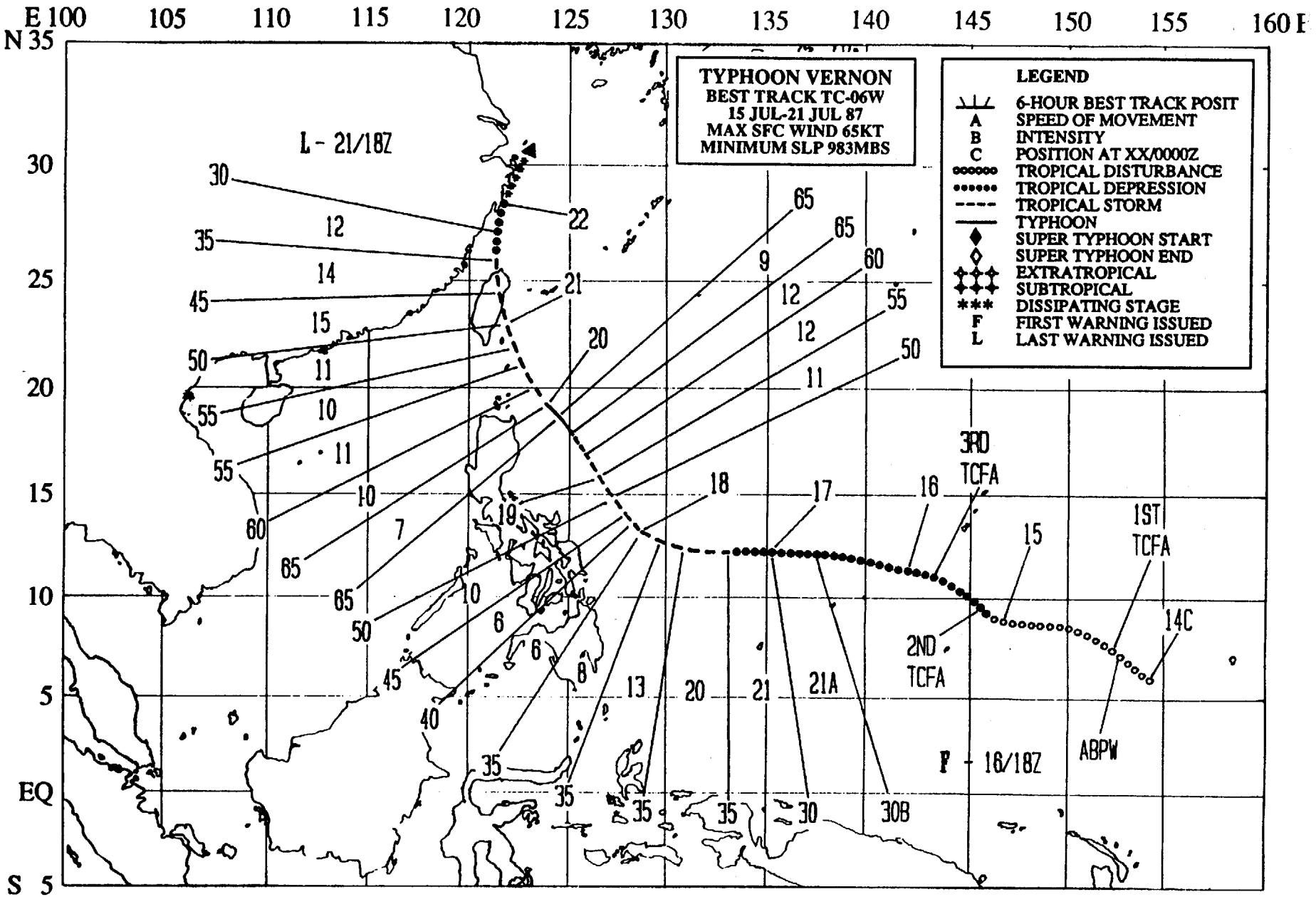
TYPHOON VERNON
BEST TRACK TC-06W
15 JUL-21 JUL 87
MAX SFC WIND 65KT
MINIMUM SLP 983MBS
LEGEND
6-HOUR BEST TRACK POSIT
SPEED OF MOVEMENT
INTENSITY
POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
L - 21/18Z
F - 16/18Z
3RD TCFA
2ND TCFA
1ST TCFA
14C
ABPW
21A
30B
E 100
105
110
115
120
125
130
135
140
145
150
155
160 E
N 35
30
25
20
15
10
5
EQ
S 5

TYPHOON VERNON (06W)

Typhoon Vernon, the second of four significant tropical cyclones to develop in July followed closely on the heels of Super Typhoon Thelma (05W). It was a weak and disorganized system throughout most of its lifetime. As such, initial positioning problems arose in the Philippine Sea due to differences between real-time fix information from radar, satellite and aircraft.

