

Preliminary Report
Hurricane Isidore
24 September - 1 October 1996

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a. Synoptic History

Hurricane Isidore formed from a tropical wave that had a well-defined cyclonic circulation of clouds and was clearly marked at mid-levels in the Dakar sounding data when it crossed the west coast of Africa on 22 September 1996. Deep convection increased and satellite analysts provided the first Dvorak scale T-numbers on the 23rd, while the circulation passed to the south of the Cape Verde Islands. Thunderstorms became more concentrated, T-numbers from the NOAA Tropical Analysis and Forecast Branch (TAFB) increased to 2.0, and ship reports suggested the formation of a surface circulation by 1200 UTC on the 24th. The "best track" begins at that time (Fig. 1, Table 1), indicating the start of the tropical depression stage of Isidore.

The tropical cyclone was initially located to the south of a deep-layer anticyclone. It moved toward the west-northwest at 15-20 knots and intensified. An intense convective band wrapped around the center and the system became a tropical storm on the 25th. Further intensification ensued, an eye began to appear intermittently, and Isidore reached hurricane intensity on the following day.

The mature and dissipating stages of Isidore were influenced by a well-defined mid- through upper-level low that was quasi-stationary near 25°N 45-50°W through the 25th. The low then weakened and lifted northward to near 35°N, but was reinvigorated there by its interaction with a mid-latitude short-wave trough which passed by to the north on the 27-28th. The steering currents on the east side of the low gradually turned Isidore in a general northward direction. The forward speed slowed to about 10 knots during the turn on the 28th, but then increased to 20 knots on 1 October. During this period, Isidore reached its estimated maximum intensity of 100 knot winds. The eye disappeared on the 29th and upper-level westerly to southwesterly winds of around 60 knots contributed to a shearing and weakening of Isidore, down to a

tropical storm with an exposed low-level cloud center on the 29th, and then to a tropical depression on the 1st. Deep convection dispersed and Isidore transformed to extratropical status on the 2nd.

b. Meteorological Statistics

The "best track" (Table 1) was obtained from the data presented in Figs. 2 and 3. Those figures show Isidore's estimated central pressure and maximum one-minute wind speed, respectively, versus time. Position and intensity estimates from satellite pictures were provided by the NOAA Synoptic Analysis Branch (SAB) and TAFB, and by the Air Force Global Weather Central (AFGWC). They are the basis for showing Isidore's maximum wind speed at 100 knots and minimum pressure at 960 mb. Isidore passed through the eastern part of the NOAA drifting buoy network. Observations from those platforms helped define the western part of the cyclone's low-level wind field.

The ship *Magnific* reported southeast (140°) winds of 58 knots at 1200 UTC on the 30th of September, while located at 25.1°N 37.2°W , about 175 nm from the center of Isidore. The reliability of that measurement is in doubt because the estimated maximum surface wind near the center was 50 knots at that time. This was the only surface sustained wind report of 34 knots or higher to be possibly associated with Isidore.

c. Casualty and Damage Statistics

No reports of casualties or damages were received.

d. Forecast and Warning Critique

Table 2 lists track forecast error statistics. The official forecasts and many of the numerical models had track prediction errors that, on average, were at least 33% smaller than normal. The GFDL and GFDI performed best. CLIPER errors were very large at 72 hours.

NHC intensity forecasts were good, in general, but did not show fast enough weakening on the 27th and 28th.

Hurricane and tropical storm watches and warnings were neither issued nor necessary.

Table 1. Preliminary best track, Hurricane Isidore, 24 September - 1 October 1996.

