

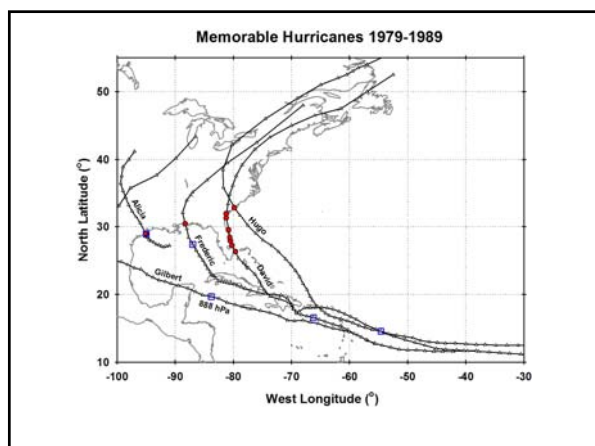
Cyclone Tracy

- Formed on 20DEC74, 500 km NE of Darwin
- Became visible on Darwin Radar on the 22nd as a 50 m/s cyclone
- Slowed and tracked around Bathurst Is
- Moved over shallow warm water
- Intensified and turned toward Darwin late on the 23rd and 24th
- Landfall Christmas morning



Tracy Damage

- Struck at 2:30 AM local
- Maximum winds may have been 85 m/s
- Small vortex
 - 15 km eye
 - Gale force winds to 40 km radius
 - Sudden onset
- Impact
 - Killed 65
 - Injured 790
 - 36,000 homeless
 - 35,000 evacuated
 - US\$800M in damage



David & Frederic in 1979

- David passed by Miami as a CAT 1
- First real threat since Betsy
- Last direct experience before Andrew
- Killed 12 in the US and did \$1.5B (1979) in damage
- Killed ~2000 on Hispaniola
- Frederic struck Mobile AL 13SEP79 as a CAT 3
- Killed only 5 in the US, but did \$2.3 B (1979) in damage



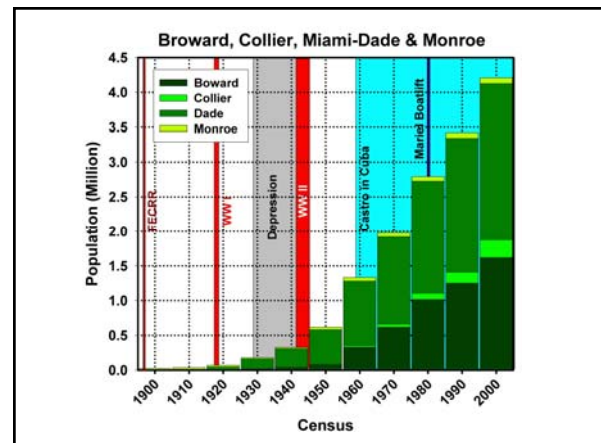
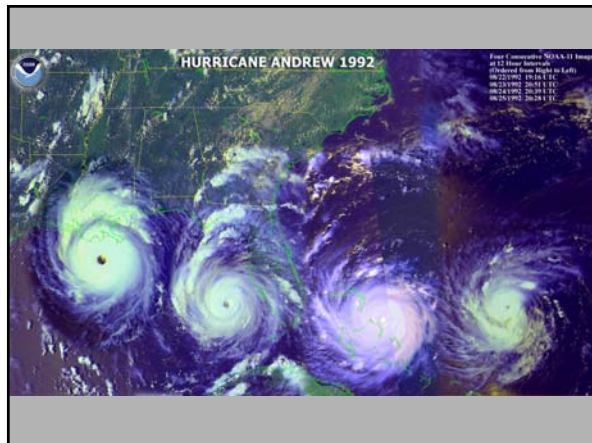
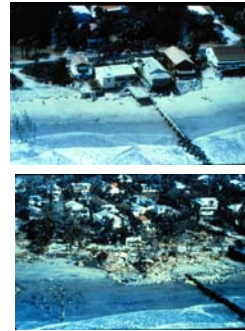
The (more-or-less) Uneventful 1980s

- 1983: Alicia CAT 3 in the Houston area
 - Killed 21
 - \$5.1 B in damage
- 1985 Season: 6 hurricane landfalls
- Neil Frank Retired in 1987 and went to KHOU in Texas
- He was succeeded by Bob Sheets