The initial tropical disturbance was first detected in the near-equatorial trough near the island of Truk in the eastern Caroline Islands at 140000Z July and was subsequently listed on the Significant Tropical Weather Advisory (ABPW PGTW) as having poor potential for development into a significant tropical cyclone. However, six hours later a low-level circulation was apparent on visual satellite imagery. The satellite intensity estimate (Dvorak, 1984) was 25 kt (13 m/sec) and a Tropical Cyclone Formation Alert (TCFA) was issued at 140830Z. Convective activity did not increase appreciably for the next two days, but the TCFA was reissued twice due to its persistence. On 161800Z, the first warning was issued for Tropical Depression 06W, based on an estimate of maximum sustained surface winds of 30 kt (15 m/sec) from satellite imagery. The initial forecasts were based on a persistent westward trend with higher than normal speeds of 17 kt (32 km/hr).

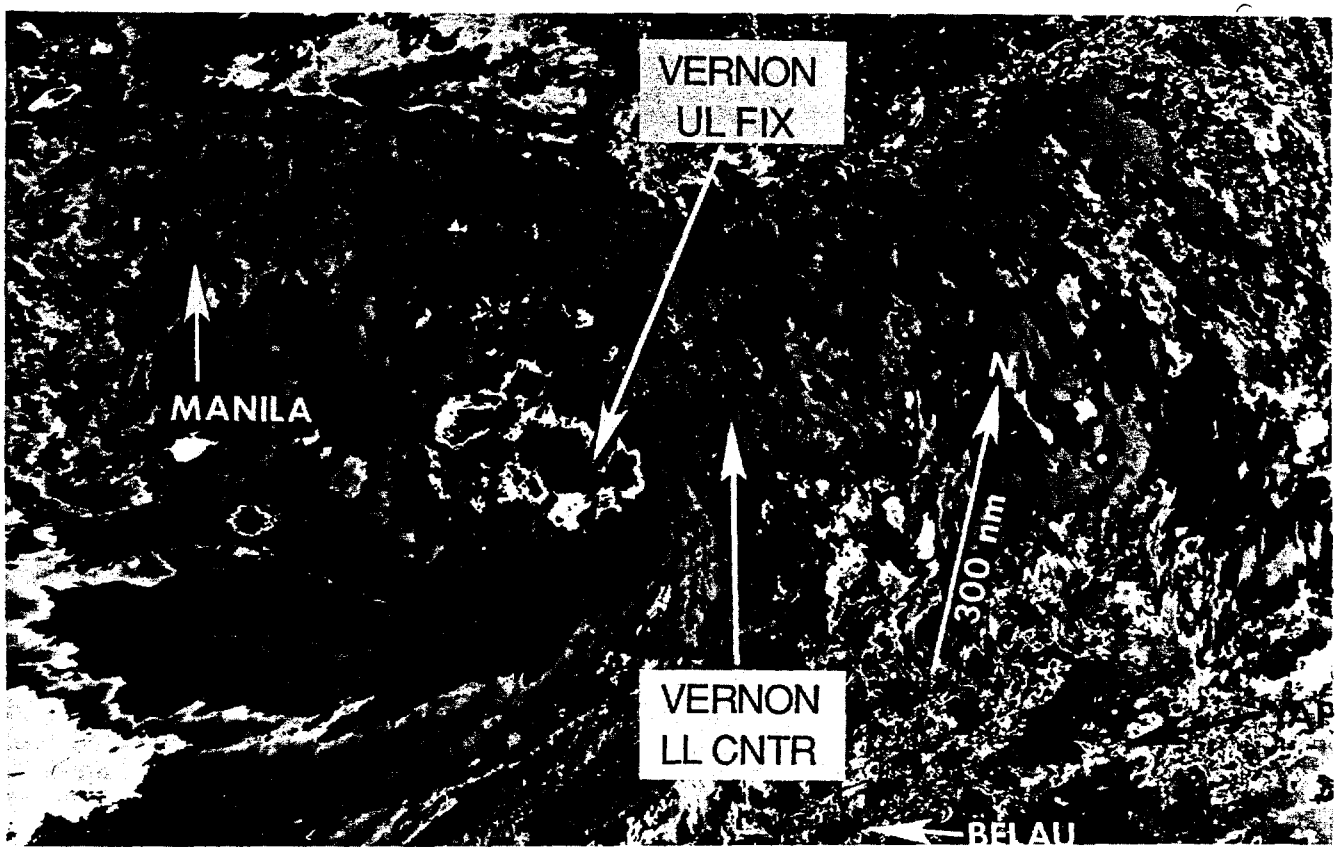

Figure 3-06-1. The area of intense convection as seen on enhanced infrared satellite imagery. This feature was used to fix Vernon during most of the period between 170000Z and the relocation at 181200Z (180042Z July DMSP infrared imagery).

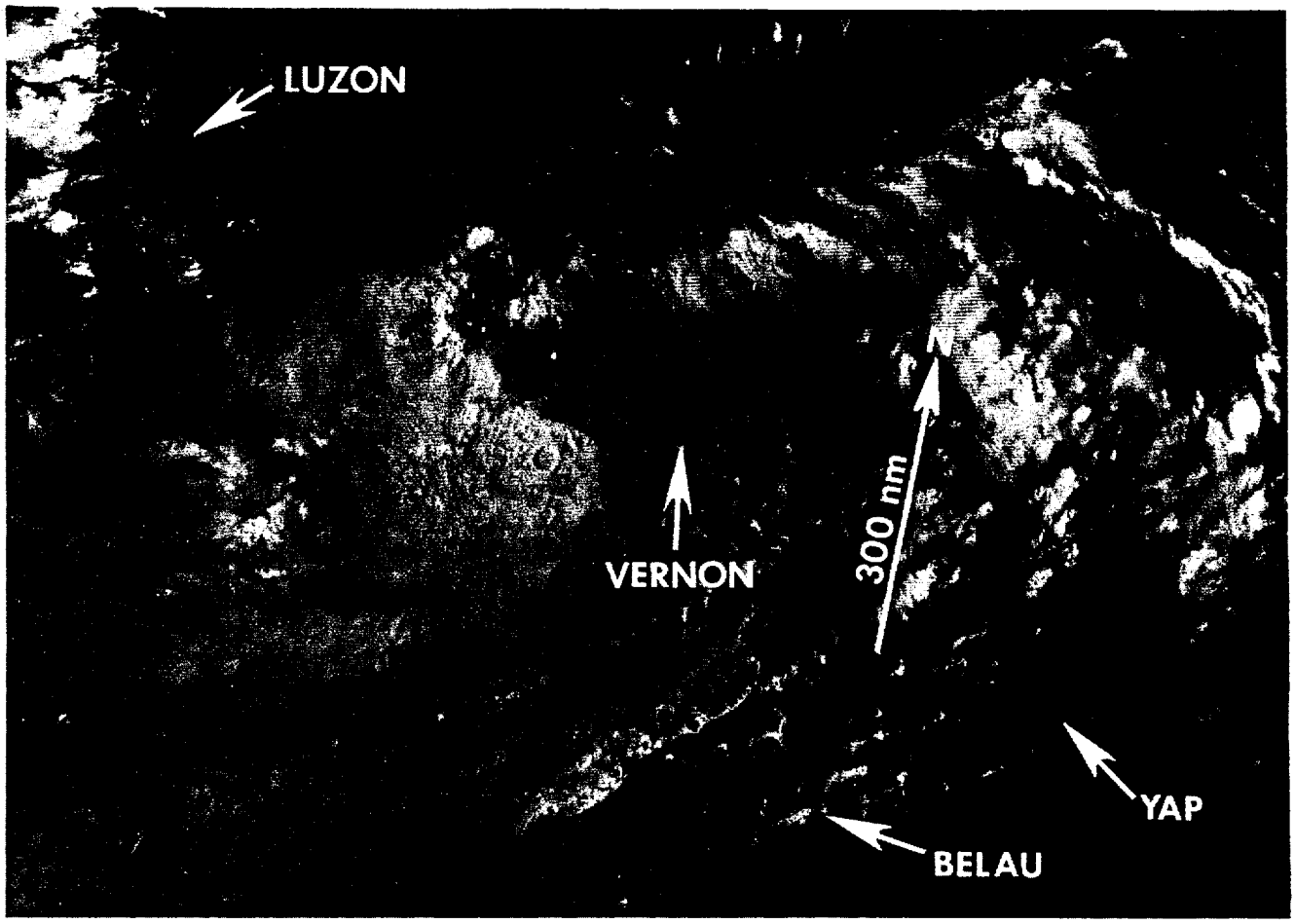

Figure 3-06-2. The exposed low-level circulation center which was mistakenly thought to be a secondary circulation can be seen in the center of the above image. This low-level circulation was not identified as Vernon's main circulation center until 181200Z (180042Z July DMSP visual imagery).

