

Preliminary Report
Tropical Storm Cristina
1 - 3 July 1996

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Cristina was the third named tropical cyclone to strike the southern coast of Mexico within a 10-day span.

a. Synoptic History

Satellite imagery showed an increase in cloudiness and showers just to the south of Central America early on 30 June. This activity was moving generally toward the west-northwest and was likely associated with a tropical wave that crossed over Panama on the previous day. Deep convection became more concentrated and analysts from both the NESDIS Synoptic Analysis Branch (SAB) and the TPC began Dvorak classifications near 1800 UTC on the 30th.

Convective banding became organized and the "best track" (Figure 1 and Table 1) indicates that the system became a tropical depression at 1200 UTC 1 July about 300 n mi south of San Salvador, El Salvador. The depression initially moved toward the northwest near 12 knots, apparently in response to a weakness in the ridge to the north over the southwest Gulf of Mexico.

Based on ship reports, the depression became Tropical Storm Cristina at 0000 UTC 2 July, while centered about 260 n mi south of Guatemala City, Guatemala. Deep convection increased near the center of the tropical cyclone, and gradual further intensification occurred. Forward motion increased to near 15 knots. It is estimated that Cristina almost reached hurricane strength just before making landfall near Puerto Angel, Mexico around 0900 UTC 3 July.

The tropical cyclone weakened rapidly as the circulation moved over the mountainous terrain of Mexico, and it dissipated by 0000 UTC 4 July.

b. Meteorological Statistics

Best track positions and intensities were derived primarily from Dvorak technique estimates. Figures 2 and 3 show the curves of minimum central pressure and maximum one-minute wind speed, respectively, versus time, along with the observations on which they are based. A ship with call sign S6IG reported 34 knot winds just to the north of the center at 2200 and 2300 UTC 1 July and was the basis for upgrading the depression to a tropical storm.

c. Casualty and Damage Statistics

According to news agency Notimex, one person drowned when his fishing boat was caught out at sea off the southern state of Oaxaca. Another man aboard the boat was missing, and another was found alive. The news agency also reported that 11 fishing vessels were missing with some 22 people aboard after they set out to sea the day before the storm made landfall. Fishermen in this area frequently seek refuge from bad weather on remote stretches of shoreline and are not heard from for days. Efforts from the NHC to determine the outcome of the missing have not succeeded.

Although no reports of damage have been received, storm surge flooding of a few feet above normal tide levels near and just to the east of the landfall point likely occurred. It is expected that wind and rain also resulted in some damage.

d. Forecast and Warning Critique

Because Cristina was a short-lived cyclone, there was only a limited number of official forecasts that were verified. During the time when Cristina was a tropical storm, the average official track forecast errors were 59 (5 cases), 118 (3 cases) and 159 (1 case) n mi at 12, 24 and 36 hours, respectively. These statistics are typical for northwestward-moving storms. The intensity forecasts were, in general, good and the strengthening trend was correctly forecast.

Figure 4 shows the best track and output from the track prediction models initialized from 0000 UTC 2 July that were available operationally to the hurricane specialist. Note that most models kept the center of the tropical storm well offshore. Figure 5 shows the GFDL forecast from this same time. Note that

this model dissipated Cristina offshore of the border of Guatemala and Mexico. Cristina actually made landfall just below hurricane strength about 33 hours after the initialized time. This observation indicates that the models were of limited value at that juncture.

The government of Mexico issued a tropical storm warning for the coast of Mexico from Tapachula (near the border of Guatemala and Mexico) to Punta Maldonado (about midway between Puerto Escondido and Acapulco) at 1500 UTC 2 July. Cristina made landfall near the middle of the warning area about 18 hours later.

