

**TROPICAL
STORM PHYLLIS**
BEST TRACK TC-12
03AUG-04AUG 1981
MAX SFC WIND 45 KTS
MINIMUM SLP 978 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ★ LAST WARNING ISSUED

The genesis of TD-11 and Tropical Storm Phyllis were associated with one synoptic feature, but the extent of development of each was significantly different. The systems are being discussed together to contrast their early development and thereby come to some understanding as to the inability of TD-11 to mature into a significant tropical cyclone. A brief discussion of Tropical Storm Phyllis will then follow.

On 30 July a monsoon trough developed that extended from the Northern Marianas Islands southwestward toward the Palau Islands. Two surface circulations were embedded at opposite ends of the trough. A mid-level cyclonic circulation was located

over the northeastern portion of the trough while upper-level data had been indicating the presence of an anticyclone over the area.

Development of a significant tropical cyclone was potentially high because of the vertical relationship of the upper level anticyclone to the mid-level and surface circulation centers. Consequently, a formation alert was issued at 310300Z for the Northern Marianas area. During the ensuing nine hours, satellite imagery showed evidence of strong upper-level outflow and ship data near the circulation center reported pressures of 997mb; thus JTWC issued the first warning on TD-11 (Fig. 3-11-1).

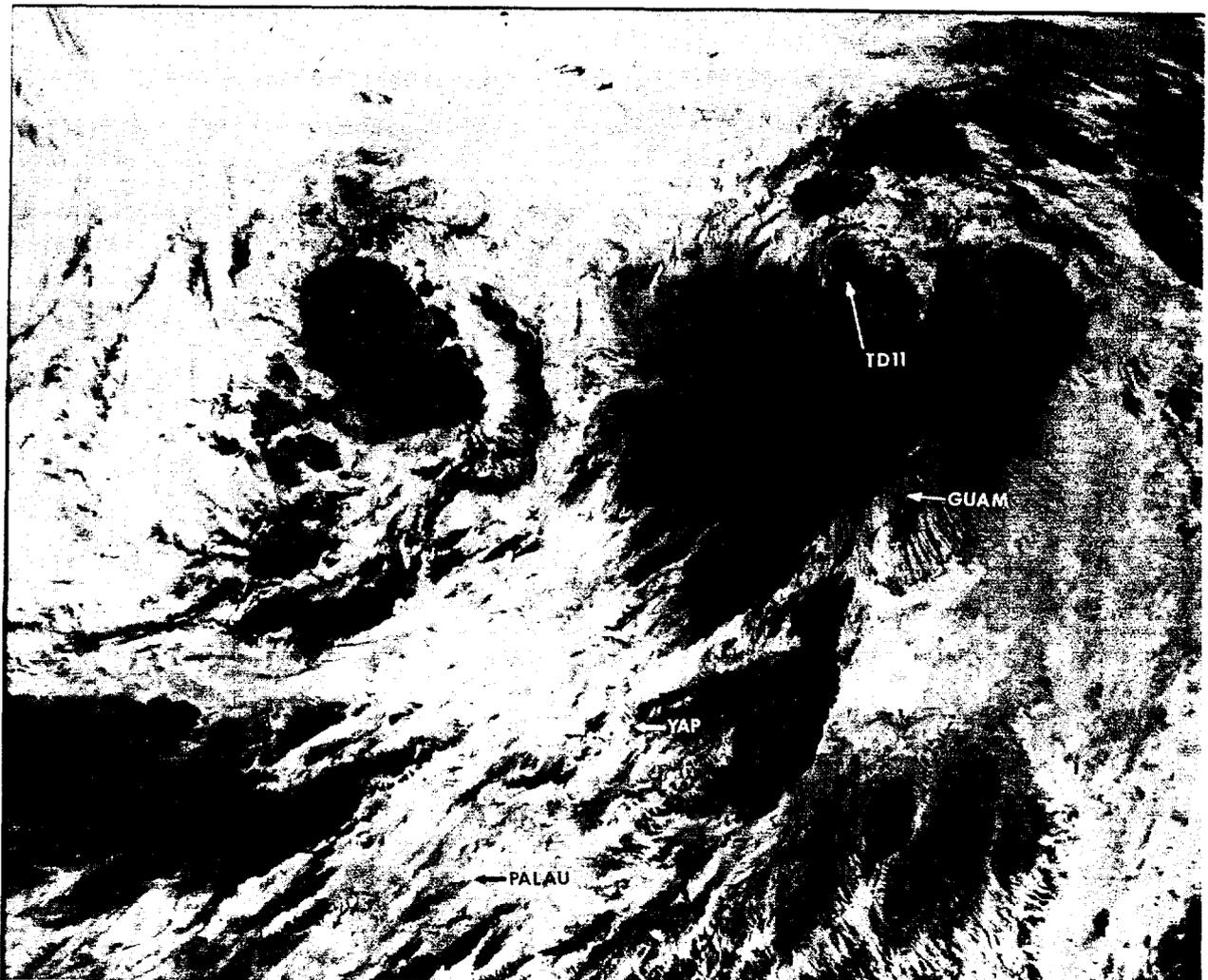


FIGURE 3-11-1. TD-11 early in its development on 30 July 1981, 2236Z. (NOAA 6 infrared imagery)

A decrease in the upper level organization was evident on satellite imagery as the anticyclone receded slowly northeastward. Although the mid and upper level features that helped form TD-11 were still present, by 1 August they appeared to be displaced from the vertical axis of the depression. TD-11 was tracking northeastward at a slower rate than the upper level anticyclone and eventually encountered upper level wind shear caused by the anticyclone which disassociated from TD-11 on the 2nd of August and moved well to the northeast. The final warning on TD-11 was issued at 020000Z.

