

Tropical Cyclone Report  
Tropical Storm Dolly  
29 August-4 September 2002

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*Final*

Dolly was the first Atlantic basin tropical cyclone to develop in the deep tropics in 2002.

a. Synoptic History

Dolly developed from a tropical wave that moved off the west coast of Africa on 27 August. As the wave moved westward, ship observations indicated that the wave was accompanied by an area of low pressure and satellite images showed increasing thunderstorm activity. The system moved west and west-southwest and became a tropical depression at 1200 UTC 29 August about 550 n mi southwest of the westernmost Cape Verde Islands. The depression quickly became better organized, developing well-defined cyclonically curved convective bands and good outflow in all quadrants. It became a tropical storm by 1800 UTC on the same day and reached its peak intensity of 50 knots and a minimum pressure of 997 mb at 1200 UTC 30 August. Dolly moved toward the west and west-northwest around the periphery of a subtropical ridge for a couple of days. Thereafter, tropical cyclone curved to the northwest and then north ahead of a mid-level trough with a minor fluctuation in intensity at 0000 UTC 3 September when convection decreased. It finally became a remnant low late on 4 September when strong shear removed most of the convection, and ultimately became absorbed by the trough.

The “best track” chart of the tropical cyclone’s path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1.

b. Meteorological Statistics

Observations in Dolly (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA). Operationally, the maximum winds in Dolly were 55 knots at 1200 UTC 30 August based on a 3.5 Dvorak classification. However, a post-analysis of visible images showed that the low level-center was not embedded completely within the deep convection. This suggested that Dolly was a weaker tropical cyclone and the maximum winds have been adjusted to 50 knots in the best track.

c. Casualty and Damage Statistics

There were no reports of damage or casualties associated with Dolly.

d. Forecast and Warning Critique

Average official track errors (with the number of cases in parentheses) for Dolly were 48 (21), 83 (19), 121 (17), 155(15), and 240(11) n mi for the 12, 24, 36, 48, and 72 h forecasts, respectively. These errors are slightly larger than the average official track errors for the 10-yr period 1992-2001 which are 43, 81, 115, 148, and 222 n mi respectively. However, they are smaller than nearly all of the numerical guidance models. A comparison of the official forecast track errors with selected numerical guidance is given in Table 2.

Average official intensity errors were 4, 8, 11, 14, and 15 kt for the 12, 24, 36, 48, and 72 h forecasts, respectively. For comparison, the average official intensity errors over the 10-yr period 1992-2001 are 7, 11, 14, 16, and 19 kt, respectively. Initially, Dolly was forecast to become a hurricane when it was located in the deep tropics and the environment appeared to be favorable. However, the cyclone turned northward into a shearing environment and weakened instead.

Table 1. Best track for Tropical Storm Dolly, 29 August- 4 September.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
29 / 1200	9.5	31.2	1007	30	tropical depression
29 / 1800	9.7	32.2	1005	35	tropical storm
30 / 0000	9.7	33.1	1002	40	"
30 / 0600	10.0	34.5	1000	45	"
30 / 1200	10.3	36.3	997	50	"
30 / 1800	10.8	37.7	1000	50	"
31 / 0000	11.5	39.1	1000	45	"
31 / 0600	12.1	40.9	1002	40	"
31 / 1200	12.8	42.9	1005	35	"
31 / 1800	13.2	44.9	1005	35	"
01 / 0000	13.6	46.8	1005	35	"
01 / 0600	14.1	48.4	1005	35	"
01 / 1200	14.8	49.9	1005	35	"
01 / 1800	15.6	51.2	1002	40	"
02 / 0000	16.4	52.0	1001	40	"
02 / 0600	17.1	52.5	1001	40	"
02 / 1200	17.9	52.9	1000	45	"
02 / 1800	18.5	53.3	1002	45	"
03 / 0000	19.3	53.7	1002	40	"
03 / 0600	19.6	53.7	1000	45	"
03 / 1200	21.0	52.9	1000	45	"
03 / 1800	22.2	52.4	1001	45	"
04 / 0000	23.1	52.4	1001	45	"
04 / 0600	23.5	52.4	1005	35	"

04 / 1200	23.5	52.5	1009	25	tropical depression
04 / 1800	24.0	52.5	1009	20	remnant low
30 / 1200	10.3	36.3	997	50	minimum pressure

Table 2. Preliminary forecast evaluation (heterogeneous sample) for Dolly, 29 August-4 September, 2002. Forecast errors for tropical storm and hurricane stages (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type.

