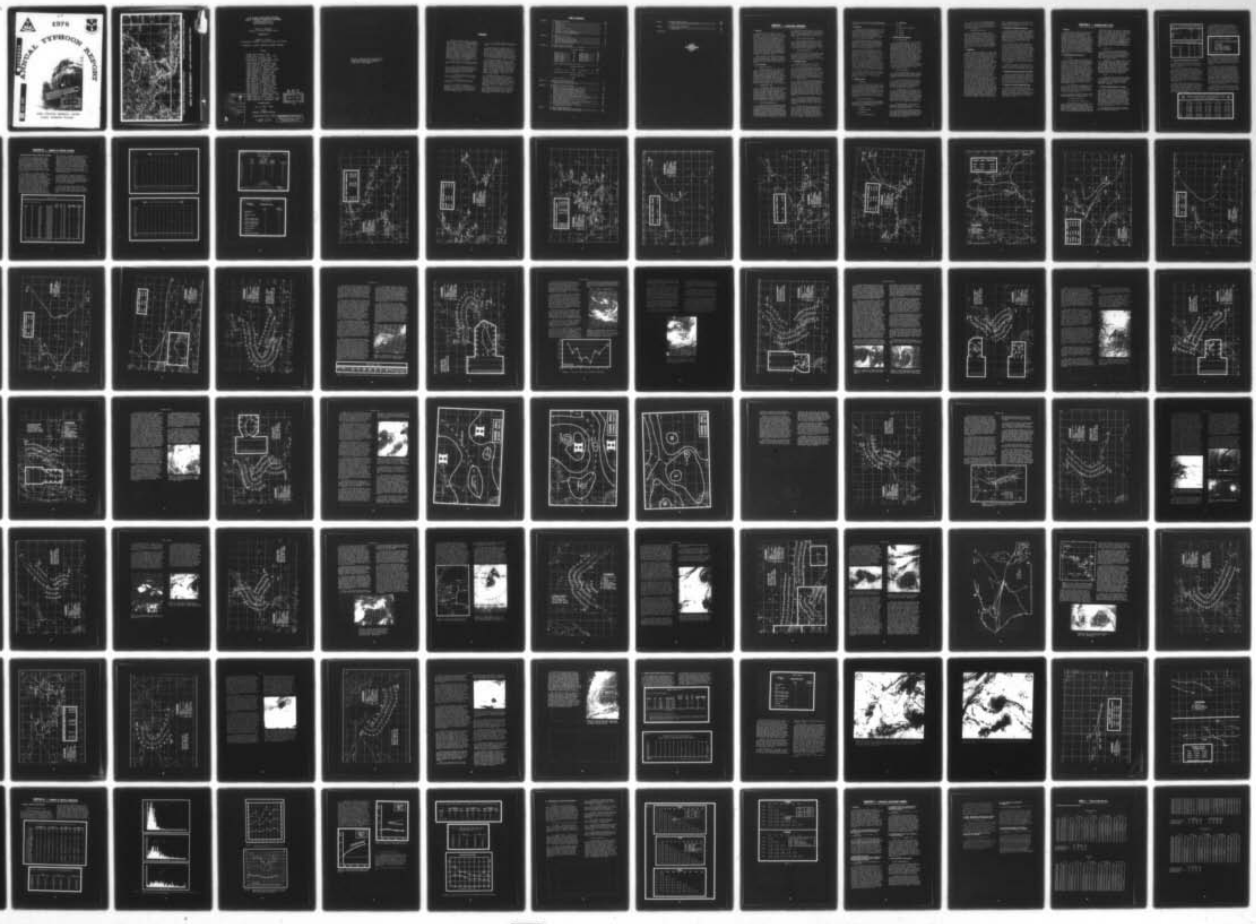
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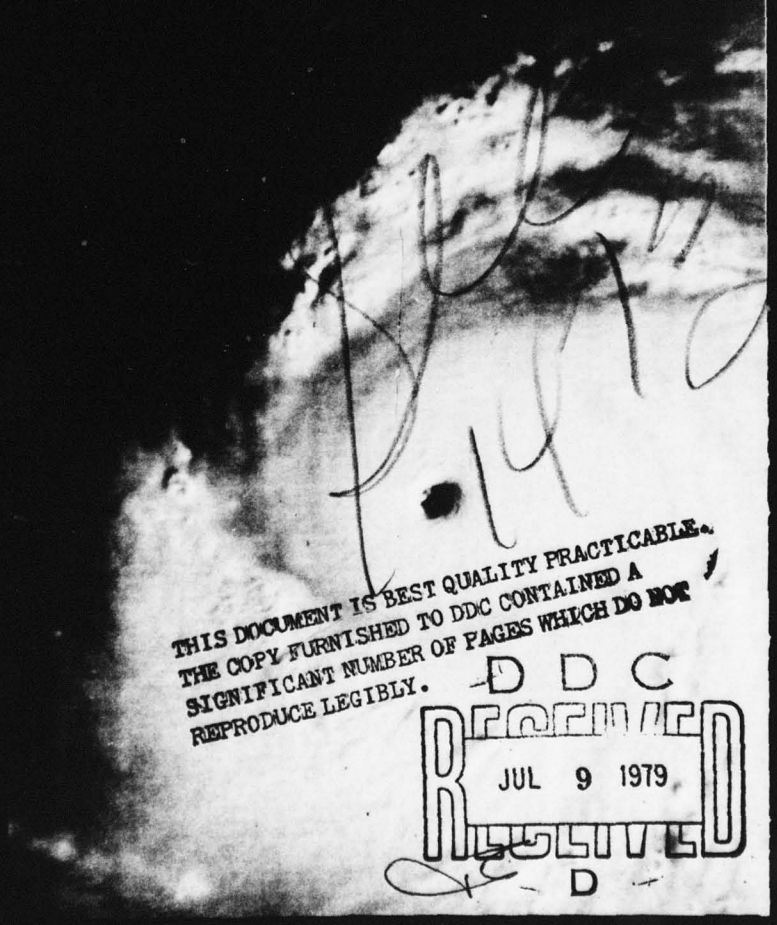
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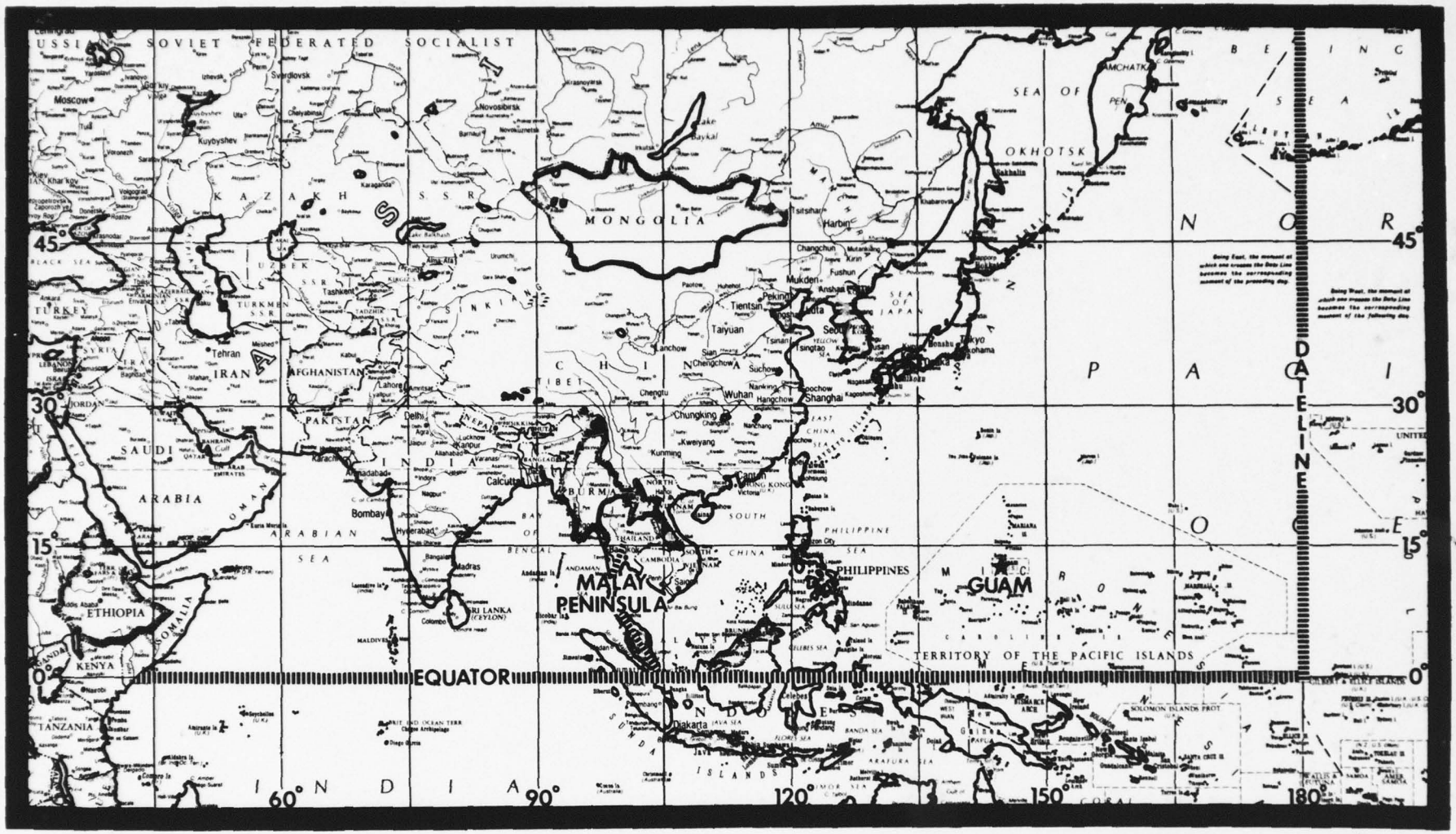
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JOINT TYPHOON WARNING CENTER
GUAM, MARIANA ISLANDS



Indian Ocean Area (Malay Peninsula to Africa)

Pacific Area (Dateline to Malay Peninsula)

AREA OF RESPONSIBILITY - JOINT TYPHOON WARNING CENTER, GUAM

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FRONT COVER: *Super Typhoon Rita at 150 kt (77 m/sec) strength and intensifying over the Philippine Sea, 24 October 1978, 2319Z. Details of Rita can be found on page 57. (DMSP imagery)*

FOREWORD

The Annual Typhoon Report is prepared by the staff of the Joint Typhoon Warning Center (JTWC). JTWC is a combined USAF/USN entity operating under the command of the U. S. Fleet Weather Central, Guam. The senior Air Force officer assigned is designated as Director, JTWC and is responsible to the Commanding Officer, U. S. Fleet Weather Central, Guam for the operation of the JTWC. The senior Naval Officer of the JTWC is designated as the Deputy Director/ Operations Officer. The JTWC was established by CINCPACFLT message 280208Z April 1959 when directed by CINCPAC message 230233Z April 1959. Its operation is guided by the CINCPACINST 3140.1 (series).

