

TROPICAL STORM TASHA (10W)

I. HIGHLIGHTS

Tasha, the third of four western Pacific tropical cyclones to occur in July, developed in the monsoon trough. Instead of following Steve (09W) and Vernon (11W) to the northeast, it made only a brief start in that direction before curving to the west and entering the South China Sea. After erratic motion and slow intensification, Tasha finally reached tropical storm intensity before slamming into the southern coast of China.

II. CHRONOLOGY OF EVENTS

- 220600Z - First mentioned on Significant Tropical Weather Advisory as an area of persistent convection with an estimated minimum sea-level pressure of 1006 mb.
- 262000Z - Tropical Cyclone Formation Alert issued based on indications in the synoptic data of increased organization of the low-level circulation and upper-level outflow.
- 272000Z - Tropical Cyclone Formation Alert reissued based on increased central convection and falling surface pressures.
- 280600Z - First warning issued due to preliminary appearance of a central dense overcast.
- 281200Z - Upgraded to tropical storm based on a ship report of 35 kt (20 m/sec) and a minimum sea-level pressure of 995 mb.
- 301800Z - Peak intensity of 55 kt (28 m/sec) coincident with increased size of the central dense overcast and an intensity estimate of CI 3.5.
- 310000Z - Final warning - dissipating over land - followed landfall 75 nm (140 km) east of Hong Kong.

III. TRACK AND MOTION

Tasha, developed in the monsoon trough over the warm 84°F (29°C) waters of the Philippine Sea. The low-level cyclonic circulation initially tracked northeastward in response to shallow southwesterly wind flow that extended up to 700 mb (Figure 3-10-1). As the pre-Tasha disturbance

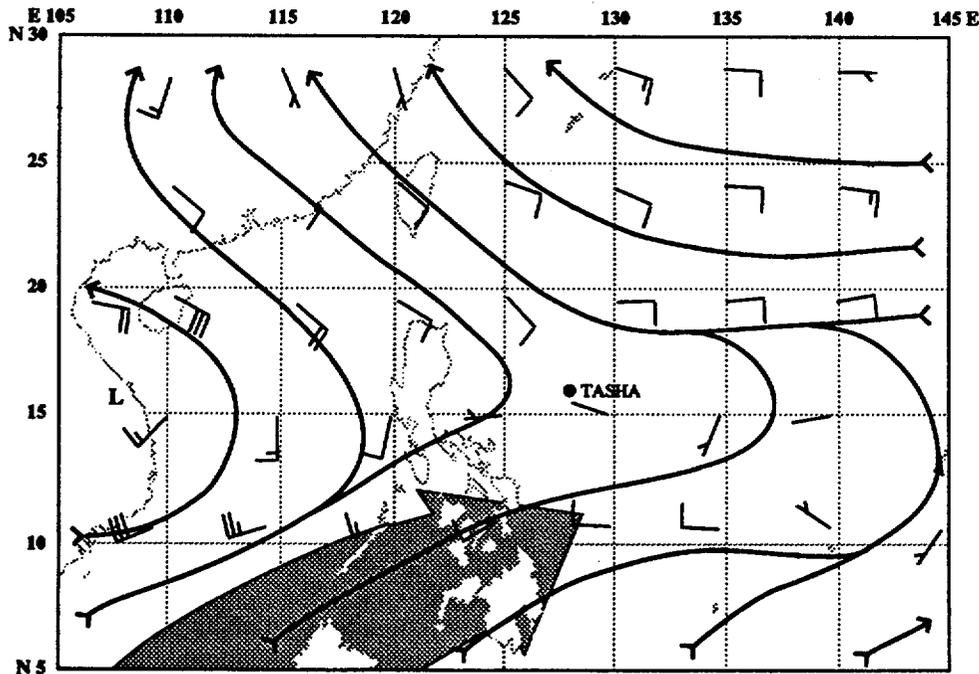


Figure 3-10-1. 700-mb NOGAPS streamline analysis at 221200Z July, showing the southwesterly steering flow over the southern Philippine Sea.

