Eastern North Pacific Tropical Cyclones, 1974: Part 2

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ABSTRACT

This article is a continuation of the report on 1974 tropical cyclone activity in the eastern North Pacific Ocean. Part 1 summarized the statistics on storm tracks, intensities, forecast verification, and damage and casualties. Part 2 presents satellite picture analyses of individual storms following the Dvorak (1974) technique for classification of tropical systems.

The following analyses of the intensities and tracks of tropical cyclone in the eastern North Pacific in 1974 use the Dvorak (1974) technique for classifying tropical systems.

1. Aletta

Aletta began as a tropical disturbance on the afternoon of 24 May, south of the Gulf of Tehuantepec near 10°N, 97°W, over waters as warm as 31°C (88°F). The disturbance developed slowly over the next 60 hours, as it moved generally north-northwestward and detached itself from the ITCZ. On the morning of May 27, Aletta reached tropical storm intensity. In the 1745 GMT ATS-3 picture, the center was at 13.8°N, 100.2°W. A moderately well-defined feeder band from the southwest flowed around and into the northeast side of the storm. A relatively well-defined central dense overcast was visible; its width was one degree. There were banding features. Dvorak’s method of tropical storm analysis yielded both a T number and a central intensity (CI) number of 2.5; these numbers indicate maximum sustained winds of 35 kt and a mean sea-level pressure (MSLP) of 997 mb. Aletta was forecast to continue normal development over the next 24 h and to reach a T/CI number of 3.5 by 18 GMT on 28 May. However, Aletta did not intensify to that extent. The lack of good organization was apparent on the NOAA-3 VHRR visual and IR pictures available at 0249 GMT 28 May. The center was easily discernable at 14.7°N, 102.1°W. The general movement was now to the northwest. The banding was loose rather than tightly wound as in a better defined system, and convective elements were poorly defined. The formation was not indicative of strong winds or circulation.

The 1425 GMT ATS-3 picture of 28 May shows that tropical storm Aletta reached T 3.0 (40 kt, 992 mb MSLP). (See Fig. 1.) Some moist flow spiraling into the northeast side from the ITCZ was still visible. There was an oval shaped central dense overcast, one degree in diameter. A small banding feature east of the center was approximately three-quarters of a degree wide and curved approximately half way around the central cloud features. In this ATS-3 photograph, the center was at 16.0°N, 103.0°W and over 28°C (82°F) water. The 1900 GMT ATS-3 picture showed little more organization, so no upgrade was issued. It was obvious at this time that the storm had started to recurve.

The ATS-3 print of May 29, 1434 GMT, showed no significant 24 h circulation changes. Therefore; the classification remained at T 3.0. The center at this time was placed at 19.5°N, 104.0°W, where the storm was just beginning to move onshore at Manzanillo, Mexico. Aletta weakened rapidly after moving over land.

2. Blanca

Blanca began as an area of enhanced convective activity within the ITCZ and started to show signs of a circulation by early afternoon, 4 June. The apparent circulation center was near 11.4°N, 106.0°W in the 2045 GMT ATS-3 picture. The system moved westerly at about 16 kt during the next 24 h. The 1352 GMT ATS-3 of 5 June showed a tropical depression with a T number of 1.5 (maximum sustained winds of 25 kt and a MSLP of 1004 mb). The center was near 12.2°N, 109.0°W over 30°C (86°F) water. At 0900 GMT, the storm was characterized by two wide hooking bands converging towards a common center. Still a depression, Blanca was classified at T 2.0 (30 kt maximum winds and a 1001 mb MSLP).

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1 Editor’s Note. Part 1, by Robert A. Baum, was published in the April 1975 issue of the Monthly Weather Review. Readers will find it convenient to refer to Figs. 1a and 1b of Part 1 of this report (Baum, 1975) to determine coordinate values of the satellite picture grids in Figs. 3-13.
Fig. 1. NOAA-3 visual photograph of tropical storm Aletta, 1515 GMT 28 May 1974. Center at 16.0°N, 103.0°W.

Fig. 2. NOAA-3 infrared photograph of tropical storm Blanca, 1614 GMT 7 June 1974. Center at 13.9°N, 115.4°W.

