

PRELIMINARY REPORT

HURRICANE DENNIS

7 - ~~22~~ August 1981
21

The system that developed into Hurricane Dennis was well organized as it moved off the African coast on August 5. This system became a tropical depression on August 7 and was upgraded to a tropical storm later that day while still in the eastern North Atlantic. The system remained a tropical storm for 3 days as it moved westward across the Atlantic. As the storm approached the Caribbean it encountered upper level westerly shear...weakened...and was downgraded to a tropical depression on August 11. The weakening process continued as the system entered the Caribbean where it became an open wave on August 12.

The tropical wave continued moving steadily westward until slowing down and nearly stalling south of Cuba. The system then rapidly became better organized, forming a tropical depression near the south coast of Central Cuba on August 15. Within a matter of a few hours the system attained tropical storm strength and began to migrate northward over Cuba toward a weakness in the surface pressure field. Further slow strengthening occurred as the storm moved across the Florida Straits toward south Florida on August 16 and 17. Satellite pictures indicated that the storm made several aborted attempts to concentrate the deep convection near the center of circulation and form an eyewall. However, most of the convective activity and strong winds remained in a trough well to the northeast of the center apparently preventing significant deepening of the storm during its slow traverse across the warm waters. Steering currents remained weak through August 18. The resulting slow motion combined with the wide spread convection to the northeast of the center brought heavy accumulations of rainfall to extreme south Florida.

On August 18 and 19, the storm moved slowly northward across south and central Florida before moving out over the Atlantic north of Cape Canaveral...skirted the Carolina coasts and then turned eastward where it reached hurricane strength for a short time before moving over colder waters on August 21 and 22 and becoming extratropical.

The initial determination that a tropical depression had formed in the Eastern Atlantic and later upgrading to Tropical Storm Dennis on August 8 was based solely on analyses of satellite pictures. The standard Dvorak technique was used for strength determination. Later, when the tropical storm came within operational range of reconnaissance aircraft, simultaneous observations were made from the aircraft and satellite. The result was a considerable difference between the intensity estimated from satellite and that reported by the aircraft. On August 10, the aircraft reported a minimum pressure of 1009.4 mb, 29.81 inches ...while the value estimated from satellite was 994 mb...29.35 inches. A similar condition existed for the next reconnaissance flight on August 11 where the aircraft reported an extrapolated minimum pressure of 1013 mb...29.91 inches ...on the poorly defined system while the satellite determined value was 1000 mb ...29.53 inches. On both of these days, the aircraft reported a poorly defined system. It is unlikely that the pressure determined from the aircraft could be in error by more than 2 to 3 mb and would probably be too high because of the broad poorly defined system which would make it difficult to locate the exact point of minimum pressure. In fact observations in the Windward Islands near

the time of the second reconnaissance mission into this storm indicated that the aircraft determined minimum pressures were probably 2 to 3 mb too high. Even with this adjustment post analyses indicated that the minimum estimated from satellite at this time are 5 to 10 mb too low. This adjustment factor was applied to the satellite derived values for the period when only satellite data were available while the storm was over the eastern and middle Atlantic in arriving at the final listed minimum pressures.

The primary effect that Dennis had on the land areas it passed over was some gusty winds and locally heavy rainfalls with occasional flooding. Wind damage was minimal. Maximum gusts recorded over land were 50 to 60 mph along the extreme southeast Florida coasts and the coastal regions of North Carolina. Maximum sustained winds were only 30 to 45 mph. The minimum pressures recorded were 998 mb...29.47 inches...on August 17 over the Florida Straits and 995 mb ...29.38 inches on August 20 and 21 for the brief period when the storm reached hurricane strength.

Some of the rain over South Florida was quite welcome, helping end a drought that had persisted through the spring and early summer. Unfortunately little of the rain fell over Lake Okeechobee over its catch basin to the north of the lake which could have provided long term drought relief. Also, considerable damage was and continues to be done in some areas of southwest Dade County where rainfall totals approached or exceeded 20 inches. Some 20 families had to be evacuated by airboats, half tracks and 4 wheel drive vehicles. Heavy losses occurred to some homes and commercial buildings due to roof failures and high waters. The largest losses, however, are those to the agricultural industry due to prolonged standing water in Dade County, Florida. Preliminary estimates of losses exceeded \$15 million in agriculture alone in Dade County. These losses are now expected to be much higher because they have been compounded by heavy rains since Dennis. Also, the standing water has created health hazards to residents of the affected communities. Similar but less extensive losses to agriculture and residential areas were reported in the coastal regions of North Carolina and along the Maccamaw River in South Carolina which reached its highest levels since 1945. The extreme northeast North Carolina and Virginia coastal regions only experienced minor localized flooding and beach erosion was also generally minor but occasionally moderate. Some residential damage occurred on the barrier islands. In particular Wiloughby Spit. where?

