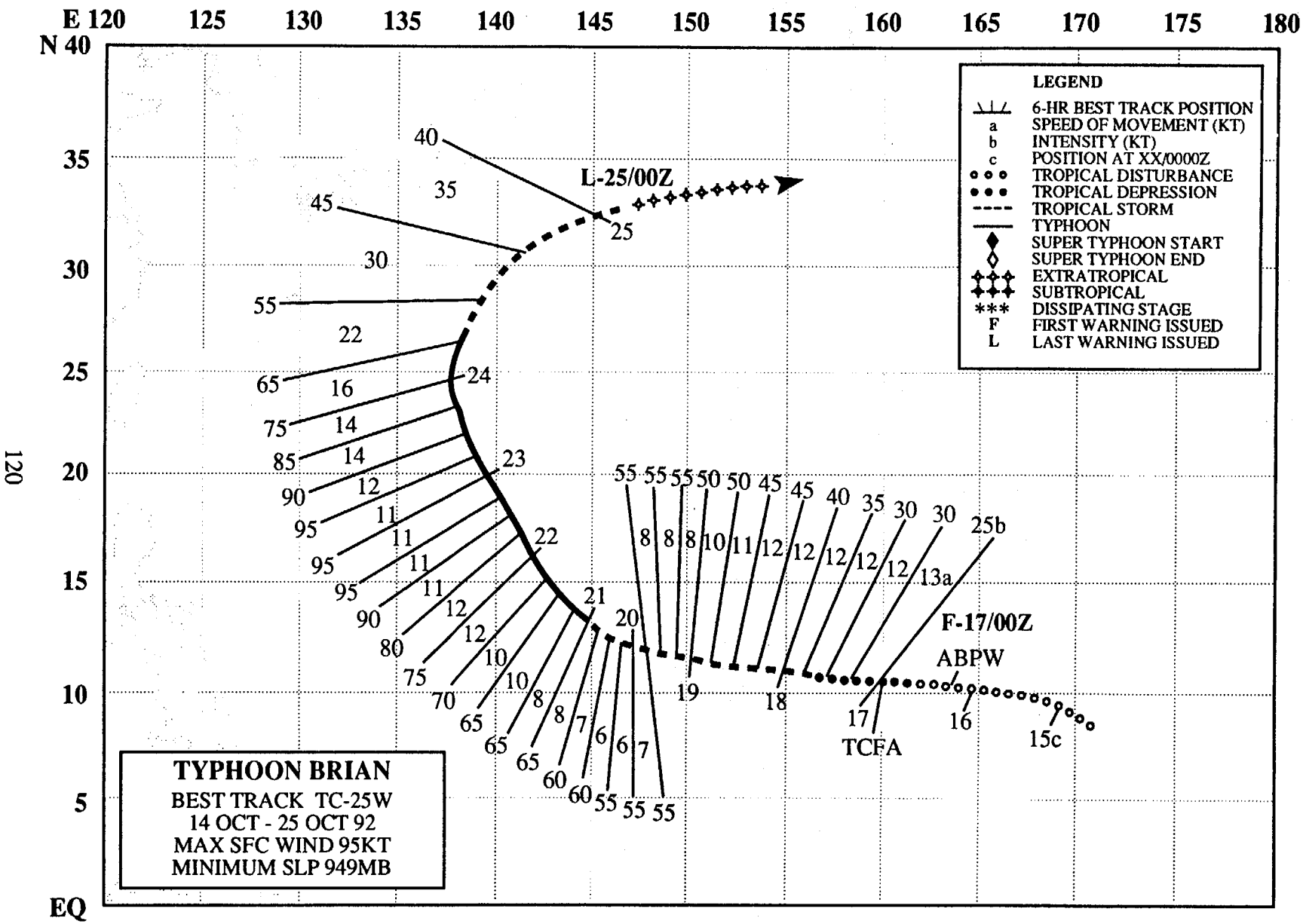
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EQ
120
LEGEND
6-HR BEST TRACK POSITION
a SPEED OF MOVEMENT (KT)
b INTENSITY (KT)
c POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
*** DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
L-25/00Z
F-17/00Z
ABPW
TCFA
TYPHOON BRIAN
BEST TRACK TC-25W
14 OCT - 25 OCT 92
MAX SFC WIND 95KT
MINIMUM SLP 949MB

TYPHOON BRIAN (25W)

I. HIGHLIGHTS

Brian was part of the four storm outbreak in October that included Angela (24W), Colleen (26W) and Dan (27W). Forming in the southern Marshall Islands, Brian moved west-northwestward and intensified to a typhoon as it passed across Guam. For Guam, it was the second eye passage in less than two months - Omar (15W) was the first. Later, Brian underwent binary interaction with Typhoon Colleen (26W), subsequently recurved, and finally transitioned to an extratropical system.

