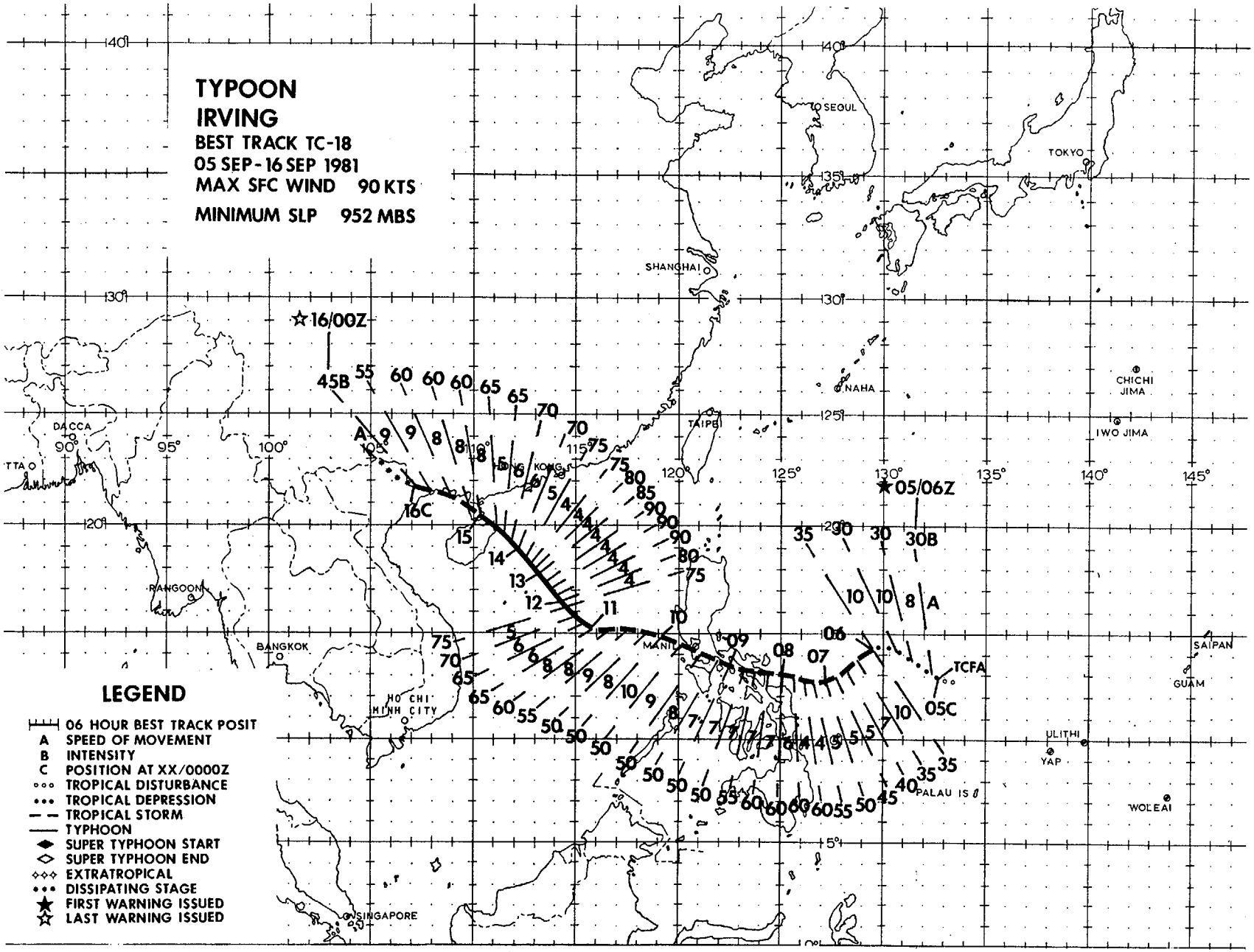
TYPOON
IRVING
BEST TRACK TC-18
05 SEP - 16 SEP 1981
MAX SFC WIND 90 KTS
MINIMUM SLP 952 MBS
16/00Z
05/06Z
TCFA
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
CHICHI JIMA
IWO JIMA
DACCA
RANGOON
BANGKOK
MANILA
HO CHI MINH CITY
SINGAPORE
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI

Typhoon Irving developed within an area of unorganized convection associated with an active monsoon trough anchored south of Guam in early September. Surface pressures throughout the region between 125E to 165E and 8N to 13N were below 1004 mb, and the southwest monsoon flow averaged 20 kt (10 m/sec) over much of the region. By 040300Z, a low-level circulation was evident on visual satellite imagery near 11N 130E, although nearby convection had decreased during the preceding 12 hours. During this period, another tropical cyclone was developing in the monsoon trough near 12N 147E (Typhoon Judy (19)). The passage of Typhoon Gordon (16) east of Japan re-established a low-level easterly flow to the north of both of the developing systems; thus increasing the potential for further development.

