

Preliminary Report
Hurricane Dolores
5-12 July 1997

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a. Synoptic History

Hurricane Dolores formed from a disturbance of uncertain origin. The development could have been related to a tropical wave that traversed the Atlantic Ocean from 17-26 June and moved slowly westward over the eastern North Pacific Ocean during the following week. On the 3rd and 4th of July, clouds increased in the vicinity of the wave. The cloudiness was initially elongated from north to south, but some circular symmetry was noted by the end of the day on the 4th. Ship data indicated that surface pressures in the area were a little lower than usual, near 1005 mb, at that time. Dvorak T-numbers were first assigned to the tropical disturbance early on the 5th.

Banding of deep convection then quickly increased in an environment characterized by upper-level diffluence. It is estimated that the disturbance became a tropical depression at 1200 UTC 5 July, about 600 nautical miles to the south of the southern tip of Baja California (Table 1 and Fig. 1).

With a strong and deep ridge to the north, Dolores moved toward 280 to 290 degrees at 10 to 15 knots for most of the cyclone's lifetime. Despite some northeasterly wind shear, the initial pace of development continued for about a day (Figs. 2 and 3), during which time the cyclone became Tropical Storm Dolores and winds increased to 45 knots. The cyclone was then generating convection with cloud top temperatures lower than -80°C . After a pause in development, strengthening resumed on the 7th while the outflow became more symmetrical. Dolores became a hurricane that day and developed a mostly cloud-filled, ragged-appearing eye, analyzed to be 10-20 nautical miles in diameter by the Air Force Global Weather Center (AFGWC). The hurricane attained its peak strength of 80 knots around 0600 UTC on the 9th, shortly after becoming the first hurricane in two years to cross 125°W .

The eye then disappeared and the cyclone gradually weakened while becoming sheared from the southwest and moving over progressively cooler waters from the 9th-11th. Only a few clusters of deep convection were generated on the 10th and 11th. Dolores crossed 140°W and entered the central Pacific hurricane basin as a tropical depression on the 11th. Analyses from the Central Pacific Hurricane Center in Honolulu indicate that Dolores dissipated the following day.

b. Meteorological Statistics

Table 1 lists the post-storm, i.e., "best track" analysis of Dolores' location and intensity. Figures 2 and 3 show the hurricane's estimated central pressure and maximum one-minute wind speed, respectively, versus time and the associated satellite data. Position and intensity estimates from satellite pictures were provided by the AFGWC, NOAA Tropical Analysis and Forecast Branch (TAFB) and NOAA Synoptic Analysis Branch (SAB).

There were no observations of tropical storm force winds from surface sites. Surface wind estimates derived from a pass of the ERS-2 were helpful operationally in defining the structure of the surface wind field.

c. Casualty and Damage Statistics

Dolores did not directly affect land and the NHC received no reports of casualties or damages.

d. Forecast and Warning Critique

The NHC average track forecast errors were smaller than the long-term averages (Table 2). On average, the NHC track forecasts also were generally better than the numerical guidance.

It is noted that the UKMET had rather small track forecast errors in their few forecasts that could be evaluated. Unfortunately, that model frequently dissipated the cyclone prematurely.

The NHC intensity forecast errors were remarkably low, with about 75% of the 12-72 hour forecasts in error by 0 or 5 knots.

Coastal watches and warnings were neither issued nor necessary.

Table 1. Preliminary best track, Hurricane Dolores, 5-12 July 1997. Data from 140°W westward provided by the Central Pacific Hurricane Center.