II. TRACK AND INTENSITY

JTWC began monitoring the tropical disturbance, that would become Typhoon Brian, in the southern Marshall Islands on 14 October. After an increase in the amount and organization of the cloudiness, the tropical disturbance was mentioned on the 161600Z Significant Tropical Weather Advisory. Initially the potential for development was considered to be poor. However, a rapid increase in convection prompted JTWC to reissue the Advisory at 161800Z, and the area's potential for development was upgraded to fair. A Tropical Cyclone Formation Alert followed at 162223Z as organization continued to improve. Anticipating continued consolidation within the small compact cloud system, and assessing the potential for subsequent rapid intensification as good, JTWC issued the first warning at 170300Z.

The tropical cyclone was upgraded to Tropical Storm Brian at 171800Z. As it approached Guam, Brian's convection increased markedly during the nighttime hours. With no synoptic data reports near the center of the small circulation and impressive convective flare-ups for two nights running on the satellite imagery, there was a question on the second night: "Was rapid intensification taking place or not?" When satellite data gave conflicting information concerning the intensity of the storm, JTWC elected to go with the higher intensity that indicated that rapid intensification was occurring. Subsequently, Brian was upgraded to typhoon intensity at 190600Z based on the higher satellite intensity estimates. As the tropical cyclone approached Guam on the morning of 21 October, it became apparent that Brian was a smaller than expected system, and that its intensity and area affected by the high surface winds were significantly less than forecast. Brian was, in fact, a midget typhoon with 65-kt (33-m/sec) sustained winds.

The extended outlook for the track was more straight forward. For two days prior to Brian hitting Guam, JTWC predicted a direct hit. As Brian approached Guam, fixes from satellite imagery and the Federal Aviation Administration flight control radar at Mount Santa Rosa showed that as the tropical cyclone slowed, it began to exhibit erratic motion. Despite the erratic motion, JTWC continued to predict a direct hit, and actually pin-pointed the southern half of the island as the target. The leading edge of the small, 10 nm (19 km) diameter eye came ashore just northeast of DanDan at 202350Z, and later exited near Orote Point at 210300Z (Figure 3-25-1).

As Brian's eye came across Guam, an interesting phenomena was observed by residents on the west side of the island from Orote Point northward to Taguac. Preceding the onset of the primary area of light-and-variable winds within the eye, there was another low pressure area — a precursor — where the winds lessened prematurely and the sky lightened. This precursor event was followed by a band of heavy rain and wind. Figure 3-25-2 illustrates the merge of the leeside low with the eye of Brian. The event appears on the Nimitz Hill microbarograph trace (Figure 3-25-3) as a drop in pressure (at Point A) followed by a rise in pressure associated with the squall, and then another drop in pressure (at Point B).