The NOAA-3 VHRR picture for 0340 GMT 6 June still showed a system with two wide hooking bands, no central dense overcast, the T number still at 2.0, and the center at 12.3°N, 111.0°W. From this time until dissipation, Blanca moved generally toward 300° at approximately 10 kt.

Fig. 3. Tropical cyclone Connie, 1974. Daily pictures in sequence from right to left. See Fig. 1a (Baum, 1975) for coordinates.
By the morning of 6 June (1418 GMT ATS-3 picture) greater circulation led to classification as a tropical storm. Development over the last 24 h was slow and classification of the system was T 2.5 (maximum winds 35 kt). A new center was located at 12.8°N, 112.7°W.

NOAA-3 VHRR data available 1607 GMT 6 June still showed slow development, and the beginning of a banding feature on the southeast side of the center, which was at 12.8°N, 112.8°W. The VHRR pictures did not show reason for expecting much development as the storm was on the edge of a stratocumulus field and should shortly have an inflow of more stable air from the northwest quadrant. However, because the center was still over warm water, the forecast was for no change.

There was very little development over the next 24 h. The NOAA-3 VHRR photograph for 1641 GMT 7 June (Fig. 2) led to a classification of T 3.0, or only 0.5 greater than the day before. The center was at 13.9°N, 115.4°W and over 28°C (82°F) water. The storm was forecast to weaken because of more stable inflow from the northwest and its proximity to cooler water. Blanca became a depression on the morning of 8 June and rapidly dissipated at sea.

3. Connie

Connie (Fig. 3) began on 5 June as an area of enhanced convection imbedded in an active ITCZ. By the morning of 6 June, the area showed signs of a forming circulation near 9.5°N, 100.5°W; also, the system had begun to shift to the north and was partially detached from the ITCZ. The pre-noon NOAA-2 VHRR picture of 7 June showed no further development; the system was classified T/CI 1.5 with 25 kt maximum winds and a 1004 mb MSLP. The 1919 GMT 8 June ATS-3 picture showed rapid development during the past 24 h north-northwesterly movement across warm Pacific waters, so Connie was upgraded to a tropical storm. A banding-type eye, visible near 11.8°N, 104.7°W, was ragged and lasted less than 12 h. Movement was northwesterly at about 5 kt for the next 24 h, then west-north-westerly during the succeeding 24 h, and only slight intensification occurred. Development was more evident in the NOAA-3 VHRR picture of 1644 GMT 11 June. The central dense overcast had broadened, and a small banding feature was taking form. Classification was T/CI 3.5 with 50 kt maximum winds and a 987 mb MSLP.

The morning NOAA-3 VHRR photo of 12 June showed Connie had become a hurricane, but the evening VHRR picture on 15 June showed weakening to tropical storm intensity. During the relatively lengthy period at hurricane intensity (72 h), movement was generally 300° at 8 kt. During the last 25 h at hurricane intensity, the storm started to weaken, and to recurve toward the north northeast. Maximum intensity was seen on the NOAA-3 1633 GMT VHRR photograph of 13 June. Classification was T/CI 6.0, center was near 14.4°N, 111.8°W (110 kt maximum winds and a 942 mb MSLP). Connie’s eye, about 30 n mi in diameter, stood out in bold relief on satellite pictures. After Connie became a tropical storm on 16 June movement was primarily eastward, and Connie became a depression on the evening of 18 June.

There was recurvature towards the north on the afternoon of 20 June and a brief period of regeneration
for about 24 h. Then cold air entrainment caused dissipation by the afternoon of 21 June. Later pictures showed only a low-level cloud circulation.

4. Dolores

Dolores (Fig. 4) was first observed on the evening of 13 June as a disturbance east of Connie, near 12.0°N, 98.0°W. The morning ATS-3 prints of 14 June showed a rapidly developing circulation, and the system was designated a tropical storm. A T 2.5 was assigned to the storm (35 kt maximum winds, and a 997 mb MSLP). This storm was to be watched closely throughout its lifetime because of its close proximity to land.