Forecast Technique	Forecast Period (h)				
	12	24	36	48	72
CLP5	60 (21)	110 (19)	174 (17)	239 (15)	355 (11)
GFDI	64 (21)	122 (19)	165 (17)	230 (15)	342 (11)
GFDL	59 (21)	109 (18)	159 (16)	212 (14)	314 (10)
LBAR	51 (21)	77 (19)	<b>103 (17)</b>	<b>137 (15)</b>	<b>194 (11)</b>
AVNI	54 (21)	96 (19)	157 (17)	223 (14)	343 ( 7)
AVNO	56 (21)	87 (19)	139 (17)	192 (14)	285 ( 6)
AEMI	71 (14)	145 (12)	249 (11)	<b>73 ( 4)</b>	
BAMD	56 (21)	92 (19)	134 (17)	186 (15)	274 (11)
BAMM	49 (21)	88 (19)	<b>119 (17)</b>	167 (15)	261 (11)
BAMS	65 (21)	129 (19)	193 (17)	262 (15)	392 (11)
NGPI	60 (20)	99 (18)	144 (16)	199 (14)	297 (10)
NGPS	68 (21)	96 (19)	131 (17)	188 (15)	308 (11)
UKMI	64 (20)	88 (18)	<b>118 (16)</b>	157 (14)	243 (11)
UKM	58 (10)	92 ( 9)	<b>99 ( 8)</b>	<b>118 ( 7)</b>	<b>200 ( 5)</b>
A98E	60 (21)	94 (19)	134 (17)	197 (15)	313 (11)
A9UK	52 (10)	89 ( 9)	141 ( 8)	223 ( 7)	330 ( 5)
GUNS	58 (19)	97 (17)	130 (15)	182 (13)	265 (10)
GUNA	55 (19)	92 (17)	131 (15)	179 (12)	<b>205 ( 6)</b>
OFCL	48 (21)	83 (19)	121 (17)	155 (15)	240 (11)
NHC Official (1992-2001 mean)	43 (2199)	81 (1965)	115 (1759)	148 (1580)	222 (1272)

