

TYPHOON JOE (22W)

Typhoon Joe was the third of four tropical cyclones to reach warning status in the month of November. As a tropical disturbance, Joe became evident on satellite imagery on the 12th. JTWC mentioned it for the first time on the Significant Tropical Weather Advisory (ABPW PGIW) when it appeared as an area of enhanced convective activity 425 nm (787 km) south of Guam at 120600Z. The amount of convection and organization (Figure 3-22-1) increased very slowly as it moved west-northwestward. Synoptic data during this period indicated a weak low-level cyclonic circulation. Upper-level data indicated divergent flow aloft. The central convection began to consolidate and a Tropical Cyclone Formation Alert (TCFA) was issued at 172251Z. Satellite intensity analysis shortly after the TCFA issuance indicated surface winds of 35 kt (18 m/sec).

The initial aircraft vortex fix mission at 0213Z on the 18th located a 30 kt (15 m/sec) low-level circulation. The extrapolated minimum sea-level pressure (MSLP) was 1005 mb, which normally supports less than 30 kt (15 m/sec) winds (Atkinson and Holliday, 1978). By 181800Z, however, satellite imagery indicated increased development and the first warning was issued on Tropical Depression 22W. A circular eye 15 nm (28 km) in diameter was first observed by aircraft reconnaissance at 190046Z. Some elongation north-northeast/south-southwest was apparent on satellite imagery by 191800Z as Joe began to interact with a mid-latitude trough passing to the north. Three hours later, aircraft reconnaissance reported that Joe's eye had become elliptical and the MSLP had decreased to 976 mb. Typhoon intensity was reached between 191800Z and 200000Z as Joe began to

