

TYPHOON ALEX (03W)

Typhoon Alex was the first typhoon of the 1984 western Pacific season. It was also the season's first recurver. The satellite fixes during the formative stages of Alex were somewhat misleading and contributed to rather large forecast errors on the first day in warning status. After reaching typhoon intensity and crossing Taiwan, the last phase of Alex's life was characterized by a complex transition into an extratropical low.

The seedlings of Alex first caught the attention of the JTWC forecasters on the 28th of June. Based on several ship reports showing that a circulation center had developed in the Philippine Sea, the Significant Tropical Weather Advisory (ABEH PGTW) was reissued at 281415Z stating that a 10 to 15 kt (5 to 8 m/s) surface circulation had developed near 16N 129E, within a disorganized area of convection in the monsoon trough (point A on Figures 3-03-1 and 3-03-2). This area was identified as one with a "poor" potential for development (meaning the disturbance was not expected to require a TCFA during the advisory period). For the next day-and-a-half the disturbance persisted with no signs of development. At 2301Z on the 29th, visual satellite pictures indicated that a partially exposed low-level circulation had developed on the northern edge of the disturbance (point B on Figures 3-03-1 and 3-03-2). Consequently an aircraft investigation of the area was requested for the following day.

Upon arrival at the invest point, the aircraft radioed back to the JTWC forecaster that a well-defined circulation center was present and that a vortex fix would be forthcoming. Now things happened quickly. The forecaster first notified his customers on Luzon that a tropical depression was developing just to the east of them and they could experience 30 kt (15 m/s) winds within 18 hours. At 2300Z on the 30th a TCFA was issued. Shortly thereafter, at 2338Z, the vortex fix was radioed to JTWC containing details on the closed surface circulation. The first warning on Alex, valid at 0000Z on 1 July quickly followed.

Unfortunately, the first four warnings forecast Alex to move to the west. Satellite fixes starting late on the 29th and continuing through 1800Z on the 1st indicated that the depression was moving west-southwest. Limited radar fixes indicated that the system was nearly stationary. However, when the daylight satellite pictures became available late on 1 July, it was obvious that the system had in reality moved north-northwest (along track CD in Figure 3-03-2) and was now a tropical storm. Thus it was not until warning number five that the westward track was abandoned and not until warning number seven that the recurvature scenario was fully developed.

The rationale behind the forecast track on warning number one now becomes instructive: When the system was first detected "on the doorstep" of Luzon, there

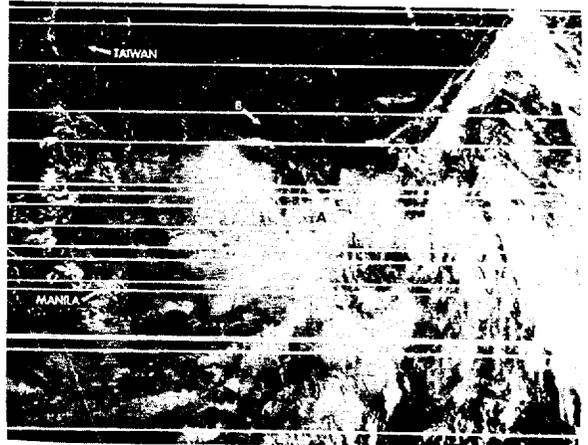


Figure 3-03-1. Initially the exposed low-level circulation center at point B was thought to be the origin of Typhoon Alex. However, post-analysis indicates the actual point of origin was probably near point A (292301Z June NOAA visual imagery).

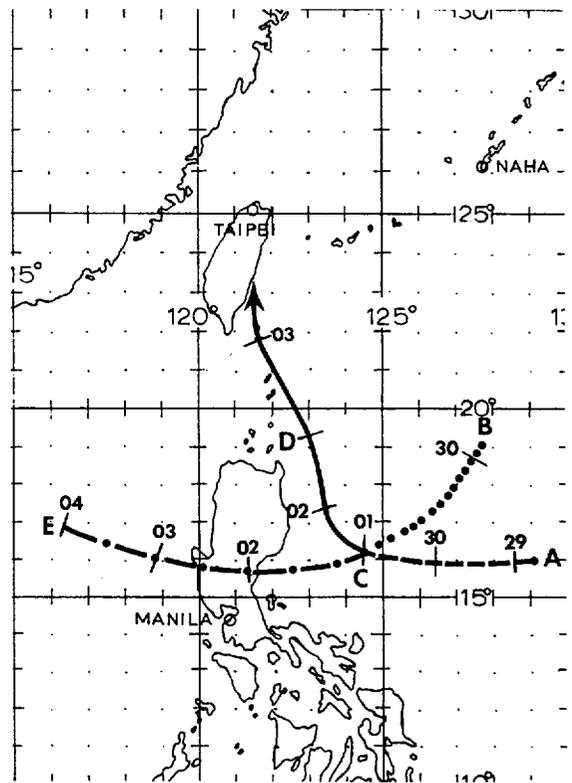


Figure 3-03-2. Point A is believed to be the actual point of origin of Typhoon Alex; Point B is the position of the partially exposed low-level circulation center, initially thought to be the origin of Alex; Point C is the location of the center found by the first aircraft invest; Point D is the best track through 021200Z, and Point E is the 72 hour forecast from warning number one.

