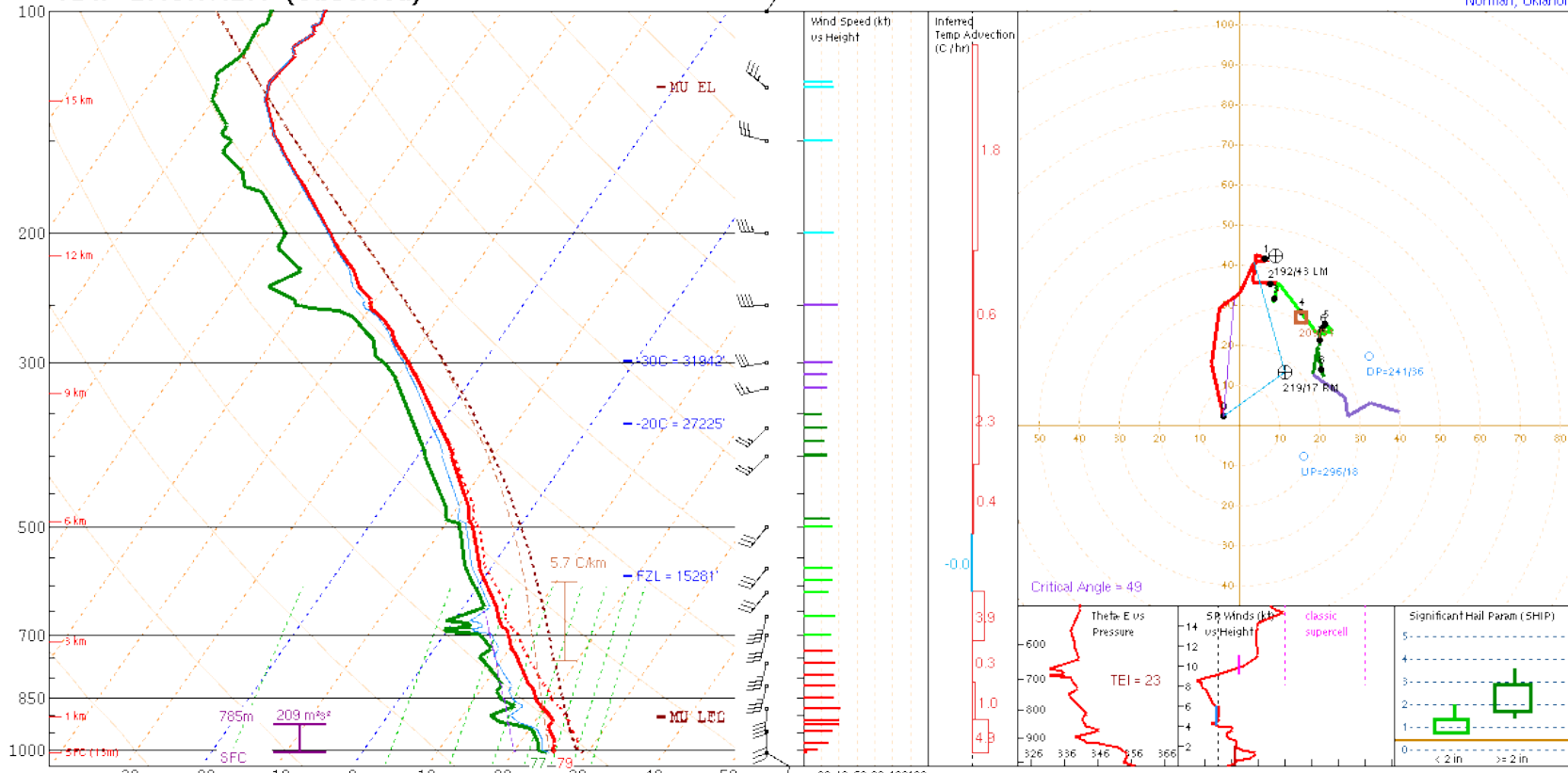
CAPE (J/kg) and CIN (J/kg) 20200607 1900



NWS Melbourne — www.weather.gov/melbourne

Local ADAS Analysis at 19 UTC (3 PM) on June 7th

TBW 200607/1200 (Observed)



PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	2277	-10	159m	-6	997m	49986'
MIXED LAYER	685	-37	966m	-3	1866m	36326'
FCST SURFACE	1907	0	1539m	-5	1539m	49246'
MU (1011 mb)	2277	-10	159m	-6	997m	49986'

