

Tropical Cyclone Report  
Hurricane Cosme  
(EP062007)  
14 – 22 July 2007

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This report was corrected on 17 December 2007 to modify the best track for 1800 UTC 22 July when the system was a remnant low.

Cosme was briefly a category 1 hurricane on the Saffir-Simpson Hurricane Scale that remained over the open waters of the eastern and central North Pacific.

a. Synoptic History

Cosme originated from a tropical wave that emerged off the coast of Africa on 27 June. The wave was difficult to track across the Atlantic Ocean and Caribbean Sea due to a lack of convective activity, but is estimated to have entered into the eastern North Pacific basin around 8 July. The wave began to show signs of organization on 10 July, but remained embedded within the InterTropical Convergence Zone (ITCZ) for the next couple of days and was slow to develop a well-defined circulation. After separating from the ITCZ on 13 July, the system gradually gained convective organization and became a tropical depression by 1200 UTC 14 July, centered about 1725 n mi east-southeast of Hilo, Hawaii. 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.

The depression had a very large circulation and initially moved slowly toward the northwest in response to a weakness in a high pressure ridge to the north. Once convection deepened and a well-defined banding feature developed on July 15, the cyclone became a tropical storm at 1800 UTC that same day. With both the atmospheric and oceanic environments conducive for strengthening (low vertical shear and warm waters), Cosme reached hurricane strength 24 hours later while centered about 1400 n mi east of Hilo. At this time, both conventional and passive microwave satellite imagery showed hints of a developing eye feature. The strengthening episode was short-lived, however, and Cosme only maintained hurricane status for six hours as a result of cooler waters.

Cosme was now being steered toward the west as the ridge to the north had strengthened. By early on 17 July, the cyclone reached an environment of moderate easterly shear and 25°C waters, and Cosme weakened to a tropical storm. The cyclone continued to slowly weaken as it moved westward and became a tropical depression at 1800 UTC 18 July, about 900 n mi east-southeast of Hilo. The depression continued westward and crossed 140°W into the central North Pacific basin around 0000 UTC 19 July, where it became the forecast responsibility of the Central Pacific Hurricane Center. The depression continued westward for the next four days and remained well to the south of the Hawaiian Islands. The cyclone degenerated to a remnant low

late on 22 July, about 180 n mi east-southeast of Johnston Island, and the low dissipated by 1800 UTC 24 July, about 570 n mi west of Johnston Island.

b. Meteorological Statistics

Observations in Cosme (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB). Microwave satellite imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, and Defense Meteorological Satellite Program (DMSP) satellites were also useful in tracking Cosme. Analysis from a 1435 UTC QuikSCAT pass on 16 July yielded a peak intensity of at least 60 kt, and by 1800 UTC Dvorak satellite intensity estimates from both TAFB and SAB supported hurricane strength as an eye feature became apparent and the satellite appearance became better defined.

No ship or land station reported sustained winds of at least tropical storm force in association with Cosme.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The potential development of Cosme was first introduced into the Tropical Weather Outlook (TWO) on 10 July, about four days prior to genesis. The system was described as an area of disturbed weather located about 700 miles south of the southern tip of Baja California with additional development possible over the next couple of days. By late on 11 July, however, the system became indistinct within the ITCZ and the potential for further development appeared to have lessened. Subsequently the system was removed from the TWO but was reintroduced early on 13 July for the possibility of slow development. During the morning of 14 July, visible imagery indicated that the area of disturbed weather had developed a surface circulation and enough deep convection to be classified as a tropical depression. Despite the inclusion of the system in the TWO, no explicit mention of tropical depression formation was ever made.