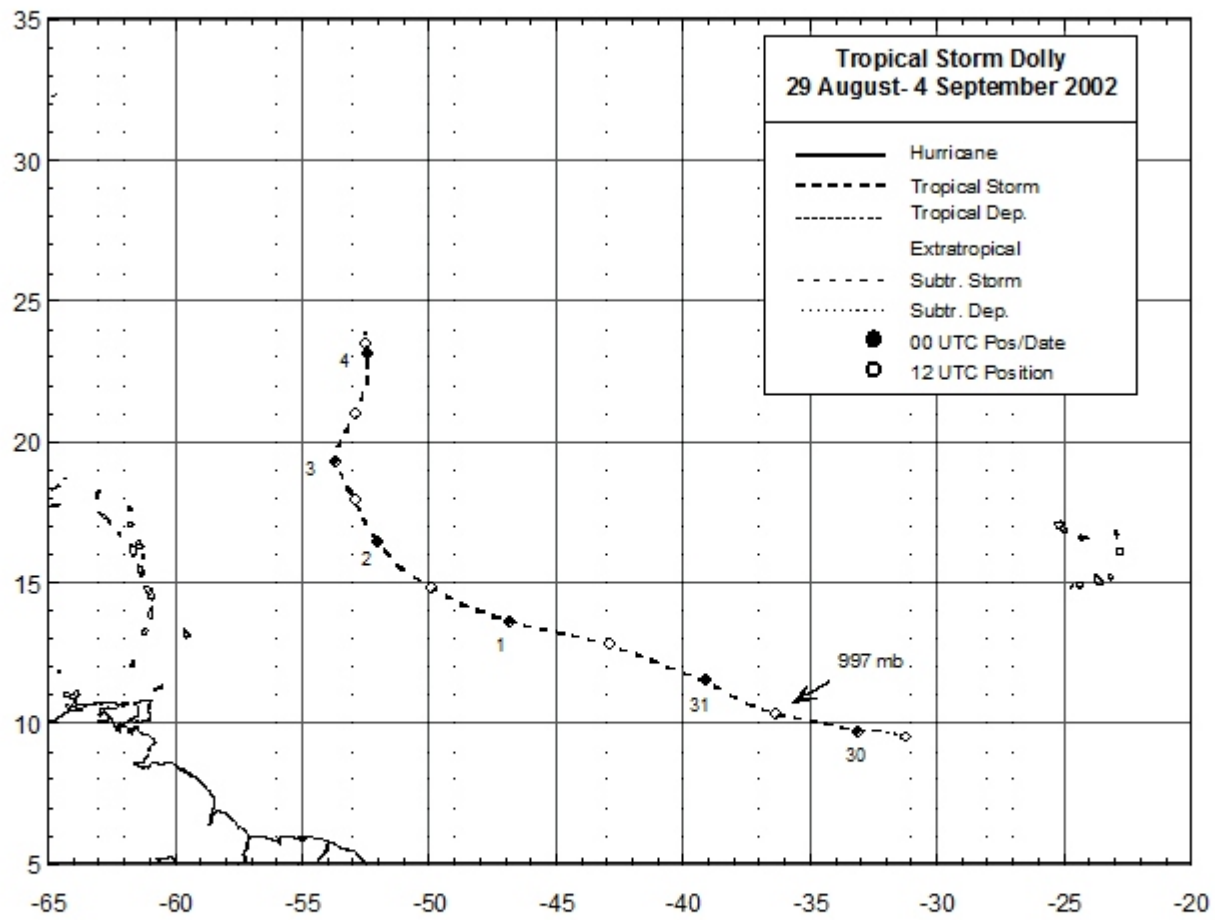


Figure 1. Best track positions for Tropical Storm Dolly, 29 August - 4 September 2002.

