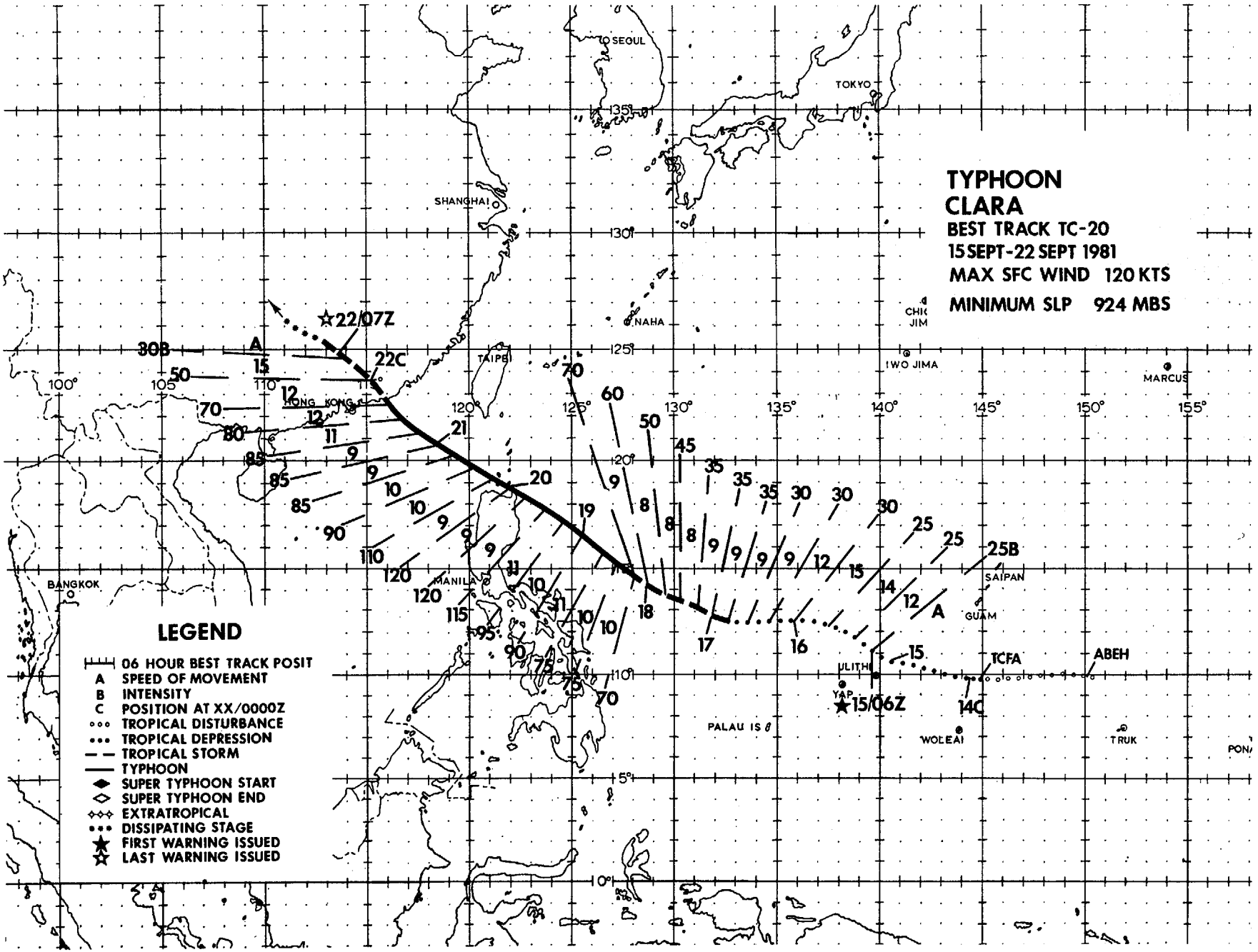
TYPHOON
CLARA
BEST TRACK TC-20
15 SEPT-22 SEPT 1981
MAX SFC WIND 120 KTS
MINIMUM SLP 924 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
☆22/07Z
15/06Z
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
IWO JIMA
MARCUS
HONG KONG
BANGKOK
MANILA
SAIPAN
GUAM
YAP
ULITHI
WOLEAI
TRUK
PALAU IS
TCFA
ABEH
100°
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
20°
15°
10°
5°
0°

Clara was first detected on satellite imagery at 1600Z, 11 September near Ponape as an area of concentrated convection embedded within the monsoon trough. No development was noted during the next two days as the disturbance tracked westward at 9 kt (16 km/hr).

