

The Lake Tohopekaliga (Toho)/St. Cloud Tornado - 12/27/97

A long track supercell developed over west central Florida during the early morning hours of 27 December. Radar signatures indicated the storm was becoming tornadic over Polk County (just west of the NWSO Melbourne County Warning Area [CWA]) prior to 4 AM (0900 UTC). Two touchdowns occurred across Polk County between 356 AM and 417 AM (0856-0917 UTC), the first producing F0 damage (length 1 mile), and the second resulting in strong F2 damage (5.8 mile path) according to NWSO Tampa Bay/Ruskin. The tornadic signature weakened as the cell approached Osceola County (NWSO Melbourne's CWA), however soon thereafter, another tornadic signature began to develop a few miles farther southwest, in association with the same supercell. As the cell crossed Lake Toho, the rotation strengthened, and a waterspout likely developed. The waterspout emerged from the eastern portion of Lake Toho around 0445 AM (0945 UTC) and produced F0 tornado damage in a 6-8 block area known as "Kissimmee Park". Many trees and powerlines were downed and several homes/trailers were damaged or destroyed.

TOTAL LENGTH OF OSCEOLA COUNTY DAMAGE: LESS THAN 1 MILE.
FUJITA DAMAGE SCALE ESTIMATE: F0.
MAXIMUM WIND SPEED ESTIMATE: NEAR 70 MPH.



Lake Toho (St. Cloud) Tornado damage location map (designated by "T").

METEOROLOGICAL OBSERVATIONS

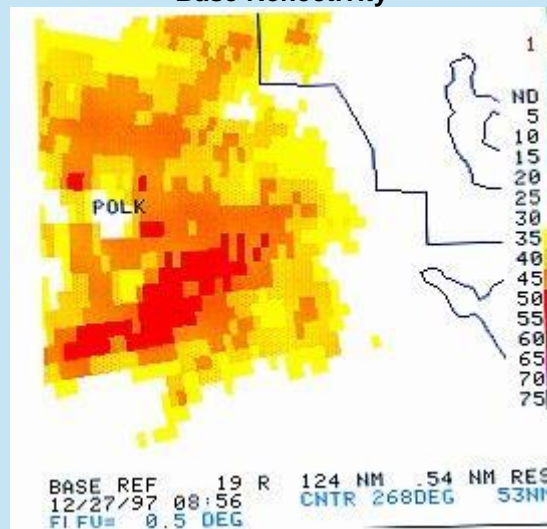
At least 3 separate tornado touchdowns resulted as the parent supercell travelled along a long track across the central Florida peninsula. The touchdowns across Polk County produced extensive damage and many injuries, while less extensive damage and no injuries occurred across Osceola County.

WSR-88D Doppler Radar

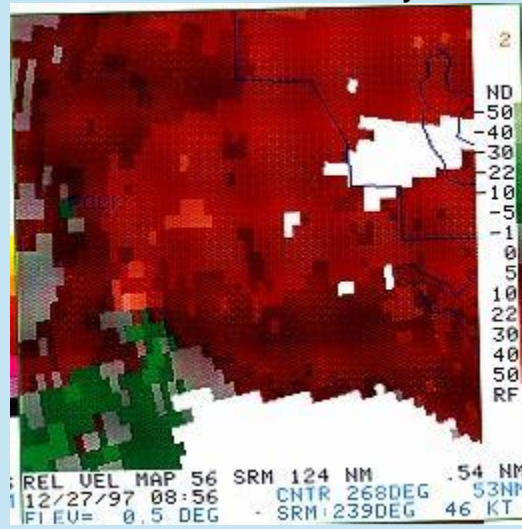
Below are a series of reflectivity and storm-relative velocity images. The scale to the right of each image reveals the associated radar return in dBZ (reflectivity; brighter colors equate to heavier rainfall) and wind speed in knots (storm relative velocity; green colors indicate motion toward the radar site, while red colors indicate motion away from the radar site; in this case the Melbourne radar is located 30-60 nmi due east of the tornado signatures). Note the "tightening" of the red/green "couplet" as time evolves..this is the signature associated with the tornado.