Two tornadoes were reported. One on Plantation Key in the Florida Keys and another on Haulover Beach in northern Dade County, Florida. Only minor damage resulted from these occurrences.

WATCHES AND WARNINGS

| LOCATION | TYPE | EFFECTIVE | DISCONTINUED |
|---------------------------------------------------------------------------|-----------------|------------|--------------|
| LONG KEY TO DRY TORTUGAS | GALE WARNINGS | 8/16/0400Z | 19/0400Z |
| KEY LARGO TO LONG KEY | GALE WARNINGS | 8/16/0400Z | 8/17/1600Z |
| SOUTH FLORIDA...FT. MYERS AND PALM BCH SOUTHWARD INCLUDING THE KEYS | HURRICANE WATCH | 8/16/0400Z | 8/17/1300Z |
| KEY LARGO TO PALM BCH | GALE WARNINGS | 8/17/1000Z | 8/19/0400Z |
| FLORIDA BAY | GALE WARNINGS | 8/17/1300Z | 8/19/0400Z |
| PALM BCH TO SOUTH OF DAYTONA BCH | GALE WARNINGS | 8/17/2200Z | 8/19/0400Z |
| EXTREME NE FLA. COAST | GALE WARNINGS | 8/19/1000Z | 8/19/1600Z |
| GEORGIA COAST | GALE WARNINGS | 8/19/1000Z | 8/19/2200Z |
| SOUTH CAROLINA COAST | GALE WARNINGS | 8/19/1000Z | 8/20/1000Z |
| BRUNSWICK TO CHARLESTON | GALE WARNINGS | 8/19/1600Z | 8/19/2200Z |
| NORTH OF CHARLESTON TO LITTLE RIVER S. C. | GALE WARNINGS | 8/19/1600Z | 8/20/0100Z |
| LITTLE RIVER S. C. TO CAPE LOOKOUT | GALE WARNINGS | 8/19/1600Z | 8/20/1000Z |
| CAPE LOOKOUT TO CAPE HATTERAS N. C. | GALE WARNINGS | 8/19/2200Z | 8/20/1600Z |
| CAPE HATTERAS N.C. TO CAPE CHARLES VA. | GALE WARNINGS | 8/19/2200Z | 8/20/2200Z |
| CAPE CHARLES TO CHINCOTEAGUE INLET INCLUDING OUTER BANKS | GALE WARNINGS | 8/20/1000Z | 8/20/2200Z |
| CHESAPEAKE BAY FROM WINDMILL POINT SOUTH | GALE WARNINGS | 8/20/1000Z | 8/20/2200Z |
| UPPER FLA. KEYS | TORNADO WARNING | 8/17/0420Z | 8/17/0500Z |
| NORTHEAST DADE AND SOUTHEAST BROWARD COUNTIES | TORNADO WARNING | 8/16/2145Z | 8/16/2230Z |
| FLORIDA SOUTH OF LINE FT. MYERS TO PALM BEACH | TORNADO WATCH | 8/16/1600Z | 8/17/1600Z |
| FLORIDA SOUTH OF ORLANDO EXCLUDING FLORIDA KEYS | TORNADO WATCH | 8/17/1600Z | 8/17/2200Z |
| FLORIDA SOUTHEAST OF LINE MARCO ISLAND TO MELBOURNE | TORNADO WATCH | 8/17/2200Z | 8/18/1000Z |
| FLORIDA EAST COAST AND INLAND 50 MILES...PALM BCH THRU KEY WEST | TORNADO WATCH | 8/18/1000Z | 8/18/2200Z |

GEORGIA AND ... INLAND 50 MILES
 BY JACK TO MYRTLE BEACH

GEORGIA, SOUTH AND NORTH
 CAROLINA COASTS... INLAND
 30 MILES... SAVANNAH TO
 WILMINGTON, N.C.

