

**PRELIMINARY REPORT**  
Tropical Storm Frank  
6-10 August 1998

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**a. Synoptic History**

Satellite imagery showed an area of cyclonic circulation associated with a tropical wave over west-central Africa on 19 July. The system moved westward and it was clearly observed as a distinct mid-level cloud rotation south of the Cape Verde Islands on 22 July. Thereafter, the wave became less distinct but it continued westward and crossed Central America during 31 July. Convection then began to increase but it was not until 4 August that the cloud pattern showed some organization and satellite classifications began. Based on ship reports and satellite it is estimated that the system became a tropical depression at 1200 UTC 6 August when it was located about 480 n mi south of the southern tip of Baja California.

The depression moved on a general northward track, apparently steered by the flow around a mid-level trough just west of the U.S. west coast and a high over Mexico. The depression reached tropical storm status at 0000 UTC 8 August and became a threat to portions of Baja California. Frank's maximum intensity was estimated at 40 knots with a minimum pressure of 1001 mb at 0000 UTC on the 9th. Frank turned toward the north-northwest, which maintained a portion its the circulation over Baja California. It reached cooler waters and gradually weakened.

Frank's track is shown in Fig. 1. Table 1 is a listing, at six-hourly intervals, of the best-track position, estimated minimum central pressure and maximum 1-minute surface wind speed.

**b. Meteorological Statistics**

The best track pressure and wind curves as a function of time are shown in Figs. 2 and 3 and are based on satellite intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the Air Force Weather Agency, (AFGWC) in figures. Winds of 30-35 knots reported by the ship C6LF9 were used to upgrade the tropical depression to tropical storm status. As Frank approached Cabo San Lucas, the system was under surveillance by Mexican radar at that location. This was very helpful in locating the center of the storm and the rainbands.

### c. Casualty and Damage Statistics

There were no reports of casualties or damage associated with Frank. Bands of heavy showers and gusty winds were observed primarily in the Gulf of California and moisture from the storm reached the southwestern U.S.

### d. Forecast and Warning Critique

Since Frank was a threat to Baja California, tropical storm watches and warnings were required for a portion of this area. (Table 2).

Frank was a tropical storm for less than two days. Therefore, an evaluation of the average forecast errors would not be meaningful. However, it is important to note that initially, with the exception of NOGAPS, track models did not forecast the northward motion of the storm. Instead, track models turned Frank toward the northwest and west-northwest. The official forecast was nearly always to the right of most of the guidance.