A verification of NHC official and guidance model track forecasts is given in Table 2. Average official track errors for Cosme were 33, 50, 64, 75, 102, 155, and 232 n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively, which there were 18 forecasts made for each period out through 72 hours. These errors are lower than or close to the average long-term official track errors for all forecast periods (Table 2). The consensus models (GUNA/FSSE) and the GFSI and AEMI models performed quite well and had lower errors than the official forecasts through 48 h. In particular, the FSSE had the lowest track errors of all the model guidance at all forecast lead times through 96 h. With the exception of the GFDI and FSSE track forecasts, the 120 h track errors from the model guidance were rather large, between 250 n mi and 500 n mi, as

most models predicted Cosme to remain a stronger cyclone and be steered toward the west-northwest.

Average NHC official intensity errors were 6, 9, 11, 10, 8, 8, and 4 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively (Table 3). For comparison, the average long-term official intensity errors are 6, 11, 15, 17, 19, 19, and 19 kt, respectively. The official intensity forecast errors were better than the average long-term errors at all forecast periods. Notably, the official intensity forecast errors were much lower than the long-term average errors at 48, 72, 96, and 120 h. These low errors are attributed to official intensity forecasts that accurately predicted Cosme to weaken in the later forecasts due to the cyclone encountering cooler waters and increased vertical wind shear. The ICON consensus (GHMI and DSHP) performed well and was slightly better than the official forecasts for Cosme at forecast periods 36 h through 96 h.

Table 1. Best track for Hurricane Cosme, 14 – 22 July, 2007. Best track information west of 140°W was provided by the Central Pacific Hurricane Center.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
14 / 1200	11.2	125.8	1007	25	tropical depression
14 / 1800	11.3	126.3	1007	25	"
15 / 0000	11.6	126.6	1006	25	"
15 / 0600	11.9	126.9	1006	25	"
15 / 1200	12.1	127.2	1006	30	"
15 / 1800	12.5	127.7	1005	35	tropical storm
16 / 0000	13.0	128.4	1000	45	"
16 / 0600	13.6	129.1	997	55	"
16 / 1200	14.0	130.0	992	60	"
16 / 1800	14.4	130.9	987	65	hurricane
17 / 0000	14.8	131.8	992	60	tropical storm
17 / 0600	14.9	132.8	997	55	"
17 / 1200	14.9	133.8	1000	45	"
17 / 1800	14.9	134.8	1005	35	"
18 / 0000	15.0	136.0	1005	35	"
18 / 0600	15.1	137.2	1005	35	"
18 / 1200	15.1	138.3	1005	35	"
18 / 1800	15.0	139.5	1006	30	tropical depression
19 / 0000	15.2	140.7	1008	30	"
19 / 0600	15.3	142.0	1010	30	"
19 / 1200	15.5	143.6	1010	30	"
19 / 1800	15.7	145.0	1010	30	"
20 / 0000	16.0	146.6	1010	30	"
20 / 0600	16.0	148.3	1010	30	"
20 / 1200	16.1	149.9	1010	30	"
20 / 1800	16.5	151.8	1010	30	"
21 / 0000	16.5	153.8	1010	30	"
21 / 0600	16.3	155.7	1010	30	"
21 / 1200	16.1	157.4	1010	30	"
21 / 1800	16.2	159.1	1010	30	"
22 / 0000	16.4	161.0	1010	30	"
22 / 0600	16.4	162.6	1010	30	"
22 / 1200	16.3	164.5	1010	30	"
22 / 1800	16.1	166.5	1010	25	remnant low
23 / 0000	16.1	168.3	1011	25	"
23 / 0600	15.9	170.0	1011	25	"
23 / 1200	15.8	171.7	1011	25	"
23 / 1800	15.7	173.3	1011	25	"
24 / 0000	15.7	175.0	1011	25	"
24 / 0600	15.7	176.8	1011	25	"

24 / 1200	15.8	178.3	1010	25	"
24 / 1800	15.8	179.4	1009	25	"
25 / 0000					dissipated
16 / 1800	14.4	130.9	987	65	minimum pressure

