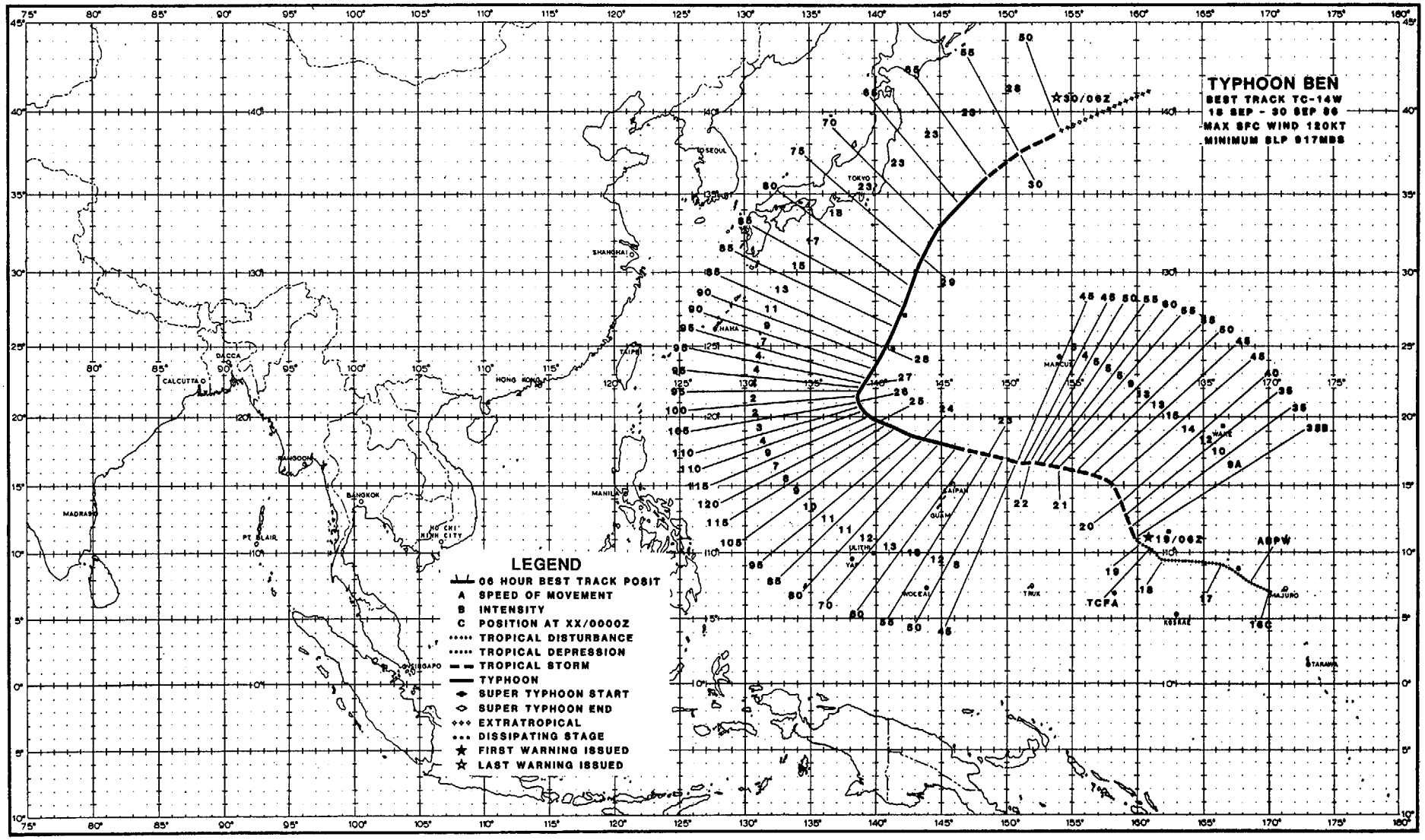

NOCC GUAM 3142/20 (NEW 5 - 80)

Typhoon Ben was the second of two tropical cyclones that reached warning status in the western North Pacific in September. Ben resulted in the loss at sea of thirteen fishermen from Saipan, who had sought shelter, as it passed by the island of Pagan in the northern Marianas. (The tragedy of the lost fishermen at Pagan was that, although the advanced warning was accurate, the captain apparently decided to leave Saipan for the northern islands anyway.) It was a long-lived typhoon with 46 warnings issued between the 19th and 30th of September.