The Fleet Weather Central/Joint Typhoon Warning Center, Guam has the responsibility to:

1. Provide continuous meteorological watch of all tropical activity north of the equator, west of the Date Line, and east of the African coast (JTWC area of responsibility) for potential tropical cyclone development;

2. Provide warnings for all significant tropical cyclones in the assigned area of responsibility;

3. Determine tropical cyclone reconnaissance requirements and assign priorities;

4. Conduct an annual post analysis of all tropical cyclones occurring within the area north of the equator from 140W west to the coast of Africa and prepare an Annual Typhoon Report for issuance to interested agencies; and

5. Conduct tropical cyclone forecasting and detection research as practicable.

In the event of incapacitation of the JTWC, the alternate (AJTWC) assumes the responsibility for the issuance of warnings. The U. S. Fleet Weather Central, Pearl Harbor, Hawaii is designated as the AJTWC. Assistance in determining tropical cyclone reconnaissance requirements and in obtaining reconnaissance data is provided by Detachment 4, 1st Weather Wing, Hickam AFB, Hawaii.

The Central Pacific Hurricane Center, (CPHC) Honolulu, Hawaii is manned by personnel of the U. S. National Weather Service who are responsible for the issuance of tropical cyclone warnings for the area north of the equator from the Date Line east to 140W. Warnings are issued in coordination with the U. S. Fleet Weather Central, Pearl Harbor and Detachment 4, 1WW, Hickam AFB, Hawaii. Post analysis information is forwarded to the JTWC for inclusion in the Annual Typhoon Report.

The meteorological services of the United States are planning to implement the metric system of measurement over the next few years. Some civilian and military agencies have started the education program by showing the metric equivalents to current units of measure. This Annual Typhoon Report includes metric equivalents to most measures.

Unless otherwise stated all satellite data used in this ATR are Air Force Weather Service DMSP Data as acquired by OL-C, 27CS personnel and analyzed by Det 1, 1WW personnel colocated with the JTWC at Nimitz Hill, Guam.

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CHAPTER I – OPERATIONAL PROCEDURES

1. GENERAL

Routine services provided by the Joint Typhoon Warning Center (JTWC) include the following: (1) Significant Tropical Weather Advisories issued daily describing all tropical disturbances and their potential for further development; (2) Tropical Cyclone Formation Alerts issued whenever interpretation of satellite and synoptic data indicates likely formation of a significant tropical cyclone; (3) Tropical Cyclone Warnings issued four times daily whenever a significant tropical cyclone exists in the Pacific area; (4) Tropical Cyclone Warnings issued twice daily whenever a significant tropical cyclone exists in the Indian Ocean area; and (5) Prognostic Reasoning messages issued twice daily for tropical storms and typhoons in the Pacific area.

JTWC responds to changing requirements of activities serviced. Therefore, contents of routine services are subject to change from year to year usually as a result of the Annual Tropical Cyclone Conference deliberations.

2. DATA SOURCES

a. COMPUTER PRODUCTS:

FLEWEACEN Guam provides computerized meteorological/oceanographic products for JTWC. In addition, the standard array of synoptic-scale computer analyses and prognostic charts are available from the Fleet Numerical Weather Central (FNWC) at Monterey, California via FLEWEACEN Guam. With the installation of the Naval Environmental Display Stations (NEDS) during 1978, JTWC now has very timely access to necessary FNWC products and is thereby able to more efficiently and effectively use this information.

b. CONVENTIONAL DATA:

Conventional meteorological data are defined as surface and upper air observations from island, ship and land stations plus weather observations from commercial and military aircraft (AIREPS). Computer plotted charts of 0000Z and 1200Z conventional data are produced daily for the surface, 700 mb, and 500 mb levels. A chart of upper air data is produced which utilizes 200 mb rawinsonde data and AIREPS above 29,000 ft within 6 hours of the 0000Z and 1200Z synoptic times.

c. AIRCRAFT RECONNAISSANCE:

Aircraft weather reconnaissance data are invaluable in the positioning of centers of developing systems and essential for the accurate determination of the eye/center, maximum intensity, minimum sea-level pressure and radius of significant winds exhibited by tropical cyclones. Winds and pressure height data at the 500 and/or 400 mb level, provided by reconnaissance aircraft while enroute to, or returning from, fix missions, is also used to supplement the sparse data in the tropics and subtropics. These data are plotted on large-scale sectional charts for each mission flown. A comprehensive discussion of aircraft weather reconnaissance is presented in Chapter II.

d. SATELLITE RECONNAISSANCE:

Meteorological satellite data from the Defense Meteorological Satellite Program (DMSP) and the National Oceanic and Atmospheric Administration played a major role in the early detection and tracking of tropical cyclones in 1978. A discussion of this role is presented in Chapter II.

e. RADAR RECONNAISSANCE:

During 1978, as in recent years, land radar coverage was utilized extensively when available. Once a storm moved within the range of a land radar site, reports were usually received hourly. Use of radar during 1978 is discussed in Chapter II.

3. COMMUNICATIONS

a. FWC/JTWC currently has access to three primary communications circuits:

(1) The Automated Digital Network (AUTODIN) is used for dissemination of warnings and other related bulletins to Department of Defense installations. These messages are relayed for further transmission over U. S. Navy Fleet Broadcasts, U. S. Coast Guard CW (continuous wave morse code) and voice communications. Inbound message traffic for JTWC is received via AUTODIN addressed to FLEWEACEN GUAM.

(2) The Air Force Automated Weather Network (AWN) provides necessary weather data to JTWC through a dedicated circuit from the automated digital weather switch (ADWS) at Clark AB, R.P. The ADWS selects and routes the large volume of meteorological reports necessary to satisfy JTWC requirements for the right data at the right time. Weather bulletins prepared by JTWC are inserted into the AWN circuit by the Nimitz Hill Naval Telecommunications Center (NTCC) of the Naval Communications Area Master Station Western Pacific.

(3) The Naval Environmental Data Network (NEDN) connects FWC/JTWC with the computers at FNWC. FWC/JTWC is able to both receive environmental data from FNWC and access the computers directly to run various programs.

b. Besides providing forecasters with the ability to rapidly access computer products from FNWC, the NEDS has recently become the backbone of the FWC/JTWC communications system. AUTODIN and AWN message tapes can now be prepared by JTWC personnel for insertion into the AUTODIN and AWN circuits by the NTCC. The NEDS is also used by the TDO to request forecast aids which are

processed by the computers at FNWC Monterey and transmitted back to the TDO over the NEDN circuit.

4. ANALYSES

A composite surface/gradient level (3000 ft) manual analysis is accomplished on the 0000Z and 1200Z conventional data. Analysis of the wind field using streamlines is stressed for tropical and subtropical regions. Analysis of the pressure field is stressed for higher latitudes and in the vicinity of tropical cyclones.

Manual analysis of the 500 mb level is accomplished on the 0000Z and 1200Z data when significant tropical cyclones exist. Although the analysis of the 500 mb height field is stressed, analysis of the wind field to more clearly delineate steering currents is equally important.

A composite upper-tropospheric manual analysis, utilizing rawinsonde data from 300 mb through 100 mb, wind directions extracted from satellite data by Det 1, 1WW and AIREPS (plus or minus 6 hours) at or above 29,000 feet is accomplished on 0000Z and 1200Z data daily. Wind and height data are used to arrive at a representative analysis of tropical cyclone outflow patterns, of steering currents and of areas that may indicate tropical cyclone intensity change. All charts are hand plotted over areas of tropical cyclone activity, to provide all available data as soon as possible, to the TDO, and then augmented by the computer plotted charts for the final analyses.

Additional sectional charts at intermediate synoptic times and auxiliary charts such as checkerboard diagrams and pressure change charts are also analyzed during periods of significant tropical cyclone activity.

5. FORECAST AIDS

a. CLIMATOLOGY:

Climatological publications utilized during the 1978 typhoon season include previous JTWC Annual Typhoon Reports and climatic publications from Fleet Weather Central, Guam, Naval Environmental Prediction Research Facility, Naval Postgraduate School, Air Weather Service, First Weather Wing and Chanute Technical Training Center, plus publications from other Air Force and Navy activities, various universities and foreign countries.

b. OBJECTIVE TECHNIQUES:

The following objective techniques were employed in tropical cyclone forecasting during 1978. A description of these techniques is presented in Chapter IV.

