CENTRAL PACIFIC HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL CYCLONES 1970

Central Pacific Hurricane Center

The tropical cyclone summaries for the years between 1832 and 1979 were taken from A History of Tropical Cyclones In the Central North Pacific and the Hawaiian Islands 1832-1979.This Department of Commerce publication was printed in 1981 and authored by Samuel Shaw of the Central Pacific Hurricane Center (CPHC) and the National Weather Service Forecast Office in Honolulu, Hawaii.

JULY 29 - AUGUST 3 1970 (TROPICAL STORM THERESE)

Two tropical disturbances which originated in the Central North Pacific during 1970 moved into the Western North Pacific and intensified into tropical cyclones.

The first of these was Tropical Storm THERESE which developed from a tropical disturbance first located from satellite imagery about 100 miles southeast of Midway Island near 27N 176W. The disturbance moved west, passing about 60 miles south of Midway, to 27N 175E and then turned to the northwest. It intensified to a tropical depression near 29.5N 170.0E during the afternoon of August 1. The following afternoon an Air Force reconnaissance aircraft reported THERESE at tropical storm strength with 40-knot winds near 36N 166E, it recurved to the northeast with a forward speed of 25 knots.

The next afternoon the HARBASHAN encountered 40-knot south southwesterly winds and 11-foot swells near 44N 171E, 80 miles east of THERESE. That was the last report on the storm as it became extratropical.

AUGUST 15-26, 1970 (HURRICANE LORRAINE)

LORRAINE developed slowly and reached hurricane intensity west of 115W, where most Eastern North Pacific hurricanes weaken. This anomalous behavior may have been related to the existence of tropical storm MAGGIE to the west. The circulation around MAGGIE apparently diverted low-level cool air, which usually flows in from the north, away from LORRAINE and allowed an increased inflow of moist unstable air from the ITCZ causing intensification.

The original low pressure center was traced from about 300 miles southwest of Tehuantepec. It was brought to the attention of the forecasters at the NWS San Francisco office by a report from the COLUMBIA MARINER on the 15th which located the center near 11N 96W.

Satellite pictures indicated little change on the 16th but definite intensification was noted on the 17th with an expanded area of rotation shown by spiral banding centered near 13N 104W. The picture on the 18th again indicated a period of little development; then for more than 3 days, there was steady intensification, documented by daily Air Force and Navy aircraft reconnaissance and twice-daily APT photographs.

The MARGARET LYKES, moving southeast at 18 knots, passed through the eye of the storm at 14.2N 114.9W between 2000 and 2100 GMT on the 19th and still estimated 50-knot winds and 25 foot seas 3 hours later.

Satellite photos on the 20th when LORRAINE was near 14.5N 118.0W, were remarkable for the apparent heavy cirrus production, with anticyclonic outflow to the southwest from the top of the eye-wall chimney and a broad feeder band from the direction of developing tropical storm MAGGIE to the west.

An excellent interpretation of satellite imagery pertaining to LORRAINE as related by William J. Denney (1971), lead meteorologist at the NWS forecast office at San Francisco, follows and is quoted verbatim because of its sound meteorological thinking:

"Pictures on the 22nd were of a mature hurricane with maximum winds near 100 kt. The perfectly round eye seen by reconnaissance was clearly visible, and internal banding was defined by bulges in the solid cloud top, which cast shadows on the northeast side. However, the feeder bands that had been on the south and southwest side the day before were losing connection to the ITCZ. There was reason to believe that dynamic processes in the storm were retaining only some of the inflow energy for release in the eye wall, but were releasing most of it about 200 nm east of the center where cumulonimbus were more numerous and developed than downstream along the spiral toward the hurricane. Premature release of inflow energy would mean less heat would be released in the eye-wall chimney and the concentration of warm air and pressure gradients would be reduced near the eye. In the satellite pictures, it was seen that the continuous stratocumulus sheet northeast of the storm area was disturbed by the storm circulation; it could be assumed that cold surface air was flowing in with the usual cross-isobaric component toward lower pressure.