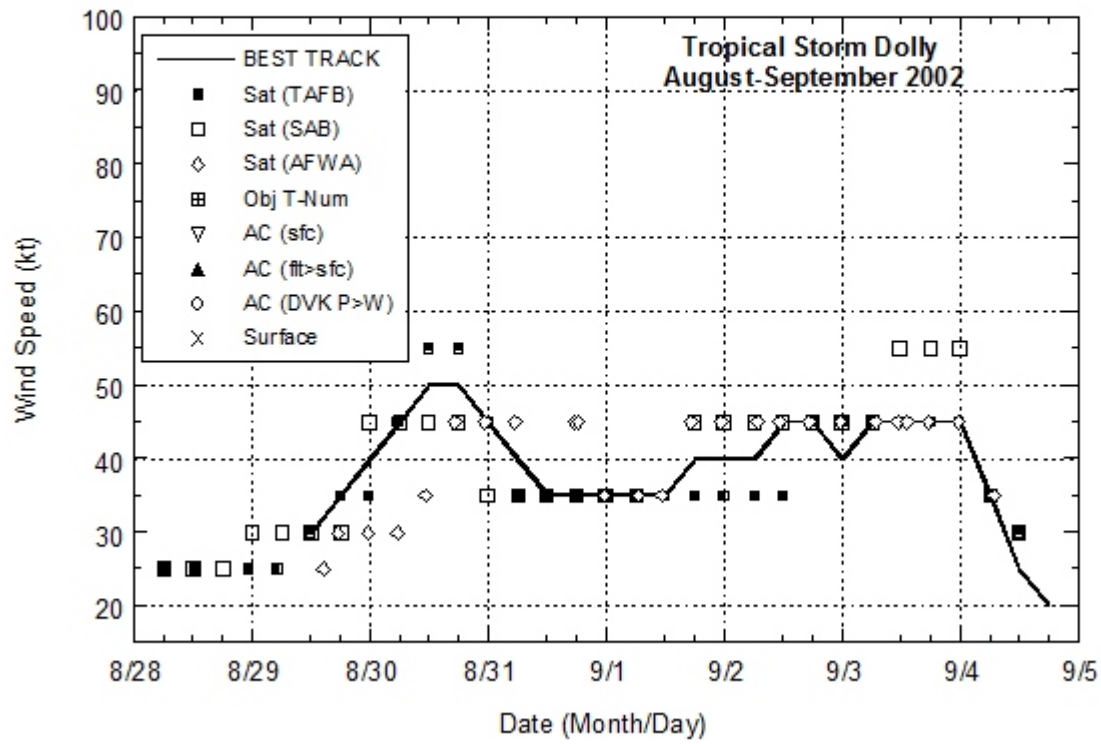


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Dolly, 29 August- 4 September, 2002.

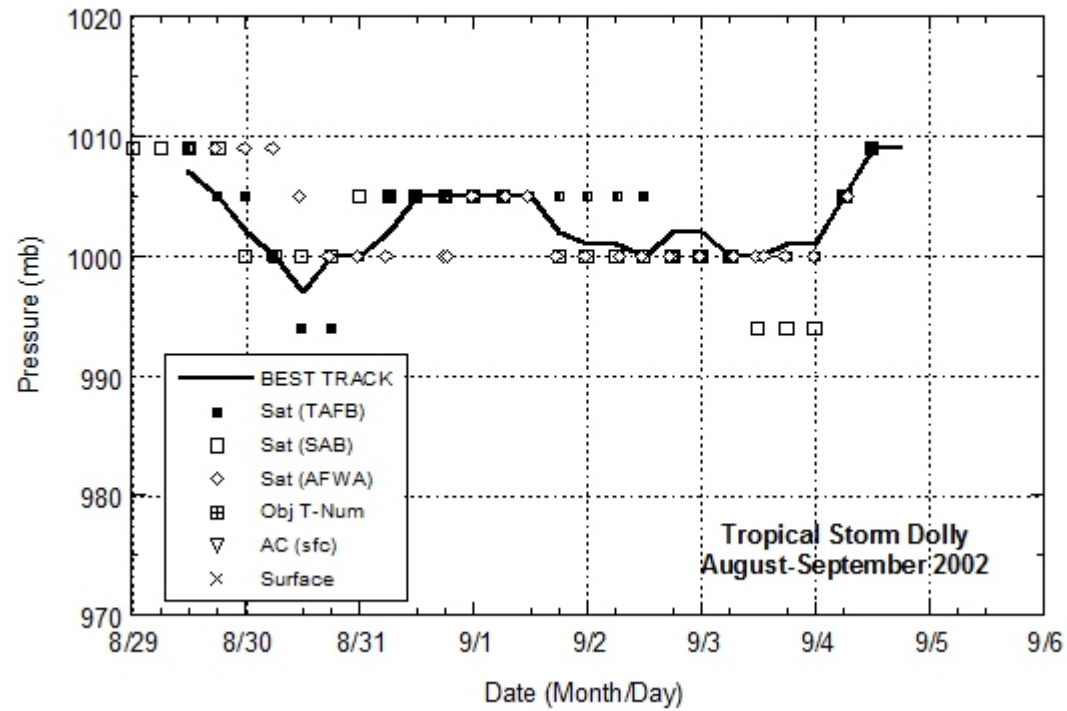


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Dolly, 29 August- 4 September.