(1) TYFN75

(2) MOHATT 700/500

(3) FCSTINST

(4) 12 HR EXTRAPOLATION

(5) CLIMATOLOGY

(6) HPAC

(7) TROPICAL CYCLONE MODEL

(8) INJAH74

(9) CYCLOPS

(10) TYAN78

6. FORECASTING PROCEDURES

a. INITIALIZATION:

In the preparation of each warning, the actual surface location (fix) of the tropical cyclone eye/center just prior to (within three hours of) warning time is of prime importance. JTWC uses the Selective Reconnaissance Program (SRP) to levy an optimum mix of aircraft, satellite and radar resources to obtain fix information. When tropical cyclones are either poorly defined or the actual surface location cannot be determined, or when conflicting fix information is received, the "best estimate" of the surface location is subjectively determined from the analysis of all available data. If fix data is not available due to reconnaissance platform malfunctions or communication problems, synoptic data or extrapolation from previous fixes is used. The initial forecast (warning time) position is then obtained by extrapolation using the current fix and a "best track" of the cyclone movement to date.

b. TRACK FORECASTING:

An initial forecast track is developed based on the previous forecast and the objective techniques. This initial track is subjectively modified based on the following:

(1) The prospects for recurvature are evaluated for all westward and northward moving storms. This evaluation is based primarily on present and forecast position and amplitude of middle tropospheric mid-latitude troughs from the latest 500 mb analysis and numerical prognoses.

(2) Determination of steering level is partly influenced by maturity and vertical extent of the system. For mature storms located south of the 500 mb subtropical ridge, forecast changes in speed of movement are closely correlated with forecast changes in the intensity of the ridge. When steering currents are very weak, the tendency for cyclones to move northward due to their internal forces is an important consideration.

(3) The proximity of the tropical cyclone to other tropical cyclones is evaluated to determine if there is a possibility of Fujiwhara interaction.

(4) Over the 12- to 72-hr forecast spectrum; speed of movement during the early time frame is biased toward persistence (12 hr extrapolation) while that near the end of the time frame is biased towards objective techniques and climatology.

(5) A final check is made against climatology to ascertain the likelihood of the forecast track. If the forecast deviates greatly from climatology, the forecast rationale is reappraised and the track adjusted as necessary.

c. INTENSITY FORECASTING:

In forecasting intensity, heavy reliance is placed on aircraft reconnaissance reports, the Dvorak satellite interpretation model, wind and pressure data from ships and land stations in the vicinity of the cyclone, and the objective techniques. Additional considerations are the position and intensity of the tropical upper-tropospheric trough (TUTT), extent and intensity of upper-level outflow, sea surface temperature, terrain influences, speed of movement and proximity to an extratropical environment.

7. WARNINGS

Tropical cyclone warnings are issued when a definite closed circulation is evident and maximum sustained wind speeds are forecast to increase to 34 or more knots within 48 hours, or the cyclone is in such a position that life or property may be endangered within 72 hours. Warnings are also issued in other situations if it is determined that there is a need to alert military and civil interests to conditions which may become hazardous in a short period of time. Each tropical cyclone warning is numbered sequentially and includes the initial warning time, eye/center position, intensity, the radial extent of 30, 50 and 100 knot surface winds (when applicable), the levied fix position used, the instantaneous speed and direction of movement of the cyclone's surface center at warning time and the forecast information. The forecast intervals for all tropical cyclones, regardless of intensity, are 12-, 24-, 48- and 72-hr. Warnings within the JTWC Pacific area are issued within two hours of 0000Z, 0600Z, 1200Z and 1800Z with the constraint that two consecutive warnings may not be more than seven hours apart. Warnings in the JTWC Indian Ocean area are issued within two hours of 0800Z and 2000Z with the constraint that two consecutive warnings may not be more than fourteen hours apart. These variable warning times allow for maximum use of all available reconnaissance platforms and more effectively distribute the workload in multiple storm situations. If warnings are discontinued and a cyclone reintensifies, warnings are numbered consecutively from the last warning issued. Warning forecast positions are verified against the corresponding post analysis "best track" positions. A summary of the verification results for 1978 is presented in Chapter IV.

8. PROGNOSTIC REASONING MESSAGE

In the Pacific Area, prognostic reasoning messages are transmitted based on the 0000Z and 1200Z warnings or whenever the previous reasoning is no longer valid. This plain language message is intended to provide field meteorologists with the reasoning behind the latest JTWC forecast. Prognostic reasoning messages are not prepared for tropical depressions nor for the cyclones in the Indian Ocean area.

For the 1978 season, JTWC included confidence statements for the 24 and 48-hour forecasts. The confidence values were percentage probabilities that the 24-hour forecast position error would be less than 100 nm and less than 150 nm, respectively; and that the 48-hour error would be less than 200 nm and less than 300 nm, respectively. These probabilities were based on objective data from error analysis studies of past cyclones and were a function of latitude, longitude, storm intensity and organization. The forecaster added objective data based on the subjective analysis of the synoptic situation and the variance in the objective forecast aids available.

Prognostic reasoning information applicable to all customers is provided in the remarks section of warnings when significant changes are made or when deemed appropriate.

9. SIGNIFICANT TROPICAL WEATHER ADVISORY

This plain language message, summarizing significant weather in the entire JTWC area of responsibility, is issued by 0600Z daily. It contains a detailed, non-technical description of all significant tropical disturbances and the JTWC evaluation of potential for significant tropical cyclone development within the 24-hour forecast period.

10. TROPICAL CYCLONE FORMATION ALERT

Alerts are issued whenever interpretation of satellite and other meteorological data indicates significant tropical cyclone formation is likely. These alerts will specify a valid period not to exceed 24 hours and must either be cancelled, reissued or superseded by a warning prior to expiration of the valid period.

CHAPTER II – RECONNAISSANCE & FIXES

1. GENERAL

The Joint Typhoon Warning Center depends on reconnaissance to provide necessary, accurate and timely meteorological information in support of each warning. JTWC relies primarily on three sources of reconnaissance: aircraft, satellite and radar. Optimum utilization of all available reconnaissance resources is obtained through use of the Selective Reconnaissance Program (SRP) whereby various factors are considered in selecting a specific reconnaissance platform for each warning. These factors include: cyclone location and intensity, reconnaissance platform capabilities and limitations, and the cyclone's threat to life/property afloat and ashore. A summary of reconnaissance fixes received during 1978 is included in Section 6.

2. RECONNAISSANCE AVAILABILITY

a. Aircraft:

Aircraft weather reconnaissance is performed in the JTWC area of responsibility by the 54th Weather Reconnaissance Squadron (54 WRS). The squadron, presently equipped with six WC-130 aircraft, is located at Andersen Air Force Base, Guam. From July through October, augmentation by the 53rd WRS at Keesler Air Force Base, Mississippi brings the total number of available aircraft to nine. The JTWC reconnaissance requirements are provided daily throughout the year to the Tropical Cyclone Aircraft Reconnaissance Coordinator (TCARC). These requirements include area(s) to be investigated, tropical cyclone(s) to be fixed, fix times and forecast positions of fixes. The following priorities are utilized in acquiring meteorological data from aircraft, satellite and land-based radar in accordance with CINCPACINST 3140.1N:

"(1) Investigative flights and vortex or center fixes for each scheduled warning in the Pacific area of responsibility. One aircraft fix per day of each cyclone of tropical storm or typhoon intensity is considered the minimum desired.

(2) Center or vortex fixes for each scheduled warning of tropical cyclones in the Indian Ocean Area of responsibility.

(3) Supplementary fixes.

(4) Synoptic data acquisition."

As in previous years, aircraft reconnaissance provided direct measurements of height, temperature, flight-level winds, sea level pressure, estimated surface winds (when observable) and numerous additional parameters. The meteorological data are gathered by the Aerial Reconnaissance Weather Officers (ARWO) and dropsonde operators of Detachment 4, Hq AWS who crew with the 54th. These data provide the Typhoon Duty Officer (TDO) indications of changing cyclone characteristics, radius of cyclone associated winds, and present cyclone position and intensity. Another important aspect of this data is its availability for research in tropical cyclone analysis and forecasting. Aircraft reconnaissance will become even more important in years to come when high-resolution tropical cyclone dynamic steering programs will require a dense input of wind and temperature data.

b. Satellite

Satellite fixes from USAF ground sites and USN ships provide day and night coverage in the JTWC area of responsibility. Interpretation of this satellite imagery provides cyclone positions and estimates of storm intensities through the Dvorak technique (for daytime passes).

Detachment 1, 1st Weather Wing is the primary fix site for the western North Pacific. Both DMSP and NOAA data are received and processed. DMSP fix positions received at JTWC from the Air Force Global Weather Central (AFGWC), Offutt Air Force Base, Nebraska were the major source of satellite data for the Indian Ocean. GOES fixes were also provided by the National Environmental Satellite Service, Honolulu, Hawaii for tropical cyclones near the dateline.

c. Radar

Land radar provides positioning data on well developed cyclones when in proximity (usually within 175 nm of the radar site) of the Republic of the Philippines, Taiwan, Hong Kong, Japan, the Republic of Korea, Kwajalein, and Guam.

3. AIRCRAFT RECONNAISSANCE SUMMARY

During the 1978 tropical cyclone season, JTWC levied 290 six-hourly vortex fixes (Table 2-1). New storm tracks developed by Det 4, AWS and JTWC increased the number of supplemental fixes from 4 in 1977 to 149 in 1978. These tracks require reconnaissance aircraft to penetrate a tropical cyclone twice on a one-fix mission and three times on a two-fix mission; the extra fix is termed supplemental. In addition to vortex fixes, 38 investigative missions were levied (the 1976-1978 average is 38 invests). Of 1978's 32 tropical cyclones, investigative missions were not flown on nine.

Reconnaissance effectiveness is summarized in Table 2-1 using the criteria as set forth in CINCPACINST 3140.1N.