Table 2. Preliminary track forecast evaluation (heterogeneous sample) for Hurricane Cosme, 14 – 22 July 2007. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	42 (18)	83 (18)	122 (18)	163 (18)	265 (18)	380 (17)	503 (13)
GFNI	<b>32 (11)</b>	54 (11)	77 (11)	106 (11)	162 (10)	279 ( 7)	457 ( 6)
GFDI	<b>26 (16)</b>	<b>42 (16)</b>	64 (16)	85 (16)	138 (16)	187 (15)	<b>221 (11)</b>
GFSI	<b>21 (17)</b>	<b>28 (17)</b>	<b>38 (17)</b>	<b>50 (17)</b>	104 (17)	184 (16)	258 (12)
AEMI	<b>27 (17)</b>	<b>35 (17)</b>	<b>47 (17)</b>	<b>65 (17)</b>	110 (17)	176 (15)	339 ( 7)
NGPI	<b>22 (11)</b>	<b>46 (11)</b>	72 (11)	102 (11)	161 (11)	240 (10)	421 ( 5)
UKMI	<b>28 (10)</b>	53 (10)	81 (10)	118 (10)	225 (10)	340 ( 9)	415 ( 5)
BAMD	40 (18)	66 (18)	87 (18)	112 (18)	184 (18)	272 (17)	357 (13)
BAMM	42 (18)	71 (18)	95 (18)	122 (18)	184 (18)	243 (17)	303 (13)
BAMS	48 (16)	81 (16)	108 (16)	131 (16)	189 (16)	240 (15)	302 (13)
CONU	<b>24 (16)</b>	<b>37 (16)</b>	<b>56 (16)</b>	77 (16)	129 (16)	180 (15)	256 (11)
GUNA	<b>18 (11)</b>	<b>35 (11)</b>	<b>51 (11)</b>	<b>73 (11)</b>	140 (11)	219 (10)	288 ( 5)
FSSE	<b>15 (13)</b>	<b>27 (13)</b>	<b>44 ( 8)</b>	<b>54 ( 7)</b>	<b>83 ( 7)</b>	<b>115 ( 6)</b>	249 ( 5)
OFCL	33 (18)	50 (18)	64 (18)	75 (18)	102 (18)	155 (17)	232 (13)
NHC Official (2002-2006 mean)	33 (1349)	57 (1192)	79 (1039)	99 (897)	140 (655)	188 (465)	233 (311)

Table 3. Preliminary intensity forecast evaluation (heterogeneous sample) for Hurricane Cosme, 14 – 22 July 2007. Forecast errors (kt) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
SHF5	7.4 (18)	12.2 (18)	14.8 (18)	15.1 (18)	16.6 (18)	17.2 (17)	19.6 (13)
GFDI	9.1 (16)	10.7 (16)	<b>10.3 (16)</b>	<b>9.9 (16)</b>	9.6 (16)	10.3 (15)	14.4 (11)
SHIP	6.7 (18)	10.2 (18)	<b>11.2 (18)</b>	10.7 (16)	11.6 (16)	9.6 (16)	8.3 (13)
DSHP	6.7 (18)	10.2 (18)	<b>11.2 (18)</b>	10.7 (16)	11.6 (16)	9.3 (15)	8.1 (12)
FSSE	7.7 (13)	9.8 (13)	15.6 (8)	17.6 (7)	15.6 (7)	8.8 (6)	<b>3.6 (5)</b>
ICON	7.4 (16)	8.9 (16)	<b>9.8 (16)</b>	<b>8.1 (16)</b>	<b>7.9 (16)</b>	<b>8.1 (15)</b>	9.3 (11)
OFCL	6.4 (18)	8.9 (18)	11.4 (18)	10.3 (18)	8.3 (18)	8.2 (17)	4.2 (13)
NHC Official (2002-2006 mean)	6.3 (1349)	11.0 (1192)	14.6 (1039)	16.9 (896)	18.9 (655)	18.5 (465)	19.3 (311)

Figure 1. Best track positions for Cosme, 14 – 22 July 2007. Best track information west of 140°W was provided by the Central Pacific Hurricane Center.