The morning VHRR picture of 15 June showed Dolores was now developing normally. Use of Dvorak’s technique estimated maximum winds of 50 kt. The previous 24 h movement was northwesterly at 3 kt. The center of the storm at picture time was 14.7°N, 98.8°W. The storm was being fed by a strong feeder band from the ITCZ with inflow into the southeast, east, and northeast quadrants, and good cirrus outflow in all directions. A banding type eye was also seen. Dolores continued to develop over warm waters for the next 24 h and maintained a trajectory towards the Mexican coastline.

The 1614 GMT June 16 NOAA-3 VHRR picture showed Dolores to be a hurricane; the Dvorak classification (T/CI 4.5) indicated 72 kt winds. The center was at 16.5°N, 99.5°W.

Dolores began to weaken after the morning VHRR picture of 16 June and moved over land near Acapulco on the morning of 17 June as a tropical storm.

5. Eileen

A bright area of convective activity observed on ATS-3 and VHRR prints near 15°N, 110°W on June 29 and 30 was resolved in the evening NOAA-3 VHRR picture of 30 June as a depression at 16.4°N, 110.7°W. Wind speeds were estimated at 25 kt.

The VHRR photograph of 1623 GMT July 1 showed Eileen had become a tropical storm. Eileen was assigned a Dvorak T number of 2.5 (35 kt maximum winds); Eileen never reached a higher intensity classification. An extensive stratocumulus field in her path caused stable inflow that limited her growth. This storm began weakening by the morning of 2 July. Eileen was last seen at sea near 19.9°N, 113.4°W on the evening of 3 July.

6. Francesca

Francesca (Fig. 5) was first visible as a bright, cloudy area centered near 10°N, 100°W early on 12 July. This area of enhanced convective persisted and intensified for nearly 36 h as it moved west northwesterly. This disturbance became a tropical depression on the evening of 13 July with its center near 11.5°N, 98.5°W.

The morning VHRR picture of 15 July showed tropical storm intensity (Dvorak classification T 2.5, with 35 kt maximum winds).

Francesca continued to intensify while slowing and turning more northward. She was classified at hurricane intensity by the time the afternoon ATS-3 pictures of 17 July were available. Winds estimated from the photograph were about 72 kt (T/CI 4.5) around a center at 21.0°N, 110.8°W.

Peak intensity never exceeded 72 kt. Francesca remained at a Dvorak T 4.5 intensity for more than 12 h and then started to weaken. Cooler water in the storm path and the inflow of more stable Pacific air cut life short for Francesca.

The morning VHRR picture of 18 July showed a decrease to tropical storm intensity, which was maintained until the storm merged with tropical storm Gretchen on 19 July.

7. Gretchen

Gretchen and Francesca (Fig. 6) developed within 800 n mi of each other and then began to rotate about a central point between their centers until they finally
merged on 19 July. This constituted a rare occurrence of a Fujiwhara pattern in the eastern North Pacific.

Gretchen first appeared in satellite photographs as a broad area of thunderstorms near 11°N, 114°W on the afternoon of 12 July. (Francesca, at this time, was visible as a disturbance at 10.5°N, 91.5°W). This area, which later became Gretchen, moved westerly at 3 kt through 14 July, northerly at 5 kt through 15 July, and then northeasterly at 18 kt through 17 July. On the morning of 17 July, satellite pictures showed Gretchen was a tropical storm with 35 kt winds. As Francesca moved northwestward, wind speeds in Gretchen increased, and the storm was steered towards the northeast.

Satellite pictures on the morning of 18 July showed Gretchen to have T 3.5 intensity. Apparent movement was shifting toward the northwest. T 3.5 (50 kt maximum winds) was the highest T-number classification Gretchen could be assigned by analysis of satellite pictures during its trajectory over the Pacific.

Weakening Francesca merged with Gretchen by the morning of July 19. From this time on, Gretchen also weakened while moving westward across cooler Pacific waters. She soon was classified as a depression and was finally dropped completely on 21 June. The last center location was at 26.0°N, 122.5°W.

8. Helga

On 7 August, a bright area of thunderstorms which had persisted for 24 h near 10°N, 100°W was classified as a tropical disturbance upon analysis of afternoon ATS-3 pictures.