A Tropical Upper Tropospheric Trough (TUTT) had been evident on the satellite imagery and was analyzed from synoptic data on the 200 mb streamline analysis northwest of Guam for several days. This feature had induced a large area of upper level divergence in the vicinity of the disturbance while some troughing and vertical wind shear were induced by a second TUTT cell analyzed to the northeast of the disturbance. The relative position of the disturbance to the upper level feature prevented significant development by restricting available outflow channels.

As Clara continued westward and moved past the trough axis it became apparent that the potential for significant development would increase as it moved into the upper level divergent area induced by the TUTT northwest of Guam. Satellite imagery at 131800Z showed increased convection and organization while synoptic reports indicated surface winds of 15 kt (8 m/sec) near the center of the convection. As a result a Tropical Cyclone Formation Alert (TCFA) was issued at 131935Z.

During the next 24 hours Clara remained under the upper level trough and further development was not evident based on satellite imagery during 13-14 September. However, near the end of the initial 24 hour period, convection flared up and the disturbance began moving west of the trough so the TCFA was re-issued at 141923Z.

After passing about 210 nm (389 km) south of Guam, slow but steady intensification took place as a 200 mb anticyclone became evident over the disturbance based on streamline analysis on 15 September. The first warning was issued at 150600Z with a straight westerly forecast track based on the 500 mb steering flow induced by a mid-tropospheric ridge north of Clara. Clara continued to track west-northwest and attained tropical storm intensity by 161800Z.

The warnings issued between 15 and 18 September continued to forecast Clara to take a westward track to eventually cross Luzon while, in fact, Clara was moving west-northwest. The forecast reasoning appeared sound based upon synoptic analyses that depicted a large sub-tropical ridge to the north of Taiwan, producing a strong easterly 500 mb steering flow over Clara. However, streamline analysis of the 500 mb chart on the 18th showed a weakness in the ridge west of Taiwan with a second anticyclone over southeast China. As a result of this new analysis, future forecast tracks steered Clara towards the break in the ridge with eventual recurvature west of Taiwan in response to the deepening trough moving into southeast China.

Figure 3-20-1. Typhoon Clara at 0521Z, 19 September 1981, at 115 kt (58 m/sec), 16 hours before crossing the northern tip of Luzon. (NOAA 7 visual imagery)

During this same period Clara had intensified rapidly as she attained her maximum surface winds of 120 kt (60 m/sec) six hours prior to crossing the northern tip of Luzon at 192200Z (Figures 3-20-1 and 3-20-2). Upon entering the South China Sea it became apparent that Clara was not going to recurve because the anticyclone over southeast China had moved northeast displacing the weakness west of Taiwan and preventing recurvature to the north. Clara responded to these changes and remained on a northwest track making landfall 140 nm (259 km) east-northeast of Hong Kong at 212000Z. After making landfall Clara dissipated rapidly as she accelerated inland into hilly terrain.