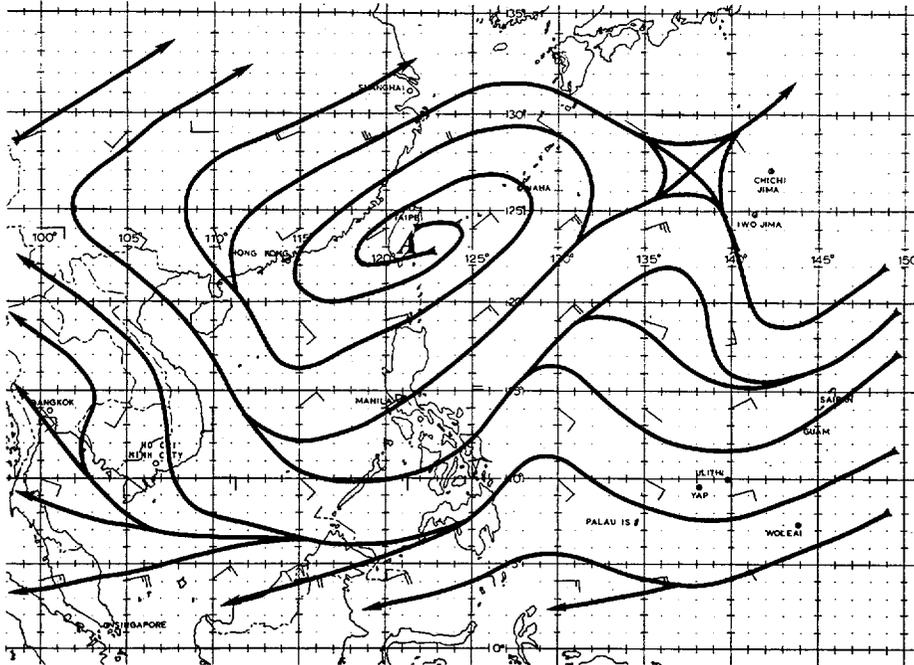


Figure 3-03-3. Mid-tropospheric flow prevailing during the formulation of the first warning forecast reasoning (Streamline analysis of the FNOC 400 mb NVA wind field valid at 301200Z June).

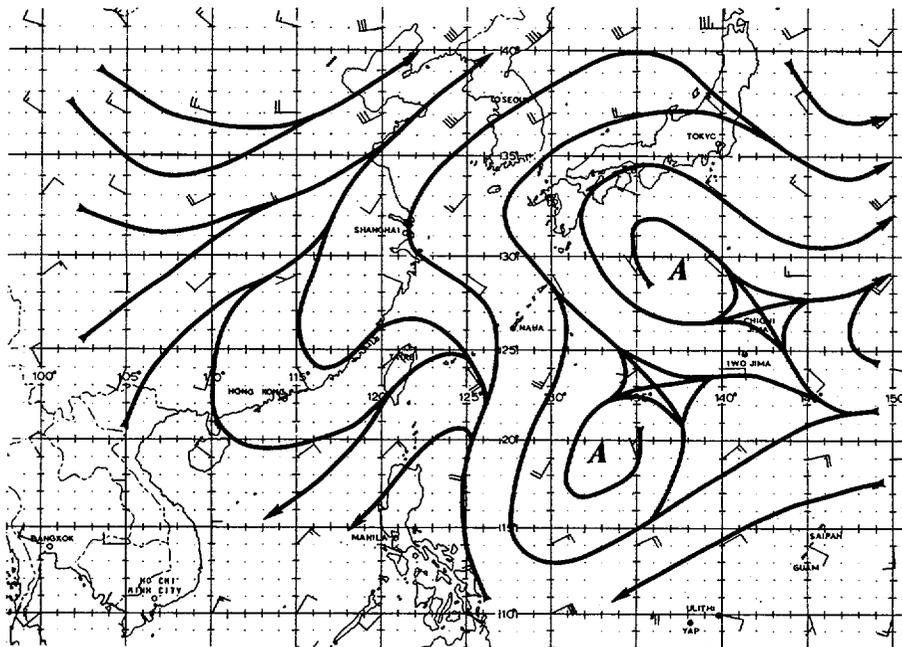


Figure 3-03-4. The mid-tropospheric synoptic situation prevailing during most of the life of Typhoon Alex. Note the anticyclone which has moved east to the south of Japan and the trough over central China which is also moving eastward (Streamline analysis of the FNOC NOGAPS 500 mb wind field valid at 021200Z July).