The disturbance developed slightly and moved west northwest for the next 36 h. The VHRR pass for the morning of 9 August showed the system to be a tropical depression at 12.8°N, 108.7°W. Winds were estimated at about 25 kt.

During the next 24 h, the depression moved west-northwesterly and developed very slowly. Maximum winds were estimated as 35 kt from the 10 August morning VHRR picture. This corresponds to a Dvorak T number of only 0.5 greater than the day before. However, at this intensity, the system qualified as a tropical storm and was named Helga.

Helga moved westerly and west-northwesterly until dissipating at sea near a stratocumulus field 48 h later.

Helga never did display good divergence aloft in the form of cirrus outflow, and her movement into the stratocumulus to the west and northwest was responsible for dissipation. The highest Dvorak classification assigned was T 3.0 at 15°N, 117.8°W on the morning of 11 August. This intensity lasted only 12 h before weakening began.

Helga was downgraded to a depression early on 12 August and was dropped completely on 13 August at 17.0°N, 126.4°W.

9. Ione

The morning VHRR picture of 19 August showed a depression located at 13.0°N, 124.5°W, with a moderate feeder band out of the ITCZ flowing into its southeast quadrant. Cirrus outflow was also visible in all but the southeast quadrant (Fig. 7).
The morning VHRR photo for 20 August showed the system had a tropical storm classification of T 2.5. The system retained tropical storm intensity for only 24 h, after which time it decreased to T 1.5 intensity. Storm movement over the previous 24 h was 285° at 10 kt. The depression remained at T 1.5 intensity level for the next 36 h, moving generally westerly at 8 kt. Cold air entrainment near a stratocumulus field seemed to be keeping the storm from developing normally.

The daytime VHRR photo for 23 August showed the storm had suddenly redeveloped overnight to tropical storm intensity (T 3.5) at 13.0°N, 138.2°W. A ragged eye was visible at picture time.

Aone continued to develop rapidly over the next 12 h and continued moving westerly at about 3 kt. On the evening of 23 August, the storm reached hurricane intensity with 97 kt winds. Tracking was taken over by the Hawaii WSO shortly thereafter, when the storm moved west of 140°W. Joyce subsided to tropical storm intensity by the evening of 24 August and weakened slowly while moving northwesterly. Joyce became a depression by the morning of 27 August near 19.5°N, 128.5°W; no further analysis was done after nightfall on 27 August.

11. Kirsten

The ATS-3 photographs of 21 August showed an area of heavy cumulus activity 5° in diameter centered near 13°N, 122°W (Fig. 9). From the evening VHRR picture of 21 August, this area was classified as a depression with winds near 30 kt, and a center at about 13.6°N, 123.8°W.

VHRR and ATS-3 prints for the morning of 22 August showed intensification to tropical storm classification (T 3.0) with 40 kt maximum winds and a MSLP of 992 mb. Kirsten continued to develop during 22 August, and by nightfall had increased to a T 3.5 intensity storm with a center at 15.8°N, 127.8°W. Movement during the previous 24 h was generally 300° at 11 kt.

The day VHRR picture for 23 August showed that overnight Kirsten had developed an eye with a diameter of approximately 20 n mi. The storm, now classified T 4.0, was centered at 16.0°N, 129.0°W, with 60 kt maximum winds.

Kirsten slowed, then reached hurricane intensity by the morning of 24 August; VHRR photos indicated a classification of T 4.5 (72 kt winds and 973 mb MSLP). The previous 24 h movement averaged 285° at 4 kt. A ragged, imbedded eye approximately 10 to 15 n mi across was visible on VHRR pictures. Stable flow marked by a stratocumulus field beginning to infiltrate the circulation was visible. Hence, no further development was expected.

By the evening VHRR photo on 24 August, Kirsten had begun to weaken and had gone to tropical storm intensity. A ragged eye was still visible on the photo. The storm continued to weaken and was classified a depression by the evening of 25 August. The night VHRR picture for 25 August showed the center of circulation near 15.0°N, 129.5°W; the past 24 h movement was generally 130° at 5 kt.
The remains of Kirsten were last seen as low-level clouds in the ATS-3 morning pictures for 28 August at 13.8°N, 127.3°W.