continued to develop, it turned westward in response to easterly flow associated with the an extension of the subtropical ridge centered over the East China Sea (Figure 3-10-2). For the next several days, the disturbance drifted slowly westward and passed through the Luzon Strait. At this point, Tasha moved slowly southward and westward, interacting with a larger, synoptic-scale cyclonic circulation to the southwest in the monsoon trough (Figure 3-10-3). By 29 July, Tasha had intensified and become the dominant vortex in the South China Sea. After a 12-hour period of quasi-stationary motion, Tasha then commenced a northward track at 291800Z in response to a moderately strong (up to 35 kt (18 m/sec) surface winds) and deep (1000 to 700 mb) surge in the monsoonal flow to the south (Figure 3-10-4) which was accompanied by a northward shift of the synoptic-scale monsoon trough axis (Figure 3-10-5). Tasha ultimately made landfall just east of Hong Kong.

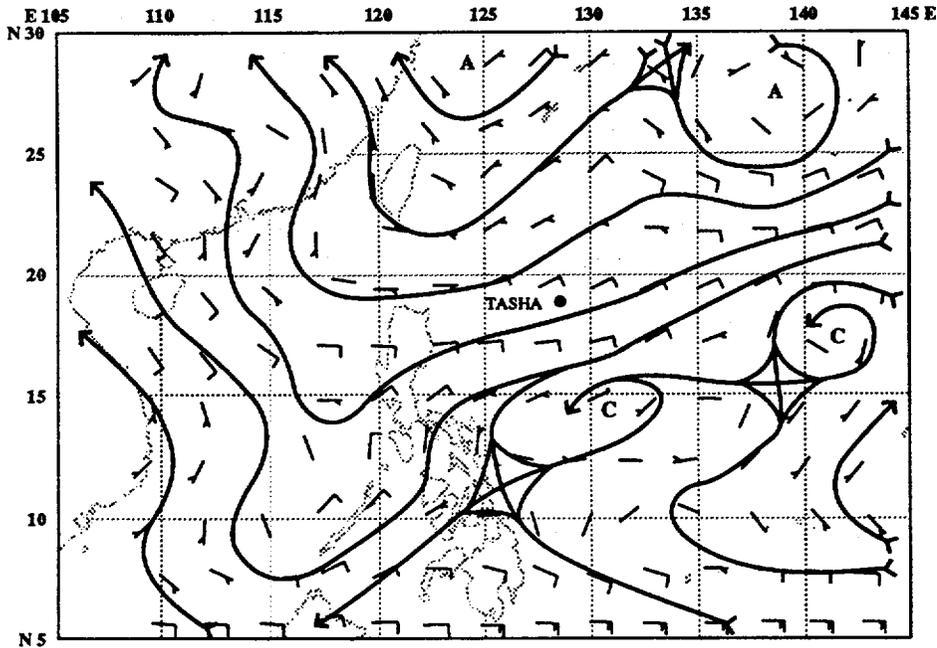
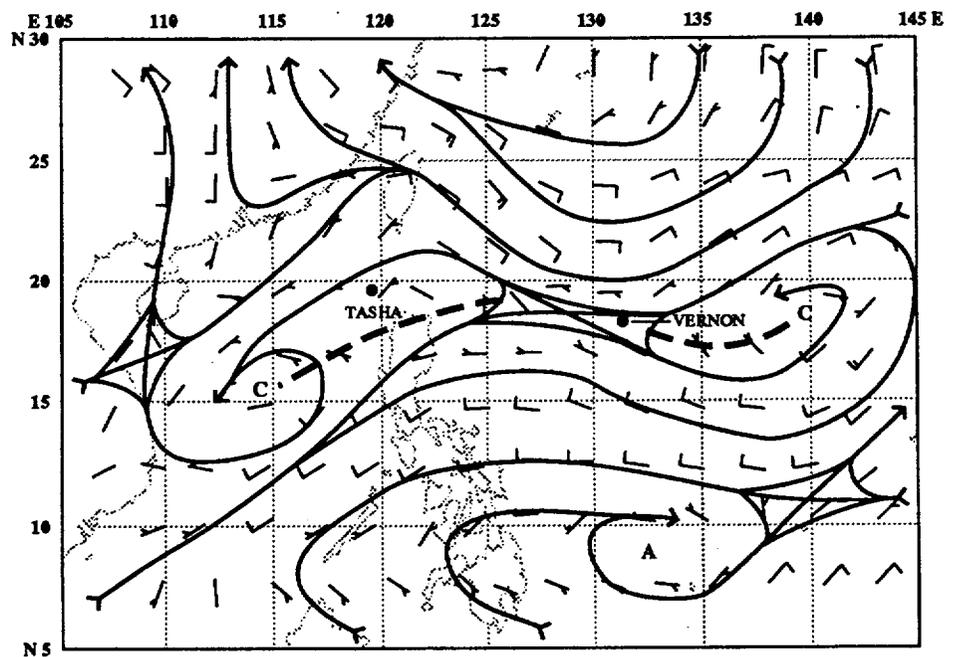


