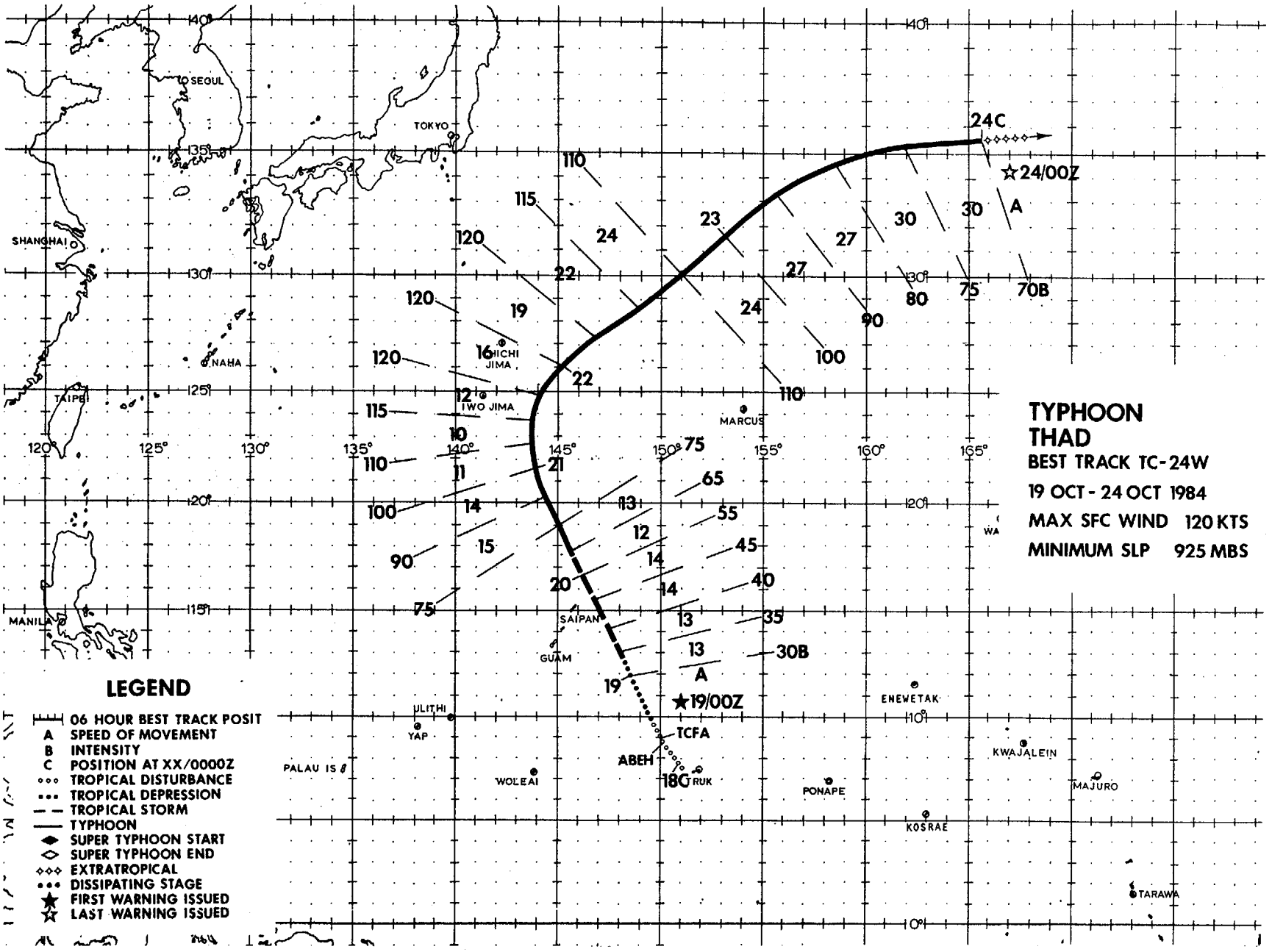

TYPHOON
THAD
BEST TRACK TC-24W
19 OCT - 24 OCT 1984
MAX SFC WIND 120 KTS
MINIMUM SLP 925 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
MANILA
ICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
YAP
ULITHI
WOLEAI
PALAU IS
ABEH
TRUK
PONAPE
ENEWETAK
KWAJALEIN
MAJURO
KOSRAE
TARAWA
24C
☆24/00Z
★19/00Z
TCFA
18C

Typhoon Thad developed southeast of Guam just as Tropical Depression 23W was dissipating several hundred miles to the northwest. Unlike its predecessor, Thad developed under favorable upper-level environment which permitted further intensification. As Thad developed, it tracked steadily to the north-northwest before recurving to the northeast. The typhoon's movement was well forecast except during the initial stages.

Late on 17 October, satellite imagery revealed that an area of strong convection was developing a few hundred miles southeast of the short-lived Tropical Depression 23W. The development of the convection was aided significantly by the presence of a weakening TUTT cell to the north-northeast which provided strong diffluence aloft over the convection.