"Weakening was well underway when Air Force reconnaissance made a detailed eye report at 1730 GMT on August 28. Cloudiness had decreased, permitting an observation of 60 kt maximum surface winds 30 nm northnorthwest of the center; wall clouds were no longer solid to the south and southwest. At 300 mb, the eye temperature was then only 6 C higher than the environment. Radar showed the structure was still well defined. A clear ESSA 8 picture showed an extensive stratocumulus deck, apparently formed by breaking of stratus around the north and northwest periphery, wrapped around the west side of the storm within 200 nm of the center. This indicated the inflow of stable air. Feeder bands in the south semicircle were completely gone, and a nearly clear tongue of air about 100 nm wide separated the storm from warmer water to the south and southeast. Fringes of the hurricane cloud spiral were feathered as if dissipating, and the dimly visible eye had become irregular in appearance as could be expected with the deterioration of the eye wall reported by reconnaissance."

LORRAINE was downgraded to a tropical storm near 17N 129W at 2100 GMT on the 23rd.

Dissipation was observed only by means of satellite photos since all available reconnaissance facilities were concentrating on tropical storm MAGGIE which was threatening Hawaii. The pictures suggested a baroclinic interaction between low-level stable air around the storm center and renewed inflow from the southeast. Heavy convection formed 150-300 miles east of the center, and there was no contribution of warm air to LORRAINE's storm core.

The final advisory on LORRAINE located it at 17.2N 157.8W on the afternoon of the 26th. Since the remnants of LORRAINE were a tropical depression while in the Central North Pacific, the system was named Tropical Depression #2 during that period of its life.

AUGUST 17-26, 1970 (TROPICAL STORM MAGGIE)

The cloud vortex near 11N 114W that eventually developed into Tropical Storm MAGGIE was discernible on satellite photos as early as August 17. It was then 650 miles west of LORRAINE. The slowly organizing vortex, after having moved west-southwest for 2 days, was clearly intensifying while moving west-northwest on the 20th. The French refrigerated cargo carrier BIAFTA, 50 miles southeast of the new storm centered near 12.8N 129.5W was buffeted by 38-knot southerly winds during mid afternoon of the 20th. MAGGIE had been moving faster than LORRAINE, increasing the distance between the two storms to 850 miles.

At 18000 GMT on the 22nd Air Force reconnaissance fixed the center at 14.55N 138.42'W, and reported maximum winds of 50 knots. It was poorly defined,open from north through southwest, and at 700 mb its temperature (13C) was 4 higher than that of the environment. A report from the aircraft stated, "An abnormal amount of moderate to heavy rain was encountered upon entering from the east, but the radar echo had only slight curvature." Satellite photos indicated the stratocumulus sheet around the north side of the storm was breaking up, as if there was widespread low-level convergence lifting the trade inversion.

MAGGIE was fixed at 17.53N 148.47W by Air Force reconnaissance visual inspection of the cloud pattern from a 300 mb flight level at 2148 GMT on the 24th. A solid wall of clouds with occasional lightning extended for 100 miles from the north to the southeast; tops were 40,000

feet and cirrus was blowing off to the east. The 15 nautical mile diameter circular center was filled with multi-layered clouds to 16,000 feet. Maximum winds of 25 knots were estimated through breaks in the undercast about 20 miles out in the south semicircle. Dropsonde surface central pressure was 1003 mb (29.62"). At 1930 GMT, ESSA 8 picture showed a dark shadow lying northwest to southeast across the center of the storm. This shadow was cast by the wall of cloud seen by reconnaissance 2 hours later.

MAGGIE had weakened on the 25th when studied by Air Force multi-level reconnaissance less than 250 miles east-southeast of Hilo. Tops of cumulonimbus were generally about 28,000 feet and the center had a weak wall cloud only in the east quadrant. Maximum observed surface winds were 25 knots 25 miles from the center on the southeast side. The temperature at 500 mb in the center was -50C; the environment temperature was -70C.

During the afternoon of the 25th MAGGIE moved westward and passed 90 miles south of South Point, the southernmost point in the Hawaiian Islands. MAGGIE was then a tropical depression with peak winds of only about 35 m.p.h. near the center. Nevertheless, it was still capable of causing torrential rains and high seas.

Hawaii Island bore the brunt of the storm. On account of the effects of MAGGIE in eliminating the trade wind inversion and in strengthening the trades, rainfall over the lower windward (eastern and northeastern) flanks of Mauna Loa and Mauna Kea was unusually heavy, with a number of stations on the slopes above Hilo reporting 24-hour amounts in excess of 18 inches and storm totals of 25 inches or more. Despite these accumulations, intensities seldom exceeded an inch an hour so that only minor local flooding, landslides, and crop damage occurred. Surf estimated up to 25 feet pounded the Kapoho Beach area on the easternmost tip of Hawaii Island, but without significant damage.