PW = 2.17 in	3CAPE = 40 J/kg	WBZ = 14764'	WNDG = 0.0
K = 34	DCAPE = 484 J/kg	FZL = 15281'	ESP = 0.0
MidRH = 73%	DownT = 69 F	ConvT = 89F	MMP = 0.18
LowRH = 78%	MeanW = 16.0 g/kg	MaxT = 92F	NCAPE = 0.16
Sig Severe = 11646 m3/s3			
Supercell = 6.8			
Sfc-3km Agl Lapse Rate = 5.5 C/km			
3-6km Agl Lapse Rate = 5.4 C/km			
850-500mb Lapse Rate = 5.5 C/km			
700-500mb Lapse Rate = 5.4 C/km			
Left Supercell = 4.1			
STP (eff layer) = 0.5			
STP (fix layer) = 1.9			
Sig Hail = 0.4			

	SRH(m2/s2)	Shear(kt)	MnWind	SRW
SFC - 1 km	229	41	178/30	141/20
SFC - 3 km	224	32	186/33	159/21
Eff Inflow Layer	209	39	174/27	134/19
SFC - 6 km	33	33	194/32	169/18
SFC - 8 km	27	27	197/31	172/16
LCL - EL (Cloud Layer)	54	204/29	183/14	
Eff Shear (EBWD)	29	197/31	172/16	
BRN Shear = 29 m/s²				
4-6km SR Wind = 220/15 kt				

Storm Motion Vectors

- Bunkers Right = 219/17 kt
- Bunkers Left = 192/43 kt
- Corfidi Downshear = 241/36 kt
- Corfidi Upshear = 296/18 kt

1km & 6km AGL Wind Barbs

*** BEST GUESS PRECIP TYPE ***

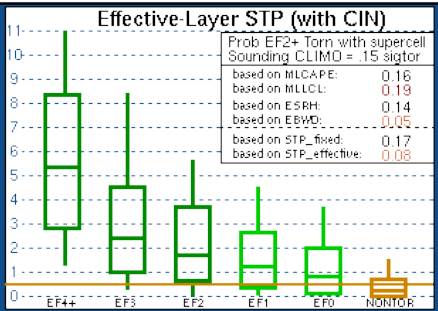
Rain.
Based on sfc temperature of 78.8 F.