Synoptic data at 180000Z confirmed what the last aircraft reconnaissance mission into Tropical Depression 23W had observed a few hours earlier; that a broad surface circulation was developing near Truk (WMO 91334). This circulation was underneath the developing convection and on the eastern end of the monsoon trough. Synoptic data south of the trough axis indicated the southwest monsoon was reintensifying with numerous 20 to 30 kt (10 to 15 m/s) west winds being reported.

Over the next several hours, the convection rapidly consolidated. In addition, satellite imagery and synoptic data showed an anticyclone was developing aloft providing good outflow to all quadrants. As a result, a TCFA was issued at 180630Z.

During the next 18 hours satellite imagery indicated the disturbance was moving northwest towards Guam. With Dvorak intensity analysis indicating 30 kt (15 m/s) surface winds present and 45 kt (23 m/s) surface winds forecast in 24 hours, the first warning on Thad was issued at 190000Z.

The initial warning forecast Thad to continue to move to the northwest, pass just south of Guam and gradually turn towards the west-northwest in the 48 to 72 hour period. This forecast was in good agreement with all JTWC forecast aids. Also the NOGAPS analysis and prog series indicated the subtropical ridge had returned closer to its climatological position north of Guam which further convinced JTWC that this track was reasonable.

As it turned out, this forecast would be wrong for two reasons. First, JTWC did not accurately know where the low-level center was located. Second, and more importantly, the subtropical ridge was not nearly as strong nor as far west as indicated in the analysis and prog series. Between 190000Z and 190600Z, as Thad supposedly neared Guam (WMO 91212), the winds on the island should have veered to the east or southeast. Instead, they remained from the northeast. But analysis of satellite imagery indicated that Thad was heading directly towards Guam. Clearly something was amiss! JTWC's efforts to locate the surface center were further hampered by maintenance problems which prevented reconnaissance aircraft from penetrating the disturbances center.

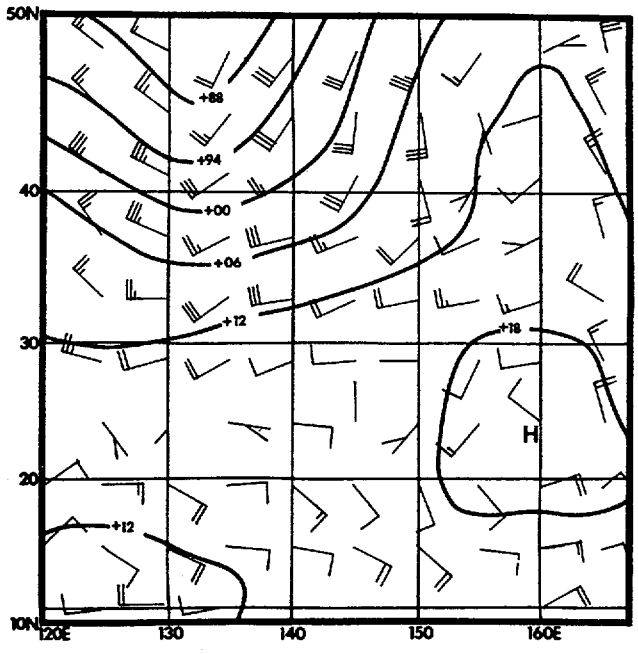
At 190728Z the first aircraft reconnaissance flight into the center of the disturbance was finally made and quickly settled the discrepency. It located Thad almost 180 nm (333 km) east of Guam with an MSLP of 990 mb. As a result, the 190600Z warning position relocated Thad some 120 nm (222 km) to the northeast! This meant that the storm would now safely clear Guam.

At 200000Z, as a now well-developed Thad continued to move to the north-northwest at 13 to 14 kt (24 to 26 km/hr), it became obvious the storm was not going to turn towards the west. Clearly the subtropical ridge was not as well-established nor as far west as the NOGAPS progs had earlier indicated (Figure 3-24-1). JTWC now forecast continued north-northwest movement for the next 24 hours with recurvature to the northeast between 210000Z and 220000Z due to the approach of a mid-latitude trough. As it turned out, this forecast track was excellent, with the speeds of movement after recurvature being only slightly faster than anticipated.