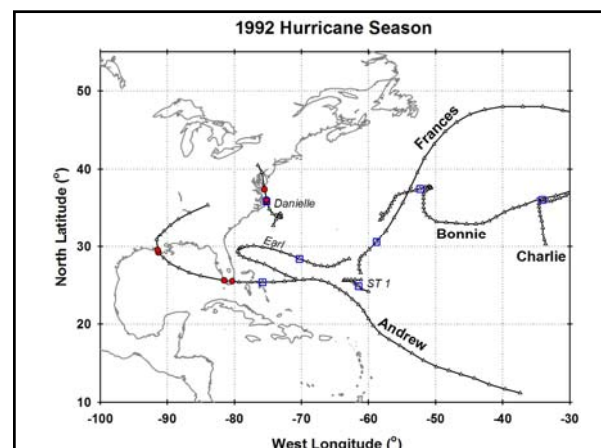
Hurricane Hugo in 1989

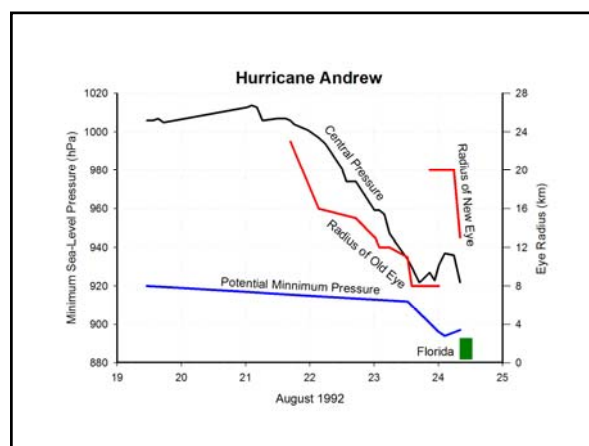
- Cape Verde Hurricane
- Intensified in the Atlantic
- N42RF nearly lost in Caribbean
- Struck Guadeloupe, Leeward Is., St. Croix, & eastern Puerto Rico
- Weakened, but then intensified rapidly before landfall N. of Charleston SC.
 - \$7B in US damage (\$10B total)
 - ~50 deaths



Andrew in Context

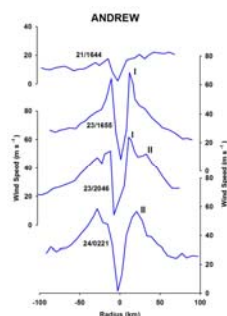
- From 1926 through 1966, 13 Hurricanes hit Miami-Dade County
- South Florida Building Code instituted after storms in the '20s, improved greatly in the late '60s due to Herb Saffir
- NO Hurricanes from 1965 (Betsy) through 1991
 - Apart from a near misses by Inez in '66 and David in 1979
- Enforcement of building standards lagged
 - 16 inspectors for whole county
 - Affordability argument from builders
 - Corruption...



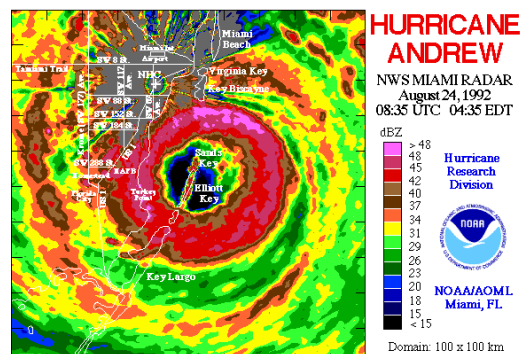


Eyewall Replacement in the Bahamas

- Tropical wave on 14AUG
- TD at 18Z on the 16th
- TS at 12Z on the 17th
- Three days as a sheared, weakening TS
- Trough lifted out on 20th and the ridge built
- Became Hurricane Andrew on the 22nd
- Intensified rapidly on 22nd and 23rd.
- Reached a maximum intensity of 922 mb & 150 kt (172 mph)
- Eye replacement weakened it to 941 mb (130 kt 140 mph)
- Intensified rapidly again to 145 kt (167 mph) and 922 mb at landfall.

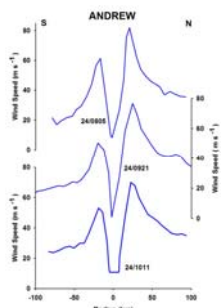


Last Sweep of the Miami WSR-57

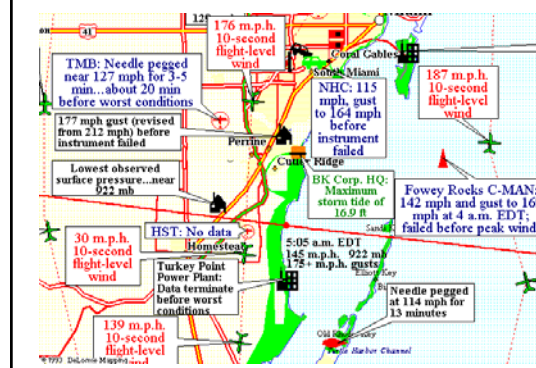


Wind Structure at Landfall

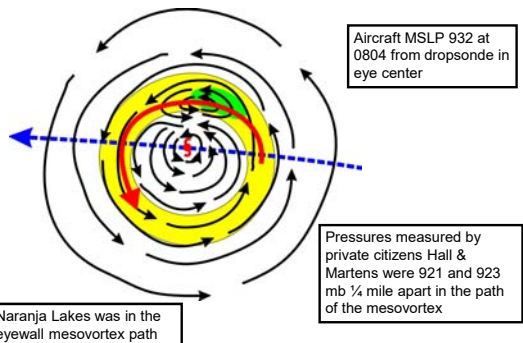
- Aircraft Fix at 0805Z
 - 82 m/s or (183 mph or 160 mph)
- Fix 1 hr before landfall at 905Z (0505 EDT)
- Second pass at 921Z
 - Over land
 - 75 m/s (168 mph or 146 kt)
- Third fix over Everglades
 - 65 m/s