SARS - Sounding Analogs

SUPERCCELL	SGFNT HAIL
No Quality Matches	No Quality Matches

(3 loose matches)
SARS: 67% TOR

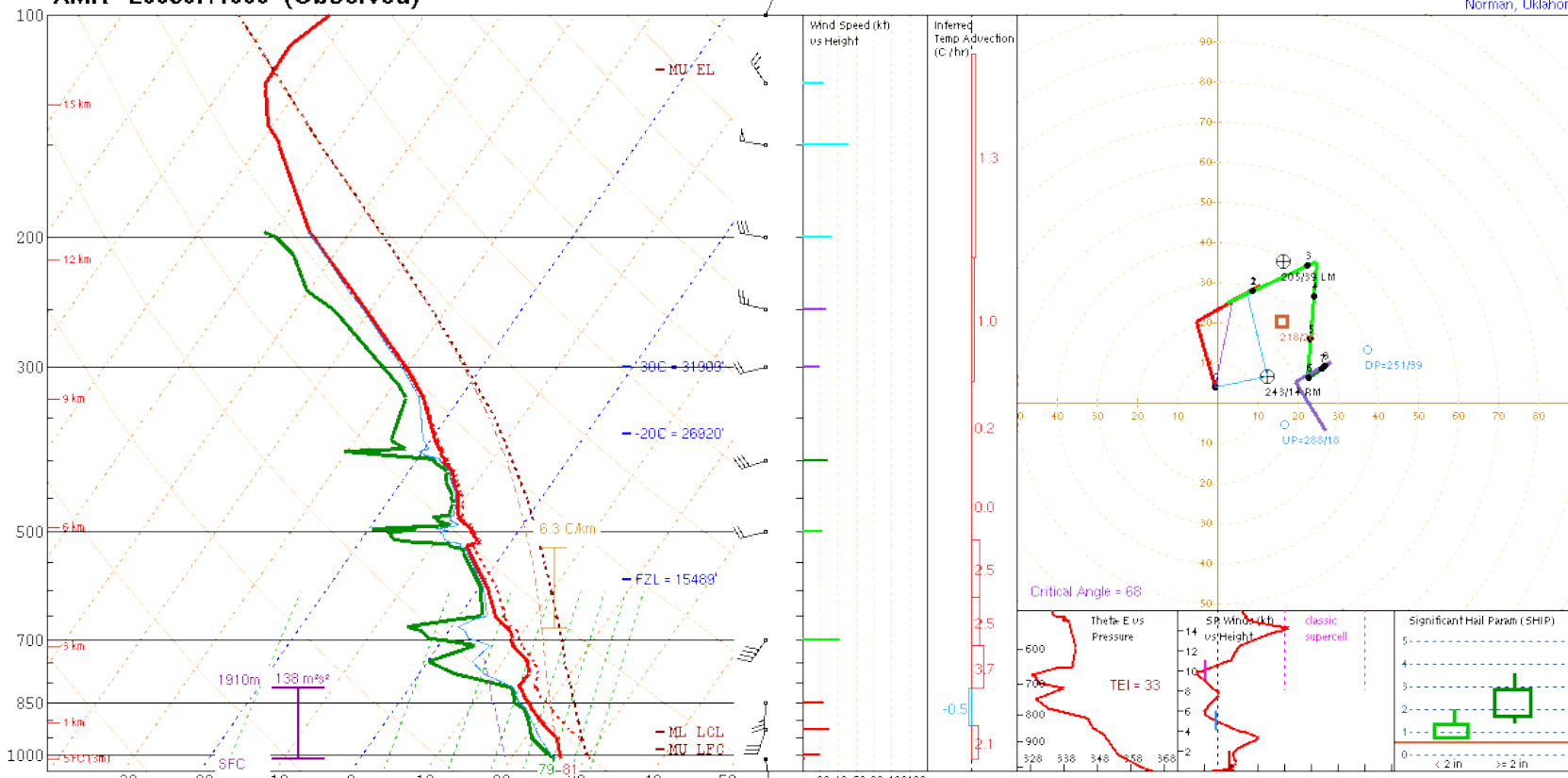
SARS: 0% SIG



Upper Air Observation from Tampa (TBW) at 12Z (8 AM) on June 7th

XMR 200607/1000 (Observed)

NOAA/NWS Storm Prediction Center
Norman, Oklahoma



PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	4166	-0	95m	-8	254m	51237
MIXED LAYER	2242	-6	748m	-6	950m	49395
FCST SURFACE	3326	0	1172m	-7	1172m	51237
MU (1013 mb)	4166	-0	95m	-8	254m	51237

PW = 2.21 in	3CAPE = 134 J/kg	WBZ = 15228'	WNDG = 0.0
K = 30	DCAPE = 542 J/kg	FZL = 15489'	ESP = 0.0
MidRH = 62%	DownT = 67 F	ConvT = 86F	MMP = 0.38
LowRH = 90%	MeanW = 18.0 g/kg	MaxT = 90F	NCAPE = 0.27
SigSevere = 26973 m3/s3			
Supercell = 8.3			
Sfc-3km Agl Lapse Rate = 5.6 C/km			
3-6km Agl Lapse Rate = 5.7 C/km			
850-500mb Lapse Rate = 5.3 C/km			
700-500mb Lapse Rate = 5.6 C/km			

SRH(m2/s2)	Shear(kt)	MnWind	SRW
SFC - 1 km	147	26	187/23
SFC - 3 km	230	38	195/27
Eff Inflow Layer	138	25	189/25
SFC - 6 km	23	207/27	180/18
SFC - 8 km	28	212/26	185/16
LCL - EL (Cloud Layer)	38	217/25	192/14
Eff Shear (EBWD)	29	212/26	185/16
BRN Shear = 28 m/s²			
4-6km SR Wind = 226/15 kt			

..... Storm Motion Vectors

Bunkers Right = 243/14 kt

Bunkers Left = 205/39 kt

Corfidi Downshear = 251/39 kt

Corfidi Upshear = 288/18 kt

*** BEST GUESS PRECIP TYPE ***

Rain.
Based on sfc temperature of 80.6 F.