TORNADO WATCH

8/19/1230Z

8/19/1800Z

SOUTH AND NORTH CAROLINA
 COASTS... INLAND 30 MILES
 MYRTLE BEACH TO CAPE
 HATTERAS

TORNADO WATCH

8/19/1800Z

8/20/0800Z

SELECTED METEOROLOGICAL STATISTICS

| LOCATION | STRONGEST WIND (MPH) | | MIN. PRESSURE | | MAX RAINFALL (IN) | | STORM TOTAL |
|----------------|----------------------|-------------|---------------|-------|-------------------|------------|-------------|
| | DATE/TIME | SUSTD PEAK | DATE/TM | INCH. | DATE 12 HR | DATE 24 HR | |
| FLORIDA | | | | | | | |
| KEY WEST | 18/1419Z | W/20 52 | 16/18Z | 29.65 | 18 | 2.11 | 5.84 |
| FLAMINGO | ..... | ..... | ..... | ..... | 18 | 8.20 | 12.85 |
| ROYAL PLM | ..... | ..... | ..... | ..... | 18 | 7.75 | 15.5 |
| HOMESTEAD | ..... | ..... | ..... | ..... | 18 | 9.67 | 13.78 |
| KENDALL | ..... | ..... | ..... | ..... | 18 | 12.00 | 15.36 |
| TAVERNIER | ..... | ..... | ..... | ..... | 18 | 4.13 | 8.46 |
| MIAMI | | | | | | | |
| NHC | 17/0958Z | S/35 52 | ..... | ..... | ..... | ..... | ..... |
| ARPT | 18/0452Z | S/23 39 | 17/21Z | 29.67 | 18 | 3.62 | 4.86 |
| BEACH | 17/0338Z | S/34 47 | ..... | ..... | ..... | ..... | ..... |
| N. DADE | | | | | | | |
| FT. LAUD. | ..... | ..... | ..... | ..... | 18 | 4.89 | 4.87 |
| BEACH | 17/AM | S/60 | ..... | 29.73 | 18 | 1.86 | 3.86 |
| ARPT. | 17/0849Z | SSE/30 | 17/22Z | 29.66 | ..... | ..... | ..... |
| W. PLM. BCH | 18/1755Z | S/25 45 | 17/22Z | 29.71 | 18 | 3.10 | 3.73 |
| ORLANDO | 19/1825Z | SW/20 S/37 | 18/22Z | 29.67 | ..... | 19 | .78 |
| DAY. BCH. | 18/2335Z | NE/23 32 | 18/22Z | 29.63 | ..... | ..... | .58 |
| SOUTH CAROLINA | | | | | | | |
| HILTON HD | ..... | ..... | ..... | ..... | ..... | ..... | 2.59 |
| BEAUFORT | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| AIR STA. | 19/2305Z | NW/22 25 | 19/17Z | 29.72 | ..... | ..... | .89 |
| EDISTO BH | 19/1938Z | NW/20 29 | 19/17Z | 29.72 | ..... | ..... | 5.88 |
| CHARLESTON | | | | | | | |
| CITY | 20/0800Z | W/21 S/37 | ..... | ..... | ..... | ..... | 5.8 |
| ARPT | 19/1937Z | NW/22 28 | 19/28Z | 29.64 | ..... | ..... | 6.92 |
| MT. PLST. | ..... | ..... | ..... | ..... | ..... | ..... | 5.69 |
| SUMRVL | ..... | ..... | ..... | ..... | ..... | ..... | 3.83 |
| LADSON | ..... | ..... | ..... | ..... | ..... | ..... | 4.18 |
| GEORGETOWN | | | | | | | |
| 12W | ..... | ..... | ..... | ..... | ..... | ..... | 7.75 |
| 10N | ..... | ..... | ..... | ..... | ..... | ..... | 7.58 |
| 4E | ..... | ..... | ..... | ..... | ..... | ..... | 9.75 |
| N. IS. CG | 20/0100Z | NW/30 40 | 19/23Z | 29.58 | ..... | ..... | ..... |
| MRTL BCH | | | | | | | |
| AFB | ..... | N/16 25 | 20/00Z | 29.59 | ..... | ..... | 6.85 |
| CITY | ..... | ..... | ..... | ..... | ..... | ..... | 3.59 |
| CONWAY 5S | ..... | ..... | ..... | ..... | ..... | ..... | 8.75 |
| CONWAY | ..... | ..... | ..... | ..... | ..... | ..... | 5.58 |
| CRSNT BCH | 20/0800Z | NE/10 20 | 20/01Z | 29.62 | ..... | ..... | 5.45 |
| CHRY G. BCH | ..... | ..... | ..... | ..... | ..... | ..... | 7.58 |
| COLUMBIA | 19/1657Z | ENE/17 N/23 | 19/21Z | 29.2 | ..... | ..... | .84 |

