

From its early stages east of the Marianas, to final dissipation over Japan, Mary's behavior was atypical of a tropical cyclone. Mary's circulation during the early stages was marked by maximum wind bands removed from the center by several hundred miles. In addition, the storm's circulation reached enormous proportions, dominating the weather events over the entire Philippine Sea for several days. The longest lived tropical cyclone of the season, Mary persisted for 15 days with 2 1/2 of these days spent inland from the East China coast. Toward the end of its lifetime, Mary culminated its unusual behavior by defying climatology, leaving the East China coast on an easterly heading, and regenerating to typhoon strength.

First identified as a weak circulation on synoptic surface charts on 9 August, Mary developed to depression status by the 11th in the monsoon trough some 250 nm east of Saipan. It is significant that during this period surface pressure falls to 5 mb below normal were occurring along the trough across the Philippine Sea. As a result, the monsoon westerlies began to intensify producing a narrow belt of winds averaging 25-30 knots feeding into the depression. By the 11th, satellite data revealed a band of cloudiness extending from the Philippine archipelago to the eastern Carolines in response to the strengthening monsoon flow (Figure 4-9).

Initially moving northeastward, Mary's circulation began to generate winds of tropical storm force late on the 11th. Thereafter, the storm shifted to a northwest course abruptly accelerating in forward speed to 14 knots on the 13th. Mary's circulation was characterized during this period by the existence of maximum wind bands far removed from the low pressure center. Reconnaissance aircraft reports on the 11th and 12th indicated that the center was becoming increasingly separated from the associated convective cloudiness. By the 13th, the center was 200 nm from the nearest convective band. The dimensions of the anomalous structure was readily apparent in satellite views on the 14th (Figure 4-10). By this time a band of convective cloudiness spiraling around the center in a broad arc was evident--a pattern quite similar to an extratropical low.

As Mary's center took a poleward component on the 12th and 13th, the associated convective band leading into the circulation, and trailing some 500 nm south and southwest of the center, drifted over Guam. Winds gusting to gale force occurred over a period of 3 days starting early on the 11th. Peak gusts from the southwest reached 57 knots on the 12th (0950Z) and the 13th (2012Z) at Andersen AFB. Rainfall amounts of 7.25 inches in 24 hours were recorded at Andersen AFB between the 11th and 12th as the island lay beneath Mary's outer convective band. This extreme 24-hour rainfall amount exceeds all records for August on Guam.

The persistent strong southwesterly winds were responsible for significant damage to marine interests on Guam. The CARIBIA, a 40,000 ton passenger liner, being towed to Taiwan for salvage, broke loose from her tug at the entrance to Apra Harbor, ran aground on the breakwater, and later sank. An estimated \$3.3 million loss was associated with the sinking of this vessel. The heavy seas also took their toll on small craft (which are normally protected on the leeward side of the island in the trades) as many broke their moorings and went aground. One yacht valued at \$250,000 was included among the lost vessels. Two lives were lost due to drowning and damage estimates amounted to over \$542,000 in the Territory.

On Rota, Tinian, and Saipan crops were especially hard hit by the strong winds and torrential rains. On Tinian, the vessel MV MARIANAS broke from its moorings and went aground. In the northern Marianas, major damage was sustained mostly to copra and banana trees.

As Mary neared the Volcano Islands, the area of surface pressure of 1000 mb or less was exceedingly large--stretching at its greatest diameter some 1200 nm in a north-northeast/south-southwest orientation and 850 nm in an east-west direction. The unusually low pressures in the trough trailing Mary southwestward into the Philippine Sea caused development of a tropical depression some 350 nm north-northwest of Yap. Moving eastward in Mary's circulation, the depression apparently interacted with the tropical storm midday of the 14th when it approached within 700 nm of Mary's center, Mary's forward motion began to slow and the storm abruptly shifted to a westerly course early on the 15th. Meanwhile the strong tropical depression accelerated in forward speed around Mary's southeastern side and dissipated due to the excessive vertical shear.

Late on the 14th the center of Mary's broad eye crossed 35 nm south of Chichi Jima. The island's meteorological station reported a minimum pressure of 977.1 mb (14/2240Z)--only slightly higher than an aircraft reconnaissance central pressure observation a few hours later (972 mb at 15/0217Z).

On the 15th, a second depression was spawned 300 nm east of Luzon in the low pressure envelope trailing Mary. Accelerating eastward in Mary's circulation, Nadine developed to tropical storm force late on that day. Once Nadine was within 700 nm of Mary's center late on the 15th a second interaction occurred, resulting in Mary's continued westward movement (Figure 4-11).

