TYPHOON MORT (31W)

I. HIGHLIGHTS

Typhoon Mort (31W) was the last tropical cyclone to form west of the international dateline (IDL) for the western North Pacific season. It tracked over the open waters of the Philippine Sea but vertical shear weakened it to a tropical depression by the time it made landfall over the island of Luzon.

II. TRACK AND INTENSITY

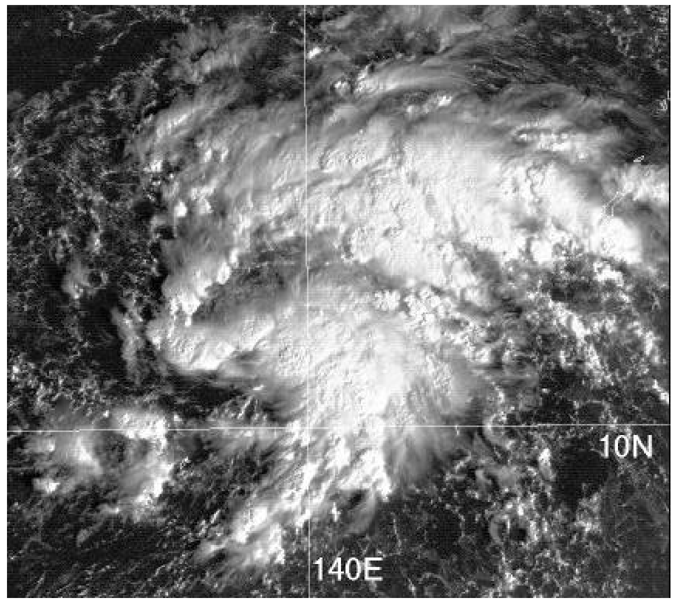


Figure 3-31-1 Visible satellite imagery of TD 31W; valid time is 102225Z November

The disturbance that would become Typhoon Mort (31W) was first noted on the Significant Tropical Weather Advisory (ABPW) as an area of convection south of Guam on 08 November at 0600Z. The convection was located within a weak monsoon trough that stretched from the southern Philippine Sea to just south of Guam. An area of divergence overlaid the disturbance, which was located equatorward of mid-level ridging. By 09 November, the disturbance had become better organized with satellite imagery indicating a developing banding feature. Animation of satellite imagery also indicated some cyclonic motion within the convection. As development continued to progress, a Tropical Cyclone Formation Alert (TCFA) was issued at 1900Z on 09 November. The disturbance was upgraded to tropical depression (TD) status with a 101800Z warning. Figure 3-31-1 shows the TD just four and a half hours after this warning, and is an example of how a typical 25 - 30 kt (13 - 15 m/sec) system appears in visible satellite imagery.

The system tracked in a westerly direction at speeds of 7 to 9 kt (13 to 17-km/hr) due to easterly steering flow in the lower to mid-levels south of the subtropical ridge. This motion would continue for the remainder of the tropical cyclone's lifecycle. Figure 3-31-2 indicates the progression in development as seen by visible satellite imagery during a 66- hour period beginning at 0425Z on 11 November. The image at top left is Mort near the time it was upgraded to a tropical storm. Eighteen hours later (top right image), Mort is a strong tropical storm with winds estimated to be 55 kt (28m/sec). The system has a cold dense overcast over the center, with a good banding feature. Twenty-four hours later (bottom left image), the overall convective cloud structure is becoming disorganized, probably due to increased vertical wind shear relative to the moving system. At this time, Mort was at its peak intensity of 65 kt (33 m/sec), and would develop no further. Between 0600Z and 2100Z on the 13th, vertical wind shear caused the low-level circulation to separate from the deep convection. The convection was sheared off to the east-southeast of the low-level circulation, which continued to track westward toward the Philippine Islands. The low-level circulation, and the associated convection can be seen in the image at bottom right. Due to the presence of an exposed low level circulation, the system was downgraded to tropical storm intensity (35 kt/ 18 m/sec) on the 14th at 0000Z. However, vertical wind shear lessened over the next day and a convective banding feature soon re-developed. This was only short-lived as vertical wind shear once again increased late on the 15th, eventually causing convection to shear to the south of the center. Mort proceeded to weaken to TD strength by 0600Z on the 16th and shortly thereafter made landfall on the island of Luzon. The system subsequently dissipated over the mountains within the island's interior.