TABLE 2-1. AIRCRAFT RECONNAISSANCE EFFECTIVENESS

EFFECTIVENESS	NUMBER OF FIXES	PERCENT
COMPLETED ON TIME	272	93.8
EARLY	6	2.1
LATE	10	3.4
MISSED	2	0.7
TOTAL	290	100.0

LEVIED VS. MISSED FIXES

	LEVIED	MISSED	PERCENT
AVERAGE 1965-1970	507	10	2.0
1971	802	61	7.6
1972	624	126	20.2
1973	227	13	5.7
1974	358	30	8.4
1975	217	7	3.2
1976	317	11	3.5
1977	203	3	1.5
1978	290	2	0.7

4. SATELLITE RECONNAISSANCE SUMMARY

The Air Force provides satellite reconnaissance support to JTWC using meteorological data from DMSP polar orbiting meteorological satellites.

A network of tactical DMSP sites at Nimitz Hill, Guam; Clark AB, Philippines; Kadena AB, Japan; Osan AB, Korea; and Hickam AFB, Hawaii provides direct readout coverage north of the equator from the dateline west into the South China Sea. In February 1977, the Guam site was modified to acquire very high resolution data from the National Oceanic and Atmospheric Administration (NOAA) satellites. The Hawaii site was modified soon thereafter.

The Air Force Global Weather Central (AFGWC) at Offutt AFB, Nebraska, using stored data readout, provides satellite reconnaissance over the Indean Ocean and backup for the tactical sites in WESTPAC. Det 1, 1WW colocated with the JTWC, operates the network tasking appropriate sites for tropical cyclone position reports.

Satellite positions are assigned Position Code Numbers (PCN's) depending on the availability of geography for precise gridding and the state of the tropical cyclone's circulation (Table 2-2). Estimates of tropical cyclone intensity are obtained from visual data using the Dvorak technique (NOAA Technical Memorandum NESS 45 and later refinements).

TABLE 2-2. POSITION CODE NUMBERS

PCN	METHOD OF CENTER DETERMINATION/GRIDDING
1	EYE/GEOGRAPHY
2	EYE/EPHEMERIS
3	WELL DEFINED CC/GEOGRAPHY
4	WELL DEFINED CC/EPHEMERIS
5	POORLY DEFINED CC/GEOGRAPHY
6	POORLY DEFINED CC/EPHEMERIS

CC=Circulation Center

Availability of satellite data enabled JTWC to effectively use satellite reconnaissance through the Selective Reconnaissance Program (SRP). During the 1978 season over 1900 satellite fixes were made on unnumbered as well as numbered tropical cyclones in WESTPAC.

By using a dual-site tasking concept which requires at least two separate DMSP sites to make each JTWC levied tropical cyclone fix, satellite reconnaissance reliability in meeting JTWC's fix requirements was 96%. Most missed fixes were due to an unreliable late morning/late evening satellite. Because of this satellite's unreliability, aircraft reconnaissance routinely supported 0600Z and 1800Z warnings with radar and NOAA-5 satellite data also being used on occasion. Use of the NOAA-5 satellite for fixing tropical cyclones ended in September 1978 when the satellite became too unstable for accurate positioning.

A comparison of satellite derived positions and the JTWC Best Track positions is included in Table 2-3. The relative accuracies of satellite positions can be obtained from this table.

TABLE 2-3. MEAN DEVIATIONS (NM) OF DMSP DERIVED TROPICAL CYCLONE POSITIONS FROM JTWC BEST TRACK POSITIONS, 1974-1978 (ALL SITES). NUMBER OF CASES SHOWN IN PARENTHESIS.

PCN	1974 (ALL SITES)	1975 (ALL SITES)	1976 (ALL SITES)	1977 (ALL SITES)	1978 (ALL SITES)
1	13.6 (224)	11.8 (214)	12.4 (131)	15.7 (134)	13.8 (189)
2	17.4 (37)	20.4 (35)	20.1 (124)	19.1 (47)	16.0 (95)
3	20.1 (422)	21.2 (271)	21.7 (161)	22.4 (141)	21.9 (353)
4	23.9 (70)	22.4 (50)	29.3 (152)	30.0 (75)	21.8 (156)
5	35.4 (342)	34.2 (323)	40.4 (247)	37.7 (357)	38.1 (571)
6	49.4 (108)	44.7 (71)	49.0 (153)	40.9 (247)	50.5 (370)
1&2	14.2 (261)	13.0 (249)	16.1 (255)	16.6 (181)	14.6 (284)
3&4	20.6 (492)	21.4 (321)	25.4 (313)	25.0 (216)	21.9 (509)
5&6	38.8 (450)	36.1 (394)	43.7 (400)	39.0 (604)	43.0 (941)

Satellite derived fixes were also obtained from: USN ships equipped for DMSP or TIROS-N/NOAA APT direct readout; the National Environmental Satellite Service using NOAA and GOES data; and Fleet Weather Facility (FLEWEAFAC), Suitland, Maryland using stored NOAA and DMSP data. This information was invaluable to the warning service. Since these were secondary sources, they were not included in statistics.

5. RADAR RECONNAISSANCE SUMMARY

Fifteen of the 32 significant tropical cyclones occurring over the western North Pacific during 1978 passed within range of land based radars with sufficient cloud pattern organization to be fixed. The hourly and oftentimes, half-hourly land radar fixes that were obtained and transmitted to JTWC totaled 848. A percentage breakdown by country is as follows: Japan-Ryukyu Islands 62%, Republic of the Philippines 18%, Hong Kong 8%, Guam (U.S.) 7%, and Taiwan 4%.

The WMO radar code defines three categories of accuracy: good (within 10 km (5.4 nm)), fair (within 10-30 km (5.4-16.2 nm)) and poor (within 30-50 km (16.2-27 nm)). This year 308 radar fixes were coded in this manner; 49% were good, 20% fair and 31% poor. Compared to the JTWC best track, the mean vector deviation for land radar sites was 13 nm (24 km).

Of the 15 tropical cyclones which were monitored with radar, 10 were typhoons (Olive, Virginia, Wendy, Carmen, Elaine, Faye, Irma, Lola, Ora and Rita). These 10 typhoons accounted for 74% of all radar fixes received this season. Excellent support through timely and accurate radar fix positioning allowed JTWC to track and forecast tropical cyclone movement through even the most difficult and erractic tracks.

The 54 WRS made four radar center fixes from their WC-130 aircraft when actual penetration was restricted. One aircraft radar fix of TC 20-78 when over the Arabian Sea was relayed to JTWC from Diego Garcia. No ship radar center fixes were received during 1978.

6. TROPICAL CYCLONE FIX DATA

A total of 3172 fixes on 32 northwest Pacific tropical cyclones and 117 fixes on four northern Indian Ocean tropical cyclones were received at JTWC. Table 2-4, Fix Platform Summary, delineates the number of fixes per platform for each individual tropical cyclone. Season totals and percentages are also indicated.

Annex B is an output of program PRNTFIX which lists individual fixes sequentially for each tropical cyclone. Fix data is divided into three categories; Satellite, Aircraft and Radar. Those fixes labeled with an asterisk (*) were determined to be unrepresentative of the surface center and were not used in determining the best tracks. Within each category, the first three columns are as follows:

FIX NO. - Sequential fix number

TABLE 2-4. FIX PLATFORM SUMMARY

		FIX PLATFORM					
	AIRCRAFT*	DMSP	NOAA-5	GOES	LAND RADAR	ACFT RADAR	TOTAL
WESTERN PACIFIC							
TS NADINE	9	29	24	3	-	-	65
TY OLIVE	25	66	23	-	17	-	131
TS POLLY	15	58	12	-	124	-	209
TS ROSE	7	25	7	-	-	-	39
TS SHIRLEY	-	21	6	-	-	1	28
TY TRIX	29	84	18	-	-	-	131
TY VIRGINIA	36	85	6	-	42	-	169
TY WENDY	26	130	7	-	100	-	263
TS AGNES	-	63	6	-	50	-	119
TS BONNIE	-	15	4	-	-	-	19
TY CARMEN	22	104	12	-	125	-	263
TS DELLA	6	22	2	-	9	-	39
TD 14	6	24	6	-	2	-	38
TY ELAINE	12	38	14	-	24	-	88
TY FAYE	45	87	6	-	9	-	147
TS GLORIA	7	36	1	-	-	-	44
TS HESTER	1	31	-	-	-	-	32
TY IRMA	7	41	-	-	72	2	122
TY JUDY	14	50	-	-	-	-	64
TS KIT	12	50	-	-	-	-	62
TY LOLA	17	90	-	-	29	-	136
TY MAMIE	12	38	-	-	-	-	50
TS NINA	16	74	-	-	34	-	124
TY ORA	18	59	-	-	96	-	173
TD 26	-	17	-	-	-	-	17
TD 27	2	28	-	-	-	-	30
TY PHYLLIS	8	58	-	-	-	1	67
ST RITA	43	110	3	5	115	-	276
TS TESS	17	42	-	-	-	-	59
TD 32	-	36	-	-	-	-	36
TY VIOLA	22	70	-	-	-	-	92
TS WINNIE	12	28	-	-	-	-	40
TOTAL	446	1709	157	8	848	4	3172
% OF TOTAL NO. OF FIXES	14.1	53.9	4.9	.3	26.7	.1	100
		DMSP		TIROS-N		ACFT RADAR	TOTAL
INDIAN OCEAN							
TC 18-78		21		-		-	21
TC 19-78		13		-		-	13
TC 20-78		30		6		1	37
TC 21-78		40		6		-	46
TOTAL		104		12		1	117
% OF TOTAL NO. OF FIXES		88.9		10.2		.9	100

* FIX POSITIONS QUOTED WERE ONLY THOSE WHERE A SPECIFIC LATITUDE AND LONGITUDE WERE GIVEN.