Figure 3-10-2. Deep layer mean analysis at 231200Z July, showing the mean position of the subtropical ridge over the East China Sea and weak easterly steering flow over Tasha.

Figure 3-10-3. Deep layer mean analysis at 261200Z July with Tasha beginning to interact with the large cyclonic circulation to the southwest.



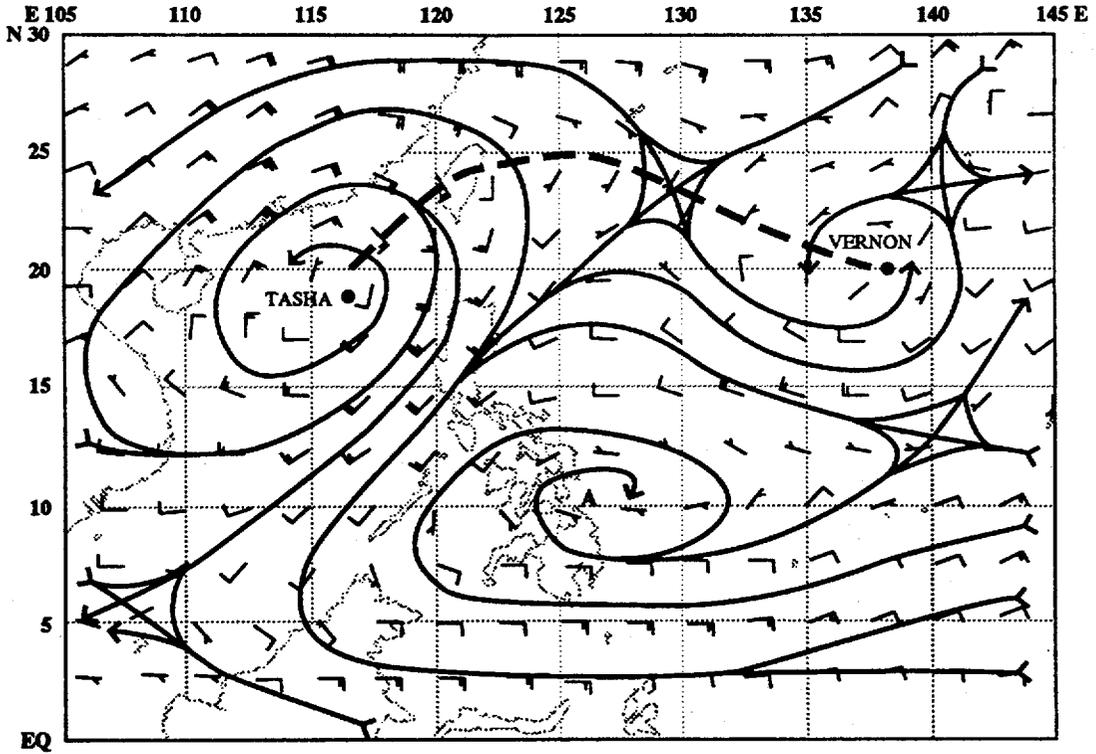


Figure 3-10-4. Deep layer mean analysis at 301200Z July depicting the moderate monsoon surge to the south of Tasha (compare with Figure 3-10-3).