12. Lorraine

A bright area of convective activity near 10°N, 110°W was spotted in ATS-3 photos of 22 August. Film loops through the day showed signs of increasing organization and some rotation within the area. The NOAA-3 VHRR photograph at 0415 GMT on 23 August showed this area to be a depression at 11.0°N, 117.2°W. For the next 24 h, the system moved toward 290° at approximately 6 kt.

The 0329 GMT 24 August NOAA-3 VHRR picture showed the system as a tropical storm (T 3.0) near 12.0°N, 119.5°W. Lorraine never reached more than tropical storm intensity. The highest Dvorak classification was T 3.5 on 24 August. The storm remained at this intensity for nearly 12 h and then the central overcast narrowed, and the storm moved on a more northward path.

The 1604 GMT 25 August ATS-3 picture showed decrease to depression intensity. From this time until 26 August, the depression moved northeastward. After 26 August, Lorraine moved west northwesterly and dissipated at sea on 28 August.

13. Maggie

A suspicious area of strong convective activity was seen in the afternoon ATS-3 pictures of 24 August. This area continued to organize during the next 12 h and was designated a tropical depression on 25 August using the 1508 GMT NOAA-3 VHRR pictures. The depression appeared to be centered near 12.0°N, 104.5°W at picture time. There was rapid development during the next 24 h (Fig. 10).

The 2038 GMT ATS-3 picture of 25 August showed tropical storm intensity. Maximum winds at the center, using Dvorak’s classification, were estimated at 50 kt and the MSLP at 987 mb. Maggie appeared to be well supported by the flow of moist air out of the ITCZ into the south and southeast quadrants.

The 2034 GMT ATS-3 picture for 26 August showed Maggie had developed to hurricane strength. The central winds were now estimated at 72 kt and the central pressure at 973 mb. The center was at 14.1°N, 106.1°W. There was evidence of an eye wall forming. Within 36 h, Maggie had developed from a depression with 30 kt winds to a hurricane with 72 kt winds.

Maggie continued to develop rapidly over the next 24 h, reaching maximum intensity on 27 August when assigned a Dvorak classification of T 6.5 from the 2030 GMT ATS-3 picture. Winds and MSLP were
122 kt and 928 mb respectively. The center was at 16.2°N, 108.6°W. A well defined banding feature, approximately one degree in width, encircled more than half of the central dense overcast. Maggie remained at peak intensity for the next 24 h and then began to weaken.

Maggie weakened quite slowly for the next few days and reached tropical storm intensity according to the 0356 GMT VHRR picture of 31 August. The banding feature was neither so wide nor so tightly wound about the central cloud features as it had been earlier; winds had dropped to approximately 60 kt. By 1 September, the storm became a depression near 20.3°N, 119.8°W, Dissipation continued for the next 36 h and Maggie died at sea by 2 September.

14. Norma

ATS-3 pictures on 7 September showed a large, bright area of thunderstorms, five degrees wide, centered near 13°N, 98°W. The afternoon ATS-3 pictures of 8 September showed a tropical disturbance at 14.0°N,
98.0°W. Winds were estimated at 20–25 kt, the MSLP at 1004 mb. The disturbed area continued to organize over the next 24 h and became a depression by the morning of 9 September.

Until then, the general movement of the storm was northwesterly. However, afternoon ATS-3 pictures on 9 September showed the storm had started to curve towards the north northwest and was headed toward the Mexican coastline. This same ATS-3 photograph showed this system was now a tropical storm. A Dvorak T 2.5 was assigned to Norma at this point in her short lifetime. The center was at 15.6°N, 100.2°W.

VHRR photographs indicated that Norma reached peak intensity on the evening of 9 September. The center with 50 kt winds was fixed at 15.8°N, 100.5°W but was still moving north northwesterly towards Mexico. Tropical storm Norma went ashore west of Acapulco during the forenoon of 10 September and penetrated the Mexican coastline with 40 kt winds (estimated from satellite pictures).

