

Tropical Cyclone Report
Tropical Storm Ivo
10-15 September 2001

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a. Synoptic History

Ivo formed from a large tropical wave that moved off the African coast on 26 August. The wave was accompanied by a large cyclonic rotation at the low to middle levels and numerous thunderstorms when it entered the eastern Atlantic. On the 28th, the wave spawned a northward-moving vortex in the eastern Atlantic, but the wave's southern portion continued westward with very limited convective activity. Once the wave reached the western Caribbean Sea on 5 September, the shower activity increased and the whole system continued slowly westward over Central America. The cloud pattern gradually became better organized and by 9 September, satellite images showed a low to middle level circulation centered near Acapulco, Mexico. The next day, a portion of the system moved over water and it became a tropical depression about 100 n mi south-southwest of Acapulco at 1200 UTC 10 September.

The center of the depression moved slowly west and west-northwestward with its circulation hugging the southwest coast of Mexico. There was moderate easterly shear over the depression as indicated by the location of the convection to the west of the center. Satellite images and a report from a ship indicated that the depression reached tropical storm status by 0600 UTC 11 September. Thereafter, there was only slight strengthening and Ivo reached its maximum intensity of 45 knots and an estimated minimum pressure of 997 mb at 1800 UTC 12 September. The tropical storm moved toward the northwest and then west over increasingly cooler waters, and gradually weakened. It became a low pressure system devoid of convection by 0000 UTC 15 September.

b. Meteorological Statistics

Table 1 gives the best track positions and intensities of Ivo at six-hourly intervals. Figure 1 shows a plot of Ivo's track. Figures 2 and 3 depict the curves of maximum one-minute average (10 m above sea-level) wind speed and minimum sea-level pressure, respectively, as functions of time. Also plotted are the observations on which the curves are based. These consist primarily of satellite-based Dvorak-technique estimates using satellite imagery by the Tropical Analysis and Forecast Branch (TAFB), Satellite Analysis Branch (SAB), and the U.S. Air Force Weather Agency (AFWA). A 37-knot wind reported at 0600 UTC 11 September by the ship ZDEB2 located about 135 n mi from the center of the tropical cyclone was used to upgrade the system to Tropical Storm Ivo.

c. Casualty and Damage Statistics

No reports of casualties or damage associated with Tropical Storm Ivo have been received.

d. Forecast and Warning Critique

Ivo formed and moved very close to the southwest coast of Mexico and then headed for Baja California. This proximity to land prompted watches and warnings which are summarized in Table 2. However, Ivo was close enough to the coast to produce tropical storm force winds on shore.

The preliminary track errors for the 12, 24, 36 and 48 hour forecasts averaged 40, 60, 85 and 124 n mi respectively. These numbers are similar to the past 10-yr average official track errors for these periods of 37, 68, 99, and 128 n mi respectively. Initially, Ivo was forecast to become a hurricane, but it peaked at 45 knots only.

Table 1. Best track, Tropical Storm Ivo, 10-15 September, 2001.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 1200	14.8	98.9	1004	25	tropical depression
10 / 1800	14.9	100.1	1004	25	"
11 / 0000	15.2	101.4	1002	30	"
11 / 0600	15.7	102.7	1000	35	tropical storm
11 / 1200	16.7	104.3	1000	35	"
11 / 1800	17.3	105.5	1000	35	"
12 / 0000	17.9	106.7	999	35	"
12 / 0600	18.5	108.0	999	35	"
12 / 1200	19.4	108.8	999	40	"
12 / 1800	20.3	109.6	997	45	"
13 / 0000	21.0	110.3	998	45	"
13 / 0600	21.8	111.2	998	45	"
13 / 1200	23.0	112.5	998	45	"
13 / 1800	23.9	113.8	1002	40	"
14 / 0000	24.6	114.6	1004	35	"
14 / 0600	25.0	115.2	1004	30	tropical depression
14 / 1200	25.2	116.2	1005	25	"
14 / 1800	25.1	117.0	1006	25	"
15 / 0000	25.1	117.5	1007	20	"
15 / 0600					dissipated
12 / 1800	20.3	109.6	997	45	minimum pressure

Table 2. Watch and warning summary for Tropical Storm Ivo, 10-15 September, 2001

Date/Time (UTC)	Action	Location
11/0900	Tropical Storm Warning issued	Acapulco to Cabo Corrientes
11/1500	Tropical Storm Warning discontinued	East of Lazaro Cardenas
11/2100	Tropical Storm Warning discontinued	East of Manzanillo
12/0300	Tropical Storm Warning issued	Cabo San Lucas to Cabo San Lazaro
12/0900	Tropical Storm Warning discontinued	Manzanillo to Cabo Corrientes
13/2100	Tropical Storm Warning discontinued	Cabo San Lucas to Cabo San Lazaro