The first set of images (356 AM) show a 35 knot rotational velocity couplet with a 2.2 nmi diameter at the time of the initial (F0) brief touchdown. By 0411 (time of F2 damage), rotational velocities increased further and the couplet diameter halved to 0.9 nmi, resulting in a shear of .022 per second. By 431 AM, the velocity image indicated a weakening and broadening of the initial mesocyclone (now in Osceola County), while a second circulation began to develop a few miles due south of the Polk/Osceola County line. On the following volume scan (440 AM), the rotational couplet, now over Lake Toho, continued to strengthen. In the last set of images (445 AM), the circulation had reached the eastern shore of Lake Toho and was beginning to weaken (19 knot rotational velocity, 2.0 nmi diameter; sampled at a distance of 38 nmi and a height of 3200 feet). It was at this time that the F0 tornado damage occurred adjacent to the lake. On several previous occasions, moderate to strong mesocyclones have been observed for long periods of time without producing damage on the ground, only to later produce a brief tornado touchdown immediately downwind of a central Florida lake. It is speculated that friction and moisture differences between the water and adjacent land surfaces are partially responsible for stretching the vortex to the surface.

Base Reflectivity

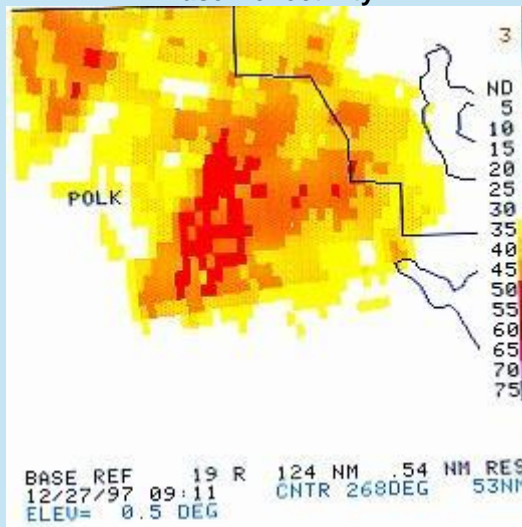


Storm Relative Velocity

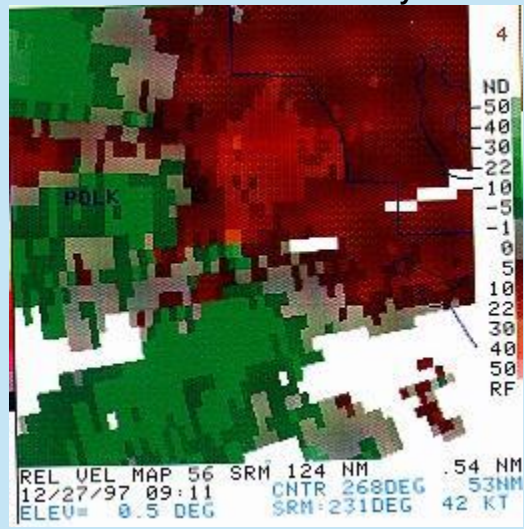


356 AM EST

Base Reflectivity

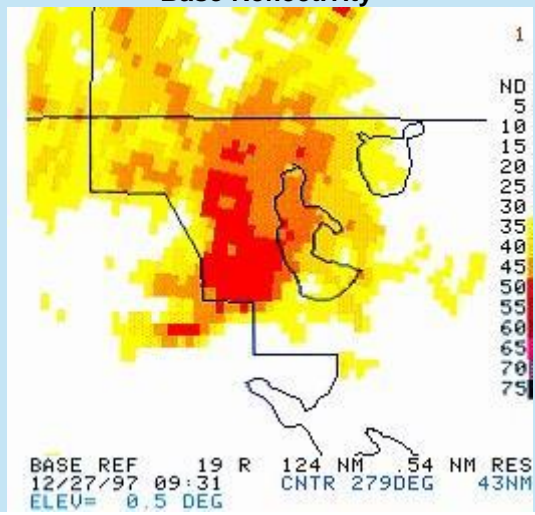


Storm Relative Velocity

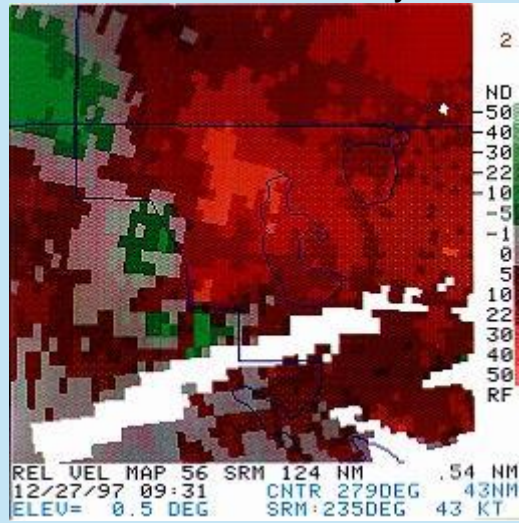


411 AM EST

Base Reflectivity

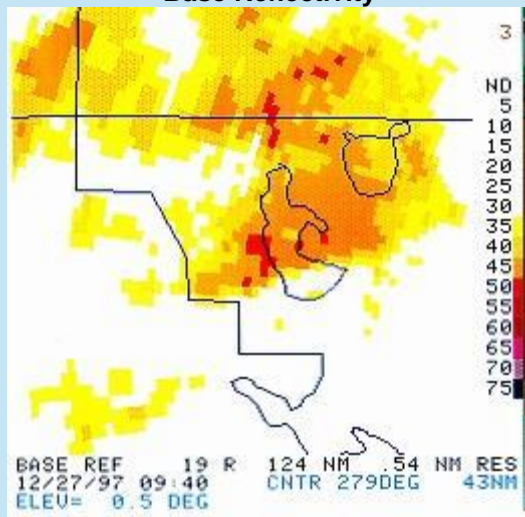


Storm Relative Velocity

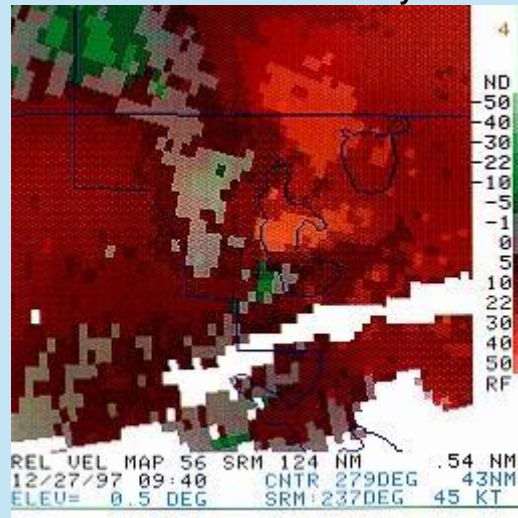


431 AM EST

Base Reflectivity

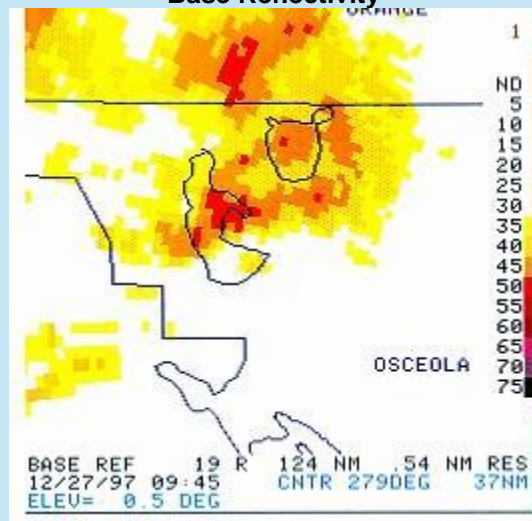


Storm Relative Velocity

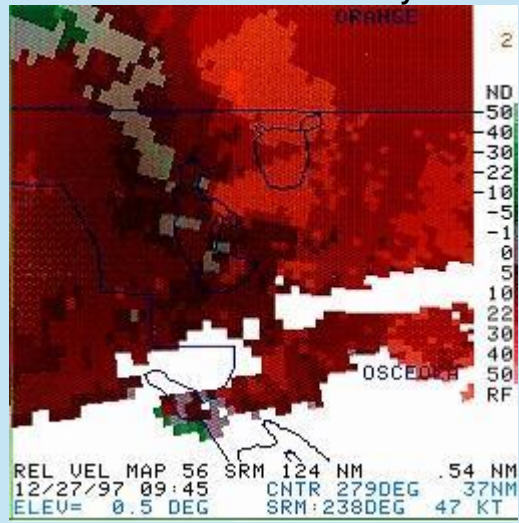


440 AM EST

Base Reflectivity



Storm Relative Velocity



445 AM EST