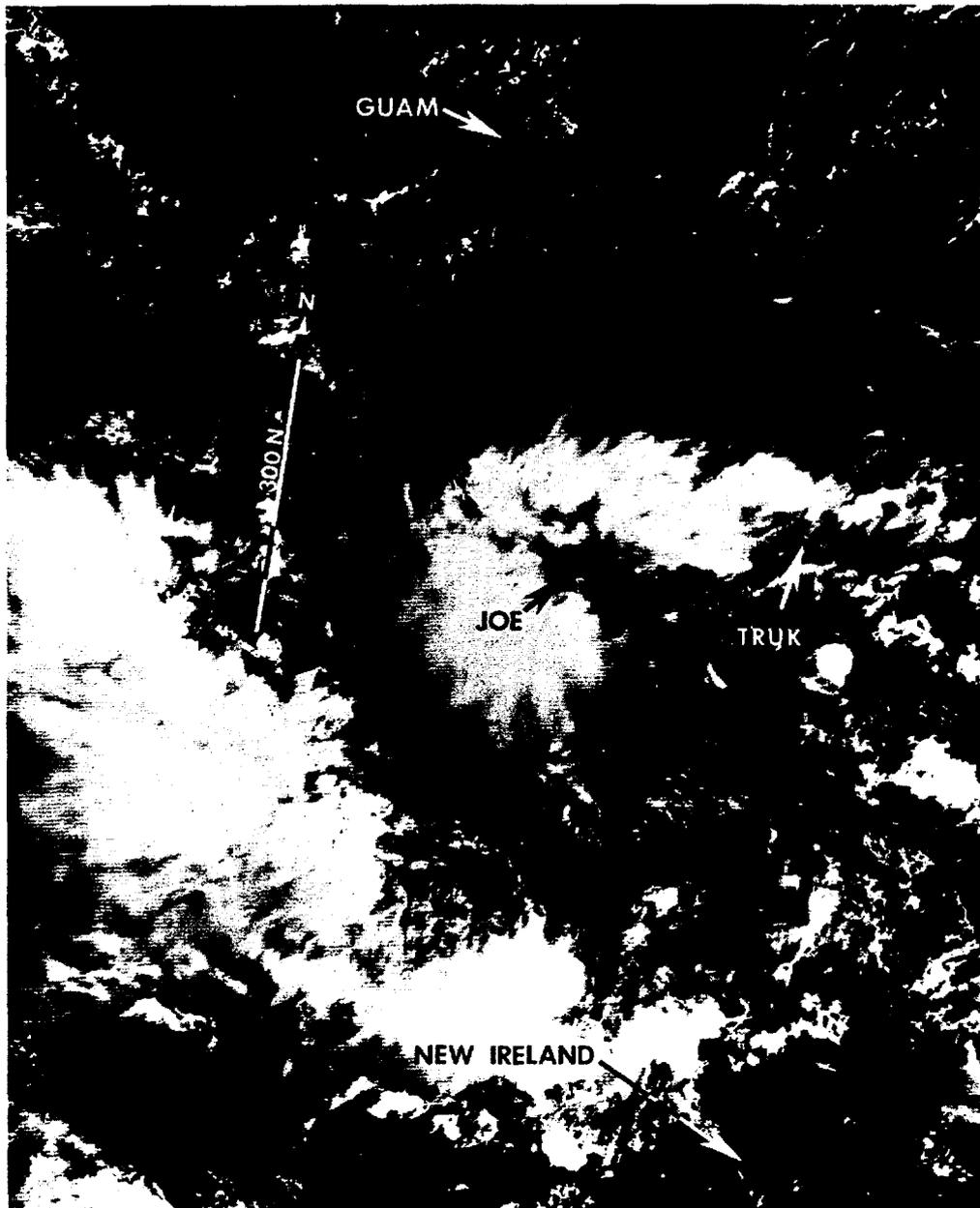
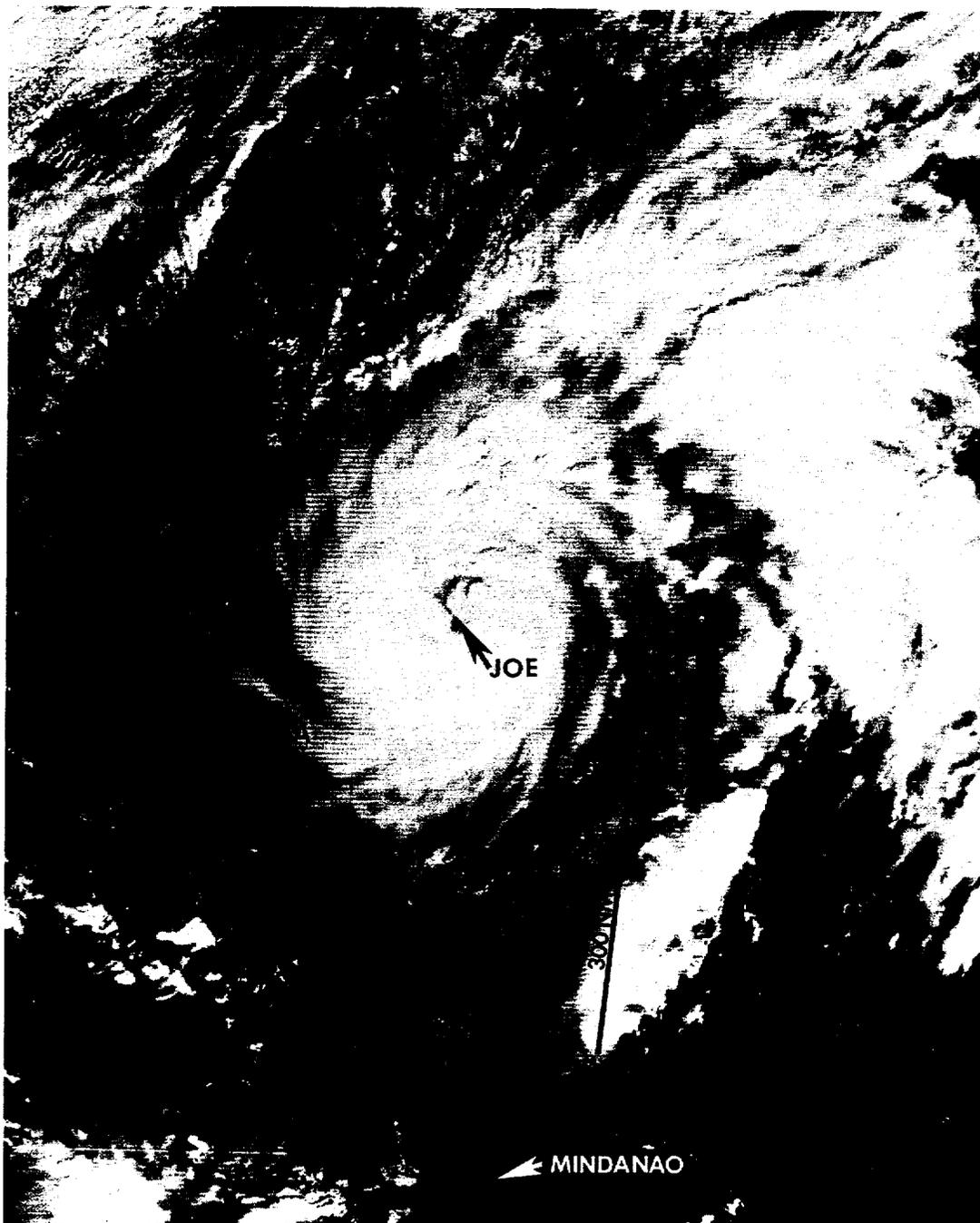


Figure 3-22-1. Typhoon Joe as an area of enhanced convection south of Guam (140008Z November DMSP visual imagery).

move northward around the periphery of the subtropical ridge to its east (Figure 3-22-2).

The first warning (181800Z) forecast Joe to move northwestward, just over the northeast corner of the island of Luzon in the Republic of the Philippines.