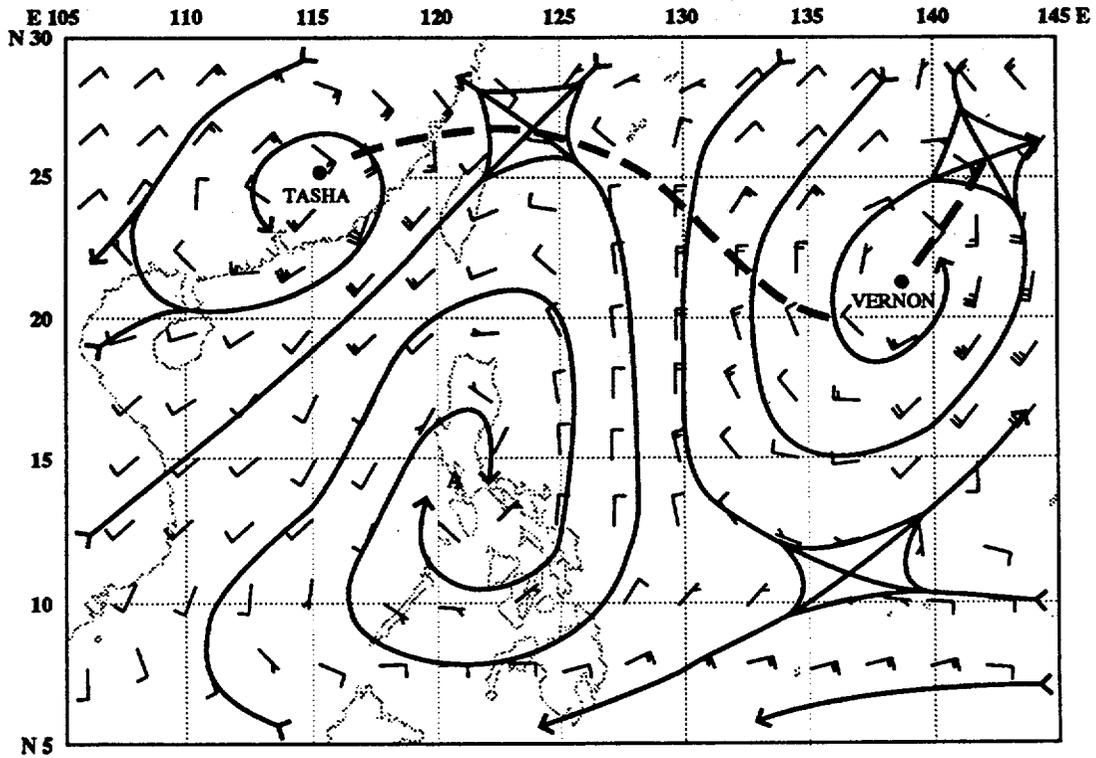


Figure 3-10-5. Deep layer mean analysis at 311200Z July, when compared with Figure 3-10-3, reveals that the axis of the monsoon trough with Tasha embedded has shifted northward over China.

IV. INTENSITY

For several days before significant development occurred, the persistent, but poorly organized, convection remained embedded in the monsoon trough, undergoing large diurnal fluctuations. During this time, the upper-level winds over the system were in excess of 30 kt (15 m/sec). However, after passing through the Luzon Strait, the tropical disturbance moved into a more favorable environment with less vertical shear near the eastern end of the tropical easterly jet. The cyclone reached peak intensity on 30 July, just prior to landfall (Figure 3-10-6). Once inland, the system dissipated due to the influence of rugged terrain in southeastern China and the loss of its oceanic source of heat and moisture.