### Figure Captions:

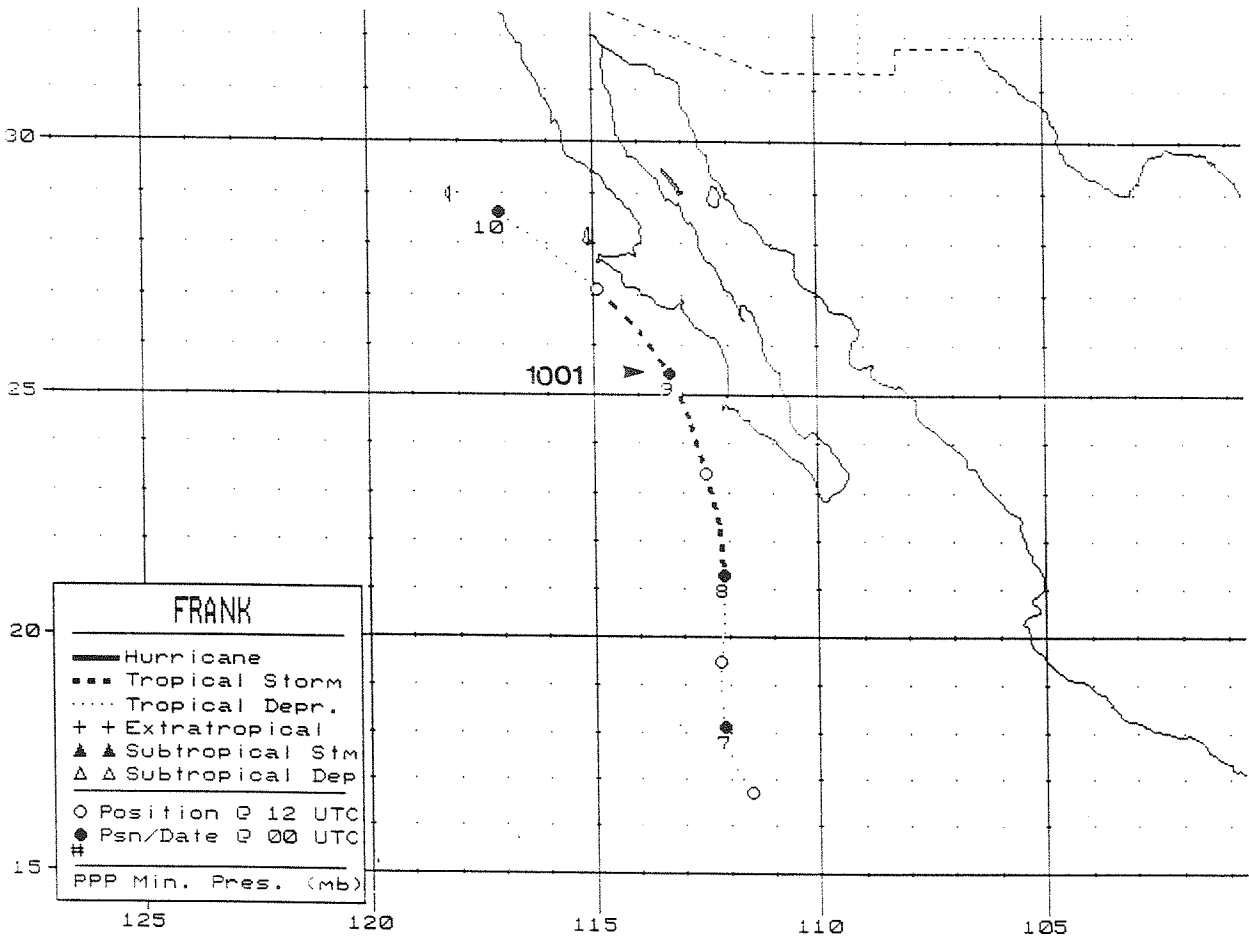
- Fig. 1. Best track positions for Tropical Storm Frank, 6-10 August 1998.
- Fig. 2. Best track one-minute surface wind speed curve for Tropical Storm Frank.
- Fig. 3. Best track minimum central pressure curve for Tropical Storm Frank.

Table 1. Best track, Tropical Storm Frank, 6- 10 August, 1998

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
6/1200	16.7	111.5	1009	30	tropical depression
1800	17.4	112.0	1008	30	"
7/0000	18.1	112.1	1007	30	"
0600	18.7	112.2	1006	30	"
1200	19.5	112.2	1005	30	"
1800	20.3	112.1	1005	30	"
8/0000	21.3	112.1	1005	35	tropical storm
0600	22.3	112.2	1005	35	"
1200	23.4	112.5	1005	35	"
1800	24.5	112.9	1003	35	"
9/0000	25.4	113.3	1001	40	"
0600	26.3	114.0	1003	35	"
1200	27.1	114.9	1006	30	tropical depression
1800	27.9	116.0	1008	25	"
10/0000	28.6	117.1	1009	25	dissipating
9/0000	25.4	113.3	1001	40	minimum pressure

Table 2. Tropical Cyclone watch and warning summary for Baja California, Tropical Storm Frank

Date/Time (UTC)	Action	Location
7/2100	Tropical Storm Watch issued	South of Cabo San Lazaro and south of Los Burros
8/0900	Tropical Storm Warning issued	Cabo San Lazaro to Punta Abreojos
8/0900	Tropical Storm Watch issued	North of Punta Abreojos to Punta Eugenia
8/0900	Tropical Storm Watch discontinued	South of Los Burros and south of Cabo San Lazaro
8/1200	Tropical Storm Warning extended southward	Punta Eugenia to Punta Tosca
9/0900	Tropical Storm warnings discontinued	Punta Eugenia to Punta Tosca