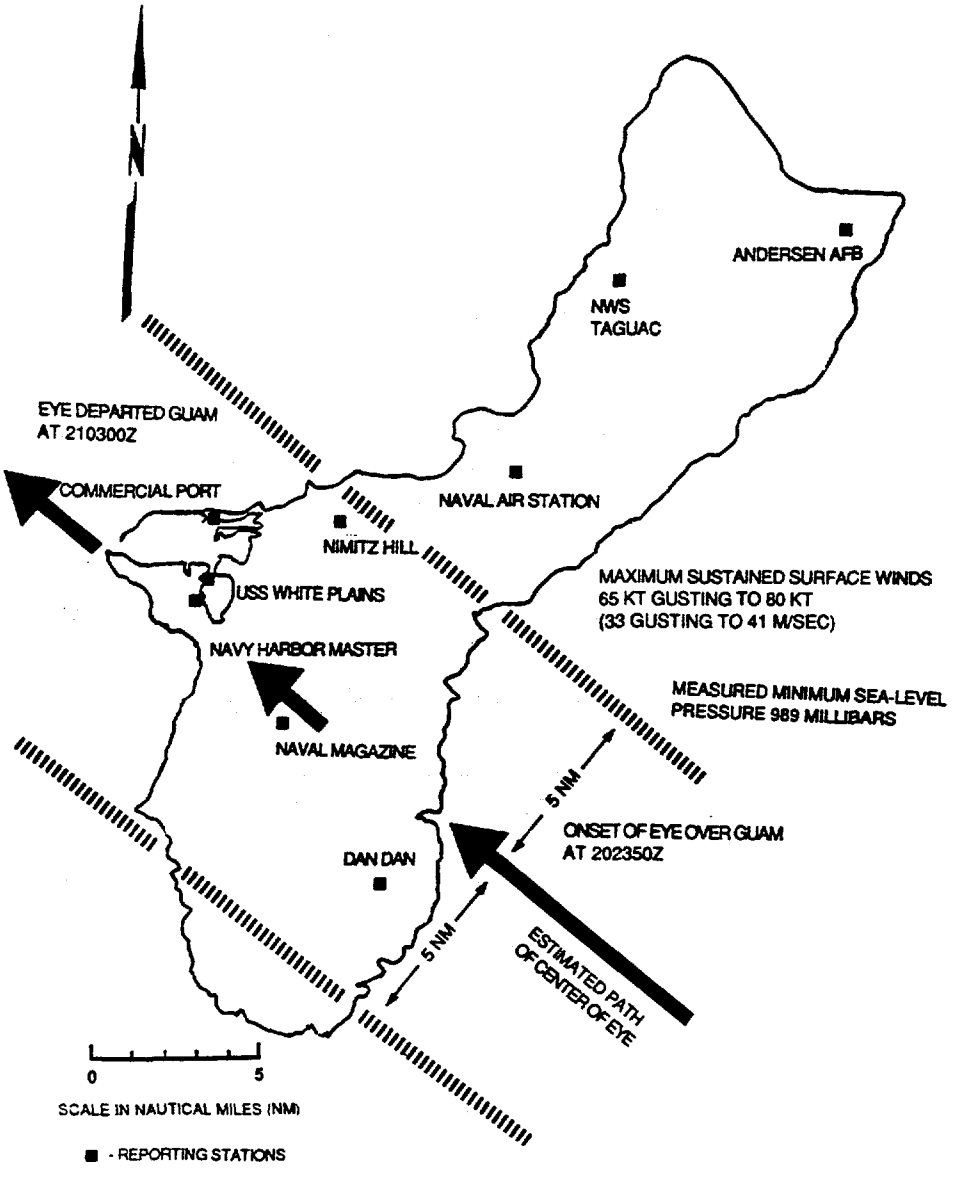

Figure 3-25-1. Graphic of Brian's 10 nm (19 km) diameter eye passage across Guam on 21 October.

What is suggested was that Brian, which was small and at minimal typhoon intensity, encountered a barrier, the island of Guam, in its path. The wind field within the core region adjusted to the barrier and a lee side low, or secondary circulation, formed ahead , and to the west of, the primary circulation center. As the eye approached, the lee side low shrunk in size, consolidating over the northwest portion of Guam. Once the eye moved to the west side of the island, strong low-level winds trying to flow toward the low pressure of the eye quickly returned to normal, and Brian regained its more normal form and intensified. During this time, Guam's maximum sustained 1-minute winds of 65 kt (33 m/sec) gusting to 80 kt (41 m/sec) were recorded at Nimitz Hill, which is 650 feet (200 m) above sea level. Typhoon force winds may also have occurred in the east coastal areas, but the no wind recording were available at these locations. The minimum sea-level pressure reading of 989 mb was recorded in the eye by the

fast supply ship **U.S.S White Plains**, which was moored in Apra Harbor. While this pressure is too high to support typhoon-force winds for a normal sized tropical cyclone, computations indicate that it was sufficient to support typhoon-force winds for a cyclone the size of Brian