15.36 x 25.4 = 390.144 mm
 20.30 x 25.4 = 515.62

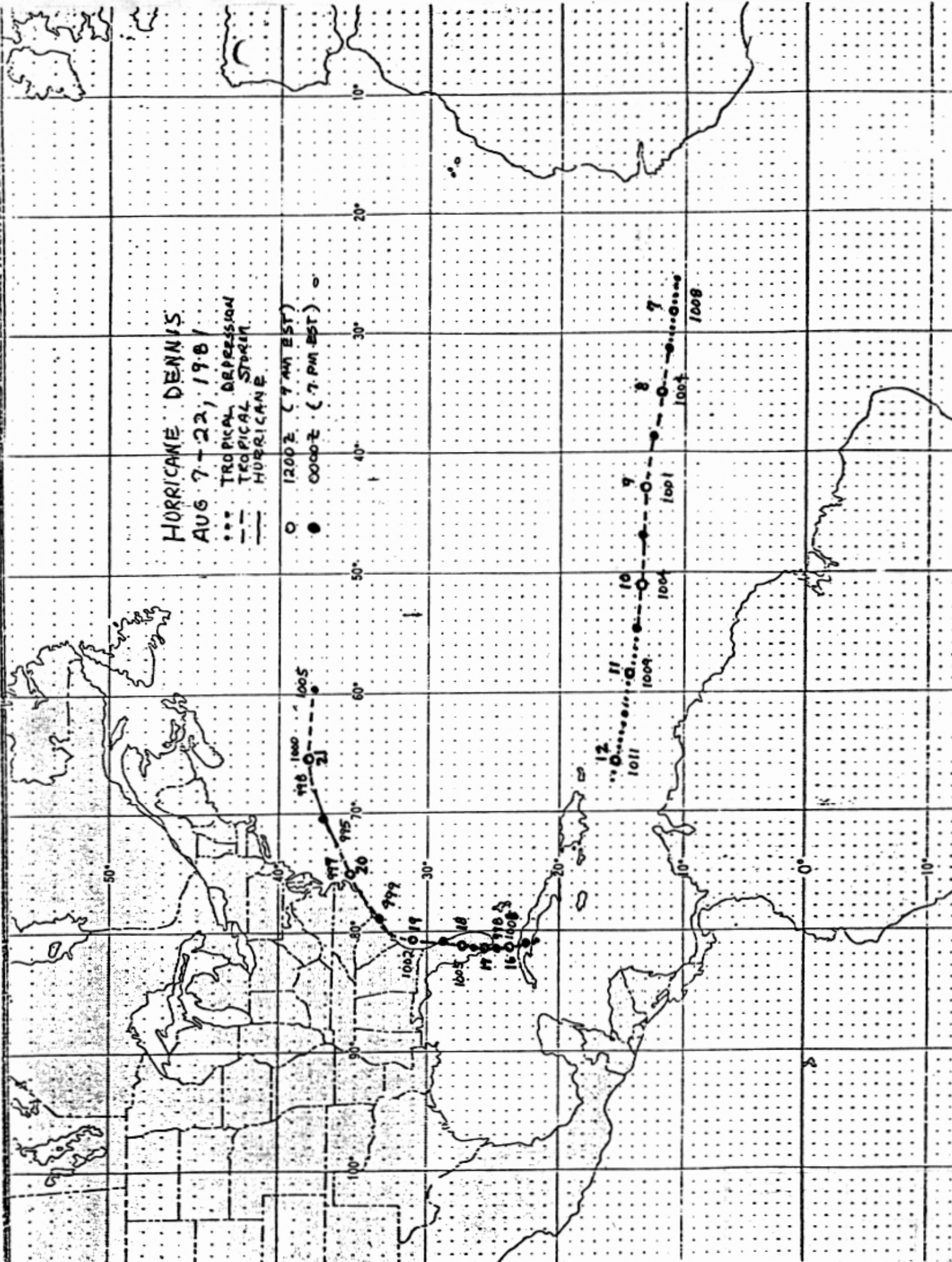
HURRICANE DENNIS

AUG 7-22, 1961