Between 170600Z and 181200Z, satellite fixes and radar reports indicated Vernon had continued to move westward toward the central Philippine Islands. During this time, the most intense area of curved convection remained just east of the Philippines (see Figure 3-06-1) and appeared to be the dominant feature. However, there was also a low-level circulation center northeast of the deep convection which was initially believed to be a secondary circulation center. Figure 3-06-2 shows this exposed low-level circulation center about 180 nm (333 km) northeast of the primary mass of convection at 180042Z.

After the last successful fix at 170224Z July, keeping track of Vernon's weak low-level circulation center became increasingly more difficult. To compound the problem, the radar fixes at two different sites in the Philippine Islands (WMO 98558 and WMO 98447) reinforced the satellite analysis which continued to fix on the main convective mass that was moving towards southern Luzon (see Figure 3-06-3). As a result, Vernon's low-level circulation was not recognized until an exposed low-level circulation was identified by the satellite analyst at 181200Z. Immediately thereafter, Vernon was relocated approximately

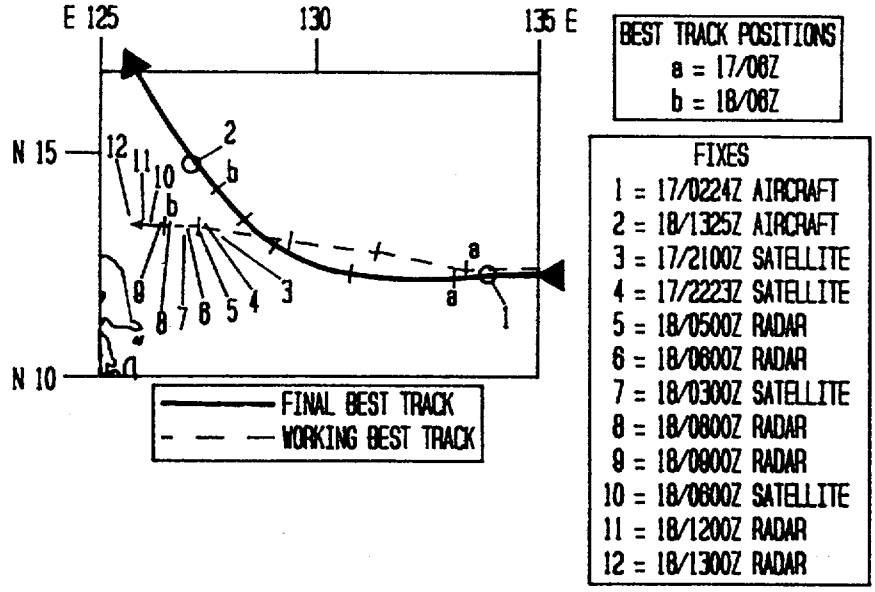

Figure 3-06-3. Typhoon Vernon's best track during the period when the system was relocated. Note that no aircraft fixes were made between 170224Z and 181325Z July. Also note the preponderance of radar fixes and satellite fixes which indicated westward movement when the system was actually moving northwestward (dashed lines). These fixes could not be used in the final best track.

145 nm (269 km) to the north-northeast of the original 180600Z position. This relocation was subsequently verified at 181325Z by the first aerial reconnaissance fix mission in nearly 36-hours.

The Aerial Weather Reconnaissance Officer (ARWO) on the fix mission reported passing a probable vortex center on the inbound leg of the primary fix mission as the aircraft was heading toward the fly-to-point given by the Typhoon Duty Officer. After consulting the Typhoon Duty Officer, it was decided that the satellite and land radar fix position should be investigated. Once there, the ARWO reported rising heights at the 850 mb level and no low-level vortex. The Typhoon Duty Officer then concluded there was only one circulation center, vice multiple vortices. The aircraft crew was then requested to return to the vortex they had passed earlier and investigate it (see Figure 3-06-4). The ARWO subsequently located the vortex and reported a center height of 1363 m at 850 mb.