Table 1. Best track, Tropical Storm Cristina, 1 - 3 July, 1996

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
01/1200	8.9	89.2	1008	25	tropical depression
1800	9.5	90.3	1006	30	"
02/0000	10.2	91.4	1005	35	tropical storm
0600	11.0	92.5	1004	35	"
1200	12.0	93.3	1002	40	"
1800	13.3	94.1	1000	45	"
03/0000	14.5	95.0	994	55	"
0600	15.3	95.9	991	60	"
1200	15.9	96.8	1000	45	"
1800	16.1	97.8	1007	25	tropical depression
04/0000					dissipated

03/0600	15.3	95.9	991	60	minimum pressure
03/0900	15.7	96.2	991	60	landfall near Puerto Angel

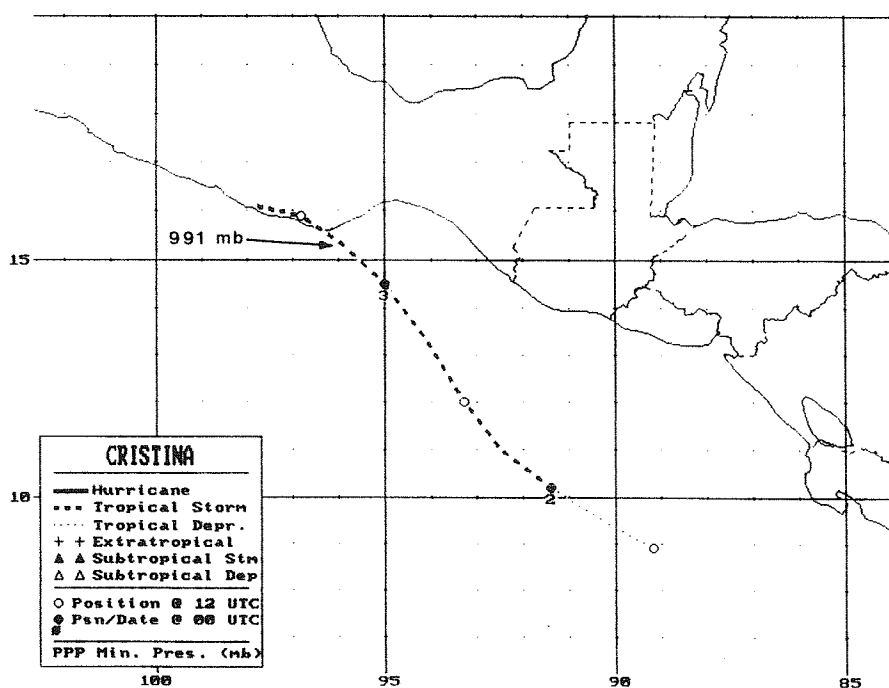


Figure 1. Best track positions for Tropical Storm Cristina, 1 - 3 July 1996.