Aircraft reconnaissance observations on the 1st of August (Fig. 3-11-2) revealed TD-11 was not as well organized as when the first warning was issued. A circulation center was evident at 1500 ft. but the surface winds were indicative of only an elongated trough extending from TD-11 to the second circulation north of the Palau Islands.

Throughout the trough in general, surface pressures were low with weak pressure gradients, thus accounting for the weak wind field about TD-11 whose central pressure could have supported much higher winds had it not been embedded in the trough.

While attention had been focused on TD-11, another surface circulation, located in the eastern-most portion of the monsoon trough continued to persist. The upper-level anticyclone was now providing the out-flow mechanism required for further development. A formation alert was issued at 022300Z for the area northeast of the Marianas Islands. By 030600Z aircraft and satellite reconnaissance provided evidence that the circulation had already attained tropical storm intensity and the first warning on Phyllis was subsequently issued at that time.

The two features most directly respons-

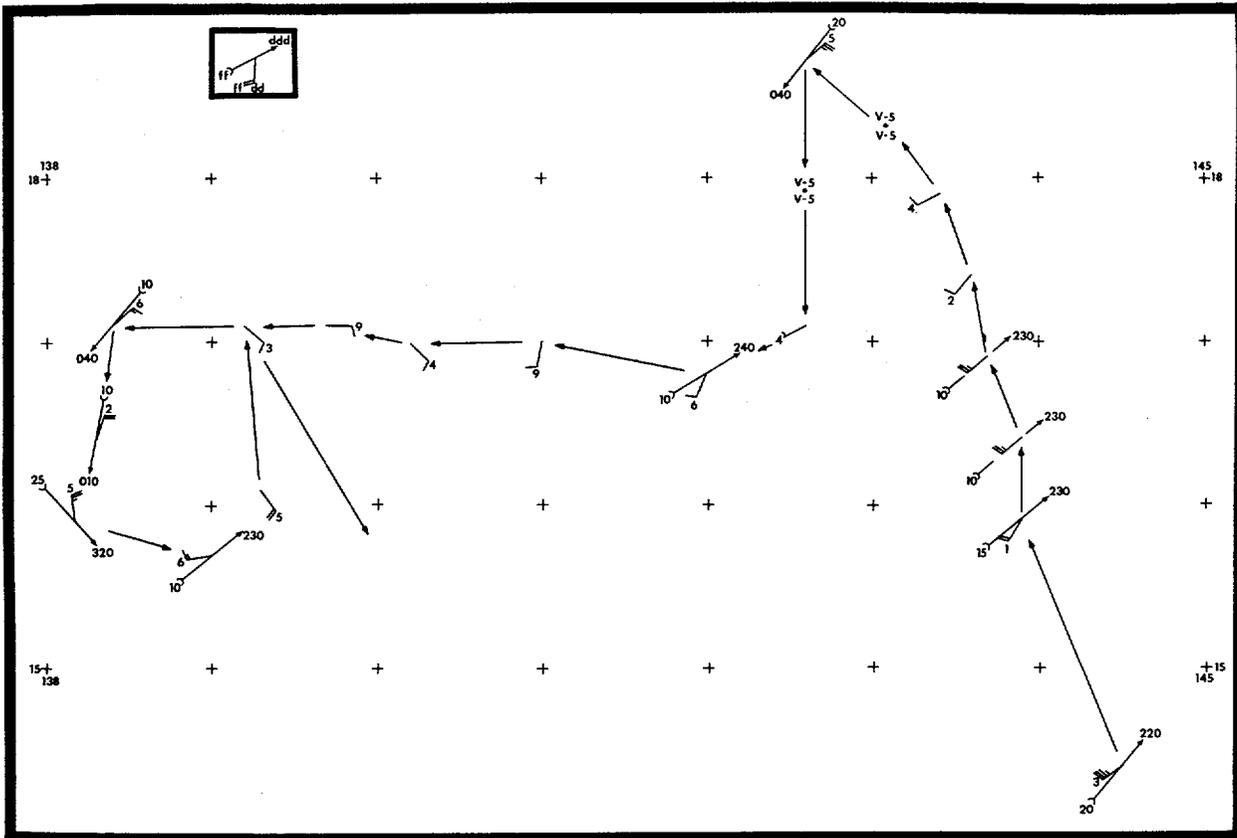


FIGURE 3-11-2. Plot of aircraft reconnaissance data at the 1500 ft. level and surface of TD-11 on the 1st of August.

ible for the lack of development of TD-11 and the intensification to Tropical Storm Phyllis were the location of the upper-level anticyclone and the elongation of the monsoon trough as the anticyclone moved northeastward. Initially both circulations were favorably positioned under the upper level anticyclone. The intensification of TD-11 was retarded because the monsoon trough elongated, thereby restricting strong surface inflow from the east. Further, TD-11 did not have the advantage of a strong mid-level steering current and was thus unable to maintain its favorable position with respect to the upper level anticyclone. This resulted in an increased vertical wind shear and eventual dissipation.