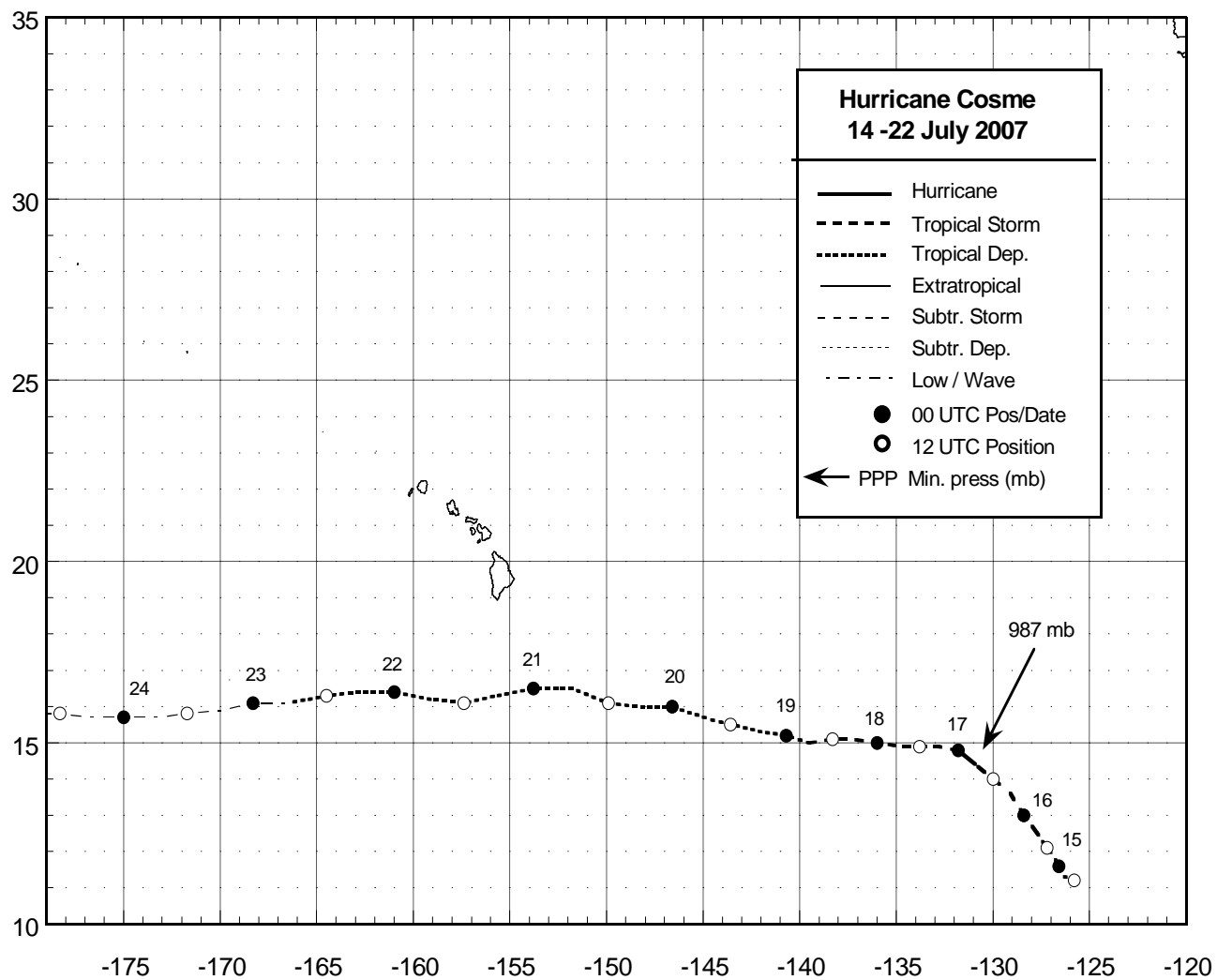




Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Cosme, 14 – 22 July 2007. The best track maximum sustained surface wind speed after 1800 UTC 18 July was provided by the Central Pacific Hurricane Center.