TIME (Z) - GMT time in day, hours and minutes

FIX POSITION - Latitude and longitude to the nearest tenth of a degree

Depending upon the category, the remainder of the format varies as follows:

a. Satellite

(1) ACCRY - Position Code Number (PCN) (See Sec. 5). The accuracy for FWF Suitland fix positions are given as confidence numbers (CONF) (See Table 2-5 for details).

(2) DVORAK CODE - Intensity evaluation and trend utilizing DMSP visual satellite data.



(For specifics refer to NOAA TM; NESS-45)

TABLE 2-5. CONFIDENCE (CONF) NUMBERS AS A FUNCTION OF DVORAK T NUMBER AND RADIUS OF 90% PROBABILITY AREA (NM).

TROPICAL CYCLONE INTENSITY	CONF (1)	CONF (2)	CONF (3)
T1.5	60	120	170
T2.0	60	120	170
T2.5	60	120	170
T3.0	50	100	150
T3.5	45	90	140
T4.0	45	90	140
T4.5	45	90	140
T5.0	40	90	130
T5.5	40	80	130
T6.0	40	80	130
T6.5	30	70	120
T7.0	30	70	120
T7.5	30	60	100
T8.0	30	60	100

(3) SAT - Specific satellite used for fix position (DMSP 35, 36 or 37, NOAA-5, TIROS-N, or Geostationary Operational Environmental Satellite (GOES)).

(4) COMMENTS - For explanation of abbreviations see Appendix.

(5) SITE - ICAO call sign of the specific satellite tracking station.

b. Radar

(1) RADAR - Specific type of platform utilized for fix (land radar site, aircraft or ship).

(2) ACCRY - Accuracy of fix position (good, fair or poor) as given in the WMO ground radar weather observation code (FM20-V).

(3) EYE SHAPE - Geometrical representation of the eye given in plain language (Circular, Elliptical, etc.).

(4) EYE DIAM - Diameter of eye given in nautical miles.

(5) RADOB CODE - Taken directly from WMO ground weather radar observation code FM20-V. First group specifies the vortex parameters while the second group describes the movement of the vortex center.

(6) RADAR POSITION - Latitude and longitude of tracking station given in tenths of a degree.

(7) SITE - WMO station number of the specific tracking station.

c. Aircraft

(1) FLT LVL - The constant pressure surface level, in mb, maintained during the penetration. 700 mb is the normal level flown in developed cyclones due to turbulence factors with low level missions flown at 1500 ft.

(2) MIN HGT - Minimum height of the 700 mb pressure surface within the vortex recorded in meters.

(3) OBS MSLP - The minimum observed sea level pressure on a 700 mb fix mission is obtained by applying the minimum 700 mb height to the following regression equation:

SLP (MB)=.115 (700 mb HGT [M]) + 645

This relationship is accurate within ± 3 mb in most cases. However, if the 700 mb center and the surface center are not vertically alligned, the minimum sea level pressure will be erroneously high. If the surface center can be visually detected (e.g., in the eye), the minimum sea level pressure is obtained by a dropsonde released above the surface vortex center.

If the fix is made at the 1500 foot level, the sea level pressure is extrapolated from that level.

(4) MAX-SFC-WND - The maximum surface wind (knots) is an estimate made by the ARWO based on sea state. This observation is limited to the region of the flight path, and may not be representative of the entire cyclone. Availability of data is also dependent upon the absence of undercast conditions and the presence of adequate illumination. The positions of the maximum flight level wind and the maximum observed surface wind do not necessarily coincide.

(5) MAX-FLT-LVL-WND - Wind speed (knots) at flight level is measured by the AN/APN 147 doppler radar system aboard the WC-130 aircraft. Values entered in this category represent the maximum wind measured prior to obtaining a scheduled fix. This measurement may not represent the maximum flight level wind associated with the tropical cyclone because the aircraft only samples those portions of the tropical cyclone along the flight path. In many instances the flight path may be through the weak sector of the cyclone. In areas of heavy rainfall, the doppler radar may track energy reflected from precipitation rather than from the sea surface; thus preventing accurate wind speed measurement. In obvious cases such erroneous wind data will not be reported. In addition, the doppler radar system on the WC-130 restricts wind measurements to drift angles less than or equal to 27 degrees if the wind is normal to the aircraft heading.

(6) ACCRY - Fix position accuracy. Both navigational (OMEGA and LORAN) and meteorological (by the ARWO) estimates are given in nautical miles.

(7) EYE SHAPE - Geometrical representation of the eye based on the aircraft radar presentation. Reported only if center is 50% or more surrounded by wall cloud.

(8) EYE DIAM/ORIENTATION - Diameter of the eye in nautical miles. In case of elliptical eye, the orientation describes the nautical mile lengths of the major and minor axes.

CHAPTER III – SUMMARY OF TROPICAL CYCLONES

1. WESTERN NORTH PACIFIC TROPICAL CYCLONES

During 1978, the western North Pacific experienced a near-climatological average with a total of 32 cyclones (Table 3-1; cyclones 10 and 30 occurred in the central North Pacific area). Four, significant tropical cyclones never developed beyond tropical depression (TD) stage. Of the 2° that became tropical storms (TS), 15 developed to typhoon (TY) stage only one of which reached the 130 kt (67 m/sec) intensity necessasry to be classified as a super typhoon (ST).

Even though the 1978 season had a near-average number of cyclones (Tables 3-2 and 3-3), it was a season full of surprises. Ten of the tropical storms and typhoons exhibited erratic movement. Typhoon Carmen remained quasi-stationary for three days over the East China Sea. Typhoon Faye executed a large anticyclonic loop and subsequently underwent explosive deepening as the surface central pressure fell 18 mb in six hours. The most ill-behaved typhoon of the season, Trix, truly lived up to her name. As Tropical Storm Kit crossed Luzon, the surface circulation dissipated while the mid- and upper-level circulations continued across and eventually became aligned with a secondary or "lee-side" low that had formed west of Luzon. Tropical Storms Hester and Phyllis attained post-recurvature speeds of 40 kt (74 km/hr) and 50 kt (93 km/hr), respectively, in extratropical transition. Typhoons Virginia and Mamie were unusually compact and could, thus, be termed midget typhoons. Virginia also traveled the farthest north (47N) while retaining tropical characteristics. Having first been detected in the central Pacific near 175W, Super Typhoon Rita traveled a record distance for the season (4142 nm (7671 km)), and was second overall only to Typhoon Sarah of 1976 (4499 nm (8332 km)).

During 1978, 32 Tropical Cyclone Formation Alerts were issued. Of these, 27 (84%) developed into significant tropical cyclones (Table 3-4). Five tropical cyclones were immediately placed into warning status without first issuing Formation Alerts due to their rapid development.

During 1978, there were 715 warnings issued for the WESTPAC region with a total of 131 "warning days" (Table 3-5). On 46 of these 131 days, two or more cyclones existed and on 16 days three cyclones were in existence.

TABLE 3-1. WESTERN NORTH PACIFIC

1978 SIGNIFICANT TROPICAL CYCLONES

CYCLONE	TYPE	NAME	PRD OF WARNING	CALENDER DAYS OF WARNING	MAX SFC WIND	MIN OBS SLP	NO. OF WARNINGS TOTAL	NO. OF WARNINGS AS TY	DISTANCE TRAVELLED
01	TS	NADINE	08 JAN-13 JAN	6	60	973	21		1340
02	TY	OLIVE	18 APR-26 APR	9	85	955	36	14	2669
03	TS	POLLY	16 JUN-20 JUN	5	50	985	16		788
04	TS	ROSE	23 JUN-24 JUN	2	40	993	7		352
05	TS	SHIRLEY	30 JUN-30 JUN	1	35	990	3		161
06	TY	TRIX	13 JUL-22 JUL	10	70	967	38	9	2326
07	TY	VIRGINIA	23 JUL-02 AUG	11	70	972	43	31	2052
08	TY	WENDY	24 JUL-03 AUG	11	80	962	42	27	1372
09	TS	AGNES	24 JUL-30 JUL	7	50	985	22		667
11	TS	BONNIE	10 AUG-12 AUG	3	40	984	9		481
12	TY	CARMEN	11 AUG-20 AUG	10	80	961	37	16	2076
13	TS	DELIA	11 AUG-13 AUG	3	45	984	10		774
14	TD	TD-14	19 AUG-20 AUG	2	30	991	6		556
15	TY	ELAINE	23 AUG-28 AUG	6	65	974	20		1036
16	TY	FAYE	28 AUG-07 SEP	11	105	936	44	17	2127
17	TS	GLORIA	29 AUG-01 SEP	4	40	990	12		553
18	TS	HESTER	30 AUG-01 SEP	3	50	987	11		851
19	TY	IRMA	12 SEP-15 SEP	4	65	972	15	3	854
20	TY	JUDY	13 SEP-17 SEP	5	90	950	18	10	1296
21	TS	KIT	21 SEP-26 SEP	6	50	992	21		1382
22	TY	LOLA	24 SEP-03 OCT	10	75	963	35	13	1672
23	TY	MAMIE	30 SEP-04 OCT	5	70	963	19	3	1578
24	TS	NINA	08 OCT-17 OCT	10	60	981	37		1299
25	TY	ORA	10 OCT-15 OCT	6	85	944	22	7	1370
26	TD	TD-26	11 OCT-12 OCT	2	30	998	7		519
27	TD	TD-27	15 OCT-16 OCT	2	20	1003	6		155
28	TY	PHYLLIS	15 OCT-22 OCT	8	95	953	30	17	1687
29	ST	RITA	17 OCT-30 OCT	14	155	878	51	34	4142
31	TS	TESS	01 NOV-07 NOV	7	60	975	22		1346
32	TD	TD-32	17 NOV-20 NOV	4	25	1002	12		296
33	TY	VIOLA	17 NOV-24 NOV	8	125	911	29	15	2042
34	TS	WINNIE	27 NOV-30 NOV	4	55	977	14		1287
			1978 TOTALS	131**			715	216	

** OVERLAPPING DAYS INCLUDED ONLY ONCE IN SUM

JTWC

TABLE 3-2.