| Date/Time (UTC) | Latitude (°N) | Longitude (°W) | Pressure (mb) | Wind Speed (kt) | Stage |
|--------------------|------------------|-------------------|------------------|--------------------|------------------|
| 24/1200 | 8.6 | 23.3 | 1008 | 25 | Trop. Depression |
| 1800 | 9.2 | 25.2 | 1008 | 30 | " " |
| 25/0000 | 9.9 | 26.9 | 1006 | 30 | " " |
| 0600 | 10.3 | 28.5 | 1004 | 35 | Tropical Storm |
| 1200 | 10.7 | 30.0 | 1000 | 45 | " " |
| 1800 | 11.0 | 31.7 | 994 | 50 | " " |
| 26/0000 | 11.2 | 32.8 | 988 | 60 | " " |
| 0600 | 11.7 | 34.2 | 984 | 70 | Hurricane |
| 1200 | 12.4 | 35.8 | 980 | 70 | " " |
| 1800 | 12.8 | 37.1 | 977 | 75 | " " |
| 27/0000 | 13.1 | 38.6 | 974 | 80 | " " |
| 0600 | 13.7 | 39.8 | 972 | 85 | " " |
| 1200 | 14.1 | 41.1 | 968 | 90 | " " |
| 1800 | 14.9 | 42.2 | 963 | 95 | " " |
| 28/0000 | 15.8 | 42.9 | 960 | 100 | " " |
| 0600 | 16.7 | 43.1 | 961 | 100 | " " |
| 1200 | 17.8 | 43.2 | 965 | 95 | " " |
| 1800 | 19.0 | 43.2 | 968 | 90 | " " |
| 29/0000 | 20.0 | 42.9 | 973 | 85 | " " |
| 0600 | 20.8 | 42.2 | 979 | 75 | " " |
| 1200 | 21.8 | 41.3 | 982 | 70 | " " |
| 1800 | 22.6 | 40.9 | 986 | 65 | " " |
| 30/0000 | 23.8 | 40.4 | 989 | 60 | Tropical Storm |
| 0600 | 25.3 | 40.1 | 992 | 60 | " " |
| 1200 | 26.7 | 40.0 | 995 | 50 | " " |
| 1800 | 28.2 | 40.1 | 997 | 45 | " " |

Table 1 con't. Preliminary best track, Hurricane Isidore, 24 September - 1 October 1996.

| | | | | | |
|---------|------|------|------|-----|------------------|
| 1/0000 | 29.9 | 40.3 | 1000 | 35 | Tropical Storm |
| 0600 | 31.6 | 40.4 | 1002 | 35 | " " |
| 1200 | 33.6 | 40.4 | 1005 | 30 | Trop. Depression |
| 1800 | 35.8 | 40.3 | 1008 | 30 | " " |
| 2/0000 | 38.1 | 40.2 | 1010 | 25 | Extratropical |
| 0600 | 40.3 | 39.6 | 1013 | 20 | " " |
| 1200 | 43.0 | 36.0 | 1015 | 20 | " " |
| | | | | | |
| 28/0000 | 15.8 | 42.9 | 960 | 100 | Min. Pressure |