A long wave mid-tropospheric trough west of Lake Baykal began to deepen on the 16th resulting in a rapid building of a ridge downstream over Manchuria with a high pressure cell centered near Port Arthur. This abnormally strong high blocked any further poleward movement and caused Mary to maintain an anomalous westward course until landfall

on the East China coast on the 19th.

During this westward movement, satellite data indicated that Mary developed a more tropical appearance as a canopy of cloudiness covered the cyclone's center. Mary intensified slightly, and for a short period on the 18th winds reached typhoon force as the storm cut through the Ryukyu chain (Figure 4-12). Naze city on Amami-O-Shima reported the lowest pressure (979.6 mb at 18/0240Z) as Mary's center tracked 20 nm to the north. The highest winds in the Ryukyus were measured at Yakushima Island which recorded a peak gust of 90 knots at 18/0040Z. As the typhoon's precipitation swept over southern Kyushu, heavy rainfall amounts varying between 8 and 11 inches were reported in the mountainous areas. Miyakonjo on Kyushu measured the greatest 24 hour total of 6.4 inches during the 18th.

Moving inland on the China coast about 100 nm south of Shanghai late on the 19th, Mary was blocked from moving into the mountainous interior by a high cell over central China. As a result, Mary stalled just inland as a deep depression for several days. Meanwhile, the mid-tropospheric ridge over Manchuria began to break down rapidly as a developing mid-tropospheric trough east of Lake Baykal begin to deepen equatorwards.

By the 22nd, the increasing westerly flow west of and over the Gulf of Chihli forced the depression back out over the open waters of the East China Sea.

Regenerating to minimum storm strength on the 23rd, Mary passed over Okinawa as a "back door" storm early on the 24th increasing in forward speed to 13 knots during crossing. The meteorological station at Kadena Air Base registered a minimum pressure of 981 mb (24/0105Z) and a peak gust from the northwest at 41 knots. Center passage was estimated 18 nm to the north of Kadena. At the Naha Observatory a peak gust of 58 knots (24/0330Z) was recorded. Later in the day, Mary passed just north of Minami Daito Jima as the storm achieved typhoon intensity. The

Japanese weather station on the island experienced a peak gust of 90 knots (24/1707Z) and a minimum pressure of 969.3 mb (24/1704Z).

The development of a low within a mid-tropospheric trough over Korea began to draw Mary on a northward course late on the 24th. Due to the tightening gradient over Japan created by this deepening trough and a subtropical ridge cell positioned east of Honshu, Mary accelerated north-northeastward reaching a forward speed of 26 knots prior to striking Honshu near Hamamatsu on the 26th.

Mary briefly maintained typhoon status on the 25th, although the cyclone's winds dropped to storm strength prior to landfall on Honshu. Further evidence of Mary's rejuvenation came from aircraft reconnaissance late on the 24th observing a 15 mb drop in 24 hrs to 964 mb (24/2141Z). Several hours later the British vessel W. C. VAN HORNE was caught near the eye of the typhoon while crossing 30 nm east of the center. Winds of 70 knots from the south and a pressure of 981.8 mb were reported from this vessel at 25/0600Z. Crossing the Japanese coastline near Hamamatsu, the meteorological station indicated Mary's central pressure had risen to 986.2 mb (26/0030Z). Thirty minutes prior to center passage a peak gust of 63 knots was recorded at the station. Elsewhere along the coast, Omaezaki reported a southerly gust of 69 knots (26/0050Z).

Merging with a frontal system over Japan, Mary became extratropical moving inland over Honshu early on the 26th. Heavy rains spread over the north central region of the island with the greatest 24 hour amount of 8.98 inches occurring at Nikko. On the southern coast, Shizuoka City recorded a 24 hour total of 6 inches.

Only one casualty occurred in the Japanese islands as a result of Mary; however, strong winds associated with Mary over the Sea of Japan were responsible for capsizing a fishing trawler off Cape Amasaki. Of a crew of eleven, only one was rescued.