- TROPICAL DEPRESSION
- - - TROPICAL STORM
- HURRICANE

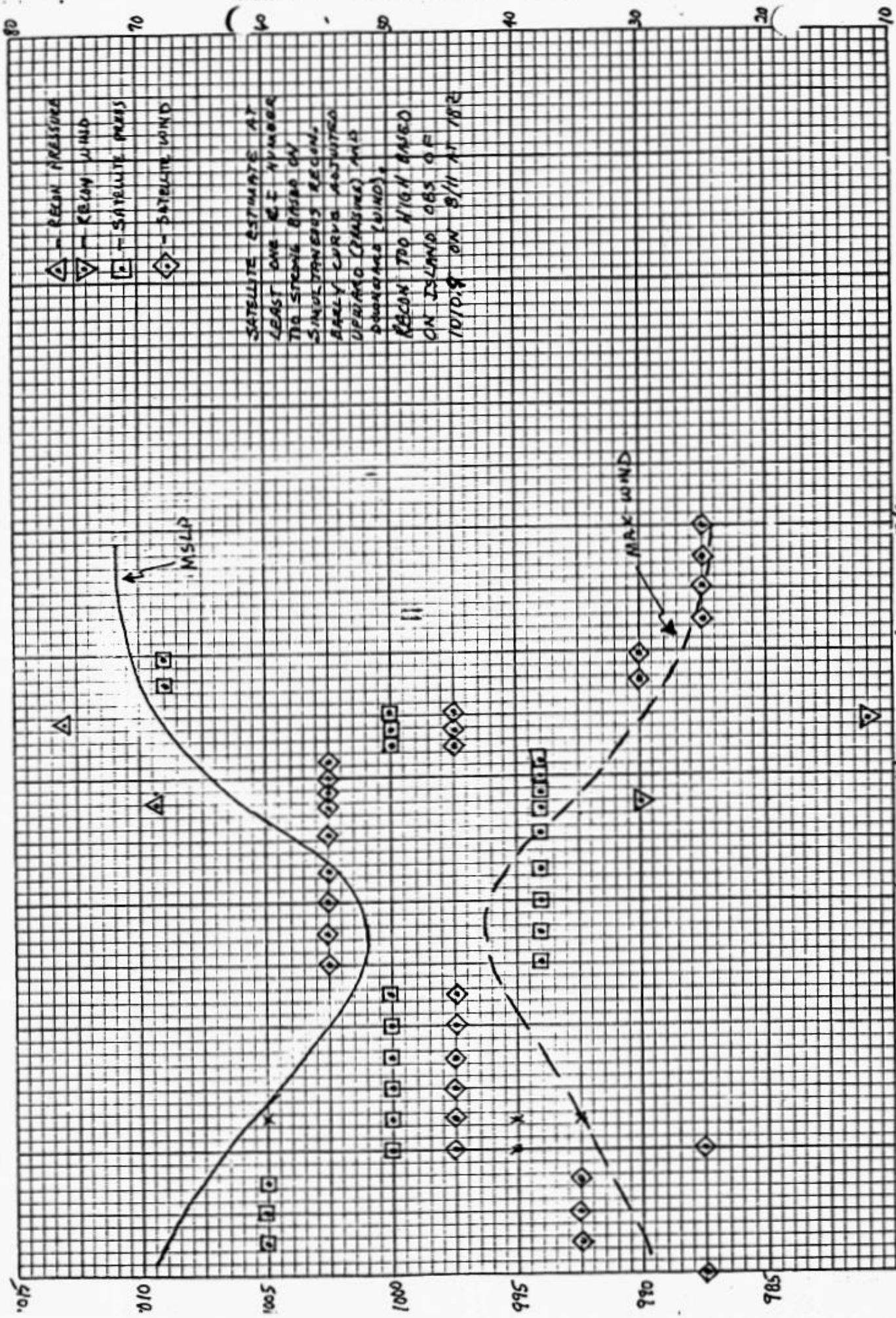
○ 1200Z (7 AM EST)

● 0000Z (7 PM EST)