Typhoon Ben developed from an area of enhanced convection on the 16th of September 165 nm (306 km) southeast of Kwajalein Atoll in the Marshall Islands. It was mentioned for the first time on the Significant Tropical Weather Advisory (ABPW PGTW) later that day. A Tropical Cyclone Forecast Alert was issued two days later, at 181830Z, after satellite imagery (Figures 3-14-1 and 3-14-2) indicated a rapid increase in the amount and organization of convection. The Dvorak intensity estimate was 35 kt (18 m/sec).

The first warning on Ben, as Tropical Depression 14W, was issued on the 19th, valid at 0000Z. Ben's initial warning position, which was based on satellite data, was 180 nm (333 km) north of the island of Pohnpei. Later, aircraft reconnaissance data at 190730Z resulted in a 160 nm (296 km) relocation of Ben to the northeast and upgrade from tropical depression to tropical storm intensity on the second warning.

Ben's initial forecast track was west-northwestward with a gradual intensity increase. The early forecast tracks were in close agreement with dynamical and statistical guidance. This made Ben an immediate threat to the island of Guam. However, Ben did not track as forecast, but instead moved north-northwestward until the 20th at 0600Z; after which it began a west-northwesterly track towards the northern Marianas.

Ben was forecast to reach typhoon intensity between 200600Z and 210600Z September. However, its forward movement slowed and its intensity decreased to 45 kt (23 m/sec) of maximum sustained surface winds. This decrease was due to increased vertical shear from the north-northeast. At 212124Z, the deep central convection became displaced southwestward and exposed the low-level circulation (Figure 3-14-3).