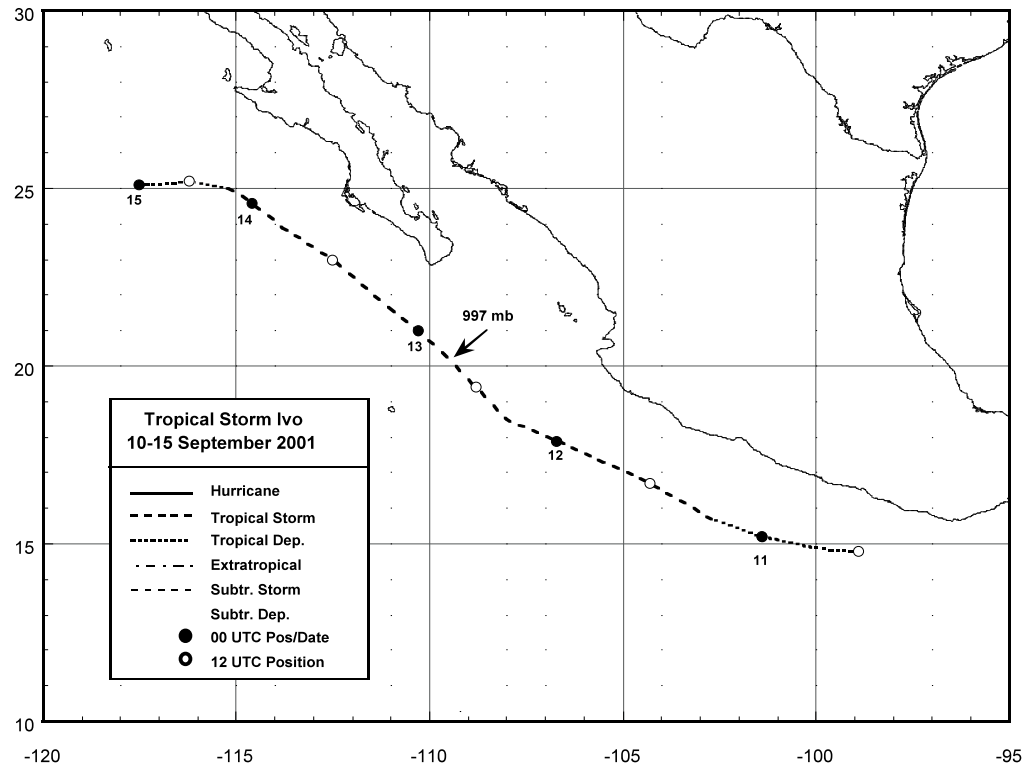


Figure 1. Best track positions for Tropical Storm Ivo, 10-15 September 2001.