| Date/Time (UTC) | Latitude (°N) | Longitude (°W) | Pressure (mb) | Wind Speed (kt) | Stage |
|--------------------|------------------|-------------------|------------------|--------------------|------------------|
| 05/1200 | 12.5 | 109.6 | 1006 | 25 | Tropical Depr. |
| 1800 | 13.0 | 110.5 | 1003 | 30 | " " |
| 06/0000 | 13.3 | 111.6 | 1000 | 40 | Tropical Storm |
| 0600 | 13.5 | 112.7 | 997 | 45 | " " |
| 1200 | 13.8 | 113.8 | 996 | 55 | " " |
| 1800 | 14.2 | 115.1 | 995 | 55 | " " |
| 07/0000 | 14.5 | 116.3 | 993 | 55 | " " |
| 0600 | 14.8 | 117.5 | 991 | 60 | " " |
| 1200 | 15.1 | 118.7 | 988 | 65 | Hurricane |
| 1800 | 15.4 | 119.9 | 985 | 70 | " " |
| 08/0000 | 15.7 | 121.2 | 981 | 75 | " " |
| 0600 | 16.0 | 122.3 | 979 | 75 | " " |
| 1200 | 16.4 | 123.7 | 979 | 75 | " " |
| 1800 | 16.8 | 125.0 | 979 | 75 | " " |
| 09/0000 | 17.2 | 126.3 | 978 | 75 | " " |
| 0600 | 17.5 | 127.5 | 975 | 80 | " " |
| 1200 | 17.7 | 128.7 | 977 | 75 | " " |
| 1800 | 17.8 | 130.0 | 979 | 70 | " " |
| 10/0000 | 18.3 | 131.3 | 984 | 65 | " " |
| 0600 | 18.6 | 132.6 | 989 | 60 | Tropical Storm |
| 1200 | 18.7 | 134.1 | 995 | 50 | " " |
| 1800 | 18.9 | 135.5 | 1001 | 40 | " " |
| 11/0000 | 19.3 | 136.9 | 1005 | 35 | " " |
| 0600 | 19.6 | 138.0 | 1007 | 30 | Tropical Depr. |
| 1200 | 20.2 | 138.9 | 1008 | 30 | " " |
| 1800 | 21.0 | 140.0 | 1008 | 30 | " " |
| 12/0000 | 21.8 | 141.2 | 1010 | 30 | " " |
| 0600 | 22.2 | 142.7 | 1010 | 30 | " " |
| 1200 | 22.7 | 144.1 | 1010 | 30 | " " |
| 1800 | 23.2 | 145.2 | 1010 | 25 | Dissipating |
| | | | | | |
| 09/0600 | 17.5 | 127.5 | 975 | 80 | Minimum Pressure |

