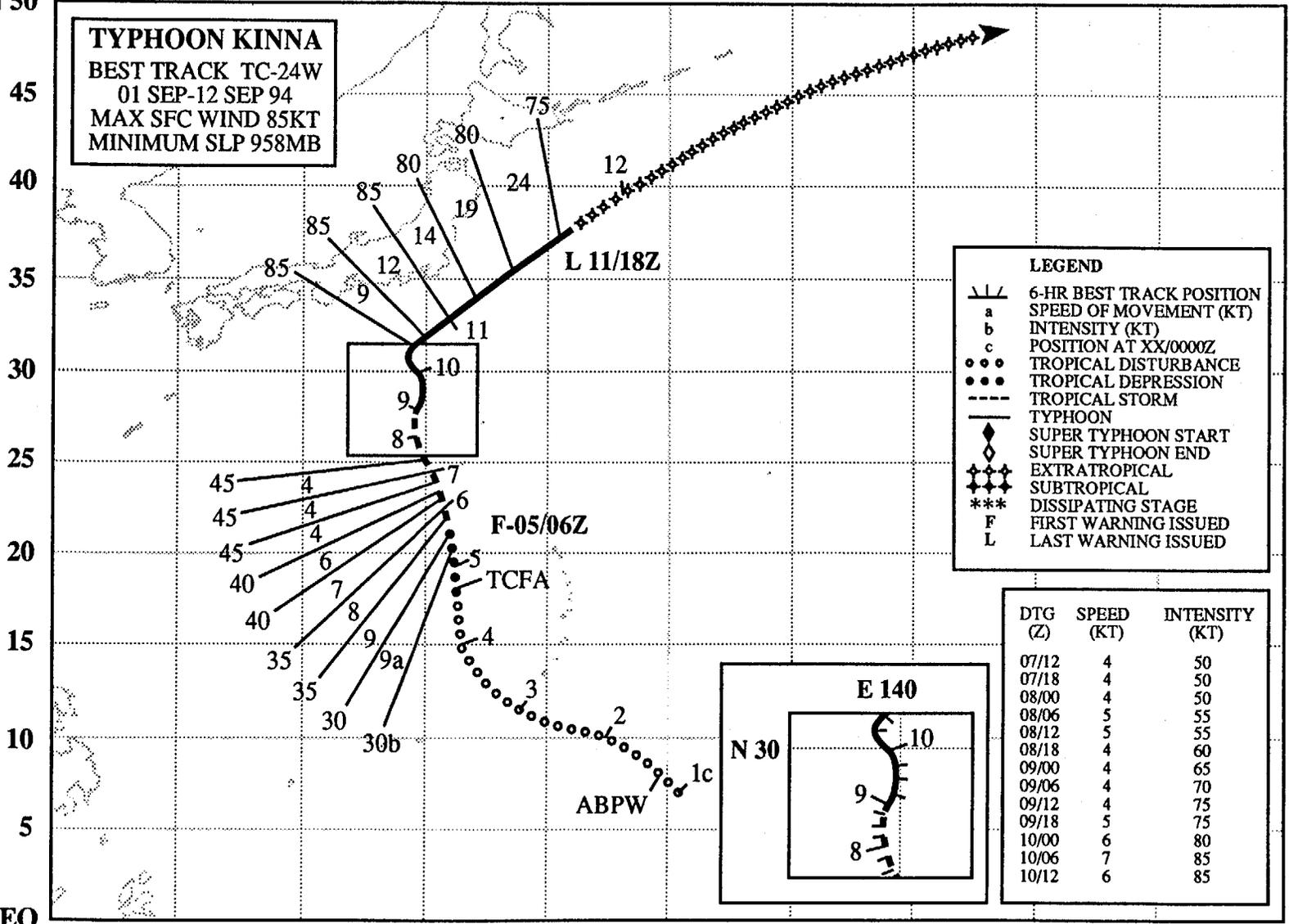


E 125 130 135 140 145 150 155 160 165 170 175 E

N 50

TYPHOON KINNA
BEST TRACK TC-24W
01 SEP-12 SEP 94
MAX SFC WIND 85KT
MINIMUM SLP 958MB

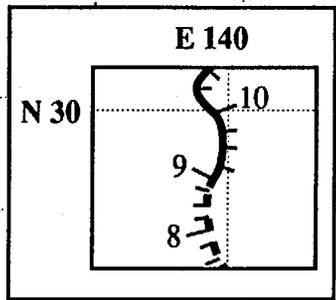
135



LEGEND

- 6-HR BEST TRACK POSITION
- a SPEED OF MOVEMENT (KT)
- b INTENSITY (KT)
- c POSITION AT XX/0000Z
- o o o TROPICAL DISTURBANCE
- • • TROPICAL DEPRESSION
- - - TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◆◆◆ EXTRATROPICAL
- ◆◆◆ SUBTROPICAL
- *** DISSIPATING STAGE
- F FIRST WARNING ISSUED
- L LAST WARNING ISSUED