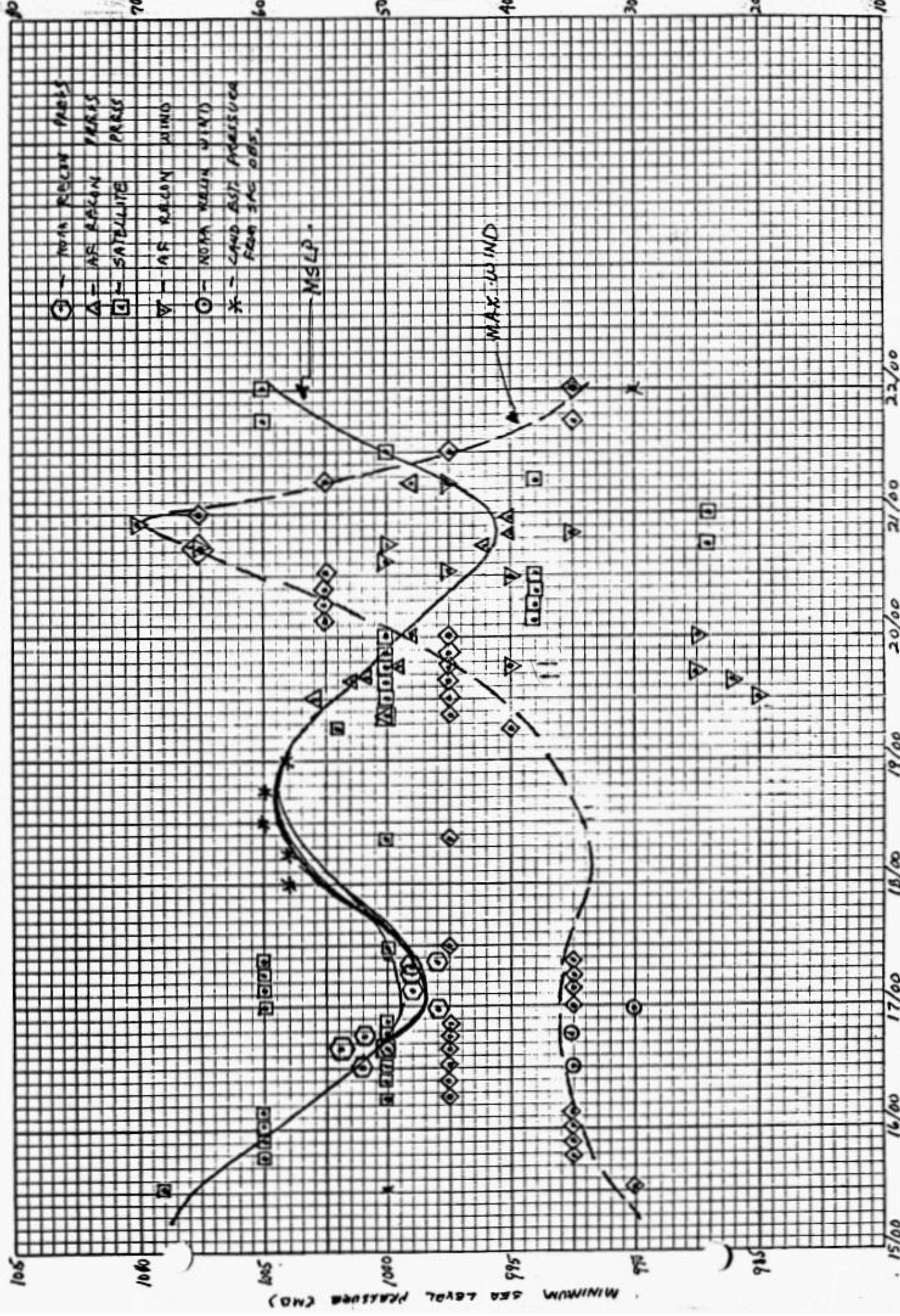
TROPICAL STORM DENNIS AUGUST 7-13, 1981

MAXIMUM WIND SPEED (KTS)



PAPER NO. 1380-10-3
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TROPICAL STORM / TUKUCICAME DENNIS AUGUST 15 - 22, 1961



GRAPHING PAPER NO. 1180-11-1
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 CROSS SECTION-18x18 TO 1 INCH
 STM LINE ACCT'D. 18781 MEASV