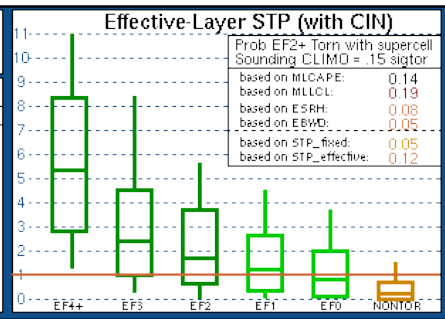
SARS - Sounding Analogs

SUPERCELL	SGFNT HAIL
00060402NFW WEAK	
00061621IPT WEAK	

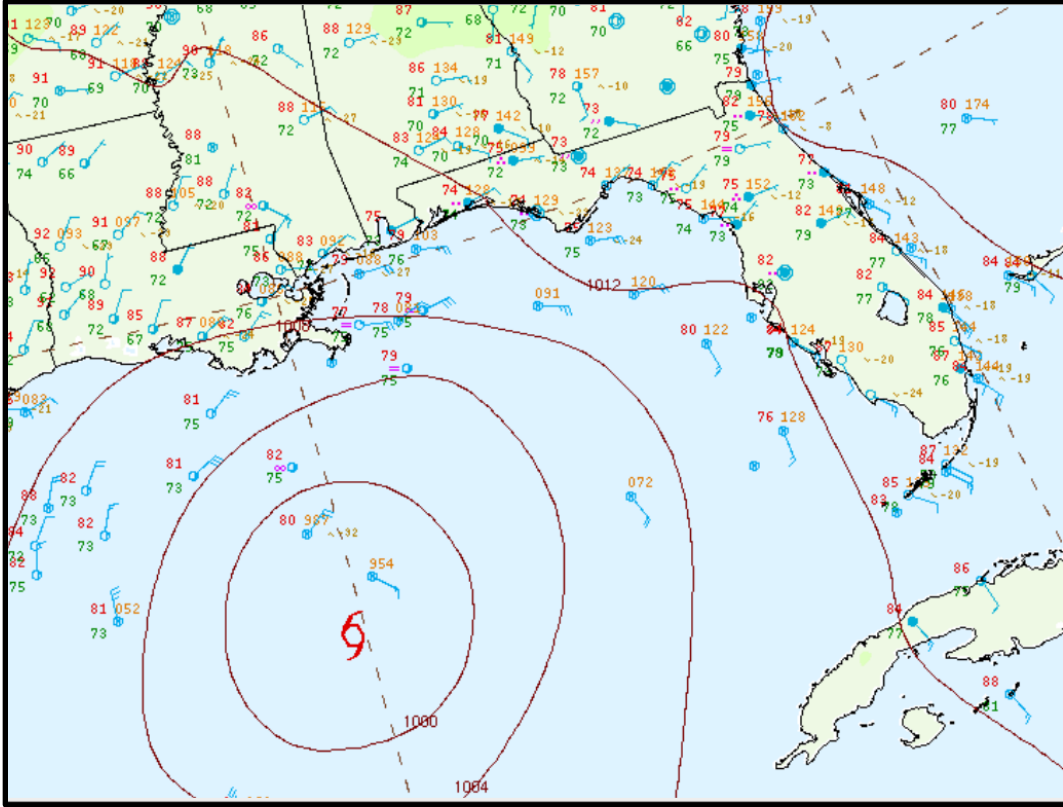
No Quality Matches

(2 loose matches) SARS: 100% TOR

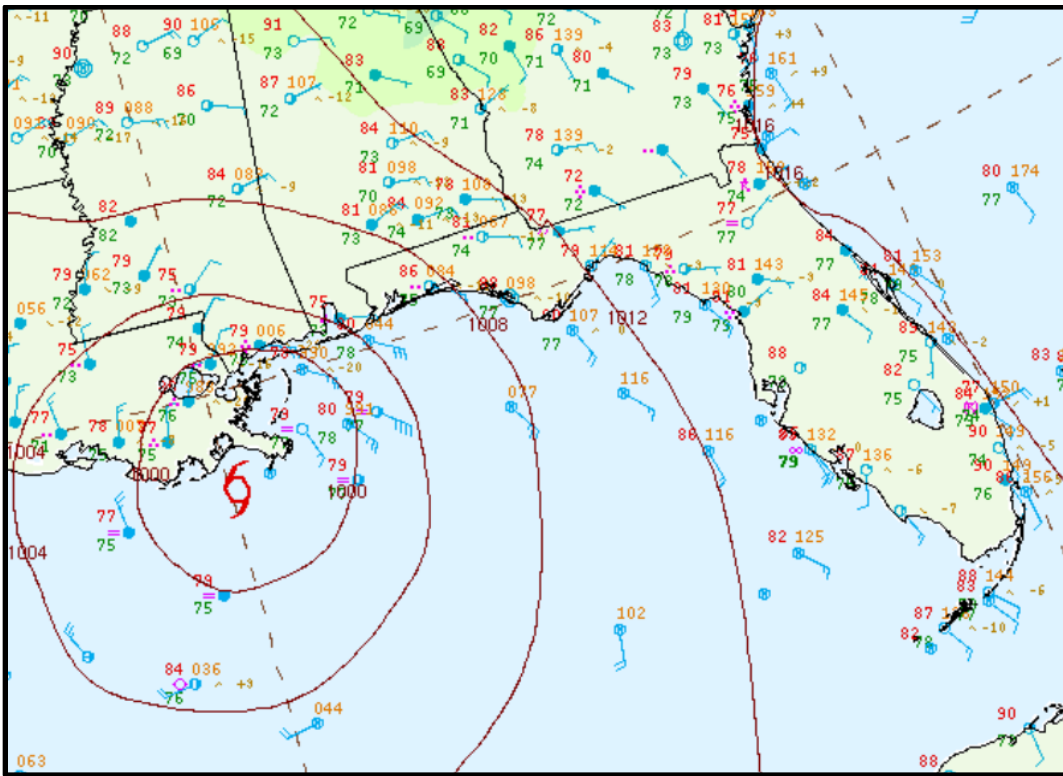
(1 loose matches) SARS: 0% SIG



Upper Air Observation from Cape Canaveral (XMR) at 10Z (6 AM) on June 7th



Surface Map 6/6/20 at 21 UTC (5 pm EDT)



Surface Map 6/7/20 at 18 UTC (2 pm EDT)

Damage Photos from Orlando Ferncreek EF-1 Tornado
Photos taken by NWS Storm Survey Team, unless otherwise stated



Worst damage at the Lake Margaret Village Apartments (both pictures)
(peak winds estimated 100-105 mph, EF-1)



Damage to a home along Hoffner Avenue (peak winds estimated 85-90 mph, EF-1)



Waterspout over Lake Conway (courtesy of Spectrum News13)











Photo Credit: Wayne Allred (looking east from Summerlin Ave.)



Waterspout over Lake Monroe (June 6, 2020). Photo credit to Cody Helton.