DTG (Z)	SPEED (KT)	INTENSITY (KT)
07/12	4	50
07/18	4	50
08/00	4	50
08/06	5	55
08/12	5	55
08/18	4	60
09/00	4	65
09/06	4	70
09/12	4	75
09/18	5	75
10/00	6	80
10/06	7	85
10/12	6	85



EQ

TYPHOON KINNA (24W)

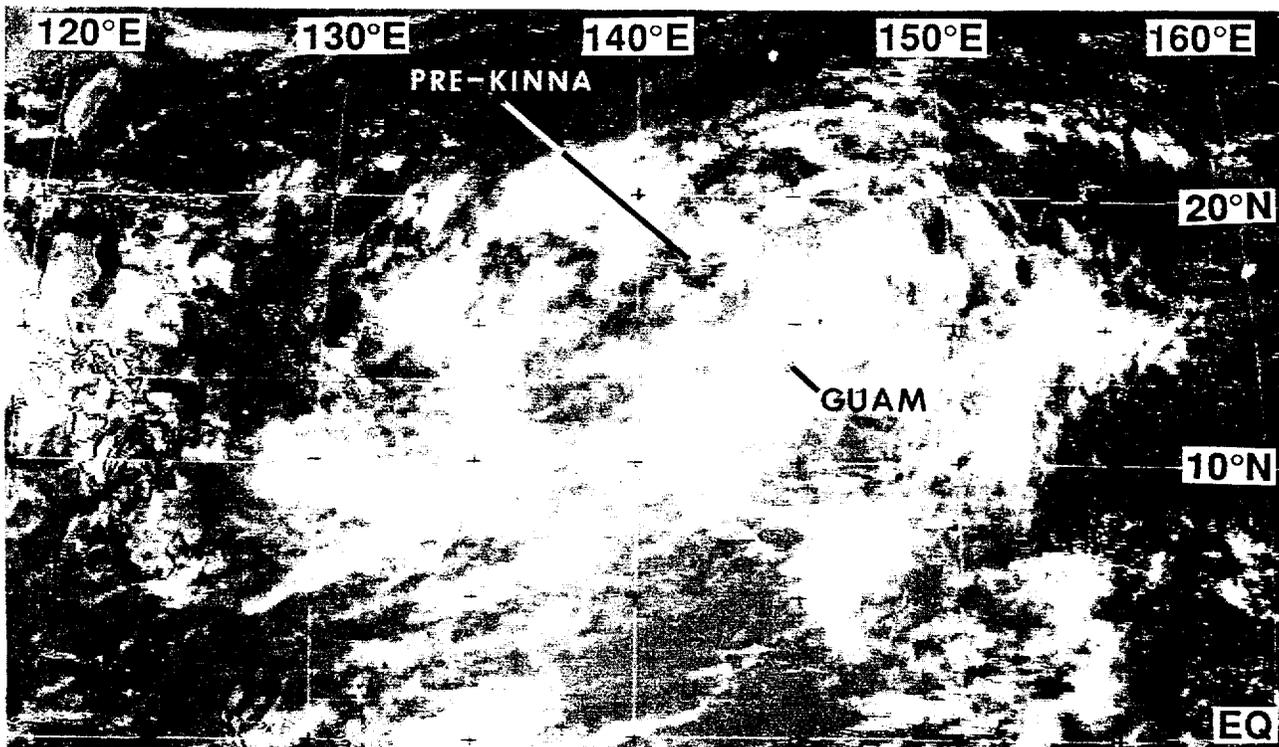


Figure 3-24-1 The pre-Kinna tropical disturbance is embedded within the cloudiness associated with a large monsoon depression (040231Z September visible GMS imagery).

I. HIGHLIGHTS

The tropical disturbance that became Kinna emerged from the northeastern quadrant of a monsoon depression. It moved on a north-oriented track. After peaking at 85 kt (44 m/sec), Kinna recurved and accelerated to more than 40 kt (74 km/hr). Kinna was a small tropical cyclone.