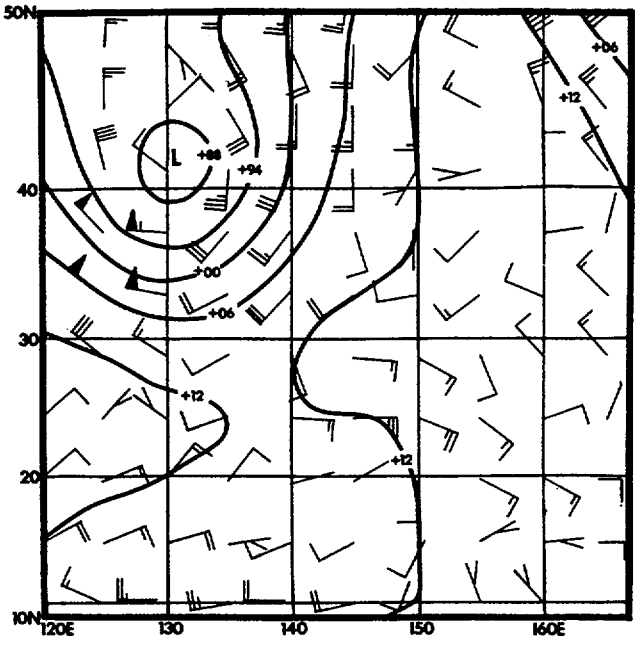
Thad intensified steadily from the time JTWC went into warning status at 190000Z, until it reached its peak intensity of 120 kt (62 m/s) at 211800Z (Figure 3-24-2). By this time Thad had begun to recurve and link-up with a mid-latitude trough. After maintaining the 120 kt (62 m/s) intensity for approximately 12 hours, Thad began a slow weakening trend which continued until the storm went extratropical. During this period, Thad accelerated from 16 to 30 kt (30 to 56 km/hr) as it became embedded in the westerlies. As would be expected with the storms that accelerate after recurvature, the strongest surface winds were consistently observed in the southeast semicircle.

As Thad accelerated to the northeast, strong upper-level westerlies began to displace the upper-level circulation and convection from the surface center. This was confirmed by the 222310Z aircraft reconnaissance fix which found the 700 mb center 28 nm (52 km) east-northeast of the surface center. All significant convection was now located north of the surface center.

On the 23rd, Thad lost most of its convection with an exposed low-level circulation center visible on satellite imagery. The final warning on this system was issued by JTWC at 240000Z. Future warnings on the extratropical low were contained in NAVOCEANCOMCEN GUAM extratropical wind warning bulletins (WWPN PGFW).

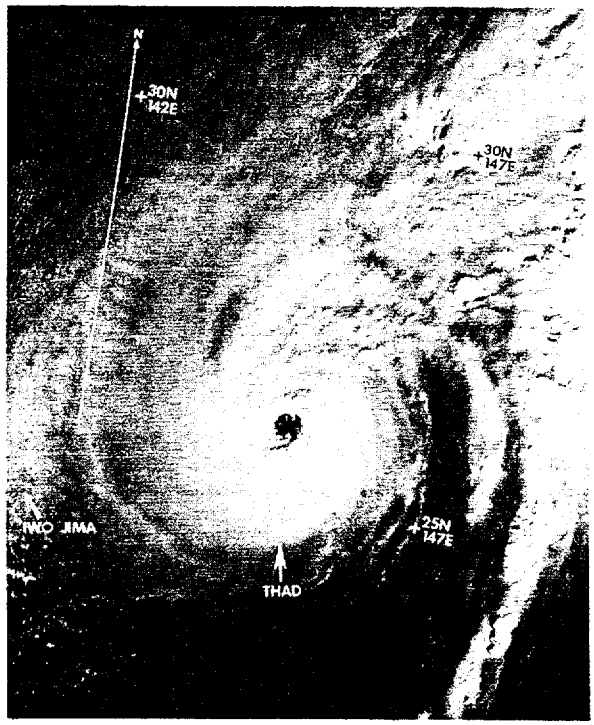


NOGAPS 700 mb 48-hour prog VT: 201200Z October

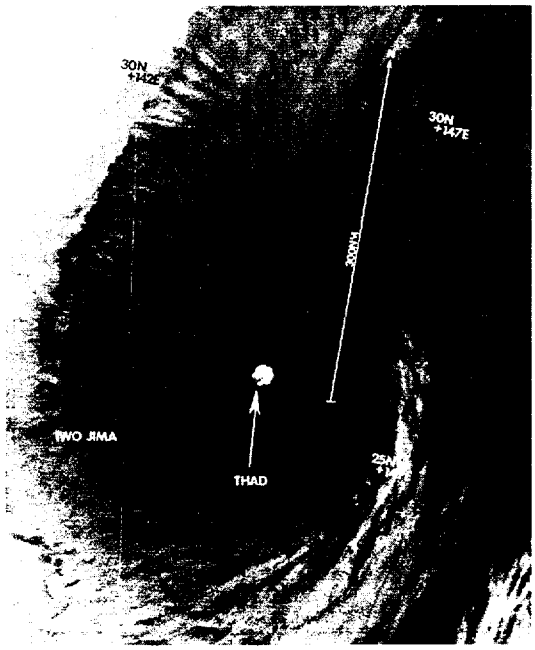


201200Z October 700 mb NOGAPS analysis

Figure 3-24-1. Comparison of the 48 hour 700 mb NOGAPS prog available to the TDO when the first warning was issued and the verifying analysis. The western extension of the subtropical ridge was forecast to extend west along 26N to near 130E. Instead, due to the effects of a digging mid-latitude trough moving into the Sea of Japan, the ridge slid east which allowed Thad to rapidly recurve to the northeast.



(a)



(b)

(c)

Figure 3-24-2. Three views of Typhoon Thad at maximum intensity: (a) Visual imagery (b) Infrared imagery and (c) Enhanced Infrared imagery - Dvorak Tropical Cyclone Curve. (2200Z27 October DMSP imagery).