Phyllis, on the other hand, was able to maintain a favorable position with respect to the anticyclone aloft. Located within the monsoon trough and exposed to strong surface inflow in three quadrants, Phyllis

was able to mature into a significant tropical cyclone.

Phyllis initially tracked northward at 11 kt (20 km/hr) and intensified slowly. An interesting feature in the vertical structure of Phyllis after she attained tropical storm intensity was that the convection was mostly limited to the eastern periphery of her circulation center, (Fig. 3-12-1). Typically, this is suggestive of the cyclone having a tilted vertical axis.

The convective activity decreased as Phyllis advanced northward toward colder water and encountered increased vertical wind shear. By 041800Z, Phyllis began to weaken rapidly and the final warning was issued. The remnants of Phyllis continued to track northwestward and later merged with an extratropical low pressure system off the east coast of Japan.

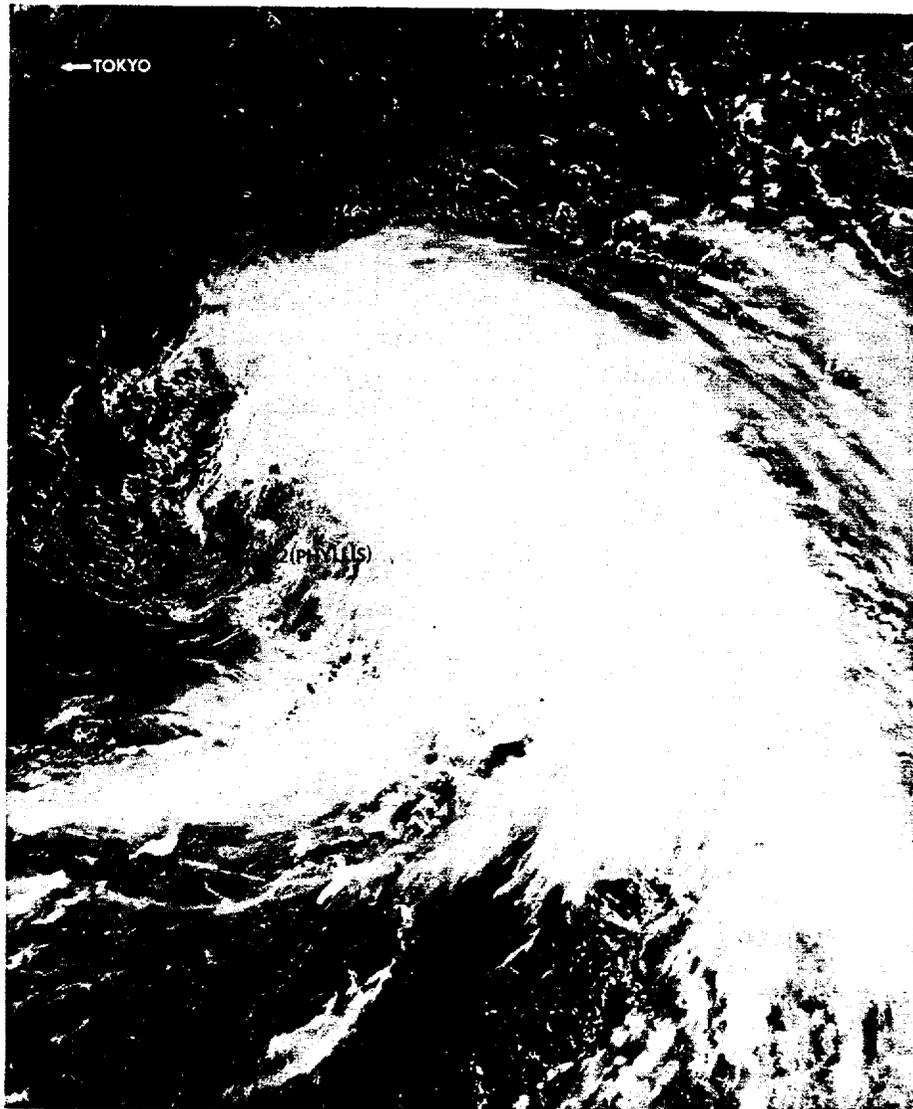


FIGURE 3-12-1. The exposed low level circulation center of Phyllis on 3 August 1981, 0410Z. The convective activity is limited to the east of her center of circulation. (NOAA 7 visual imagery)