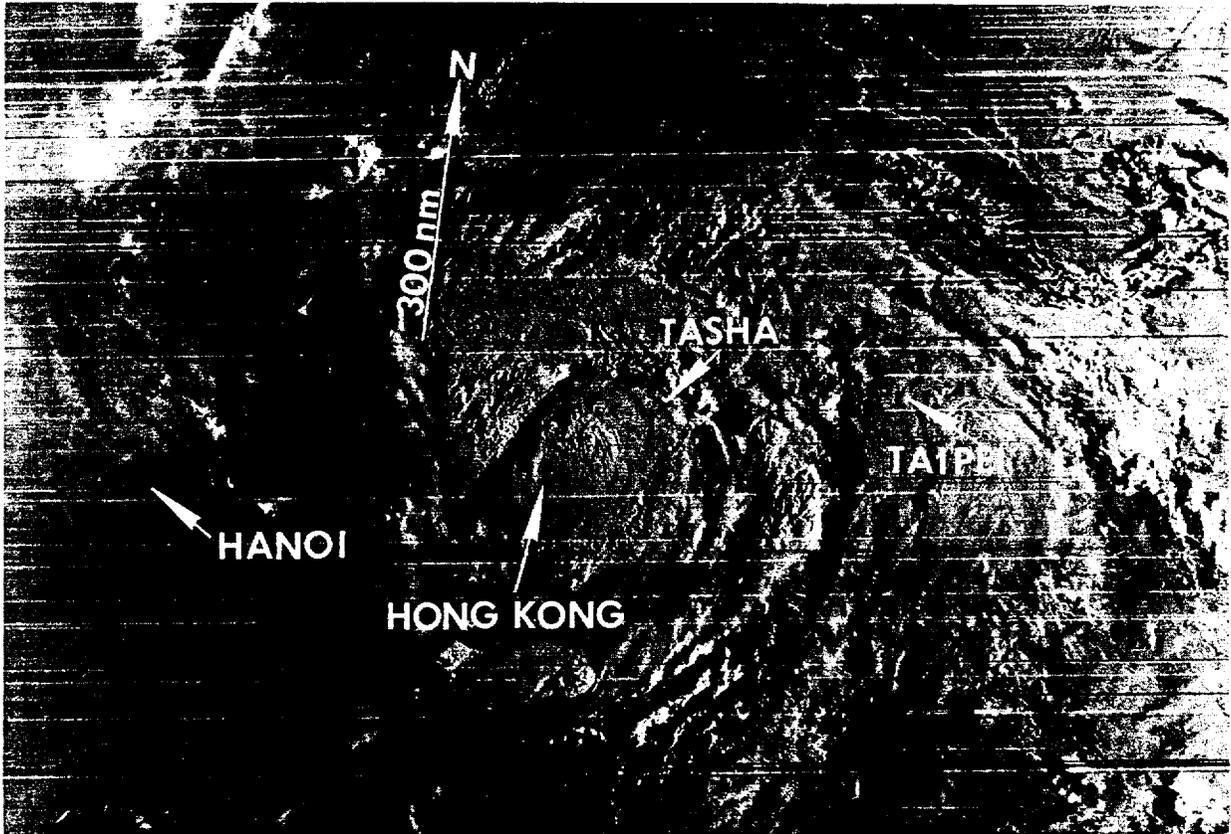


Figure 3-10-6. Tropical Storm Tasha at peak intensity moves into southern China (302210Z July DMSP visual imagery).

V. FORECASTING PERFORMANCE

Tasha's eventual northward track was not forecast initially (Figure 3-10-7). The NOGAPS prognoses maintained a weak subtropical ridge over southern China, which was expected to steer the system west-northwestward between Hainan Dao and Hong Kong. However, due to the weak steering flow depicted by the models, an alternate scenario for erratic motion was developed. On 29 July, after satellite imagery indicated that the previously mentioned monsoonal surge was beginning, the track was modified to initial northeastward movement followed by a turn to the north. If the surge turned out to be weaker than anticipated, an alternate scenario of steady northward movement was included. The alternate scenario turned out to be correct. Throughout Tasha's life, the guidance provided by the numerical forecast aids was practically useless. The major northward shift of the axis of the monsoon trough was not depicted well in the NOGAPS prognoses, and the complex and rapidly changing synoptic environment was not amenable to subjective analysis by the forecaster.