FREQUENCY OF TYPHOONS BY MONTH AND YEAR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AVERAGE (1945-58)	0.4	0.1	0.3	0.4	0.7	1.1	2.0	2.9	3.2	2.4	2.0	0.9	16.3
1959	0	0	0	1	0	0	1	5	3	3	2	2	17
1960	0	0	0	1	0	2	2	8	0	4	1	1	19
1961	0	0	1	0	2	1	3	3	5	3	1	1	20
1962	0	0	0	1	2	0	5	7	2	4	3	0	24
1963	0	0	0	1	1	2	3	3	3	4	0	2	19
1964	0	0	0	0	2	2	6	3	5	3	4	1	26
1965	1	0	0	1	2	2	4	3	5	2	1	0	21
1966	0	0	0	1	2	1	3	6	4	2	0	1	20
1967	0	0	1	1	0	1	3	4	4	3	3	0	20
1968	0	0	0	1	1	1	1	4	3	5	4	0	20
1969	1	0	0	1	0	0	2	3	2	3	1	0	13
1970	0	1	0	0	0	1	0	4	2	3	1	0	12
1971	0	0	0	3	1	2	6	3	5	3	1	0	24
1972	1	0	0	0	1	1	4	4	3	4	2	2	22
1973	0	0	0	0	0	0	4	2	2	4	0	0	12
1974	0	0	0	0	1	2	1	2	3	4	2	0	14
1975	1	0	0	0	0	0	1	3	4	3	2	0	15
1976	1	0	0	1	2	2	2	1	4	1	1	0	15
1977	0	0	0	0	0	0	3	0	2	3	2	1	11
1978	0	0	0	1	0	0	3	2	4	3	2	0	15
AVERAGE (1959-78)	0.25	0.05	0.10	0.70	0.85	0.95	2.85	3.55	3.25	3.20	1.65	0.55	17.95

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TABLE 3-3.

FREQUENCY OF TROPICAL STORMS AND TYPHOONS BY MONTH AND YEAR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AVERAGE (1945-58)	0.4	0.1	0.4	0.5	0.8	1.3	3.0	3.9	4.1	3.3	2.7	1.1	21.6
1959	0	1	1	1	0	0	3	6	6	4	2	2	26
1960	0	0	0	1	1	3	3	10	3	4	1	1	27
1961	1	1	1	1	3	2	5	4	6	5	1	1	31
1962	0	1	0	1	2	0	6	7	3	5	3	2	30
1963	0	0	0	1	1	3	4	3	5	5	0	3	25
1964	0	0	0	0	2	2	7	9	7	6	6	1	40
1965	2	2	1	1	2	3	5	6	7	2	2	1	34
1966	0	0	0	1	2	1	5	8	7	3	2	1	30
1967	1	0	2	1	1	1	6	8	7	4	3	1	35
1968	0	0	0	1	1	1	3	8	3	6	4	0	27
1969	1	0	1	1	0	0	3	4	3	3	2	1	19
1970	0	1	0	0	0	2	2	6	4	5	4	0	24
1971	1	0	1	3	4	2	8	4	6	4	2	0	35
1972	1	0	0	0	1	3	6	5	4	5	2	3	30
1973	0	0	0	0	0	0	7	5	2	4	3	0	21
1974	1	0	1	1	1	4	4	5	5	4	4	2	32
1975	1	0	0	0	0	0	2	4	5	5	3	0	20
1976	1	1	0	2	2	2	4	4	5	1	1	2	25
1977	0	0	1	0	0	1	4	1	5	4	2	1	19
1978	1	0	0	1	0	3	4	7	5	4	3	0	28
AVERAGE (1959-78)	0.55	0.35	0.45	0.85	1.15	1.65	4.55	5.70	4.90	4.15	2.50	1.10	27.90

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TABLE 3-4.

FORMATION ALERT SUMMARY

WESTERN NORTH PACIFIC

YEAR	NUMBER OF ALERT SYSTEMS	ALERT SYSTEMS WHICH BECAME NUMBERED TROPICAL CYCLONES	TOTAL NUMBERED TROPICAL CYCLONES	DEVELOPMENT RATE
1972	41	29	32	71%
1973	26	22	23	85%
1974	35	30	36	86%
1975	34	25	25	74%
1976	34	25	25	74%
1977	26	20	21	77%
1978	32	27	32	84%

MONTHLY DISTRIBUTION

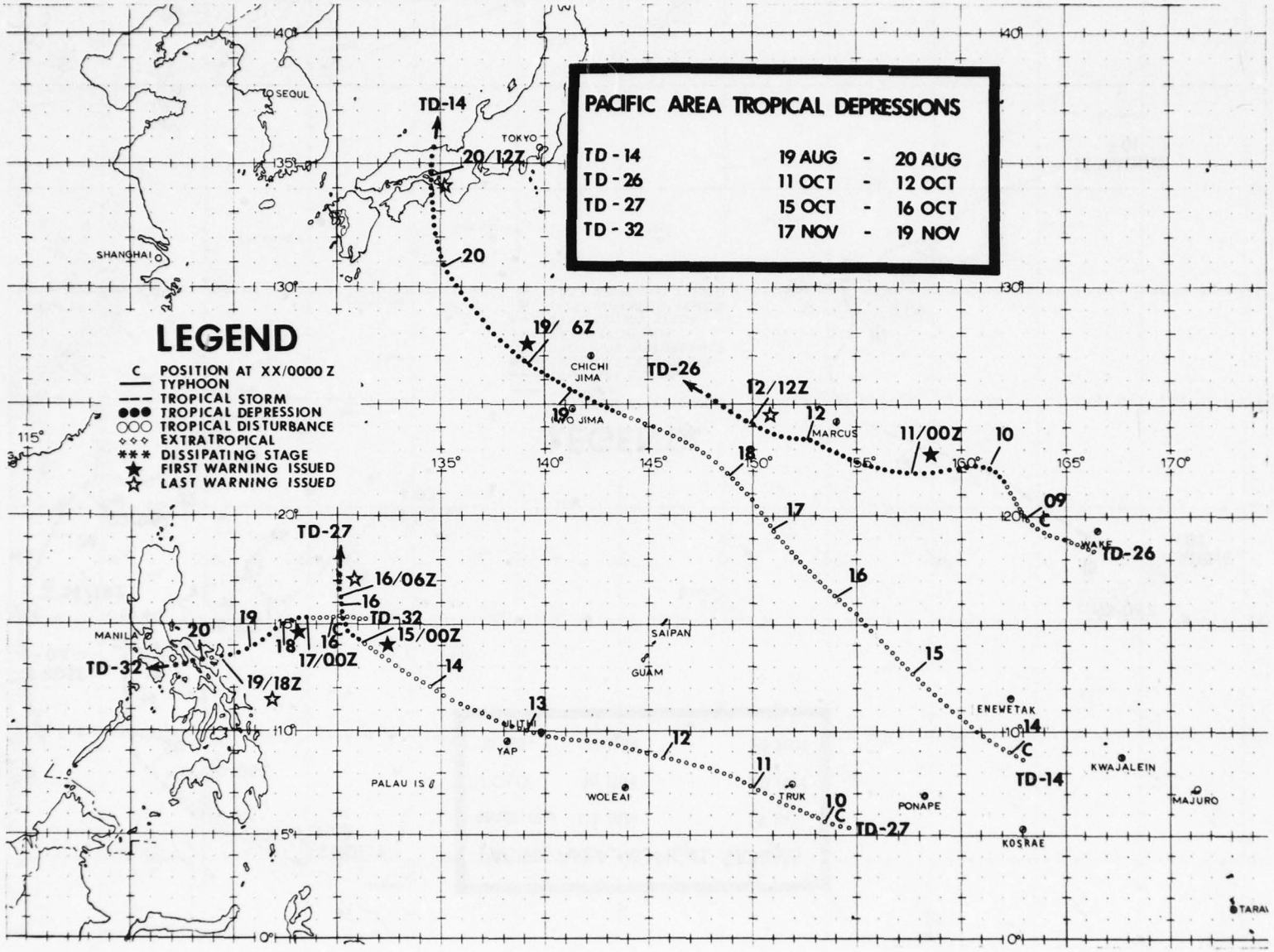
	J	F	M	A	M	J	J	A	S	O	N	D
FORMATION ALERTS	1	0	0	1	0	4	3	7	5	8	3	0