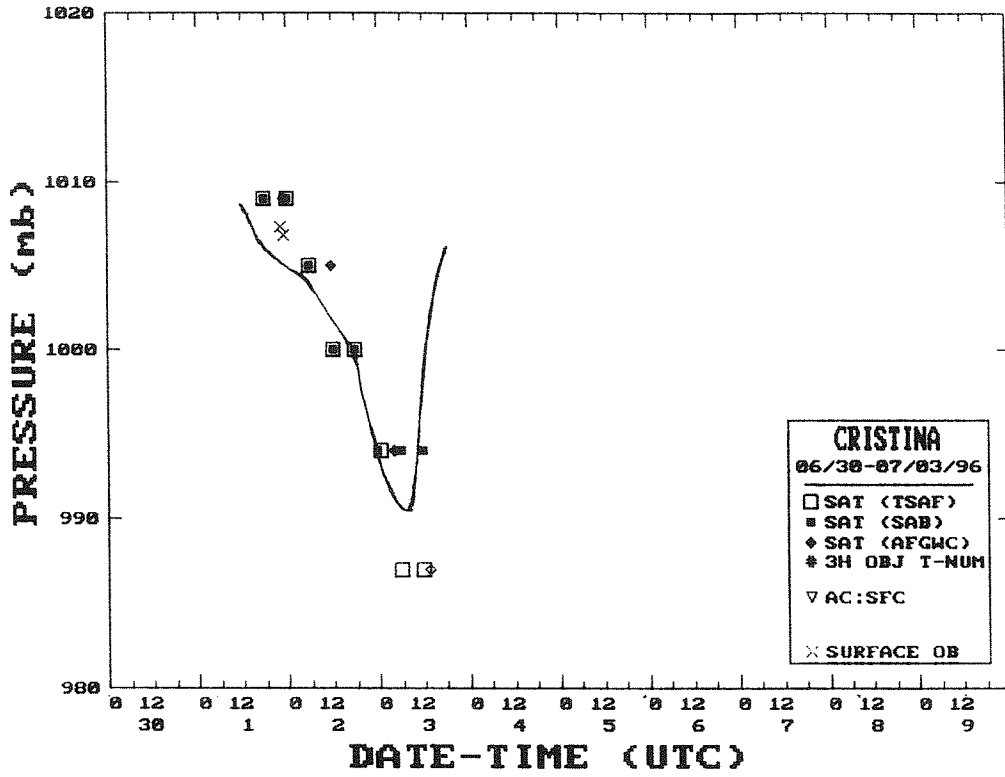


Figure 2. Best track minimum central pressure curve for Tropical Storm Cristina.

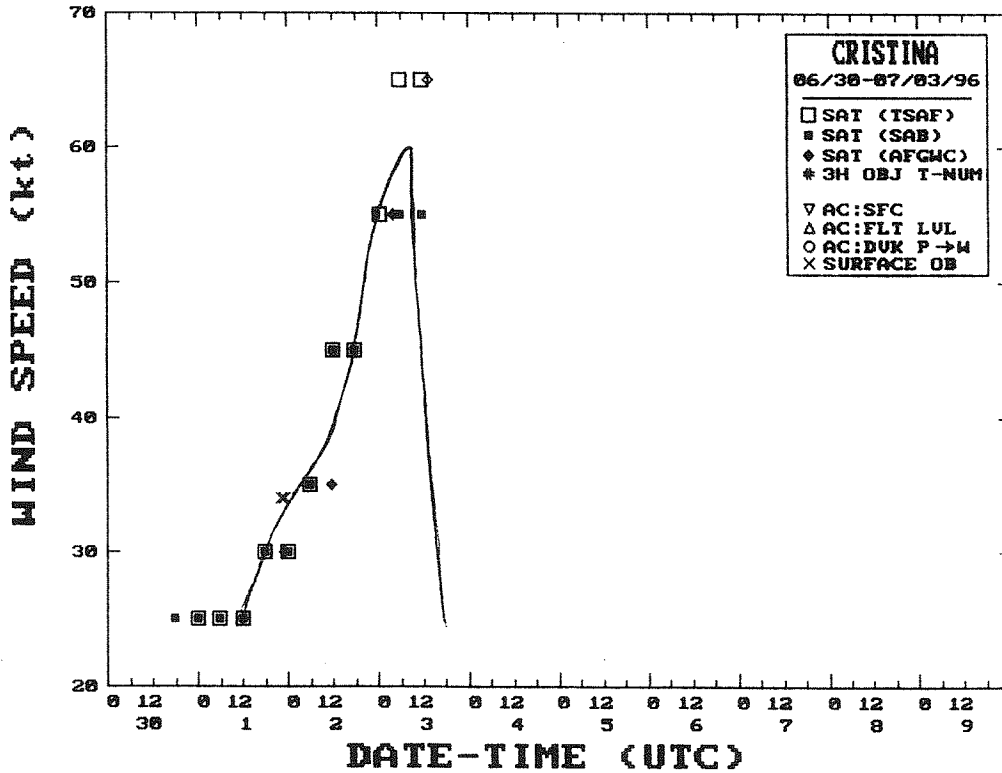


Figure 3. Best track maximum sustained wind speed curve for Tropical Storm Cristina.