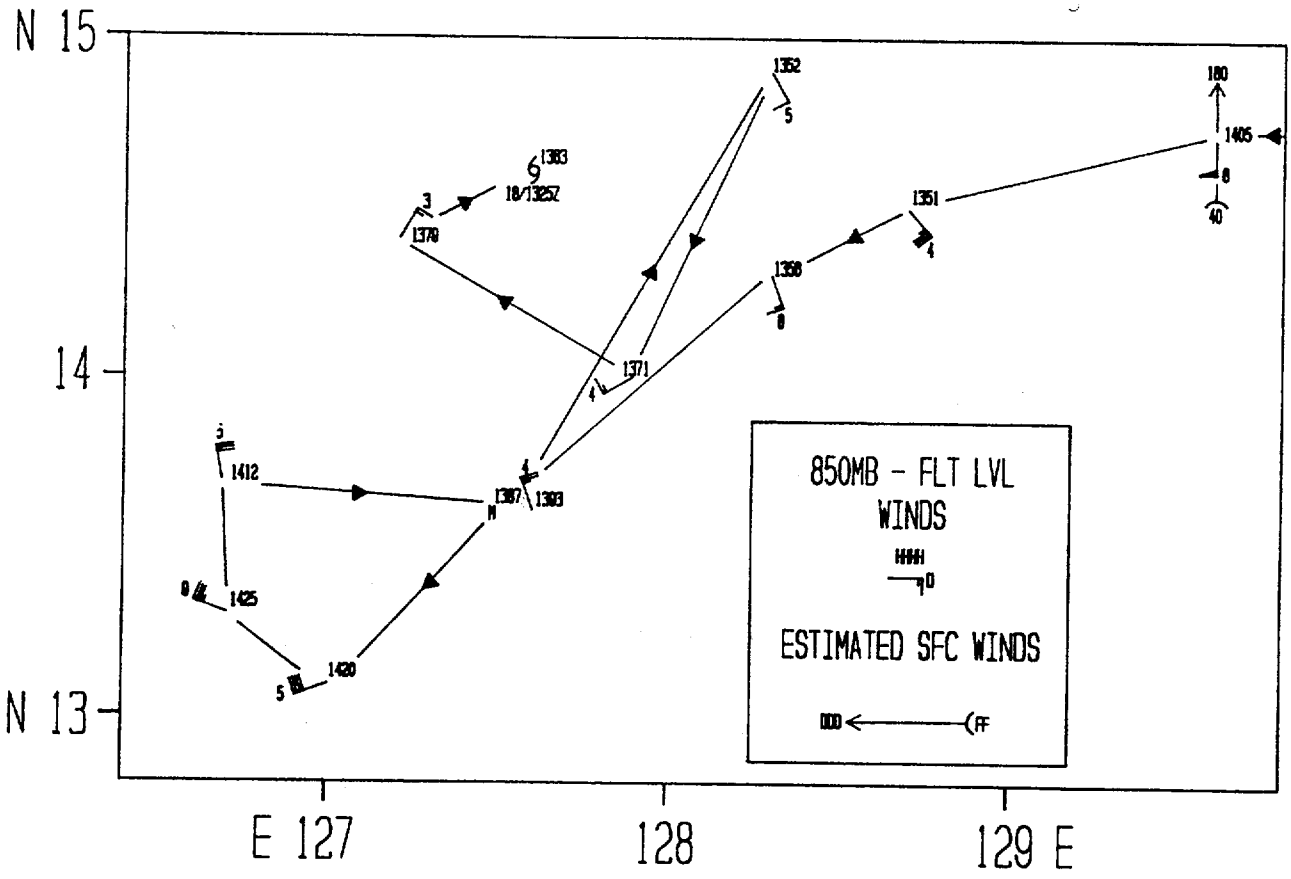

Figure 3-06-4. Plot of the 181325Z July aircraft fix mission which determined the low-level circulation center associated with Vernon.

After the relocation, radar reports from Guiuan Airport (WMO 98558) continued to fix Vernon 170 nm (315 km) south of the aircraft verified position. From synoptic data, there is no evidence that a distinct circulation ever existed separate from Vernon's exposed low-level center. There is also no evidence that the central Philippine Islands ever experienced any significant winds associated with Vernon.