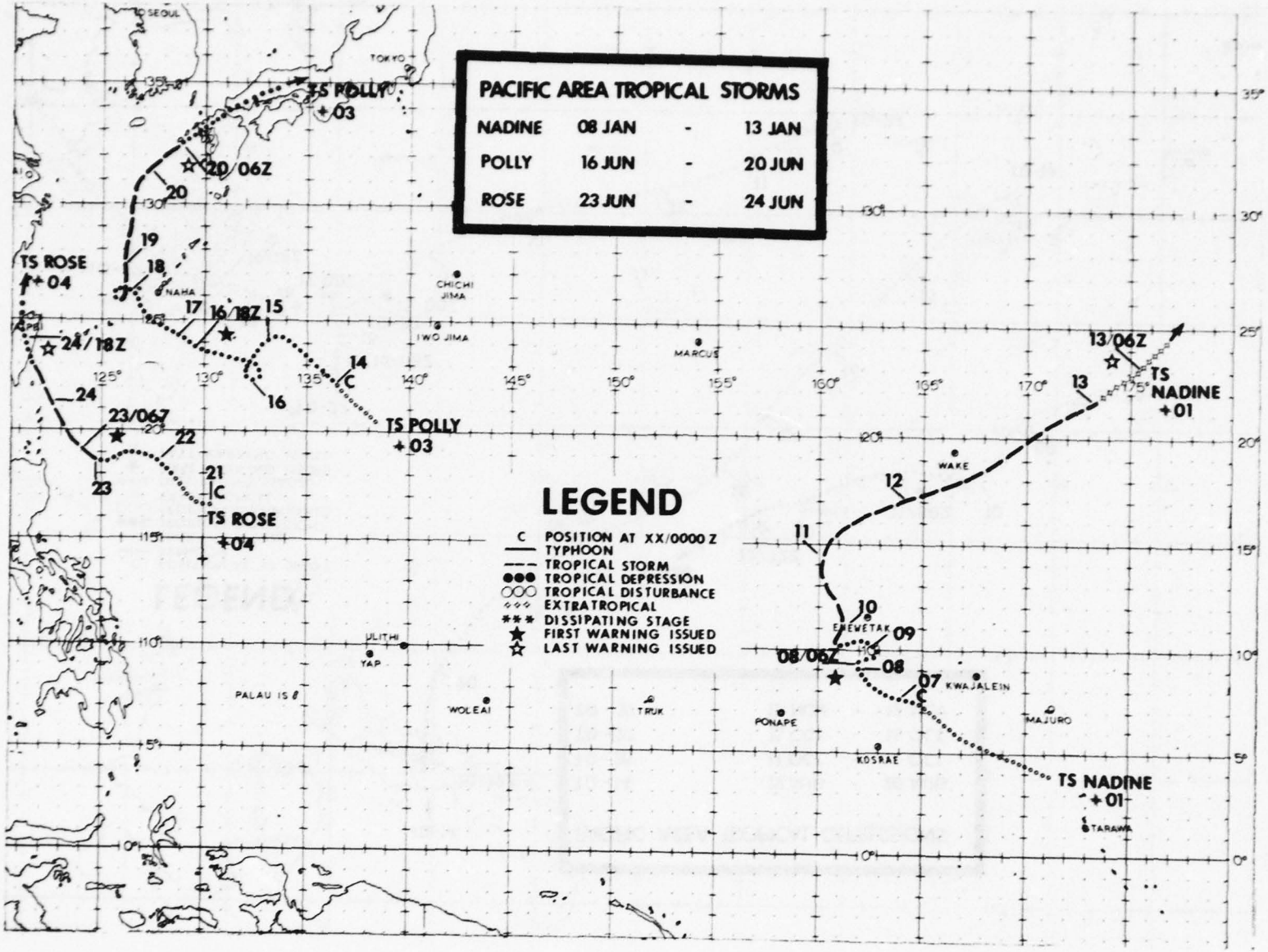
TABLE 3-5.