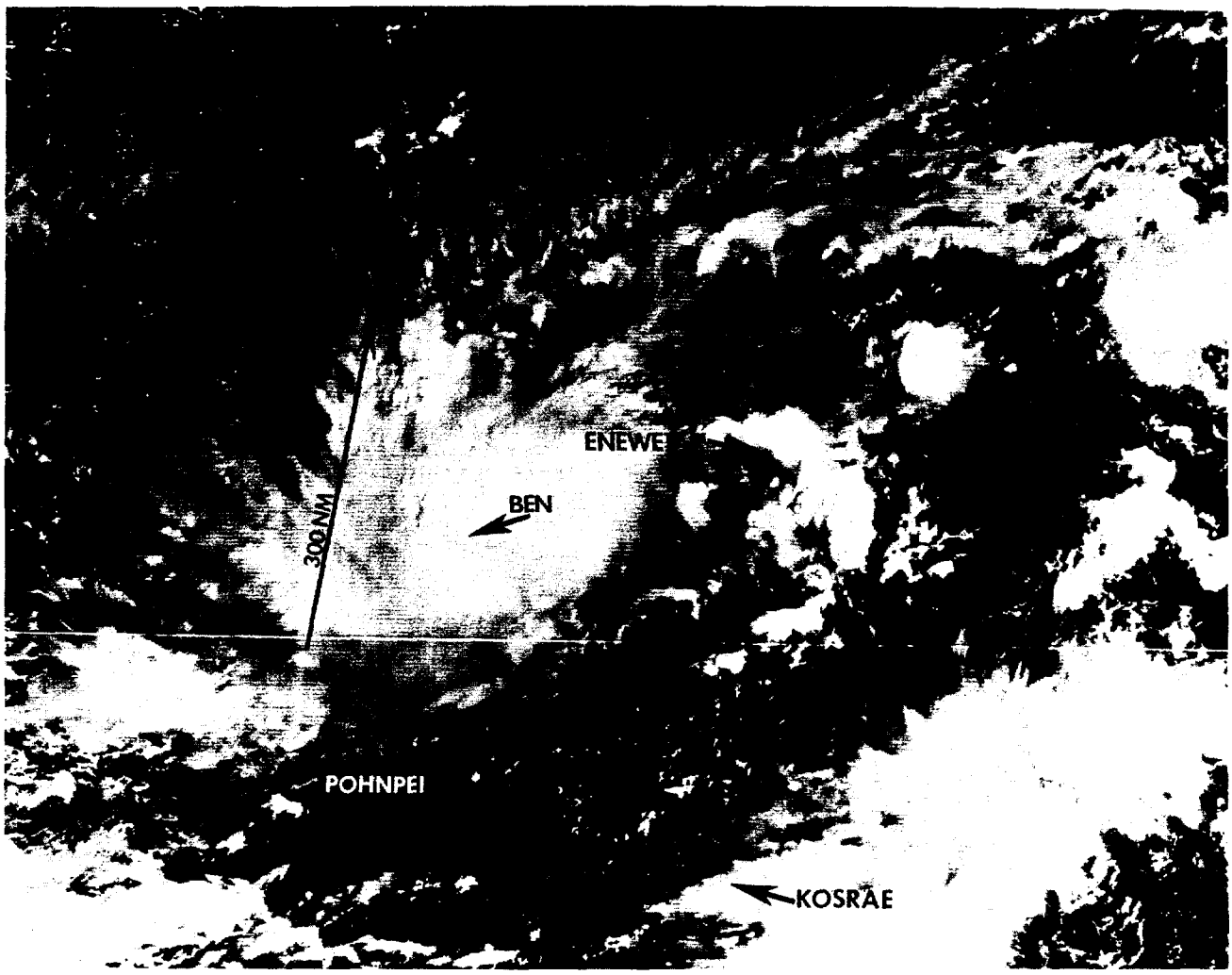

Figure 3-14-1. Typhoon Ben as a tropical disturbance (182255Z September DMSP visual imagery).

The central dense overcast had reestablished itself by 221600Z. By the 23th, Ben had increased its forward speed toward the west-northwest and intensified. It reached typhoon intensity at 230900Z just five hours before passing 20 nm (37 km) south of Pagan Island (located 270 nm (500 km) north of Guam). Ben continued to intensify through 250000Z, when its maximum sustained winds peaked at 120 kt (62 m/sec). At that time, its minimum sea-level pressure (MSLP) was 917 mb. Ben had a circular eye 40 nm (74 km) in diameter (Figure 3-14-4).

Forecasts through 250000Z indicated a gradual turn from northwestward to northward, however, Ben slowed to 2 kt (4 km/hr) by early on the 26th and drifted slowly northward into a region of increasing upper-level southwesterlies. Once Ben moved to the north of the mid-level subtropical ridge axis, the forecasts, based on a combination of dynamic and statistical aids for the track, were more accurate. Acceleration, after recurvature, was handled well by the empirical Typhoon Acceleration Prediction Technique (Weir, 1980).

As interaction with the southwesterlies aloft increased, Ben's central cloudiness became elongated north-northeast/south-southwest. At 261451Z, aircraft reconnaissance indicated that the eyewall had become ragged and open to the southwest. The MSLP had risen to 946 mb.

By 280000Z, Ben's forward speed had increased to 13 kt (24 km/hr) and its intensity had gradually decreased to 85 kt (44 m/sec). The central convection sheared away and was displaced to the northeast as the intensity decreased to 50 kt (26 m/sec). By the time the final warning was issued at 300600Z, transition to an extratropical system was complete.