The second through fifth warnings (from 190000Z to 191800Z) forecast a more westward track for Joe. These forecasts relied heavily on the dynamic guidance of the One-way Interactive Tropical Cyclone Model (OTCM) which indicated west-northwestward



*Figure 3-22-2. Typhoon Joe brushes by eastern Luzon (200128Z November DMSP visual imagery).*

movement of Joe across central Luzon. However, the OTCM persisted in forecasting westward movement as late as 231200Z, three days after Joe had assumed a northerly track. This could possibly have been due to the model's inability to adequately handle the interactions between the typhoon and the strong northeasterly low-level flow from Asia. JTWC broke with the faulty OTCM guidance after the fifth warning and correctly forecast recurvature.

A ragged eye first became visible on satellite imagery at 0128Z on 20 November. Typhoon Joe continued to intensify, even as the strength of the mid- to upper-level southwesterly flow increased

aloft. Joe continued to intensify and reached a peak of 100 kt (51 m/sec) maximum sustained surface winds at 210600Z.

As Joe continued to move northward around the western end of the subtropical ridge, the vertical shear on the system increased. The result was Joe's upper-level outflow became displaced to the northeast of the low-level leaving the exposed low-level circulation behind. The final warning was issued at 241200Z, since Joe no longer retained any persistent central convection. Only the residual low-level circulation persisted and was still evident on imagery through 242318Z (Figure 3-22-3).

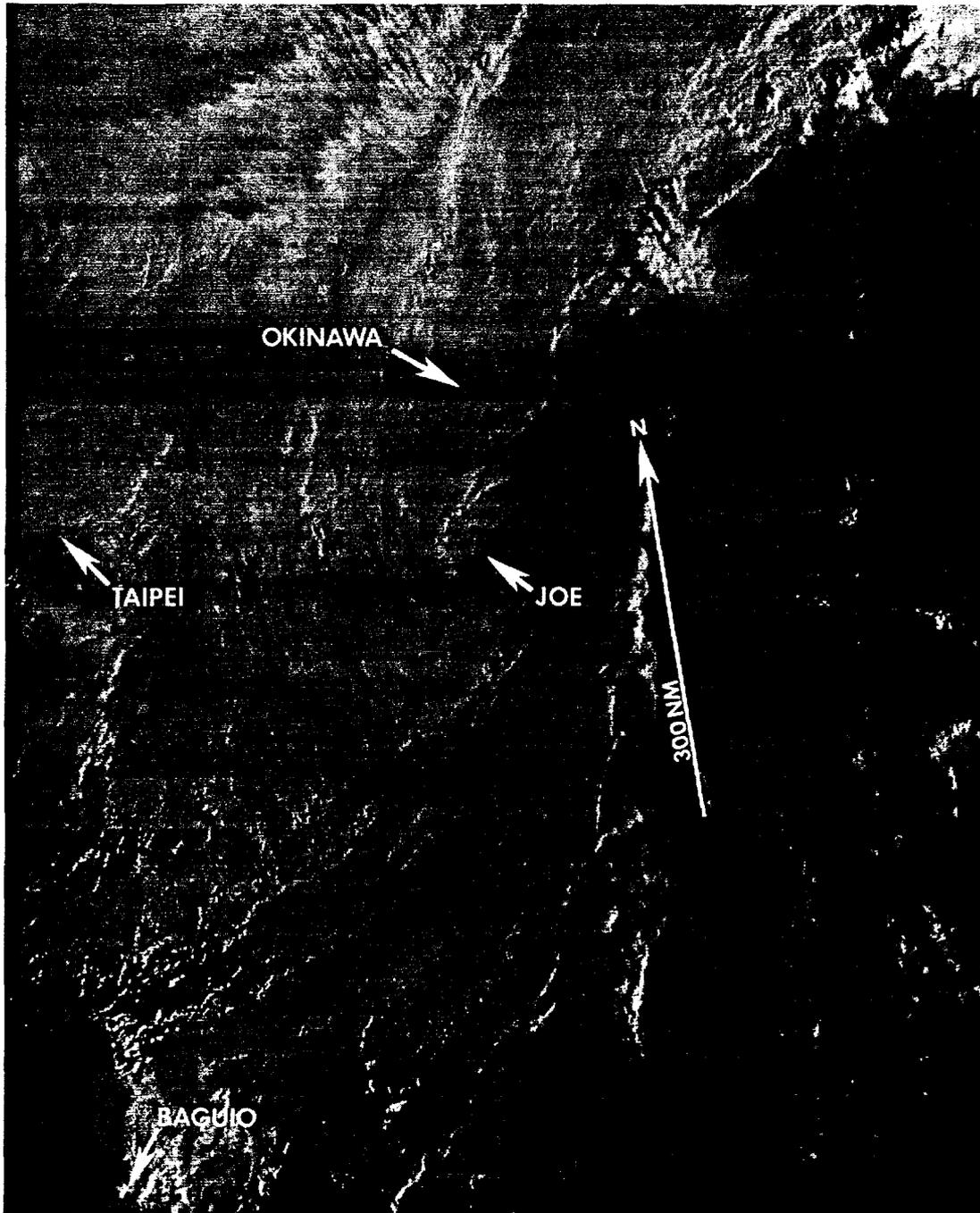


Figure 3-22-3. By 24 November, a residual low-level circulation was all that remained of Joe (242318Z November NOAA Visual imagery).