As the circulation near 130E (Irving) developed, an increase in cloud organization was seen on satellite imagery which led to the issuance of a Tropical Cyclone Formation Alert at 050000Z. An immediate, abbreviated warning bulletin for Tropical Depression 18 was issued by JTWC at 050855Z, when reconnaissance aircraft closed off a surface circulation with observed winds near 30 kt (15 m/sec). Based on continued convective organization, Tropical Depression 18 was upgraded to Tropical Storm Irving at 051800Z.

Early in its development, Irving was characterized as an exposed low-level circulation center to the east of the most active convection region of the disturbance. Visual satellite imagery and aircraft reconnaissance data enabled JTWC to follow the surface center, rather than the upper-level (convective) center, as Irving moved across the Philippine Sea.

From 6 to 8 September Irving remained equatorward of a strengthening subtropical ridge and maintained a westward track across the Philippine Sea. Irving made landfall at 080900Z, on the southern tip of Luzon (Figure 3-18-1). Maximum winds at landfall were 60 kt (31 m/sec). Thereafter, Irving assumed a more northwestward path (of least resistance) through the Sibuyan Sea

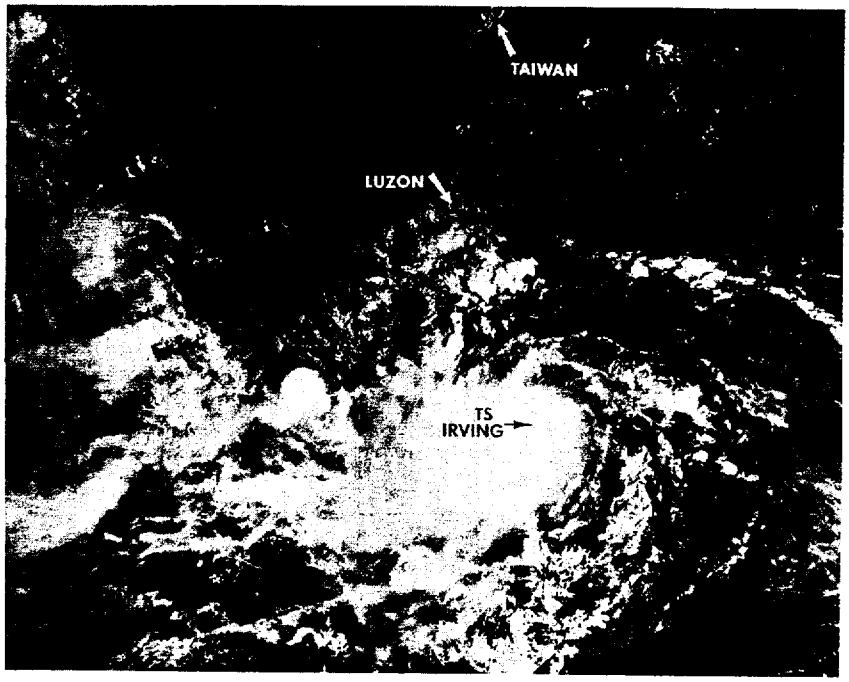


*Figure 3-18-1. Tropical Storm Irving near landfall south of Luzon. 081616Z September (NOAA 7 visual imagery)*