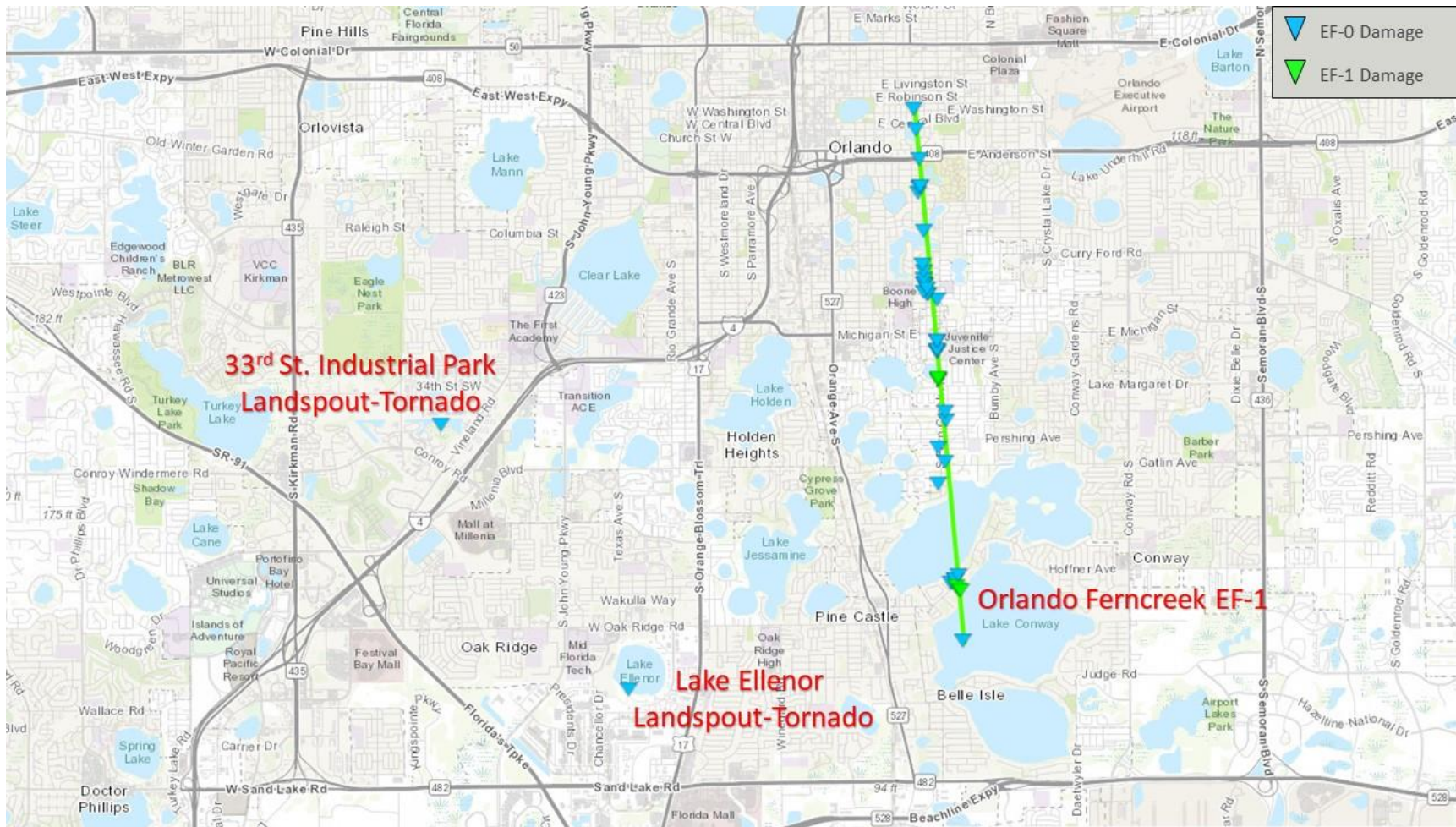


Straight-line wind damage at the Daytona Flea Market (June 6, 2020).