II. TRACK AND INTENSITY

At 010600Z September, the disturbance, that would eventually develop into Typhoon Kinna, was first mentioned on the Significant Tropical Weather Advisory when a small area of new convection appeared in the eastern Caroline Islands within the monsoon trough. For the next three-and-one-half days, the disturbance persisted as the monsoon trough moved northward, and a large monsoon depression formed near the Mariana Islands. The pre-Kinna disturbance became part of this monsoon depression on 04 September (Figure 3-24-1), and later moved north and detached from the monsoon depression (Figure 3-24-2). A Tropical Cyclone Formation alert was issued at 042000Z as an area of organized convection appeared to be emerging from the northeastern quadrant of the monsoon depression. When this convection became better organized, the JTWC issued the first warning on Tropical Depression 24W at 050600Z. Twelve hours later, the depression was upgraded to Tropical Storm Kinna. In addition to its intensification on 05 September, Kinna began to slow in forward speed as it entered a region of light southerly steering flow. Kinna remained under the influence of this weak northward steering until it moved poleward of the mid-level sub-tropical ridge on 10 September. At 070000Z, Tropical Storm Kinna passed 30 nm (56 km) west of Iwo Jima (WMO 47981) where a gust of 45 kt (23 m/sec) was

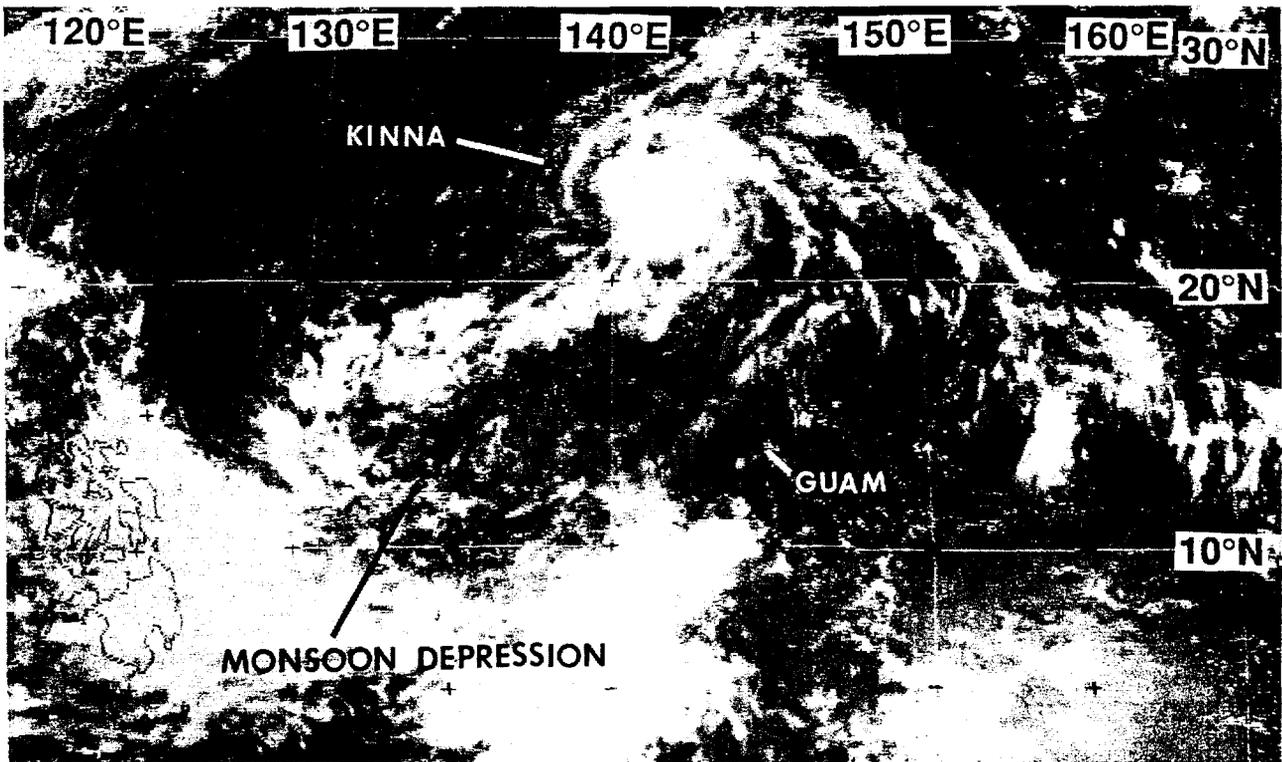


Figure 3-24-2 Kinna has moved north and become detached from the monsoon depression within which it had earlier been embedded (060031Z September visible GMS imagery).

recorded. Kinna was upgraded to typhoon intensity at 090000Z, and at 100600Z, just prior to recurvature, Typhoon Kinna reached its peak intensity of 85 kt (44 m/sec) (Fig. 3-24-3). Recurvature took the typhoon on a track that passed about 200 nm (370 km) east of Yokosuka, Japan. At 101700Z, Hachijojima (WMO 47678) recorded a peak gust of 30.8 m/sec (60 kt) as Typhoon Kinna was about 90 nm (167 km) to the south. Following recurvature, Kinna began to accelerate rapidly, eventually reaching speeds in excess of 40 kt (75 km/hr). The rapid acceleration kept Kinna's intensity high, despite its loss of symmetrical central deep convection. By the evening of 12 September, Kinna was absorbed into the cloud band of a rapidly moving front and acquired the appearance of a wave on the front.