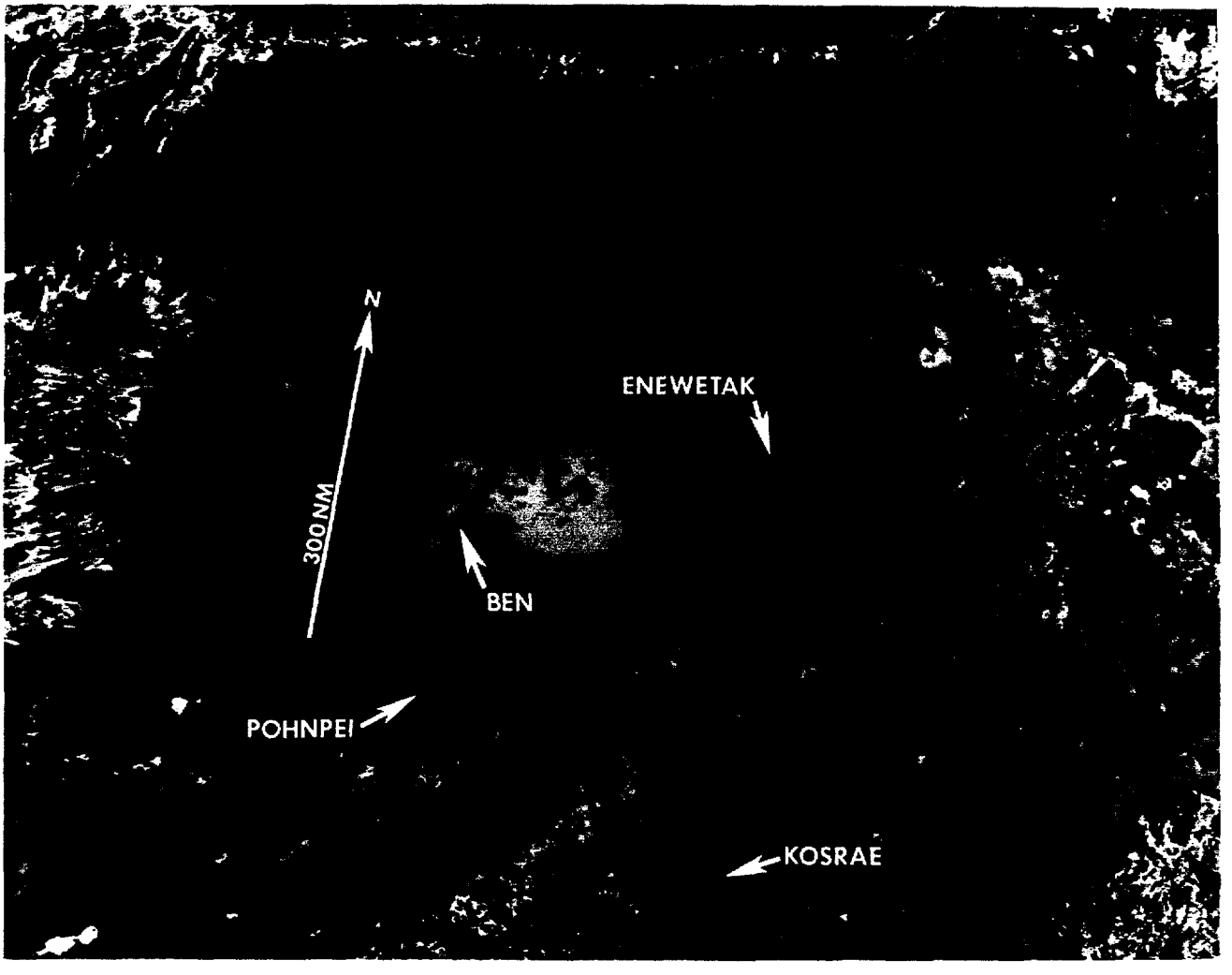

Figure 3-14-2. Enhanced infrared imagery of Ben assisted in locating the areas of vigorous convection (182255Z September DMSP infrared imagery).

Figure 3-14-3. Strong northerly upper-level flow displaces convection to the south of Ben's low-level circulation (212124Z September NOAA visual imagery).