15. Orlene

ATS-3 pictures on the morning of 20 September showed a depression at 14.0°N, 96.0°W. Fifi, a Caribbean hurricane, had moved onshore over Honduras the previous evening (Fig. 11). The remains of Fifi continued moving west and shortly thereafter joined the northwesterly track of the depression. The merging of these two systems either caused the depression to intensify or the remains of Fifi to regenerate. Whatever the case, tropical storm Orlene was moving west-northwesterly at 12 kt by the morning of 21 September.

The 1555 GMT VHRR pictures of 21 September showed Orlene’s center at 16.7°N, 100.5°W with maximum winds of 40 kt.

Orlene veered more northwesterly and reached hurricane intensity by 1420 GMT 23 September, with the center at 21.5°N, 106.8°W. The storm movement was parallel to the Mexican coastline. A small eye was imbedded within the ragged central overcast of the storm.

Orlene reached peak winds of an estimated 65–70 kt just before going ashore (at about 1800 GMT on September 23) just southeast of Culican. Orlene dissipated rapidly after hitting land, but there was heavy cumulus activity in the area of Culican and Manzanillo for some time afterwards.

16. Patricia

A persistent area of convective activity seen in the satellite pictures was designated a tropical disturbance on the afternoon of 3 October. Activity associated with the disturbance was centered near 10.0°N, 93.0°W. A circulation within the cloudy area observed on the 4 October ATS-3 film loop was identified as a depression, and a Dvorak T 2.0 was assigned using the 2150 GMT ATS-3 photograph.

A marked increase in the organization of the system was observed from the morning VHRR pictures on 6 October. Tropical storm Patricia was then listed at 10.3°N, 103.6°W with 35 kt maximum winds. The storm was moving at 285° at a speed of 8 kt.

On the 7 October morning VHRR picture, Patricia was analyzed as a hurricane, centered at 12.5°N, 108.0°W. A ragged, banding-type eye was visible. Patricia continued to develop and reached peak intensity on the evening of 9 October (Fig. 12). Analysis of the evening VHRR picture yielded 85 to 90 kt maximum winds and a 964 mb MSLP. The storm center was at 18.0°N, 120.0°W.

The storm weakened slowly after this time and turned southwestward, moving at about 5 kt. Patricia decreased to tropical storm intensity on 11 October. Analysis of the 0349 GMT VHRR photos showed winds of only 60 kt. Then the storm moved westward, increasing forward speed to approximately 12 kt. Patricia became a depression on the evening of 11 October. Because weakening was slow and gradual, Patricia still was visible in the low-level clouds on 15 October. However, with no convective clouds and with little organization visible, analysis of the system was dropped after 14 October. The remains of Patricia were last observed at sea near 17.0°N, 132.8°W.

17. Rosalie

On October 18, thunderstorm activity in the ITCZ became more pronounced in the area between 10.0°N, 15.0°N and 122.0°W, 127.0°W. Satellite pictures on 19 October hinted at a possible disturbance centered near 13.0°N, 129.0°W. Activity developed rapidly in this
area, and on the morning of 20 October tropical storm Rosalie was named. The 20 October morning VHRR photo showed the center at 15.0°N, 131.2°W. No banding features were present, but an oval shaped central cloud feature with a diameter close to 1.25° led to a T 3.0 classification (40 kt winds and a 992 mb MSLP). At picture time movement was due west at 15 kt.

Maximum intensity occurred the morning of 21 October (Fig. 13) when analysis of VHRR photos required a Dvorak T number of 3.5. The satellite picture showed Rosalie to be on the edge of a stratocumulus field, suggesting the presence of stable inflow just ahead.

Rosalie then began to weaken and became a depression the morning of 22 October. The VHRR infrared satellite photo showed an almost total lack of convective activity and mostly low-level cloudiness in the circulation. The picture showed the center at 13.6°N, 135.5°W. This indicated a more west-southwesterly movement. Later, Rosalie again moved to the west.

Rosalie hovered at about depression stage for the next 36 h. The evening VHRR on 23 October showed her remains centered at 13.4°N, 138.6°W.

REFERENCES