On Hawaii Island 12 stations with periods of record rang from 44 to 65 years exceeded their previous greatest 24-hour rainfall total for August. The previous August 24-hour extre of 9.38 inches at Hilo, with 27 years of record, was broken during this storm with 9.65 inches.

All the other islands except Molokai and Lanai received beneficial rains generally ranging from 2 to 3 inches from the 25th through the 27th. Mt. Waialeale on Kauai had a storm total near 14 inches and the Paakea station on Maui reported near 8 inches.

MAGGIE turned to the southwest and continued to weaken aft passing south of South Point and the last advisory on the storm located the center near 17.2N 157.8W at 270000 GMT.

1970: Tropical Storm Maggie

Date/Time (UTC)	Latitude (N)	Longitude (W)	Pressure (mb)	Wind Speed (kt)	Stage/Notes
08/23/0600	15.1	140.3		45	Tropical Storm
08/23/1200	15.3	141.2		45	"

08/23/1800	15.6	142.7		45	"
08/24/0000	16.0	144.1		45	"
08/24/0600	16.3	145.5		45	"
08/24/1200	16.5	147.0		45	"
08/24/1800	16.9	148.5		45	"
08/25/0000	17.3	150.0		45	"
08/25/0600	17.6	151.3		45	"
08/25/1200	17.7	152.7		45	"
08/25/1800	17.6	154.2		45	"
08/26/0000	17.5	155.7		40	"
08/26/0600	17.4	156.4		35	"
08/26/1200	17.3	157.1		25	Tropical Depression
08/26/1800	17.2	157.6		25	"
08/27/0000	17.2	158.1		25	"

SEPTEMBER 1-4, 1970 (HURRICANE DOT)

Post analysis of data indicated that Hurricane DOT was possibly a regeneration of Tropical Storm MAGGIE. The distance between the final advisory position for MAGGIE and the first warning location for DOT was 1550 nautical miles. The elapsed time indicates an average speed of 9 knots from the afternoon of the 26th to September 1. This possible connection was suggested mainly by intermediate satellite pictures.

CPHC records show that DOT was first located as a tropical disturbance on the 31st of August near 24N 172W . At 011200Z was classified as a tropical depression moving northwestward. The circulation center passed just northeast of Midway Island about 011800Z with increasing wind and precipitation. By 020000 it was classified as a tropical storm. Air Force reconnaissance verified hurricane strength with 70-knot winds at 030710Z shortly after the storm began recurvature to the northeast. DOT lost strength rapidly later that day and was downgraded to a tropical storm. Late on the 4th, DOT was absorbed into the circulation of a 1004 mb (29.65") cold LOW near 43N 17W.

1970: Hurricane Dot

Date/Time (UTC)	Latitude (N)	Longitude (W)	Pressure (mb)	Wind Speed (kt)	Stage/Notes
09/01/0000	25.3	174.0		30	Tropical Depression
09/01/0600	26.0	175.1		30	"
09/01/1200	27.0	176.2		30	"
09/01/1800	28.0	177.0		30	"
09/02/0000	29.0	178.0		40	Tropical Storm
09/02/0600	30.1	178.7		50	"
09/02/1200	31.3	179.2		55	"
09/02/1800	32.5	179.4		60	"
09/03/0000	33.6	179.7		60	"
09/03/0600	35.1	179.2		70	Hurricane Cat. 1
09/03/1200	36.2	178.2		70	"
09/03/1800	38.0	176.0		55	Tropical Storm
09/04/0000	39.8	173.0		45	"
09/04/0600	40.5	172.0		45	"

SEPTEMBER 14-29, 1970 (TYPHOON HOPE)

Typhoon HOPE was never classified as a tropical cyclone while in Central North Pacific waters. However, digitized ITOS-1 mosaics indicate that its early stages can be identified south of Johnston Island near 11N 170W on the 14th.

JTWC records showing HOPE's best track indicating a tropical disturbance which moved from 10N 173W to 13N 175E before classification as a tropical depression.

Four days later HOPE reached super typhoon status when it was southeast of Iwo Jima after experiencing a phenomenal drop of 84 mb (2.4811) in central pressure during the previous 24 hours.

HOPE is mentioned in this chronology only on account of its origin in the Central North Pacific. The Central North Pacific development of some Western North Pacific tropical cyclones should always be kept in mind by forecasters charged with interagency cooperation in

"handing off" Central North Pacific tropical cyclone activity to their counterparts at JTWC in the Western North Pacific.