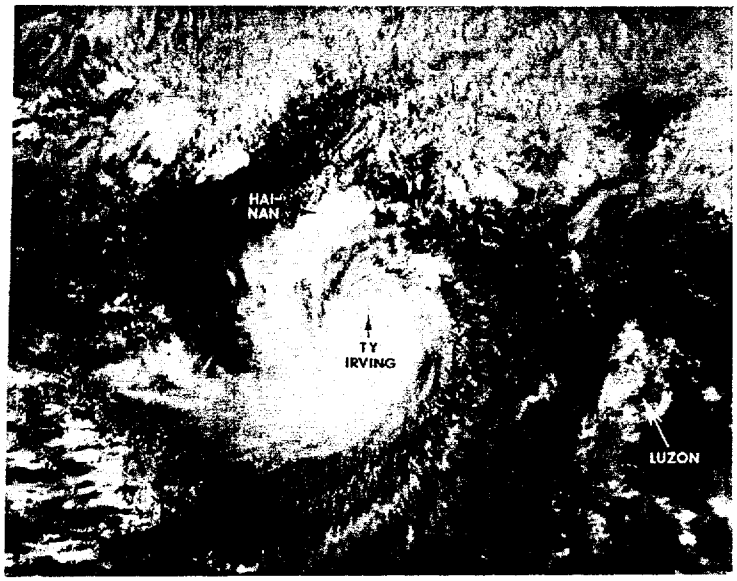


*Figure 3-18-2. Typhoon Irving near maximum intensity in the South China Sea. 130706Z September (NOAA 7 visual imagery)*

and remained over a marine pathway between the islands of the central Philippines. During this period, Irving maintained much of its intensity although some convective organization was lost. Irving entered the open waters of the South China Sea, 27 nm (50 km) southwest of Cubi Point Naval Air Station at 091700Z. NAS Cubi reported sustained winds of 46 kt (24 m/sec) with a peak gust of 64 kt (33 m/sec) during Irving's transit of the region.

As Irving moved into the South China Sea, a return to a more westward track and gradual intensification were forecast, with the subtropical ridge anticipated to maintain itself north of Irving's track throughout most of the period. A more northwestward track became probable based upon analyses of 500 and 700 mb heights at 110000Z that indicated height falls at both levels were occurring over China. Irving, sensing this developing weakness in the subtropical ridge, maintained

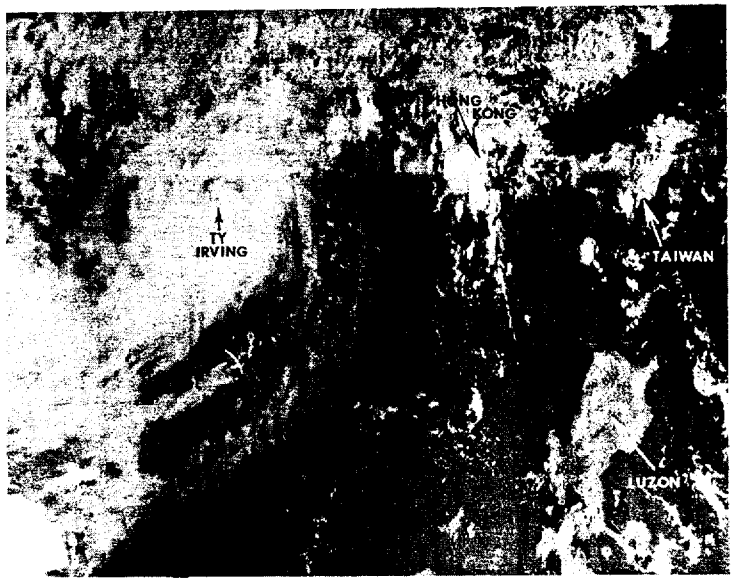


*Figure 3-18-3. Typhoon Irving approaching mainland China. 150643Z September (NOAA 7 visual imagery)*

a slow, northwestward movement until 141200Z, when a slight acceleration began. Aircraft reconnaissance at 120630Z reported a maximum observed surface wind of 90 kt (46 m/sec), well above the 50 to 65 kt (26 to 33 m/sec) range previously forecast. Figure 3-18-2 shows Irving near peak intensity. The aircraft data also indicated that Irving had a very tight circulation, with the radius of 50 kt (26 m/sec) winds within 60 nm (111 km) of the center during this period of maximum intensity. Radar observations, as well as synoptic reports from the Paracel Islands (WMO 59981 and 59985) were very useful in accurately determining Irving's position and intensity during the period 12-13 September when reconnaissance aircraft fix missions could no longer be flown.

On 15 September, as the system began to interact with Hai-nan Island and the coast of China, Irving was downgraded to tropical storm strength (Figure 3-18-3). Irving made landfall 110 nm (204 km) northeast of Hanoi at 151800Z, and thereafter rapidly dissipated over the mountainous area of Vietnam.