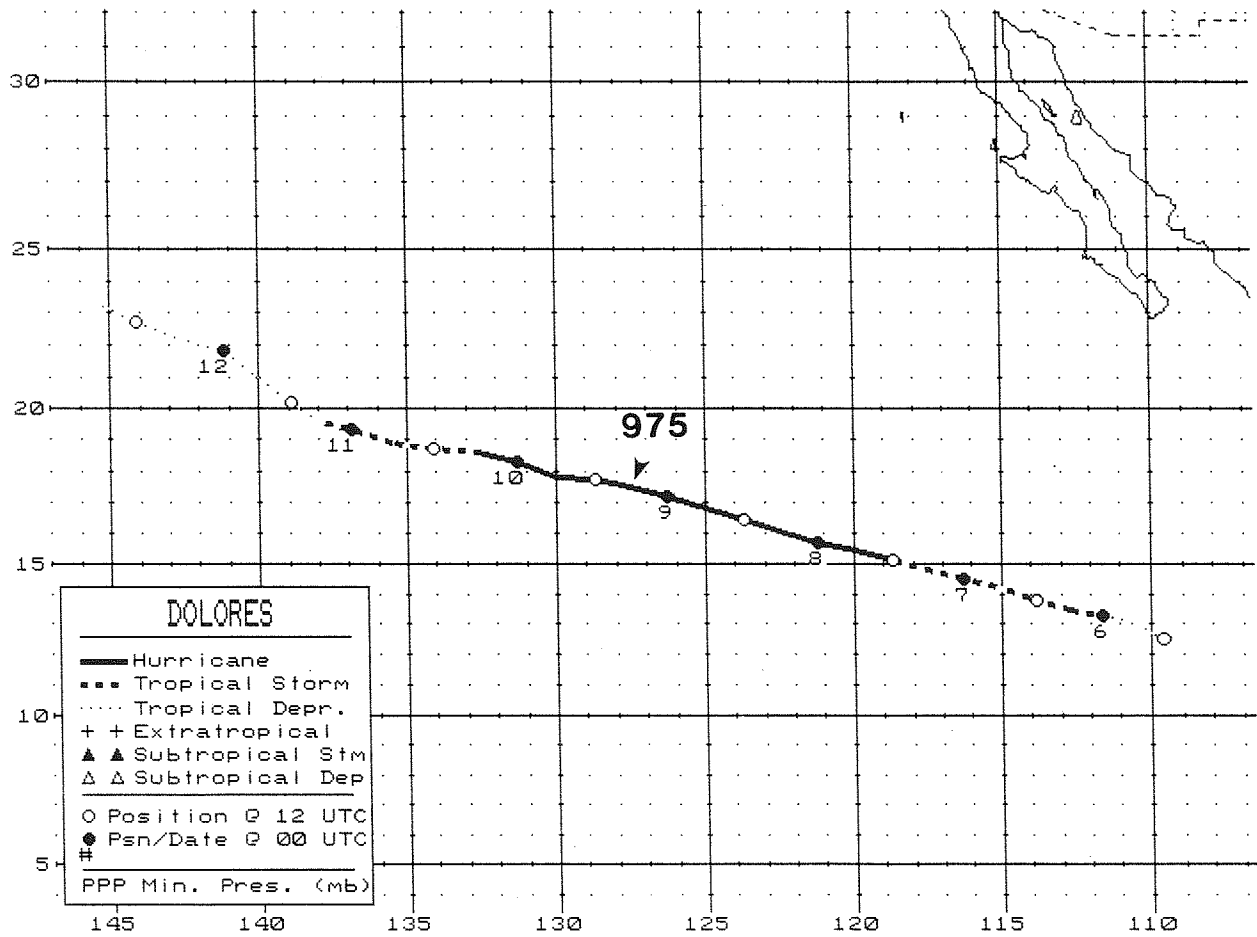


Figure 1. Best track positions for Hurricane Dolores.

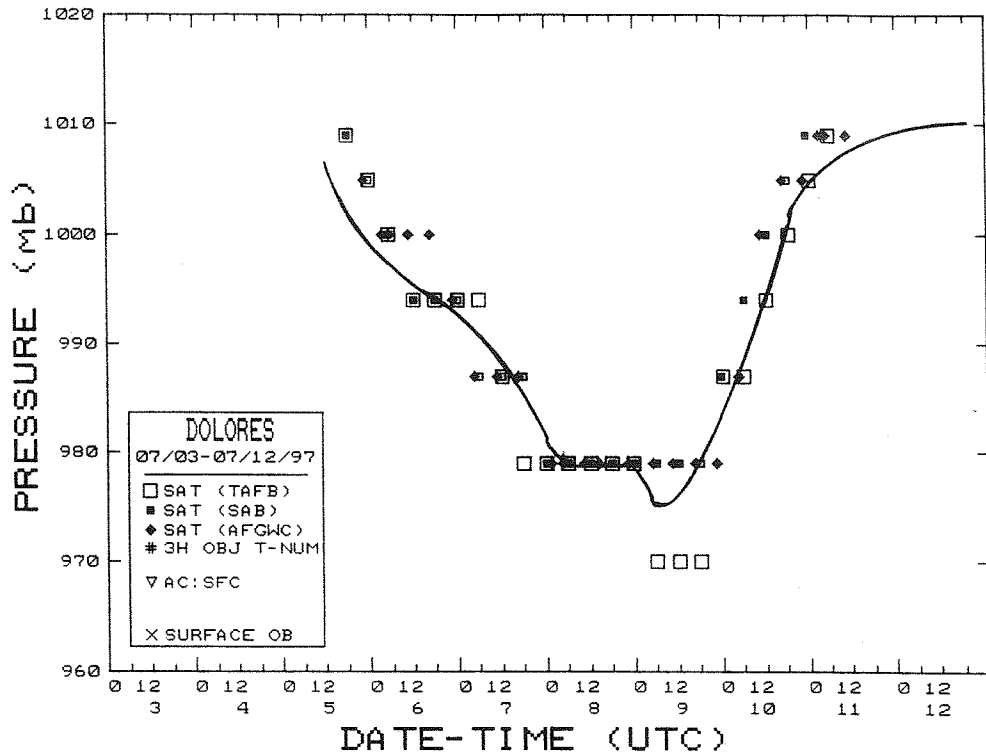


Figure 2. Best track central pressure curve for Hurricane Dolores, 5-12 July 1997. Analysis beginning 1800 UTC 11 July provided by the Central Pacific Hurricane Center.