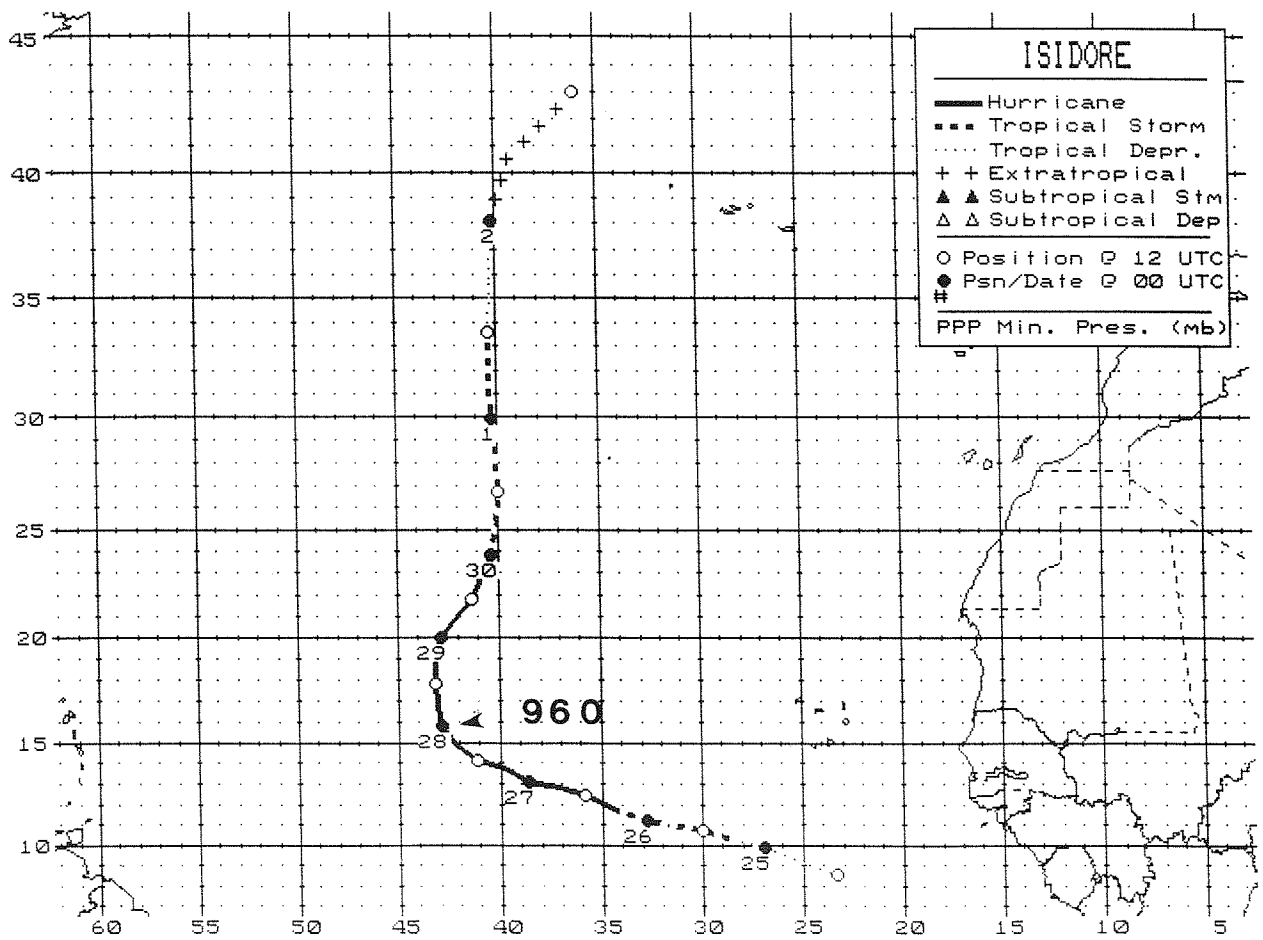


Figure 1. Best track positions for Hurricane Isidore.

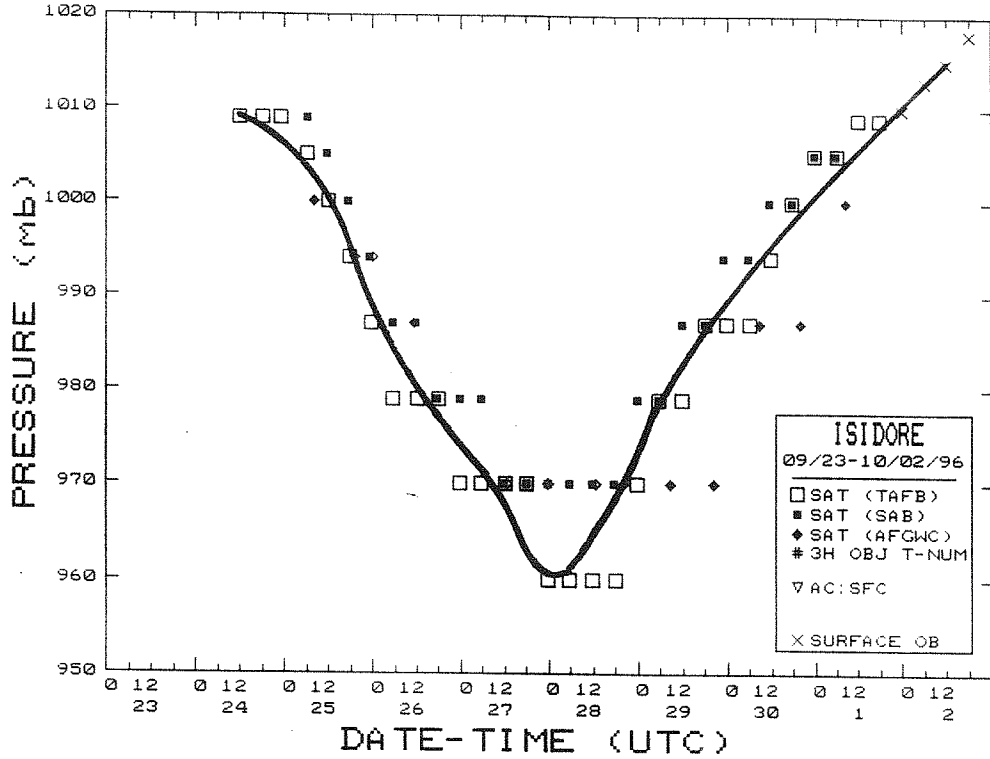


Figure 2. Best track central pressure curve for Hurricane Isidore, September-October 1996.