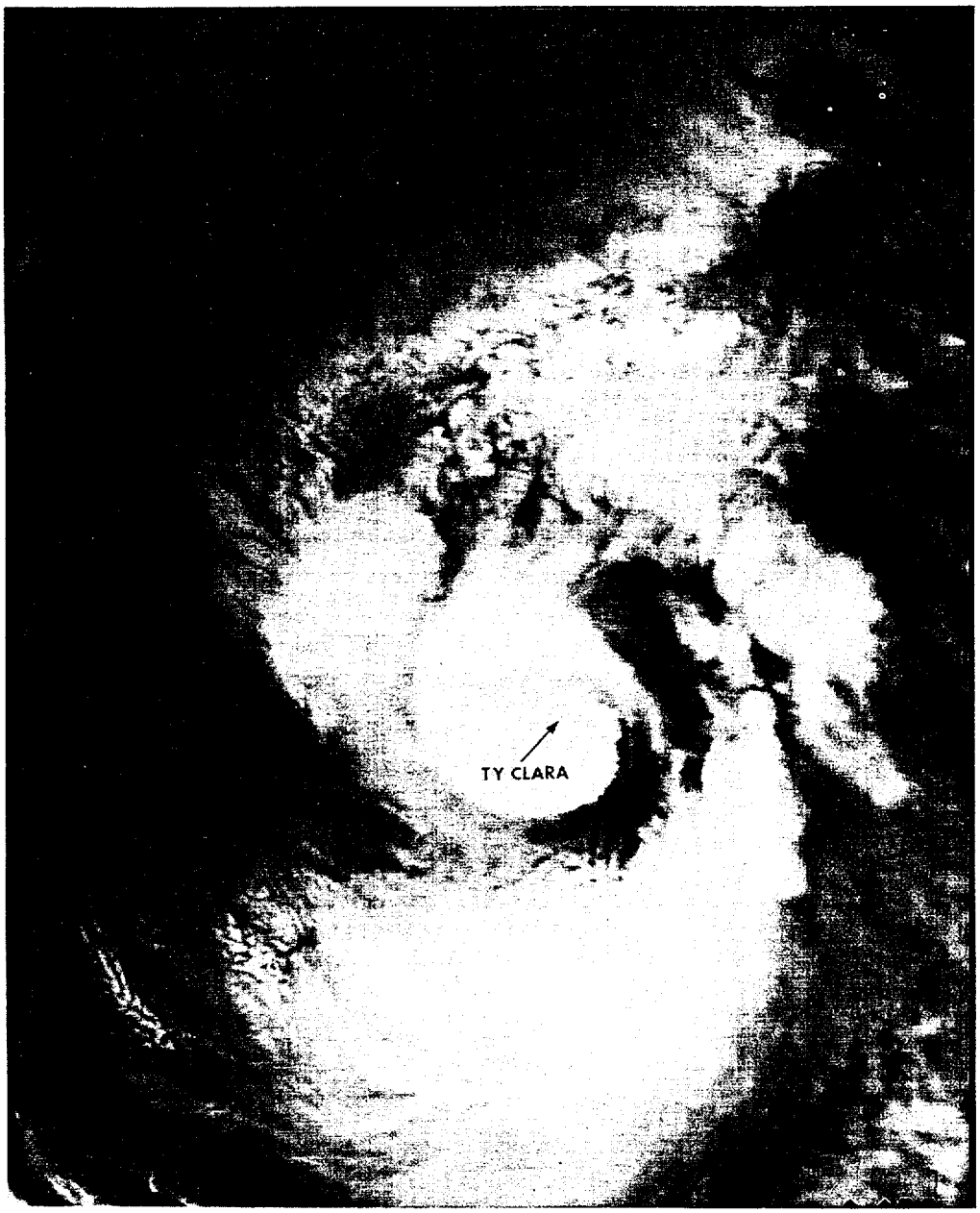

Figure 3-20-2. Typhoon Clara at 1937Z, 20 September 1981, at 85 kt (43 m/sec), about 24 hours after crossing the northern tip of Luzon and approximately 360 nm (667 km) northwest of Manila. (NOAA 7 infrared imagery)

Clara was a devastating storm as she crossed northern Luzon causing widespread damage and loss of life in eight northern Luzon provinces. Torrential rains caused floods which left thousands homeless and caused extensive damage to property and crops. A Philippine Navy destroyer and a cargo ship sank 330 nm (661 km) north of Manila leaving 68 persons missing (Fig. 3-20-3).

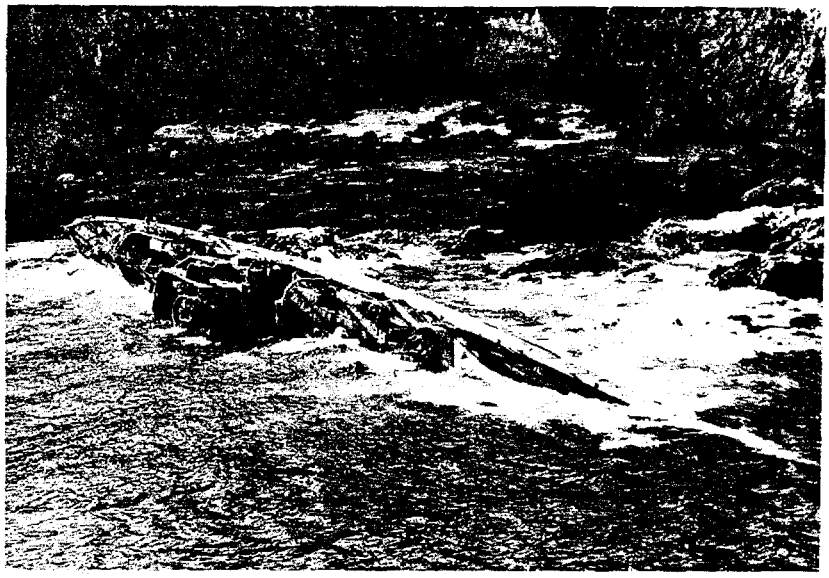

Figure 3-20-3. U. S. Navy personnel are seen on board the Philippine Navy Destroyer Datu Kalantigaw during recovery operations. The destroyer was forced aground on Calagan Island by Typhoon Clara. (U. S. Navy Photo by PH2 P. B. Soutar)