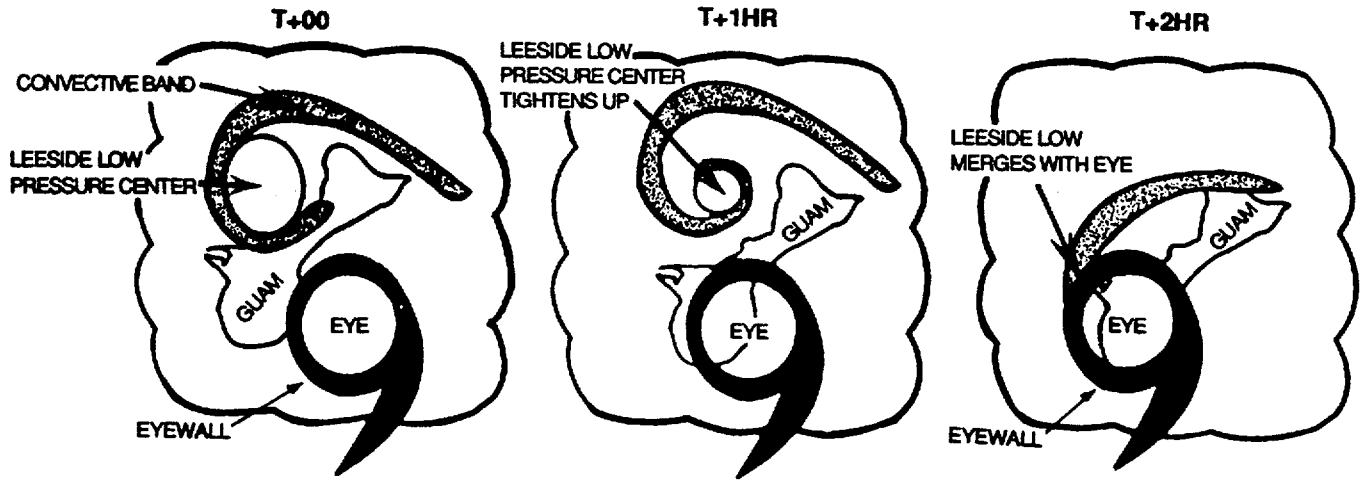

Figure 3-25-2. Sequence of events illustrating the merger of a low on the leeside of Guam with the eye of Brian.

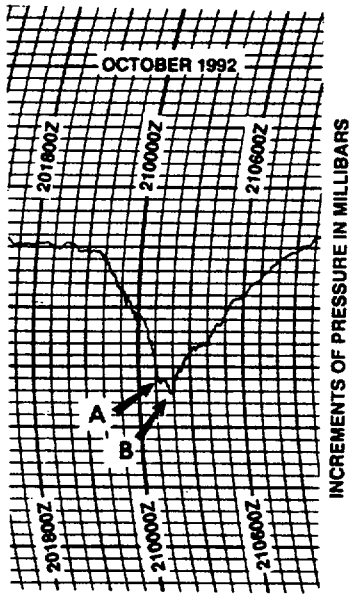

Figure 3-25-3. Microbarograph trace from the Nimitz Hill, Guam during the passage of Typhoon Brian. Point A is the passage of the leeside low that proceeded the passage of the eye at point B.

On 21 October, as Brian moved into the Philippine Sea, it became involved in a binary interaction for the next three days with Typhoon Colleen (26W) which was located to the west (Figure 3-25-4). Brian peaked at 95 kt (49 m/sec) at 221800Z, and on 24 October, the typhoon recurved south of Japan, accelerated, and transitioned to an extratropical low. The final warning was issued by JTWC at 250000Z.

III. FORECAST PERFORMANCE

The overall mean track errors for JTWC were 90, 140 and 225 nm (170, 255 and 415 km) for the 24-, 48- and 72-hour forecasts, respectively. These were 25-42% lower than JTWC's long term average and approximately 25% better than those of CLIPER, which is used as a baseline for determining skill. Typhoon Colleen (26W), which was about 1000 nm (1850 km) to the west of Brian, added a measure of difficulty and uncertainty to both the intensity and track forecasts for Brian. Colleen's outflow aloft blew eastward across Brian and impeded the formation of Brian's upper level anticyclone, which may have slowed the intensification of Brian's midget circulation. Also, the induced ridging between the two cyclones probably contributed to the slowing and erratic motion of Brian's track as it neared Guam. Finally, the binary interaction between the typhoons was of significant concern until Brian recurved.