Selected Observations



Mesovortex in Andrew's Eyewall



Intensity at Landfall

- Initial South Florida: 922 mb, 125 kt (144 mph) CAT4
- Revised extrapolation of surface winds to 90% of flight level (80% initially) based upon dropsondes
- New Landfall intensity 922 mb, 145 kt (167 mph) CAT5
- Only 1935 Labor Day and Camille were stronger at US landfall
- Maximum surge 17 ft, 6-9 ft surge widespread
- Louisiana LF intensity CAT 3
- Much of the SFLA damage occurred in CAT3 or even CAT 2 Conditions.

Naranja Lakes



Naranja Lakes

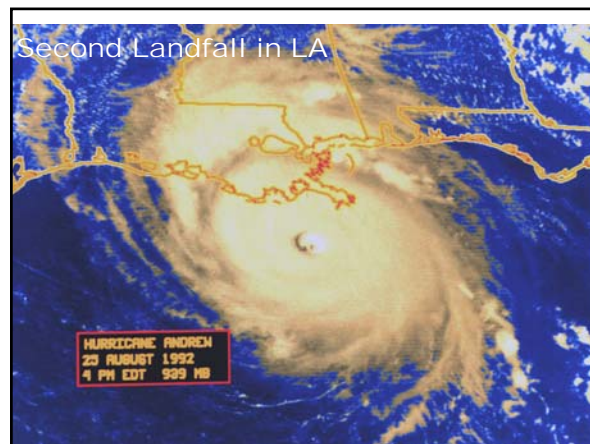


Naranja Lakes



Lakes by the Bay

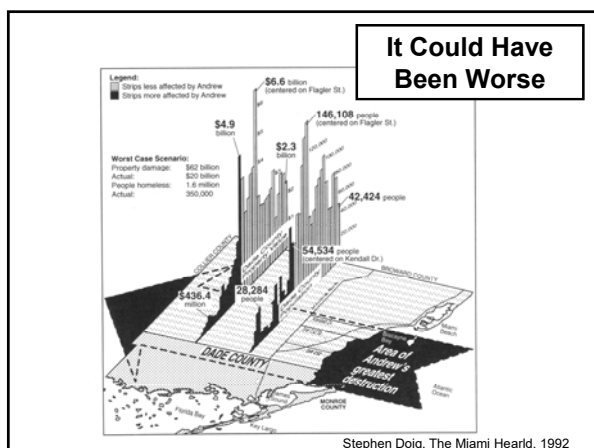
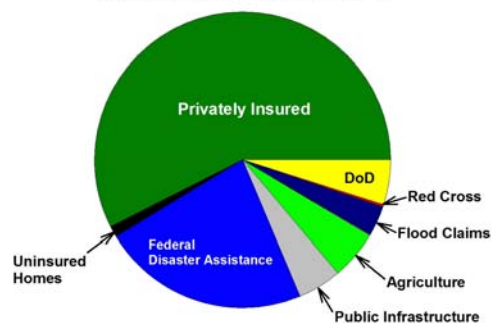




Impacts

- Damage in S. Florida \$25 B
- Homes
 - 25,524 destroyed
 - 101,241 damaged
- Damage in Louisiana: \$1B
- Deaths
 - Bahamas: 3 direct, 1 indirect (4)
 - Florida: 15 direct, 26 indirect (41)
 - Louisiana: 8 direct, 9 indirect (17)
 - Total 26 direct, 36 indirect (62)
- Closure of Homestead AFB

Andrew Economic Losses



SUMMARY

- Tracy hit Darwin Australia on Christmas Day 1974
 - Killed 65; AU\$ 0.8B (1974) in damage
 - Defining cyclone down under
- US lull in damaging hurricanes 1973-2003, apart from Frederick (1979) and Hugo (1989) as coastal populations doubled
- 1985 Season 6 US landfalls, Juan did significant damage
- Gilbert of 1988 established a new record MSLP, 888 mb
- Andrew of 1992
 - Landfall Monday morning 24 August
 - Originally estimated as CAT 4; increased to CAT 5 in 2002
 - Killed 26; did \$26B in damage
 - Defining US hurricane disaster for a time....