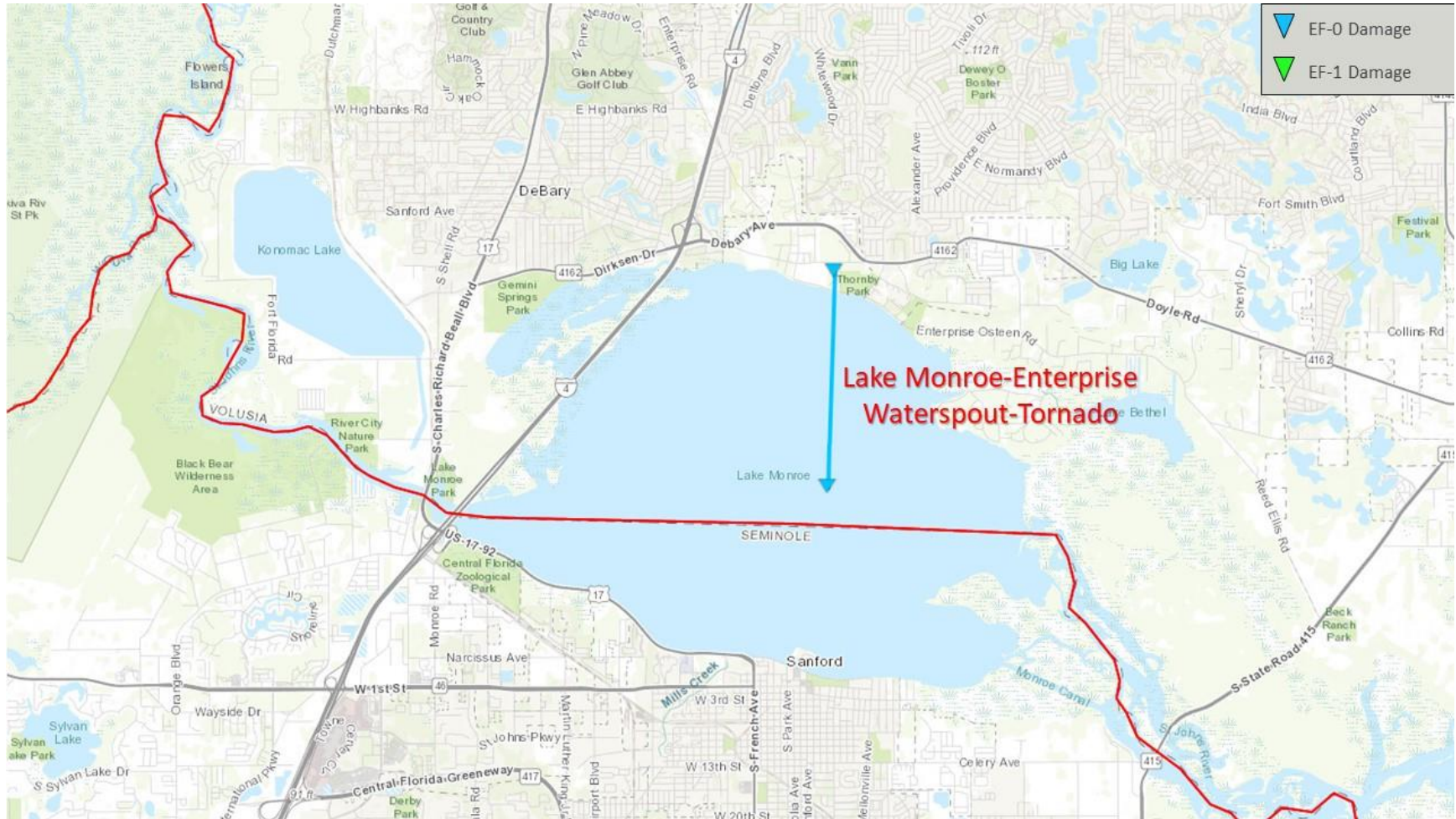


Emeralda Marsh Tornado (June 7, 2020). Photo credit to Randy and Marius.