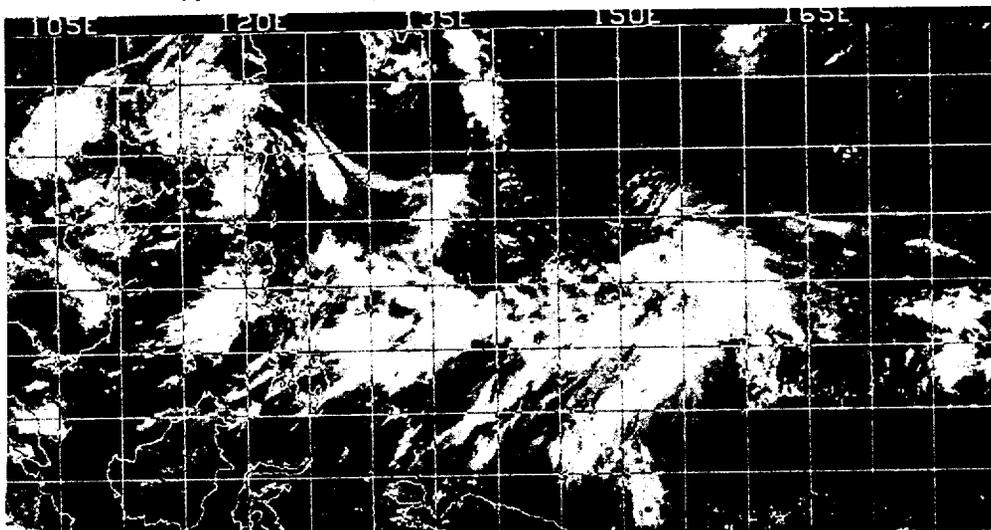


FIGURE 4-9. NOAA-2 satellite mosaic for 11 August 1974 showing cloud band associated with southwest monsoon extending from the Philippines to Mary developing east of the Marianas.



FIGURE 4-10. Tropical Storm Mary appearing as an extratropical system centered 220 nm southeast of Iwo Jima, 14 August 1974, 0118Z. (DMSP imagery)

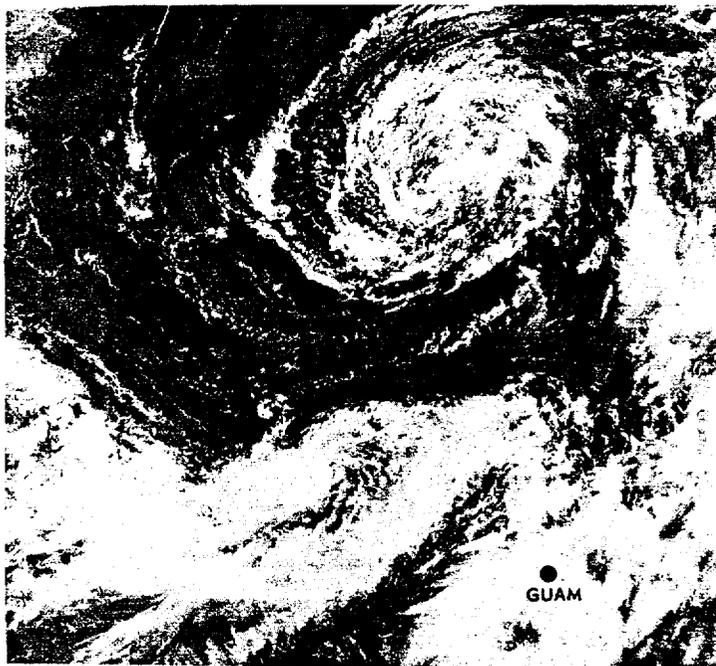


FIGURE 4-11. Tropical Storm Mary (top) centered 550 nm south of Tokyo. Tropical Storm Nadine (bottom) 700 nm further south in the Philippine Sea is centered 400 nm north of Yap Island, 16 August 1974, 0223Z. (DMSP imagery)

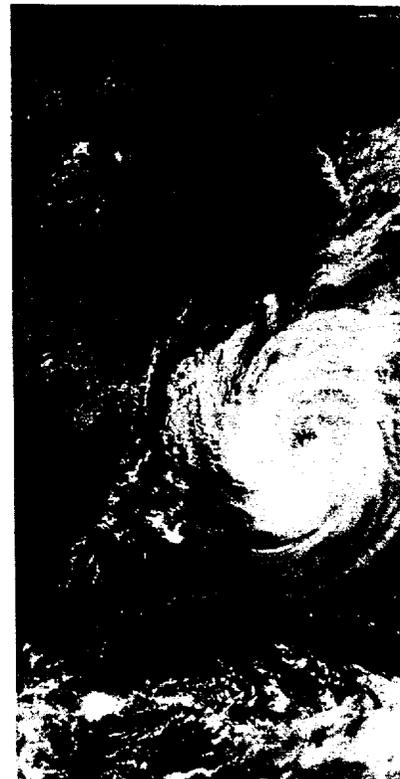


FIGURE 4-12. Mary after reaching typhoon force centered 100 nm north of Naha, Okinawa, 18 August 1974, 0327Z. (DMSP imagery)