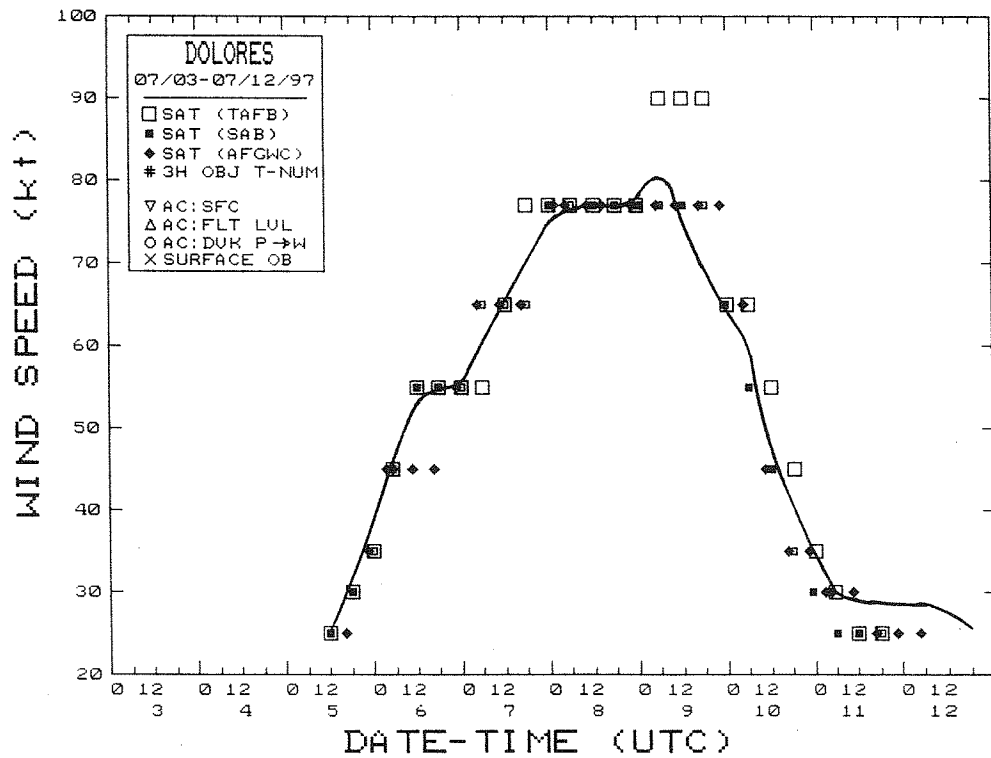


Figure 3. As in Fig. 2, except for maximum wind speed.

Table 2

Preliminary forecast evaluation of Hurricane Dolores
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 | 21 (19) | 34 (17) | 54 (15) | 80 (13) | 166 (9) |
| GFDI | 37 (18) | 68 (16) | 92 (14) | 108 (12) | 133 (8) |
| GFDL* | 45 (10) | 77 (9) | 101 (8) | 118 (7) | 128 (5) |
| LBAR | 30 (19) | 54 (17) | 85 (15) | 112 (13) | 142 (9) |
| AVNI | 26 (18) | 46 (16) | 89 (14) | 144 (12) | 424 (8) |
| BAMD | 30 (19) | 58 (17) | 86 (15) | 108 (13) | 178 (9) |
| BAMM | 24 (19) | 50 (17) | 76 (15) | 99 (13) | 122 (9) |
| BAMS | 27 (19) | 56 (17) | 94 (15) | 127 (13) | 210 (9) |
| P91E | 21 (19) | 32 (17) | 43 (15) | 59 (13) | 114 (9) |
| NGPI | 43 (18) | 74 (16) | 89 (14) | 118 (12) | 153 (8) |
| UKM* | 26 (10) | 38 (9) | 35 (5) | 16 (2) | (0) |
| UKMI | 23 (18) | 46 (16) | 53 (10) | 38 (4) | (0) |
| | | | | | |
| NHC OFFICIAL | 22 (19) | 34 (17) | 43 (15) | 58 (13) | 105 (9) |
| NHC OFFICIAL (1988-1996 9-year average) | 39 (2288) | 71 (2058) | 105 (1822) | 138 (1607) | 194 (1228) |

* Output not available until after the NHC forecast is issued.