Tornado Tracks in Orange County (June 6, 2020)

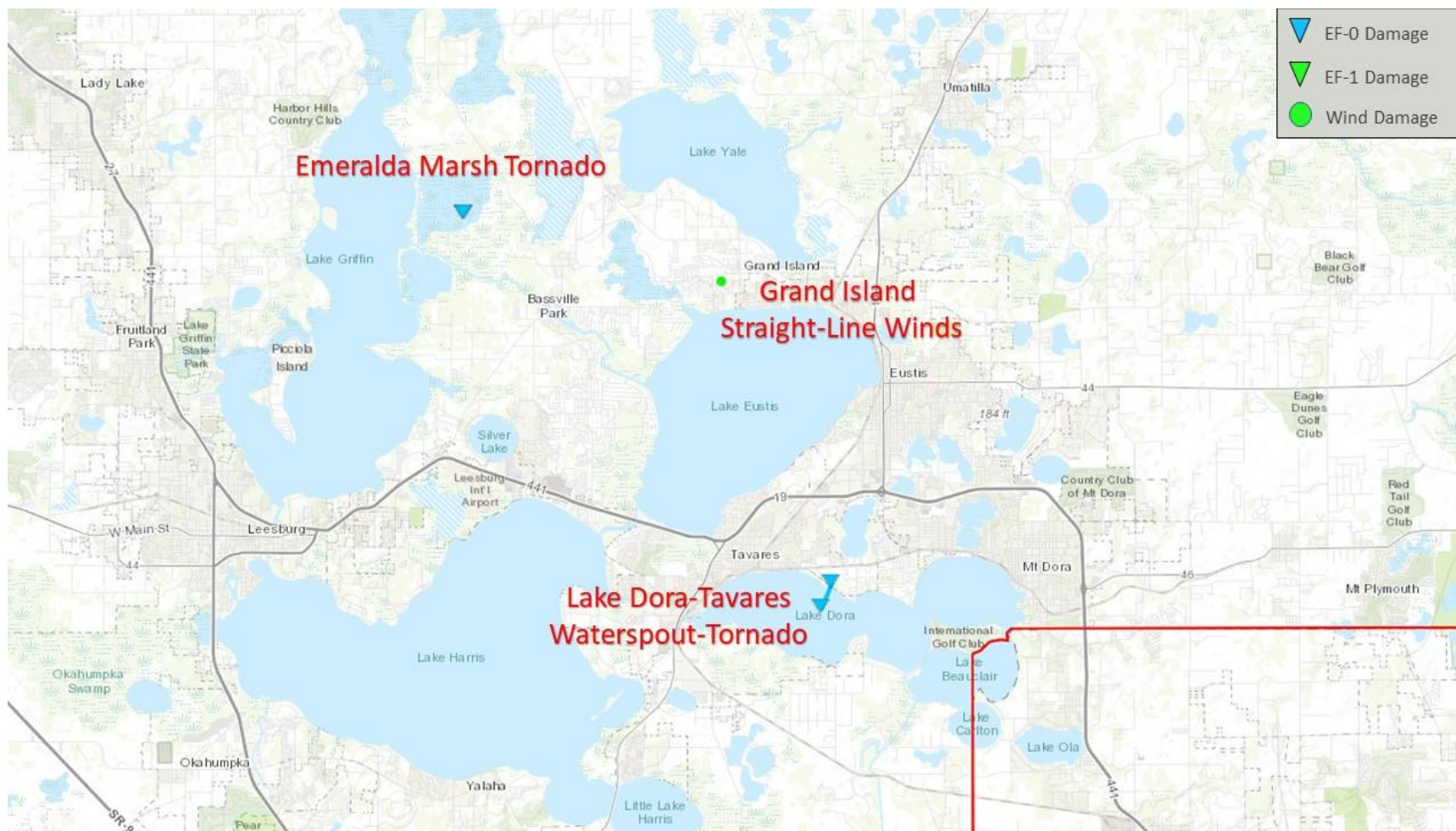


Tornado Track in Volusia County (June 6, 2020)



Straight-Line Wind Damage in Lake County (June 6, 2020)

Tornado Tracks in Lake County (June 7, 2020)



398

NOUS42 KMLB 072256

PNSMLB

FLZ041-044>047-053-054-058-059-064-141-144-147-081200-

Public Information Statement

National Weather Service Melbourne FL

655 PM EDT Sun Jun 7 2020

...NWS Damage Survey For 06/06/20 Orlando Ferncreek Tornado and
Daytona Flea Market Wind Events...