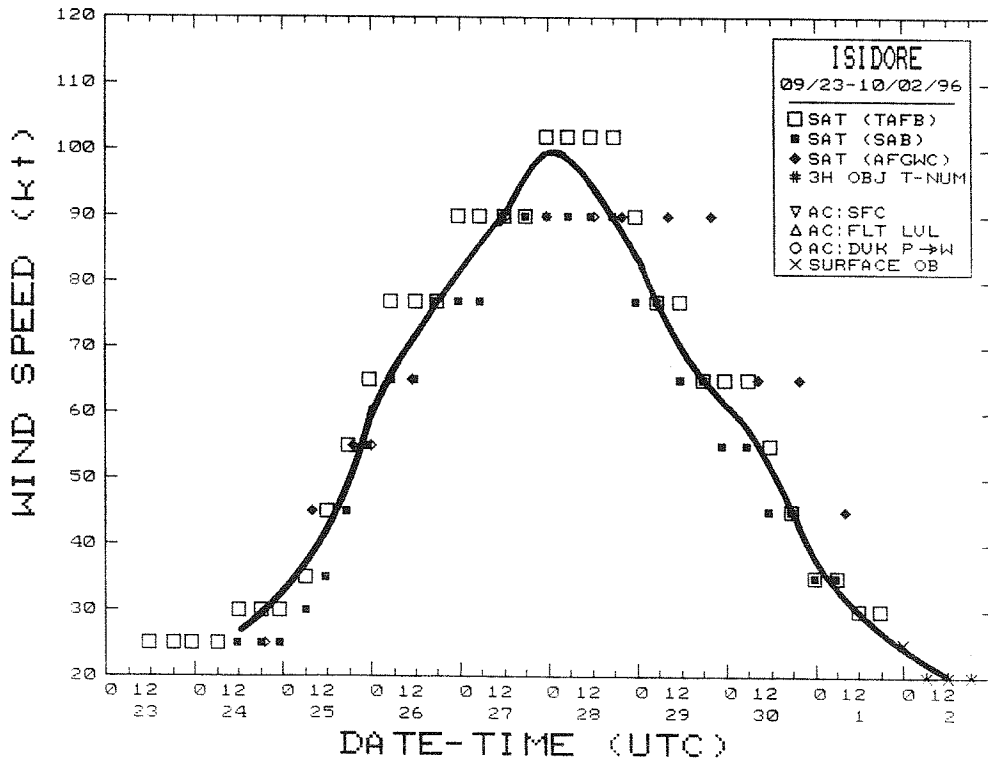


Figure 3. Best track maximum one-minute wind speed curve for Hurricane Isidore, September-October 1996.

Table 2

Preliminary forecast evaluation of Hurricane Isidore
Heterogeneous sample

(Errors in nautical miles for tropical storm
and hurricane stages with number
of forecasts in parenthesis)

| Technique | Period (hours) | | | | |
|---|----------------|--------------|---------------|---------------|--------------|
| | 12 | 24 | 36 | 48 | 72 |
| CLIP | 56 (23) | 128 (21) | 210 (19) | 300 (17) | 607 (13) |
| GFDI | 37 (23) | 62 (21) | 81 (19) | 102 (17) | 133 (13) |
| GFDL* | 34 (11) | 55 (10) | 81 (9) | 98 (8) | 149 (6) |
| VBAR | 38 (22) | 70 (21) | 99 (19) | 112 (17) | 185 (13) |
| LBAR | 37 (22) | 64 (20) | 85 (18) | 107 (17) | 216 (13) |
| AVNI | 61 (21) | 110 (19) | 176 (17) | 235 (16) | 216 (12) |
| BAMD | 35 (23) | 64 (21) | 96 (19) | 126 (17) | 183 (13) |
| BAMM | 46 (23) | 81 (21) | 123 (19) | 165 (17) | 229 (13) |
| BAMS | 60 (23) | 110 (21) | 160 (19) | 202 (17) | 278 (13) |
| A90E | 48 (23) | 96 (21) | 151 (19) | 185 (17) | 274 (13) |
| NGPI | 55 (19) | 96 (18) | 146 (16) | 137 (13) | 222 (9) |
| UKMI | 55 (12) | 113 (10) | 184 (9) | 227 (9) | 272 (8) |
| | | | | | |
| NHC OFFICIAL | 44 (23) | 74 (21) | 100 (19) | 125 (17) | 202 (13) |
| NHC OFFICIAL (1986-1995 10- year average) | 49 (1670) | 93 (1484) | 136 (1314) | 181 (1155) | 273 (882) |

* GFDL output not available until after forecast issued. VBAR output sometimes not available until after forecast issued.