was an urgency to let the people there know that the potential existed for a tropical cyclone to affect them almost immediately. Therefore it was deemed necessary to devise the forecast track before all of the JTWC forecast aids could be obtained. Available to the forecaster were the past fixes which lead to best track BC on Figure 3-03-2 and a synoptic situation characterized by a mid-tropospheric ridge north of the storm as illustrated in Figure 3-03-3. Given the present and past position of the storm and the northeasterly flow across Luzon, a westward forecast with recurvature beyond the 72 hour point seemed logical. This scenario was briefed to all concerned. When the forecast aids did arrive, they generally agreed with this reasoning. One of the aids which did not agree was the One-Way Interactive Cyclone Model (OTCM), JTWC's primary forecast aid, which forecast Alex to move to the north-northwest to near point D in Figure 3-03-2 in twenty-four hours. The OTCM forecast was discounted for three reasons. First, it was perpendicular to the mid-tropospheric flow and headed toward the center of the ridge near Taiwan. Second, the track BCD seemed highly improbable. Finally, OTCM had consistently and erroneously forecast a westward moving storm (Tropical Storm Wynne (02W)) to go to the north only a week earlier in the same general area.

As it turned out, the OTCM forecast was excellent. Figure 3-03-4 reflects the new synoptic situation. The anticyclone that had been over Taiwan did not persist as originally anticipated but weakened and moved to the east. This movement allowed Alex to accelerate to the north-northwest towards Taiwan. The OTCM had correctly forecast this to occur. With the post-analysis knowledge that Alex did not transit the Philippines, but instead went north-northwest, Figure 3-03-2 should be examined for an explanation of the true origin of Alex. The track BCD seems highly improbable. There is currently no explanation for a path from B to C at a speed of nearly 10 kt (19 km/hr), a slow down to 3 kt (6 km/hr) at C

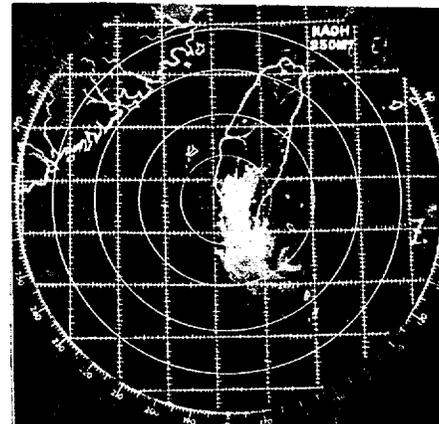


Figure 3-03-5. Typhoon Alex just prior to attaining maximum intensity (022329Z July NOAA visual imagery).

followed by a sudden 120 degree turn to the right and an acceleration to 12 kt (22 km/hr) by point D. A much more likely path would be genesis near point A, as was indicated by synoptic data back on 28 June, westward movement at about 5 kt (9 km/hr) to C and then a more gradual turn to the right with acceleration to D. Consequently it is now thought that the low-level circulation center found by satellite imagery at point B on the 29th of June was a "red-herring"; nothing more than an eddy in the monsoon trough.

Once the northward movement of Alex was well established, the forecasts were relatively accurate (although the speeds were somewhat slow). The only question was whether Alex would track up the east coast of Taiwan, cross the middle of the East China Sea and transit through the Korean Strait, or transfer across Taiwan, move along the coast of mainland China and cross South Korea. By warning number 11 this question was correctly resolved as the last eight warnings had excellent track forecasts. Alex continued to intensify reaching a maximum intensity of 75 kt (39 m/s) just prior to crossing Taiwan (Figures 3-03-5 and 3-03-6). During the middle and last phases of Alex's life, the southwesterlies in front of a trough that laid over central Korea provided the steering mechanism. This trough with its associated surface front was the same trough observed over northern China in Figure 3-03-4 several days earlier. Starting on 5 July Alex underwent a complex extratropical transition with this front. The final warning was issued at 051200Z as Alex became indistinguishable from the frontal system over the Sea of Japan.

In summary, Typhoon Alex can be identified as a typical, well-behaved recurver that transitioned into an extratropical system. The first four warnings were marred by erroneous rejection of OTCM, and by acceptance of early fixes from a feature that was probably not part of the genesis mechanism.



NR: 022 ALEX 1984 7 2 2300Z
 FFAA 02230 44794 49218 11217 35// 5000
 sp: Cat 100

Figure 3-03-6. Typhoon Alex just prior to attaining maximum intensity as seen by radar from Kaohsiung (WMO 46744) at 022300Z July (Photograph courtesy of Central Weather Bureau, Taipei, Taiwan).