Update to include damage assessment from City of Orlando.

.Orlando Ferncreek Tornado...

Rating:	EF-1
Estimated Peak Wind:	100-105 MPH
Path length /Statute/:	5.1 Miles
Path width /Maximum/:	500 Yards
Fatalities:	0
Injuries:	0
Start date:	Jun 06 2020
Start time:	720 pm EDT
Start location:	2 SW Conway / Orange / FL
Start Lat/Lon:	28.4701 / -81.3559
End date:	Jun 06 2020
End time:	732 pm EDT
End location:	4 W Azalea Park / Orange / FL
End_lat/lon:	28.5439 / -81.3636

National Weather Service Melbourne Damage Survey confirms that a waterspout/tornado moved north along a 5.1 mile path from Lake Conway to Thornton Park. The peak intensity was estimated at 100-105 mph.

A waterspout formed on west-central Lake Conway at approximately 720 pm and traveled north, briefly coming onshore and crossing Hoffner Avenue, then moving back over water, crossing Little Lake Conway. The waterspout moved back onshore as a tornado at the south end of Ferncreek Avenue. The tornado nearly paralleled Ferncreek Avenue and Martin Street as it moved nearly due north, crossing State Road 408, and lifting at Lake Lawsona Park at approximately 732 pm.

Damage was continuous along a 5.1 mile swath with a width of 350-500 yards. As the tornado came onshore at Hoffner Avenue it briefly attained EF-1 intensity (peak winds estimated at 85-90 mph) resulting in severe damage to the roof of a lakefront home and numerous large trees toppled. Damage along much of the remainder of the path was rated EF-0 (winds estimated 65-85 mph).

The EF-0 damage consisted generally of uprooted trees, toppled trees, and snapped large branches. Several large trees fell onto homes, causing significant damage mainly to roofs. Multiple vehicles were damaged due to fallen large branches and downed trees.

The tornado reached peak intensity of EF-1 in the vicinity of Ferncreek Avenue, Lake Margaret Drive and Carmia Drive (estimated peak winds 100-105 mph). Several one story apartment buildings lost significant portions of their roofs.

City of Orlando preliminary damage assessment indicates 2 homes with severe damage, 14 with moderate damage, and 11 with minor damage.

There were no injuries or fatalities. As the tornado moved through the highly urbanized area, numerous local residents witnessed the tornado and provided many videos and photos.

NWS Melbourne appreciates the assistance provided by the City of Orlando Office of Emergency Management, Orange County Fire Rescue, Orange County Emergency Management, Orlando News Media, and the many spotters and residents that provided videos, photos, and additional details.

EF Scale: The Enhanced Fujita Scale Classifies Tornadoes into the following categories.

EF0...Weak.....65 to 85 MPH

EF1...Weak.....86 to 110 MPH

EF2...Strong....111 to 135 MPH

EF3...Strong....136 to 165 MPH

EF4...Violent...166 To 200 MPH

EF5...Violent...>200 MPH

.Daytona Flea Market Wind Event...

Peak wind / E: 55-65 MPH

Path length /Statute/: 0.2 Miles

Path width /Maximum/: 135 Yards

Fatalities: 0

Injuries: 0

Start date: Jun 06 2020

Start time: 1015 pm EDT

Start location: 4 SW Daytona Beach / Volusia / FL

Start Lat/Lon: 29.1667 / -81.0827

End date: Jun 06 2020

End time: 1015 pm EDT
End location: 4 SW Daytona Beach / Volusia / FL
End_lat/lon: 29.1667 / -81.0827

National Weather Service Melbourne Damage Survey found straight-line winds estimated at 55-65 mph impacted the Daytona Flea and Farmers Market at around 1015 pm EDT, Saturday evening. Damage consisted of the removal of a large portion of a corrugated roof. The roof debris was blown downwind 100 yards onto adjacent portions of Interstate 95, causing the roadway to be closed for several hours. No other damage was noted in the area and there were no injuries or fatalities.

National Weather Service wishes to thank Volusia County Emergency Management for providing damage details.

Note:

The information in this statement is preliminary and subject to change pending final review of the events and publication in NWS Storm Data.

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Rodriguez/Spratt