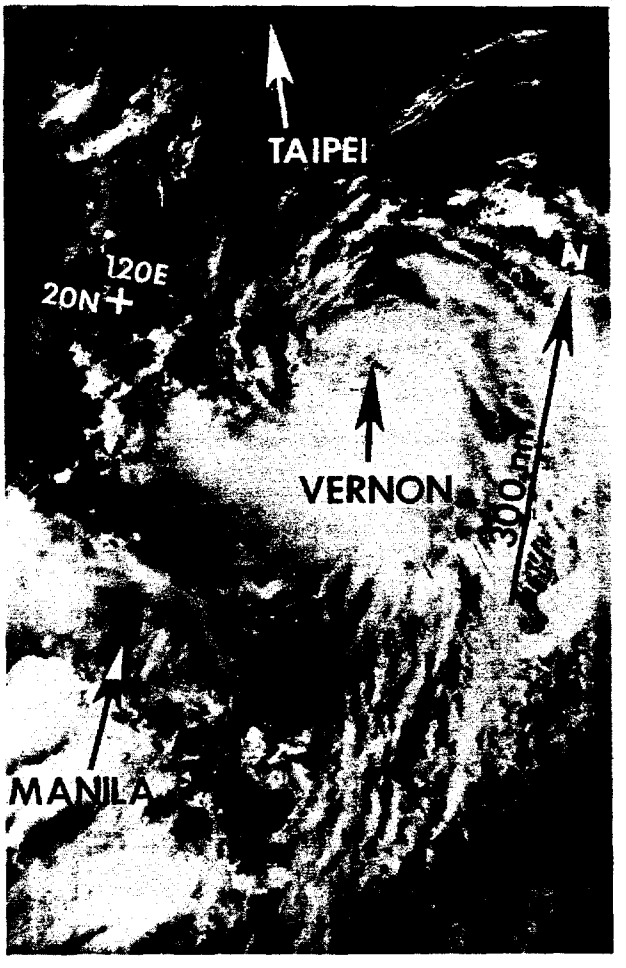

Figure 3-06-5. Typhoon Vernon at its peak intensity of 65 kt (33 m/sec) (200143Z July DMSP visual imagery).

Vernon began to track steadily northeastward toward Taiwan. It reached minimal typhoon intensity at 191200Z (see Figure 3-06-5). At that point positioning by satellite was no longer a problem due to the better defined central features. On 21 July,

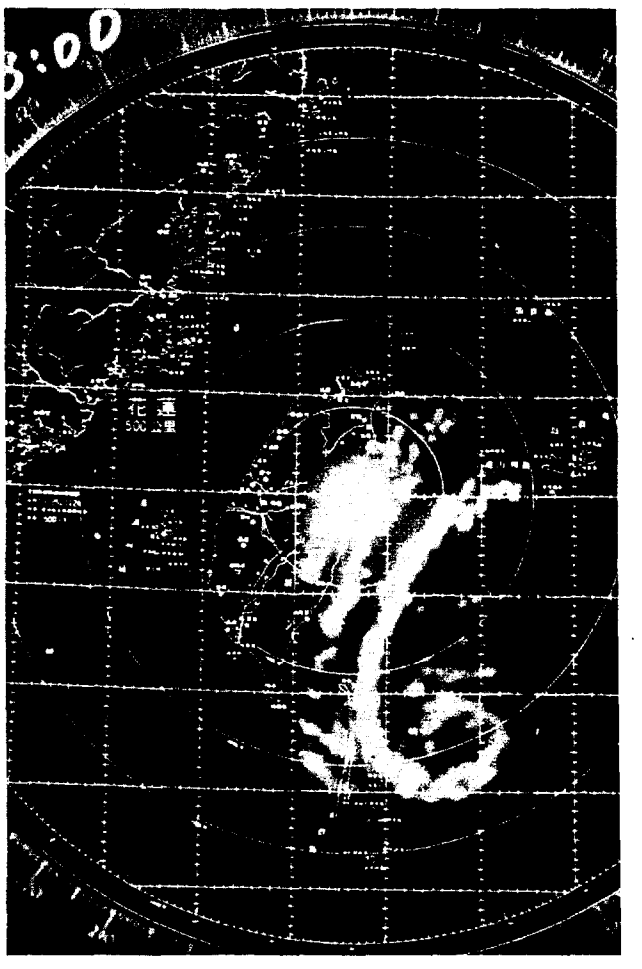

Figure 3-06-6. The spiralling rainband of Vernon as seen by radar from Hualien, Taiwan (WMO 46699) at 201500Z July (Photograph courtesy of Central Weather Bureau, Taipei, Taiwan)..

Typhoon Vernon began to interact with the terrain of Taiwan as it skirted the eastern shore and rapidly weakened to a tropical depression (Figure 3-06-6). Vernon dissipated in the East China Sea on 22 July after passing the northern tip of Taiwan.