In contrast to the track forecasts, the intensity forecasts were poor. For a four day period starting at 171800Z, the 72-hour outlooks were consistently 25 to 55 kt (13 to 28 m/sec) too high. And for two days before Brian crossed Guam, the initial warning intensities were determined to be 25 to 35 kt (13 to 18 m/sec) high. The high intensity forecasts for four days resulted from anticipation of rapid intensification that did not occur, and were compounded, for two of the four days, by high values for intensity on the initial warnings.

IV. IMPACT

Damage on Guam was much less than would have occurred had Typhoon Omar not hit less than 2 months earlier. Omar destroyed most structures that a weaker storm might have damaged or destroyed. Schools and businesses were closed for two days as the typhoon passed. Some power lines were blown down, and there were isolated reports of damage in the central portion of the island. The agriculture industry suffered the most, as the coastal regions received considerable salt water spray damage.

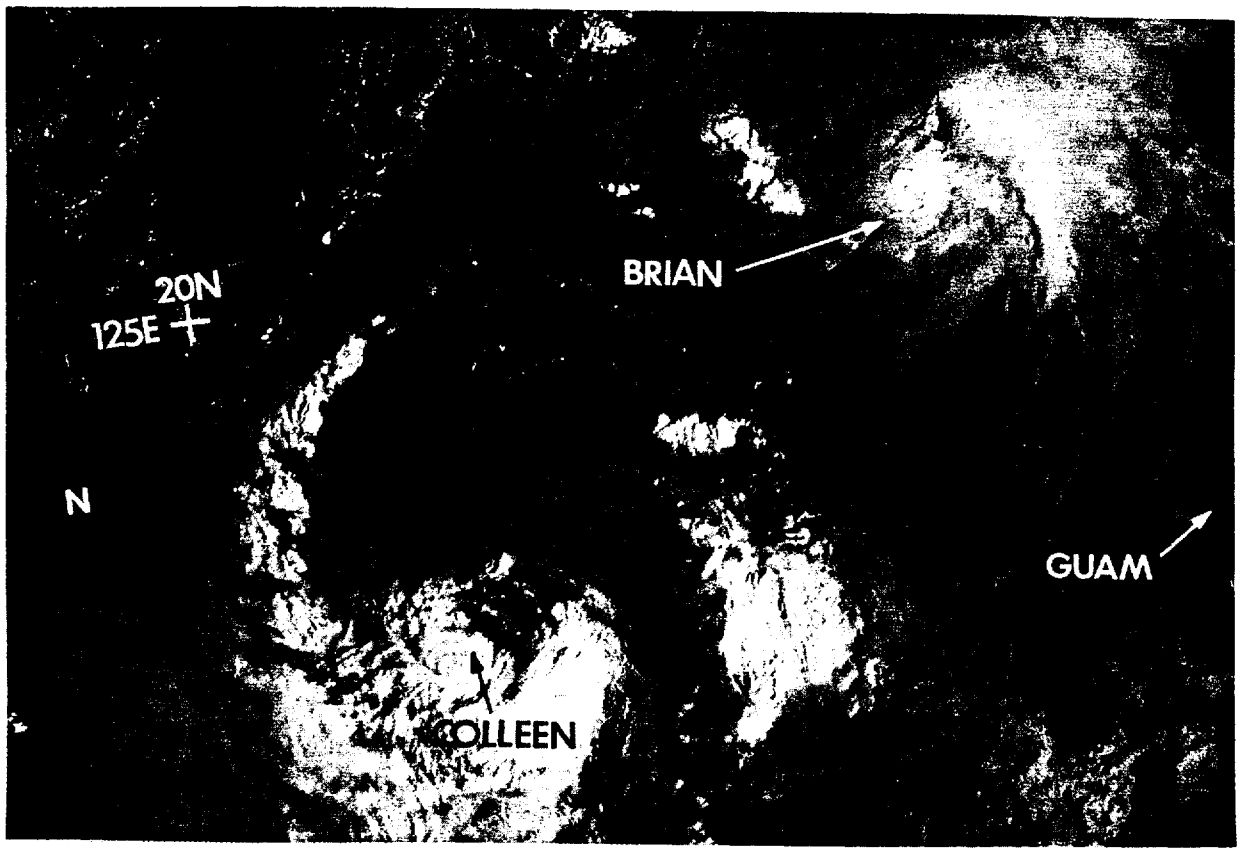

Figure 3-25-4. Brian undergoes binary interaction with Typhoon Colleen (26W) (230019Z October DMSP visual imagery).