MADE IN USA

PRELIMINARY BEST TRACK

HURRICANE DENNIS

7 - (22) AUGUST 1981

| DATE | TIME (GMT) | POSITION LATITUDE LONGITUDE | PRESSURE (MB) | WIND (KT) | STAGE |
|------|------------|--------------------------------|---------------|-----------|---------------------------------|
| 8/7 | 0600 | 10.5 25.7 | 1009* | 30* | TROP. DEPRESSION |
| " | 1200 | 10.8 28.1 | 1008* | 31* | " |
| " | 1800 | 11.0 29.6 | 1007* | 33* | " |
| 8/8 | 0000 | 11.3 31.3 | 1006* | 34* | TROP. STORM ¹ |
| " | 0600 | 11.7 33.1 | 1005* | 35* | " 2 |
| " | 1200 | 12.0 35.0 | 1004* | 36* | " 3 |
| " | 1800 | 12.5 36.7 | 1003* | 39* | " 4 |
| 8/9 | 0000 | 12.8 38.7 | 1002* | 40* | " 5 |
| " | 0600 | 13.1 40.8 | 1001* | 42* | " 6 |
| " | 1200 | 13.3 43.0 | 1001* | 42* | " 7 |
| " | 1800 | 13.5 45.0 | 1001* | 42* | " 8 |
| 8/10 | 0000 | 13.5 47.0 | 1001* | 42* | " 9 |
| " | 0600 | 13.5 49.0 | 1002* | 41* | " 10 |
| " | 1200 | 13.5 51.0 | 1004 | 39 | " 11 |
| " | 1800 | 13.6 52.9 | 1006 | 36 | " 12 |
| 8/11 | 0000 | 13.8 54.9 | 1007 | 33 | TROP. DEPRESSION |
| " | 0600 | 14.0 56.5 | 1008 | 32 | " |
| " | 1200 | 14.3 58.3 | 1009 | 30 | " |
| " | 1800 | 14.6 60.1 | 1010 | 28 | " |
| 8/12 | 0000 | 14.9 61.9 | 1010 | 27 | " |
| " | 0600 | 15.2 63.8 | 1011 | 25 | " |
| " | 1200 | 15.4 65.7 | 1011 | 25 | " |
| " | 1800 | 15.6 67.6 | 1011 | 25 | " |
| 8/13 | 0000 | | | | TROP. WAVE |
| 8/15 | 1800 | 21.7 80.8 | 1007* | 33* | TROP. DEPRESSION |
| 8/16 | 0000 | 22.4 81.0 | 1005* | 35* | TROP. STORM ¹³ |
| " | 0600 | 23.0 81.2 | 1003 | 35 | " 14 |
| " | 1200 | 23.8 81.4 | 1001 | 36 | " 15 |
| " | 1800 | 24.5 81.3 | 1000 | 36 | " 16 |
| 8/17 | 0000 | 24.9 81.3 | 998 | 36 | " 17 |
| " | 0600 | 25.2 81.2 | 999 | 36 | " 18 |
| " | 1200 | 25.8 81.2 | 999 | 35 | " 19 |
| " | 1800 | 26.2 81.2 | 1001 | 35 | " 20 |
| 8/18 | 0000 | 26.5 81.2 | 1003 | 34 | " 21 |
| " | 0600 | 26.8 81.1 | 1004 | 34 | " 22 |
| " | 1200 | 27.2 81.0 | 1005 | 34 | " 23 |
| " | 1800 | 27.6 81.0 | 1005 | 34 | " 24 |
| 8/19 | 0000 | 28.7 80.8 | 1004 | 37 | " 25 |
| " | 0600 | 29.7 80.8 | 1003 | 38 | " 26 |
| " | 1200 | 31.0 80.8 | 1002 | 41 | " 27 |
| " | 1800 | 32.2 79.9 | 1001 | 44 | " 28 |
| 8/20 | 0000 | 33.4 78.8 | 999 | 48 | " 29 |
| " | 0600 | 34.7 77.8 | 998 | 54 | " 30 |
| " | 1200 | 35.5 75.2 | 997 | 60 | " 31 |
| " | 1800 | 36.3 73.0 | 995 | 66 | HURRICANE ⁶ } 286=12 |
| 8/21 | 0000 | 37.1 70.4 | 995 | 70 | " |
| " | 0600 | 37.8 68.8 | 990 | 55 | TROP. STORM ³² |
| " | 1200 | 38.1 65.4 | 1000* | 45* | " 33 |
| " | 1800 | 38.4 62.8 | 1003* | 37* | " 34 |
| 8/22 | 0000 | 37.8 59.7 | 1005* | 35* | EXTRA TROP. |

* ESTIMATED FROM SATELLITE ONLY.

34x6=204