III. DISCUSSION

The track forecasts for Kinna were challenging, as there were two plausible scenarios: one which favored northward motion, and another which favored west-northwestward motion. Both the statistical and the dynamic guidance oscillated between these scenarios during the period 06 to 10 September. Except for small, relatively short-lived meanders, the small-sized Kinna kept moving to the north, eventually passing through the mid-tropospheric sub-tropical ridge. Through-the-ridge motion (Sandgathe 1987) is typically expected of much larger tropical cyclones whose storm-induced changes to their environment allow them to modify and pass through a preexisting sub-tropical ridge (Elsberry and Abbey 1991). Overall, the track forecast errors for Typhoon Kinna were about 15 percent better than the long-term average at 24 and 48 hours, and close to average at 72 hours. Intensity forecast errors were less than 10 kt (5 m/s) at all forecast periods.

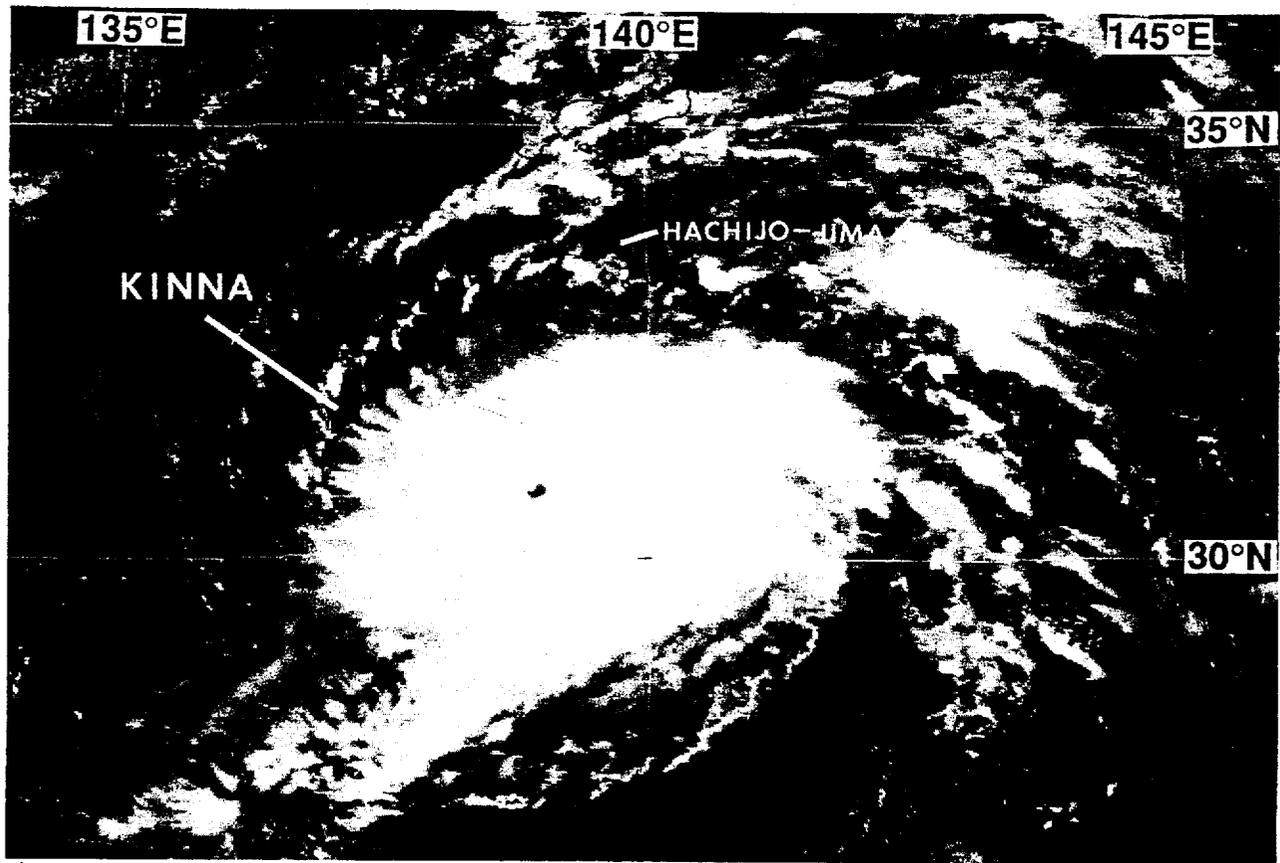


Figure 3-24-3 Kinna at its peak intensity of 85 kt (44 m/sec) (100531Z September visible GMS imagery).

IV. IMPACT

Kinna spent its entire life over open water. It turned away from the densely populated Kanto Plain area on the Japanese main island of Honshu, and produced potentially destructive winds only at Hachijo-jima, a small island about 150 nm (280 km) south of Tokyo.