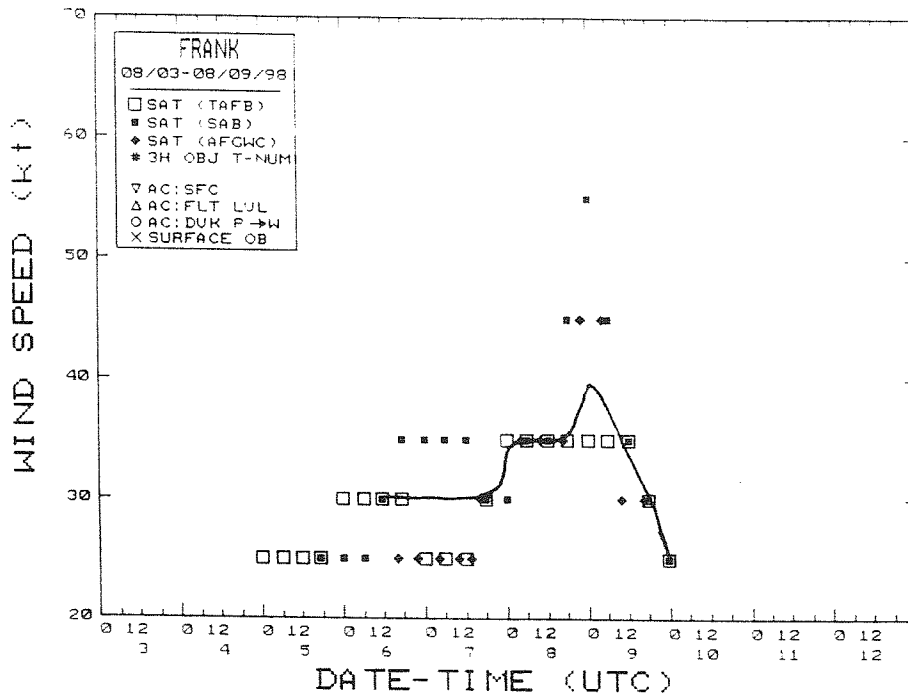


Fig. 2. Best track one-minute surface wind speed curve for Tropical Storm Frank.

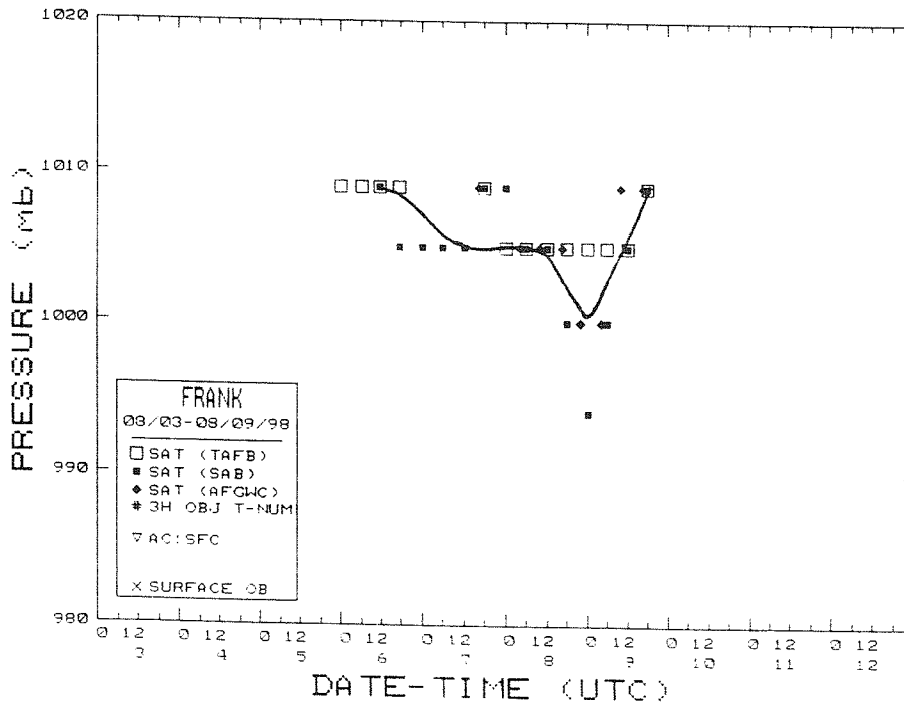


Fig. 3. Best track minimum central pressure curve for Tropical Storm Frank.