VI. IMPACT

Tasha landed 75 nm (140 km) east of Hong Kong at 312100Z and caused widespread damage due to torrential rains and flooding in Fujian and Guangdong provinces. In Fujian Province in southeastern China, 69 people were killed and 10,000 houses destroyed. Irrigation facilities were damaged, and approximately 5 million acres of farmland were flooded, with rainfall amounts reported in excess of 12 inches (305 mm). In Guangdong Province in southern China, 39 people died, 335 were injured and 25,200 houses were destroyed. Rainfall in some areas exceeded 14 inches (355 mm) with 5.3 million acres of farmland flooded. In contrast, damage in Hong Kong was relatively minor. Ferries to outlying islands, Macau and many parts of Guangdong were suspended or canceled. Seven emergency shelters were opened and many social activities were disrupted, but no serious flooding or landslides occurred.

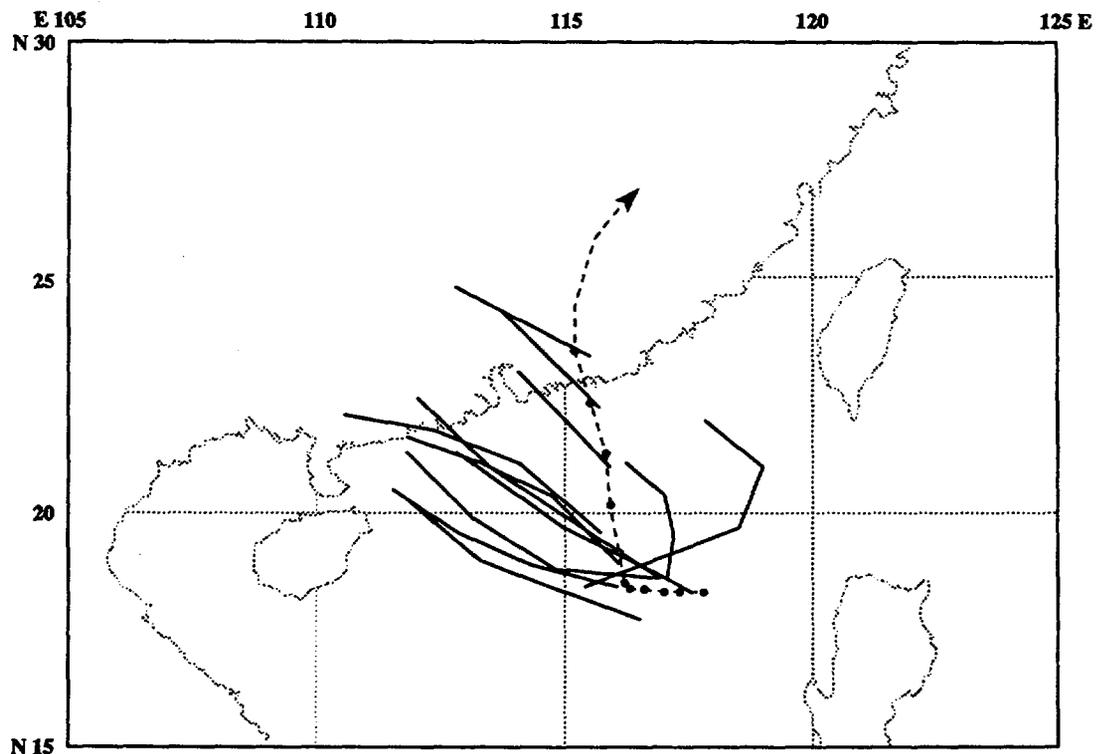


Figure 3-10-7. Summary of JTWC forecasts (solid lines) for Tasha is superimposed on the final best track (dashed line).