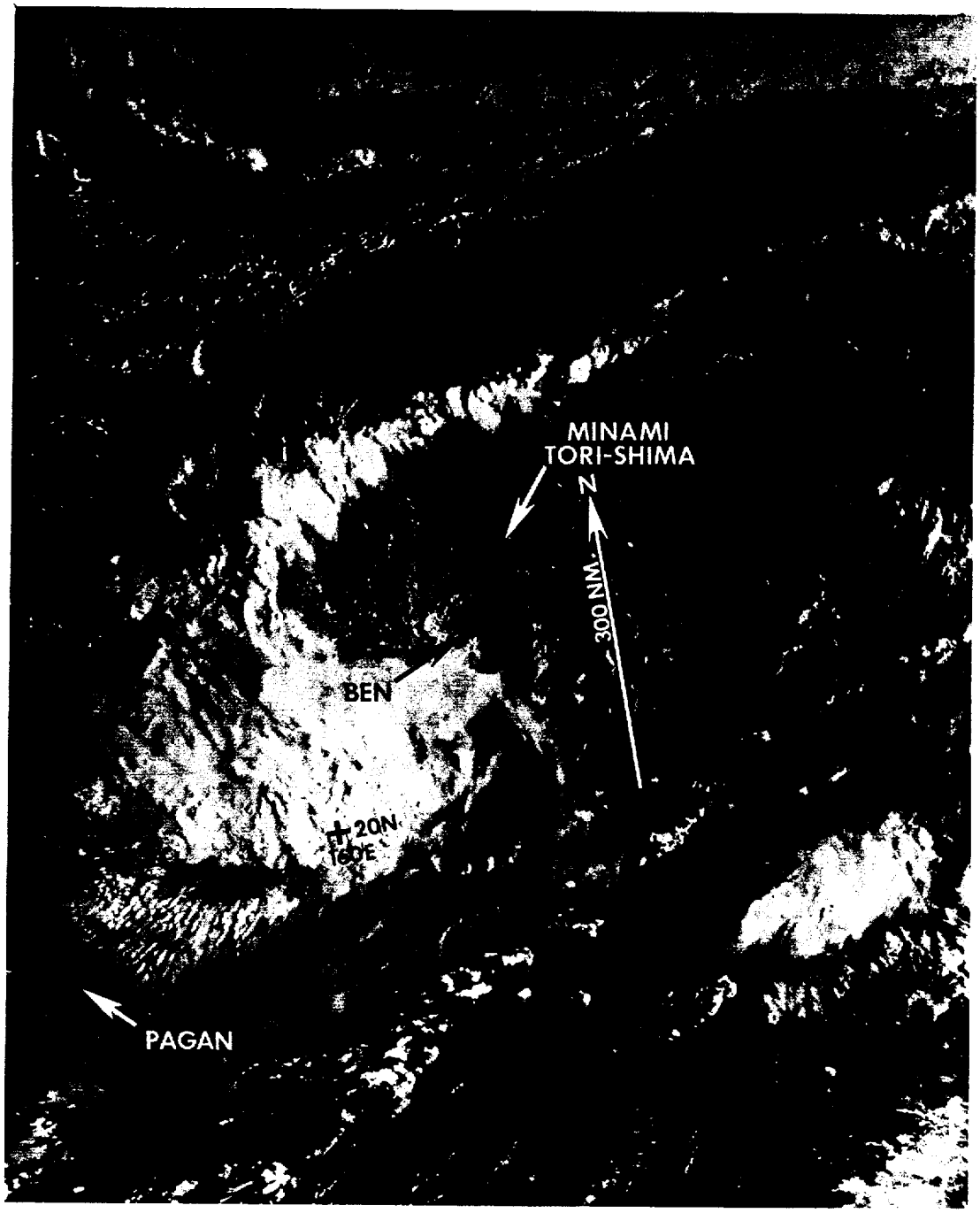

Figure 3-14-4. Two and one-half hours before Ben reached its peak intensity of 120 kt (62 m/sec). A circular eye 40 nm (74 km) in diameter is visible (242134Z September DMSP visual imagery).