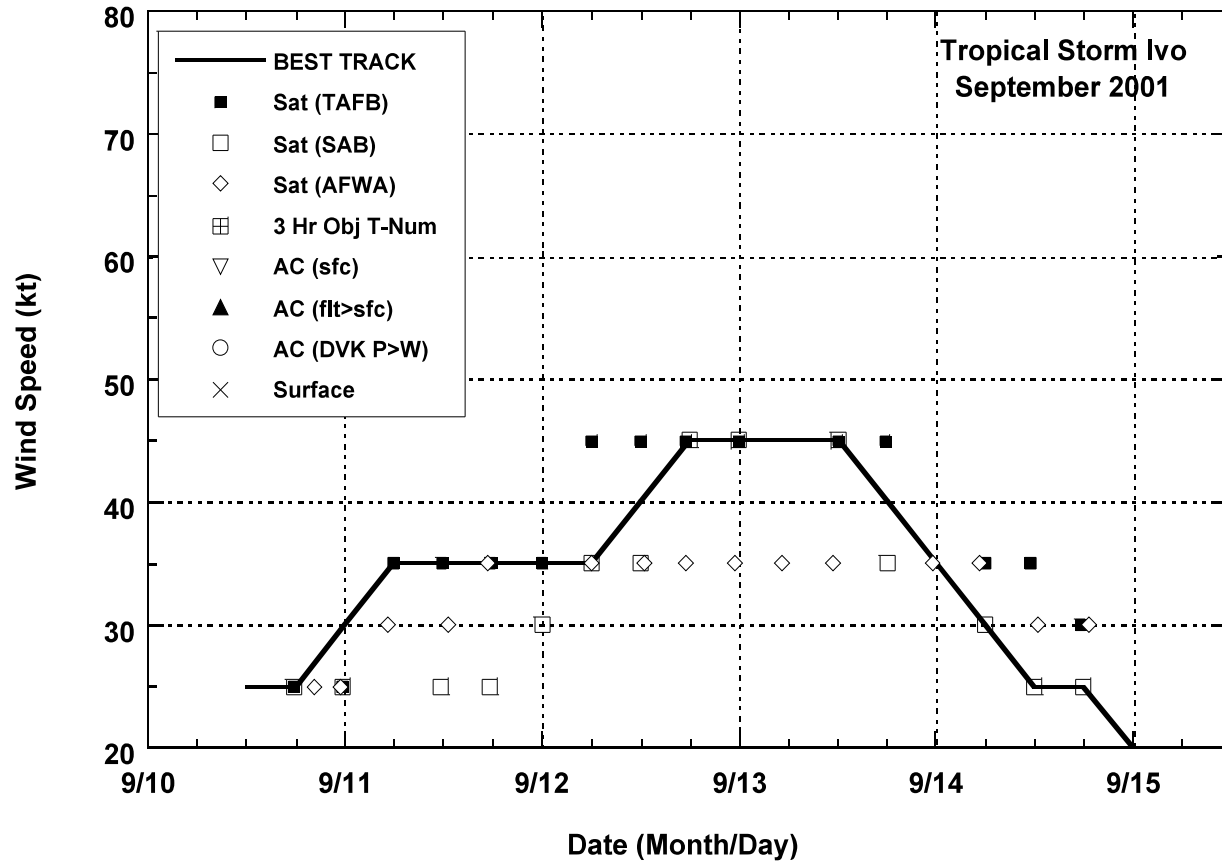


Figure 2. Best track maximum sustained 1-min 10 meter wind speed curve for Tropical Storm Ivo, 10 -15 September 2001.

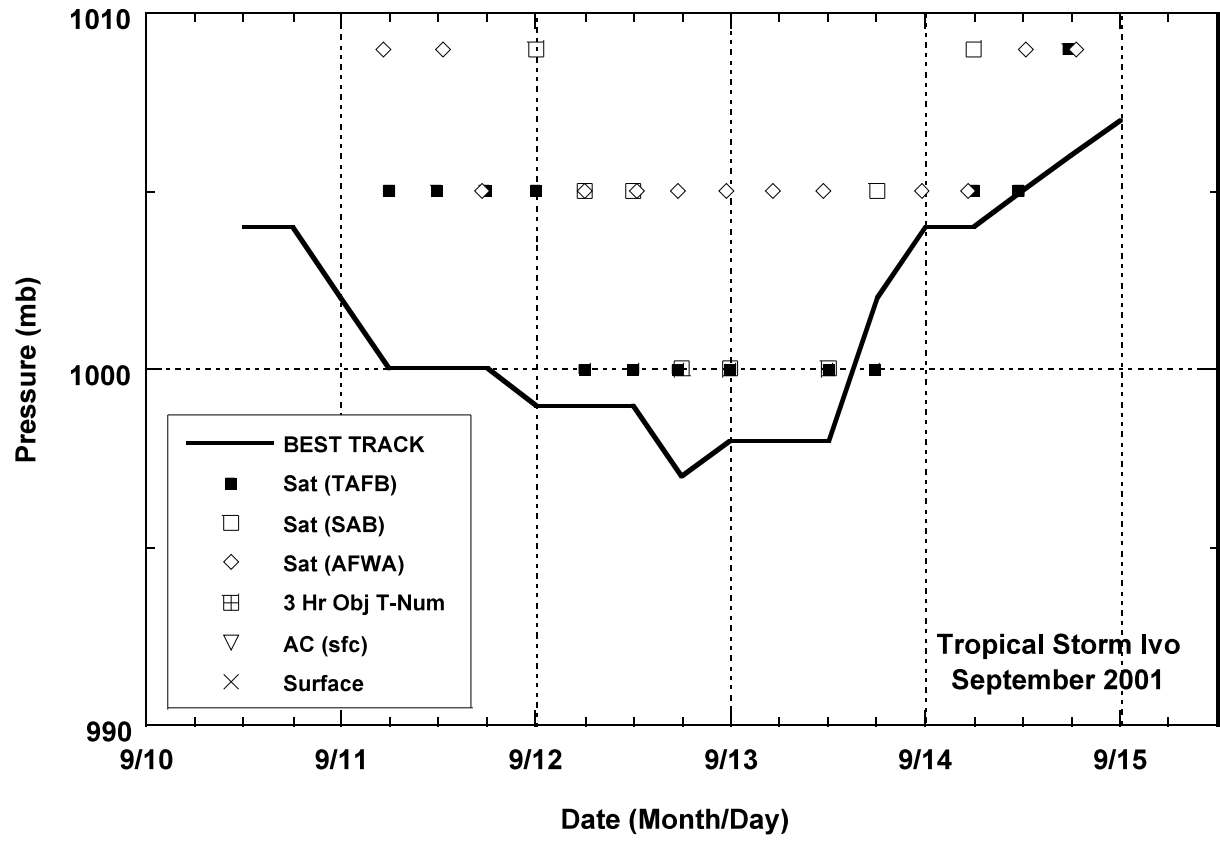


Figure 3. Best track minimum central pressure curve for Tropical Storm Ivo, 10-15 September, 2001.