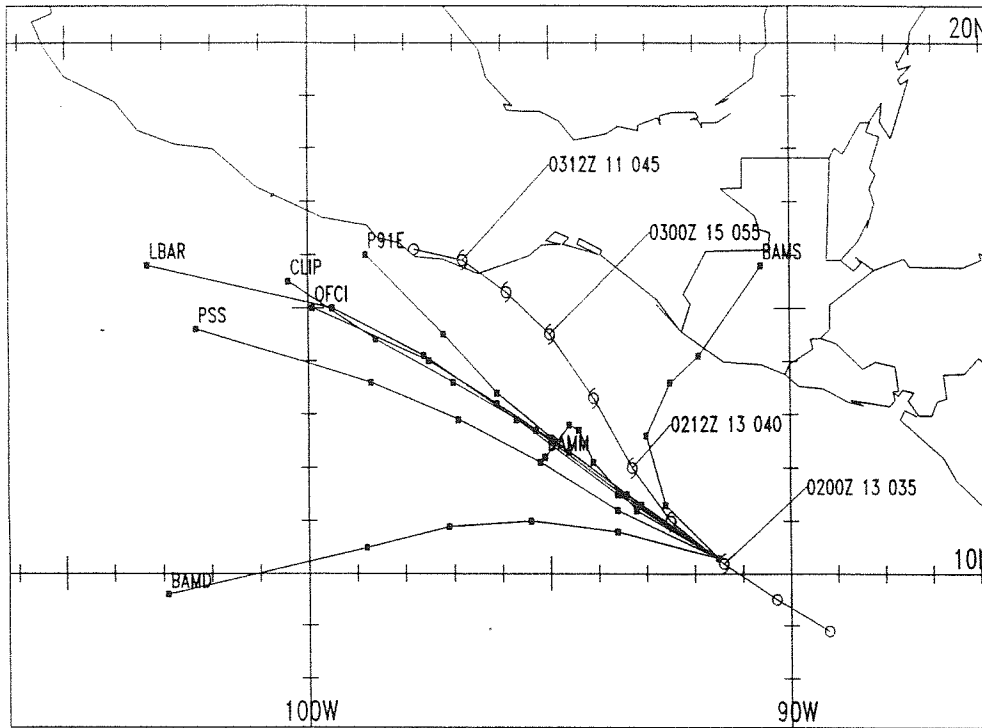


Figure 4. Track prediction models from 0000 UTC 2 July for Tropical Storm Cristina.

10 M MAX. WIND(KTS) HRS: 0-29 (2 JUL 1996 JZ INITIAL TIME) STORM:FIVE05E

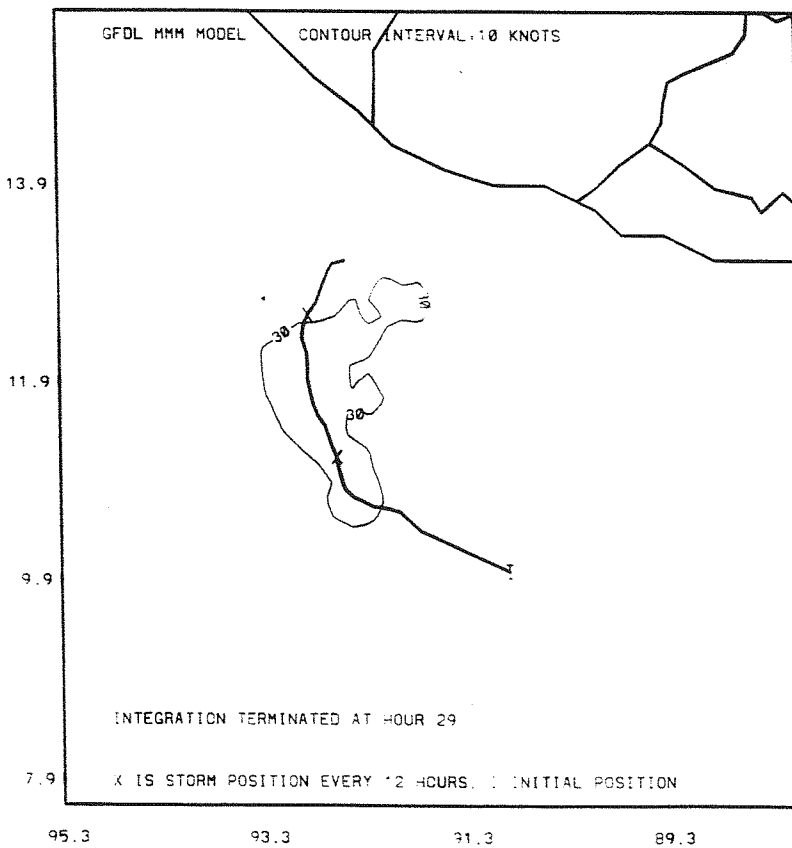


Figure 5. GFDL model forecast from 0000 UTC 2 July for Tropical Storm Cristina.