III. DISCUSION

Unexpected Vertical Wind Shear

The shearing of Mort's convection on the 14th was unexpected and surprised JTWC forecasters. Strong vertical wind shear was not indicated by NOGAPS prognostic charts. Although animated satellite imagery indicated the system's development had arrested on the 13th, it didn't appear to indicate the presence of strong vertical wind shear. Some calculations were made using upper-level water vapor wind derived data (supplied by the University of Wisconsin) and the storm's motion. The upper-level wind data was used to find an average wind vector across the system center, and the storm's motion vector was used as a proxy for the lower-level wind vector. The difference between the two vectors gave the shear across the system center. Values were calculated for the 13th and 14th at 0000Z. The shear vector value more than doubled over the 24-hour period, changing from a west-southwest direction at 12 kt (22 km/hr), to west-southwest at 26 kt (48 km/hr). In a statistical study, Zehr (1992) found a shear value of 20 kt generally inhibits tropical cyclone development. This illustrates one of the ways in which water vapor wind derived wind data can help forecasters in evaluating tropical cyclones.

IV. IMPACT:

No reports of damage or injuries associated with Typhoon Mort (31W) were received by JTWC.

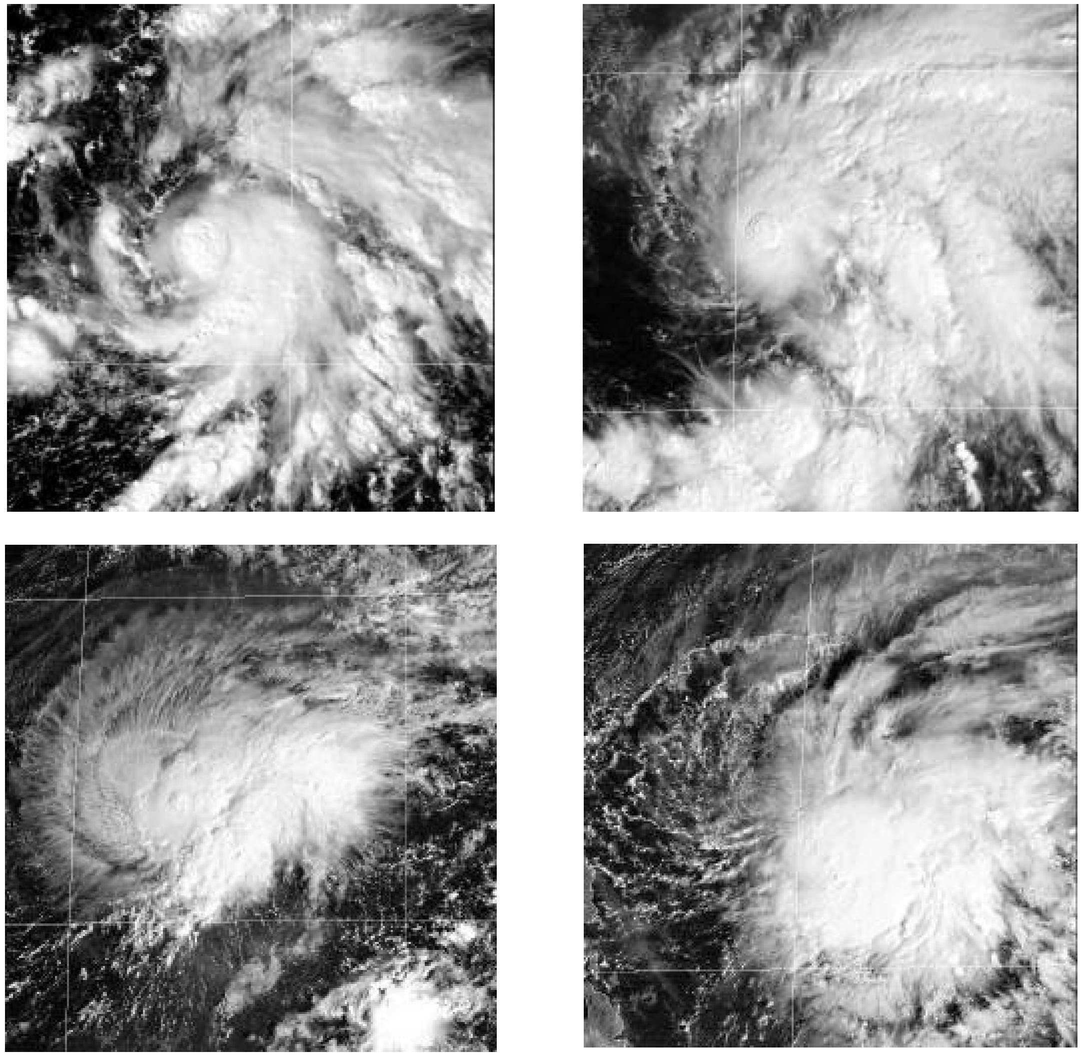
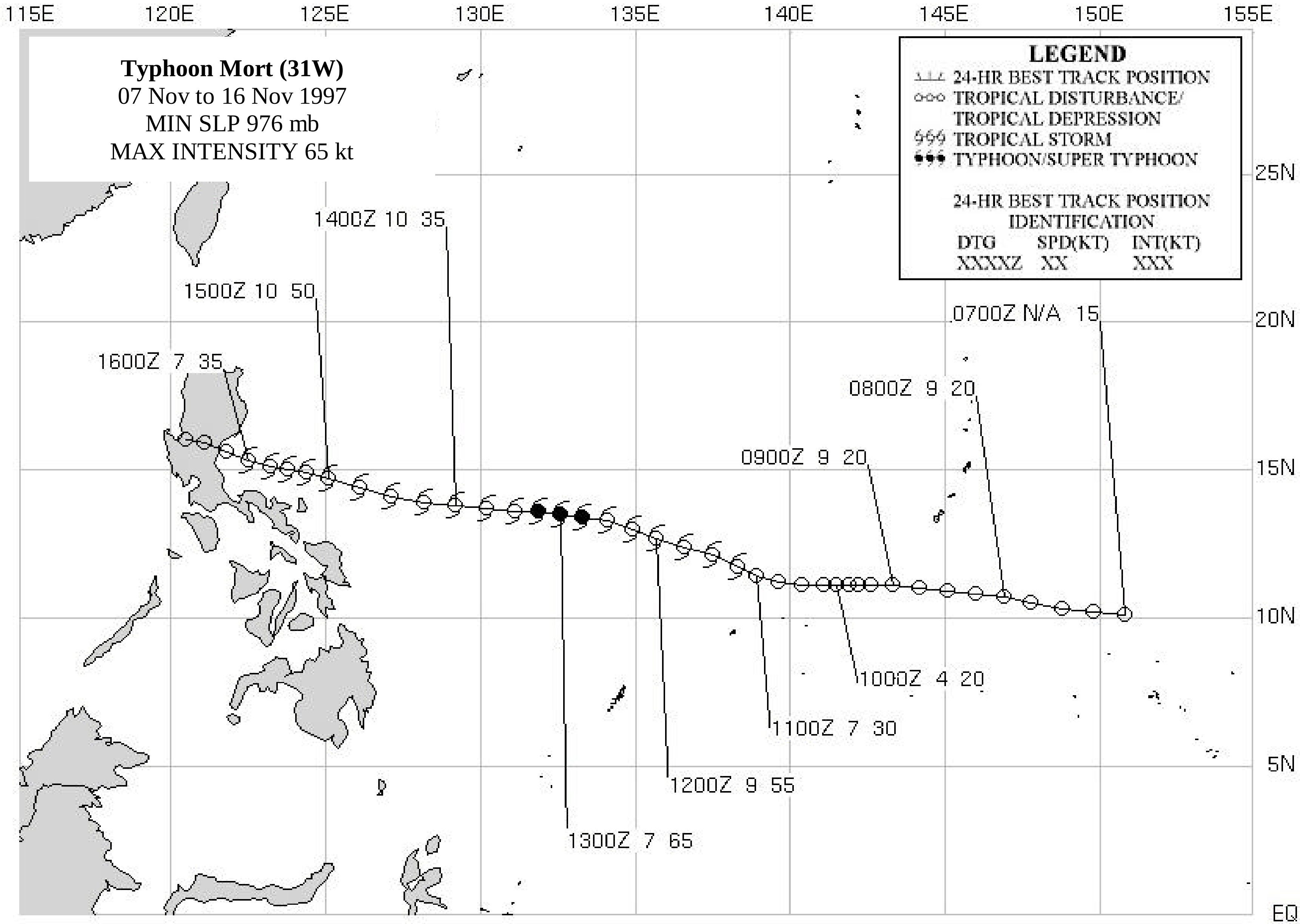


Figure 3-31-2 The different developmental stages of Typhoon Mort as seen by visible satellite imagery over a 66-hour period. Tropical cyclone best track intensities and valid times of imagery are: top left, 35 kt (18 m/sec) at 110425Z; top right, 55 kt (28 m/sec) at 112225Z; bottom left, 65 kt (33 m/sec) at 122225Z; bottom right, 35 kt (18 m/sec) at 132225Z. Note the exposed low level circulation center northwest of the convection at 132225Z.


Typhoon Mort (31W)
07 Nov to 16 Nov 1997
MIN SLP 976 mb
MAX INTENSITY 65 kt
LEGEND
24-HR BEST TRACK POSITION
TROPICAL DISTURBANCE/
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON/SUPER TYPHOON
24-HR BEST TRACK POSITION
IDENTIFICATION
DTG SPD(KT) INT(KT)
XXXXZ XX XXX
115E
120E
125E
130E
135E
140E
145E
150E
155E
25N
20N
15N
10N
5N
EQ
1400Z 10 35
1500Z 10 50
1600Z 7 35
0700Z N/A 15
0800Z 9 20
0900Z 9 20
1000Z 4 20
1100Z 7 30
1200Z 9 55
1300Z 7 65