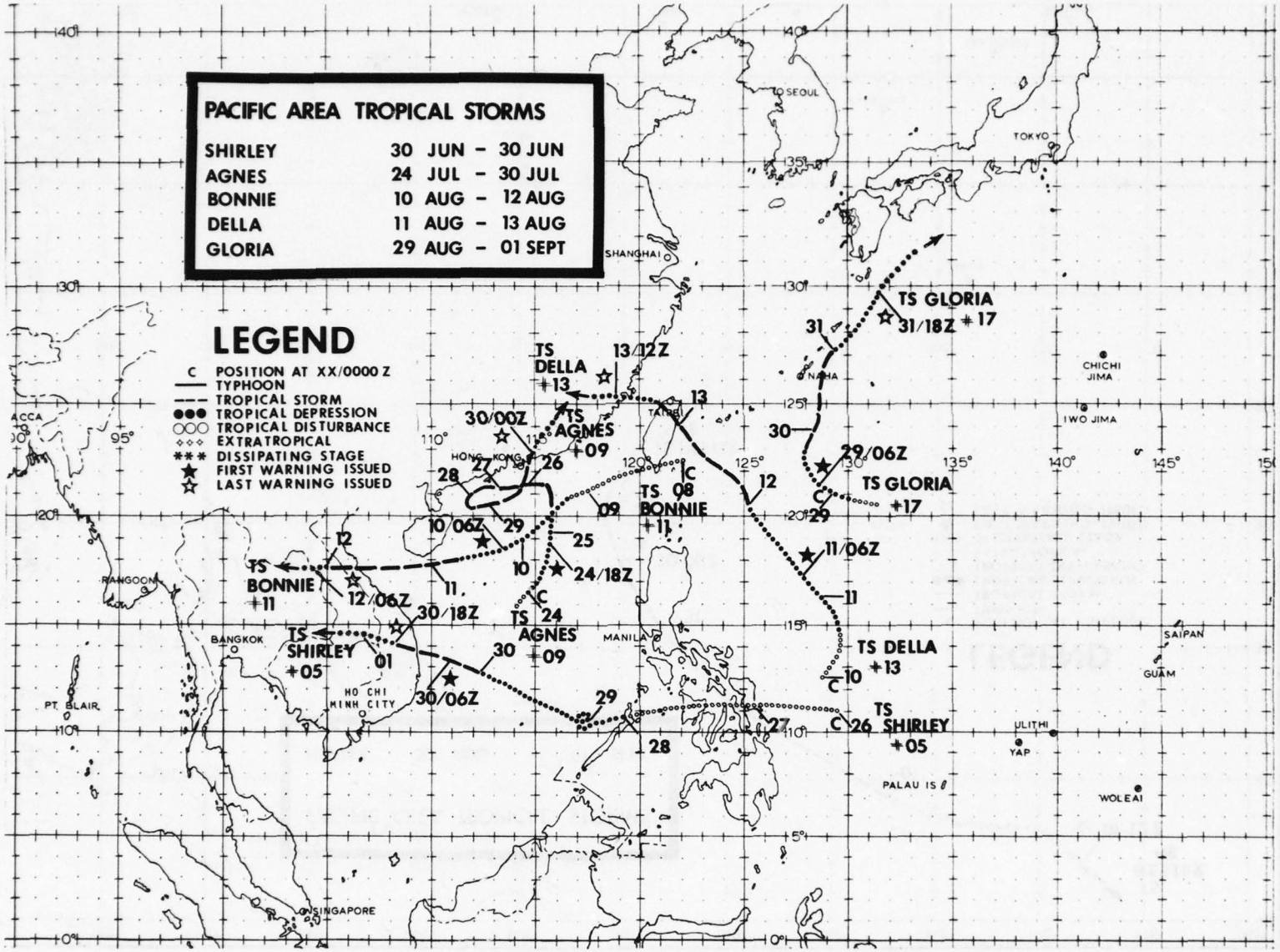
WARNING SUMMARY

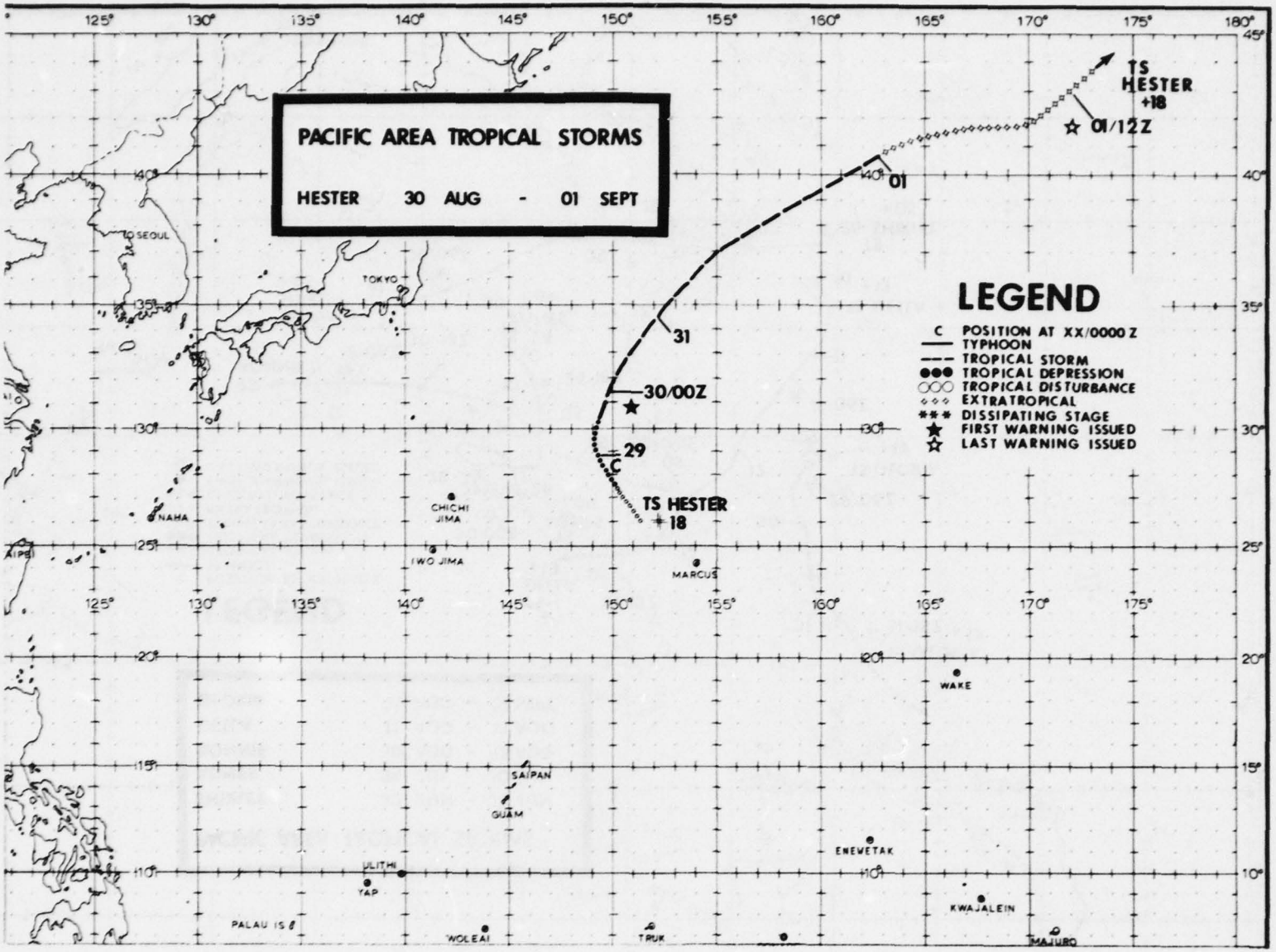
WESTERN NORTH PACIFIC

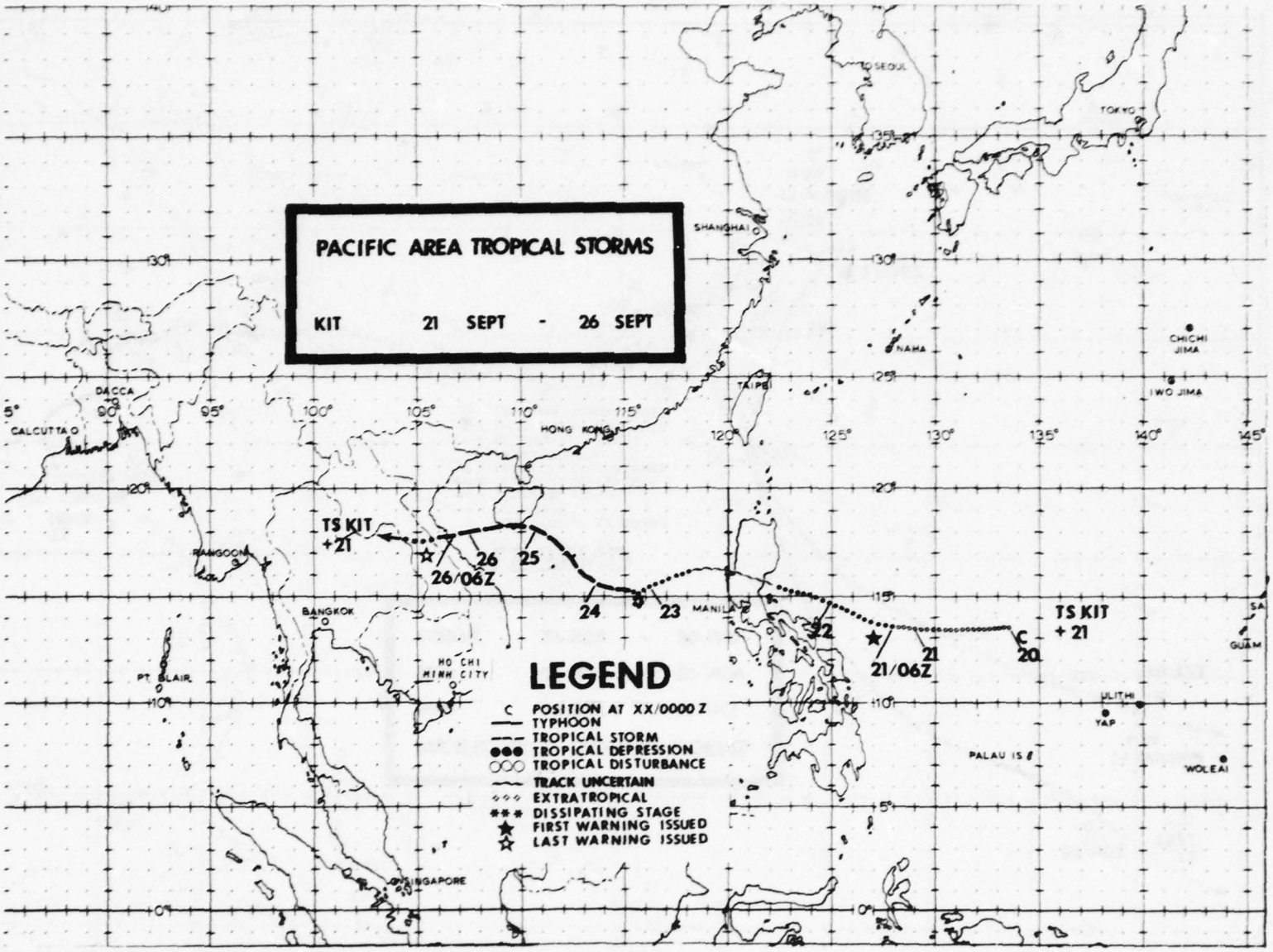
	1978	AVERAGE 1959-1977
TOTAL NUMBER OF WARNINGS	715	669
NUMBER OF WARNING DAYS	131	141
NUMBER OF WARNING DAYS WITH 2 OR MORE CYCLONES	46	46
NUMBER OF WARNING DAYS WITH 3 OR MORE CYCLONES	16	9
TROPICAL DEPRESSIONS	4	5
TROPICAL STORMS	13	11
TYPHOONS	15	19
TOTAL TROPICAL CYCLONES	32	35

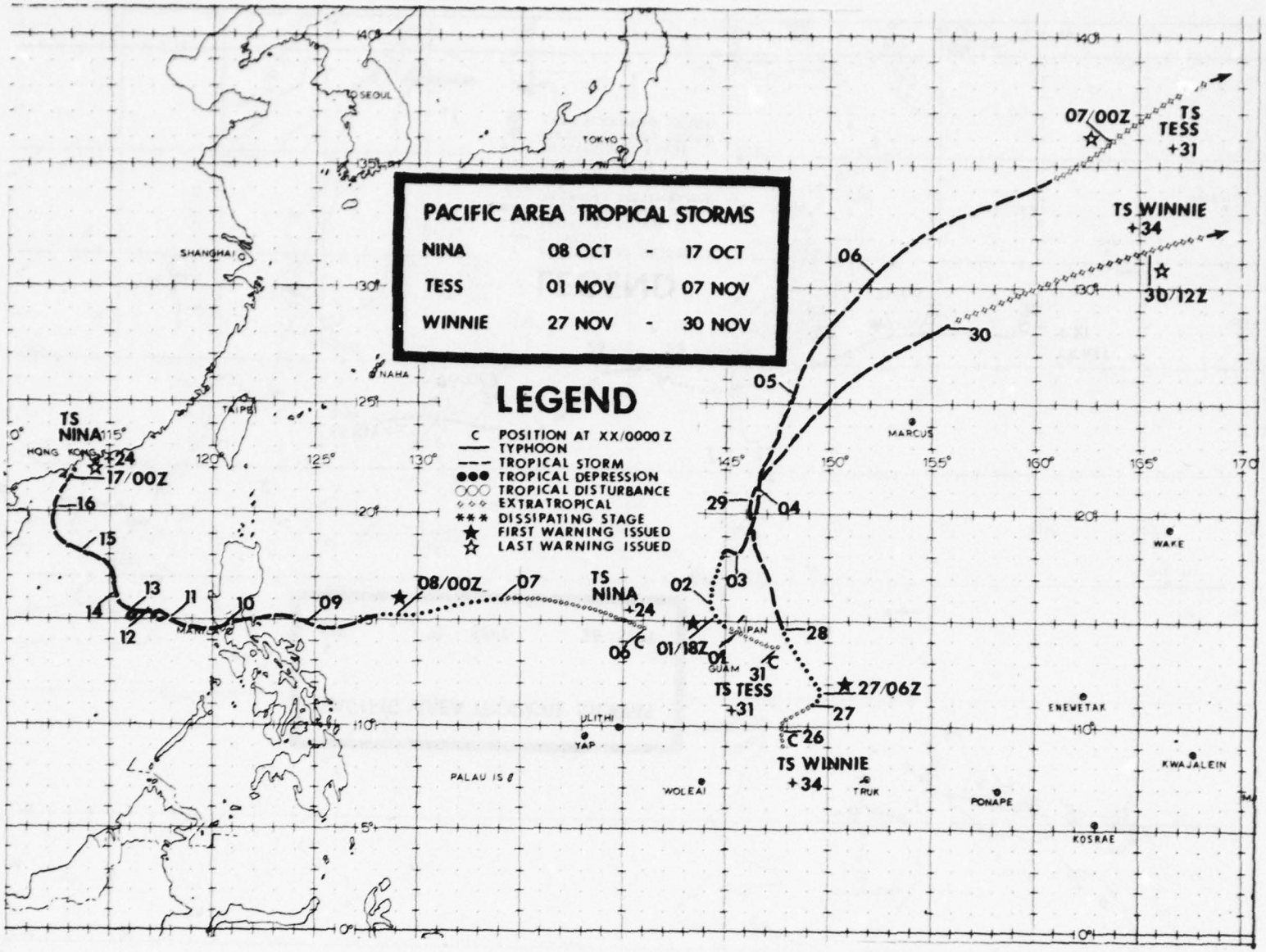

PACIFIC AREA TROPICAL DEPRESSIONS
TD - 14 19 AUG - 20 AUG
TD - 26 11 OCT - 12 OCT
TD - 27 15 OCT - 16 OCT
TD - 32 17 NOV - 19 NOV
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
YAP
PALAU IS
WOLEAI
TRUK
ENEWETAK
PONAPE
KOSRAE
KWAJALEIN
MAJURO
TD-14
20/12Z
TD-26
12/12Z
11/00Z
TD-27
16/06Z
TD-32
15/00Z
17/00Z
19/18Z
09
10
12
14
15
16
17
18
19
20

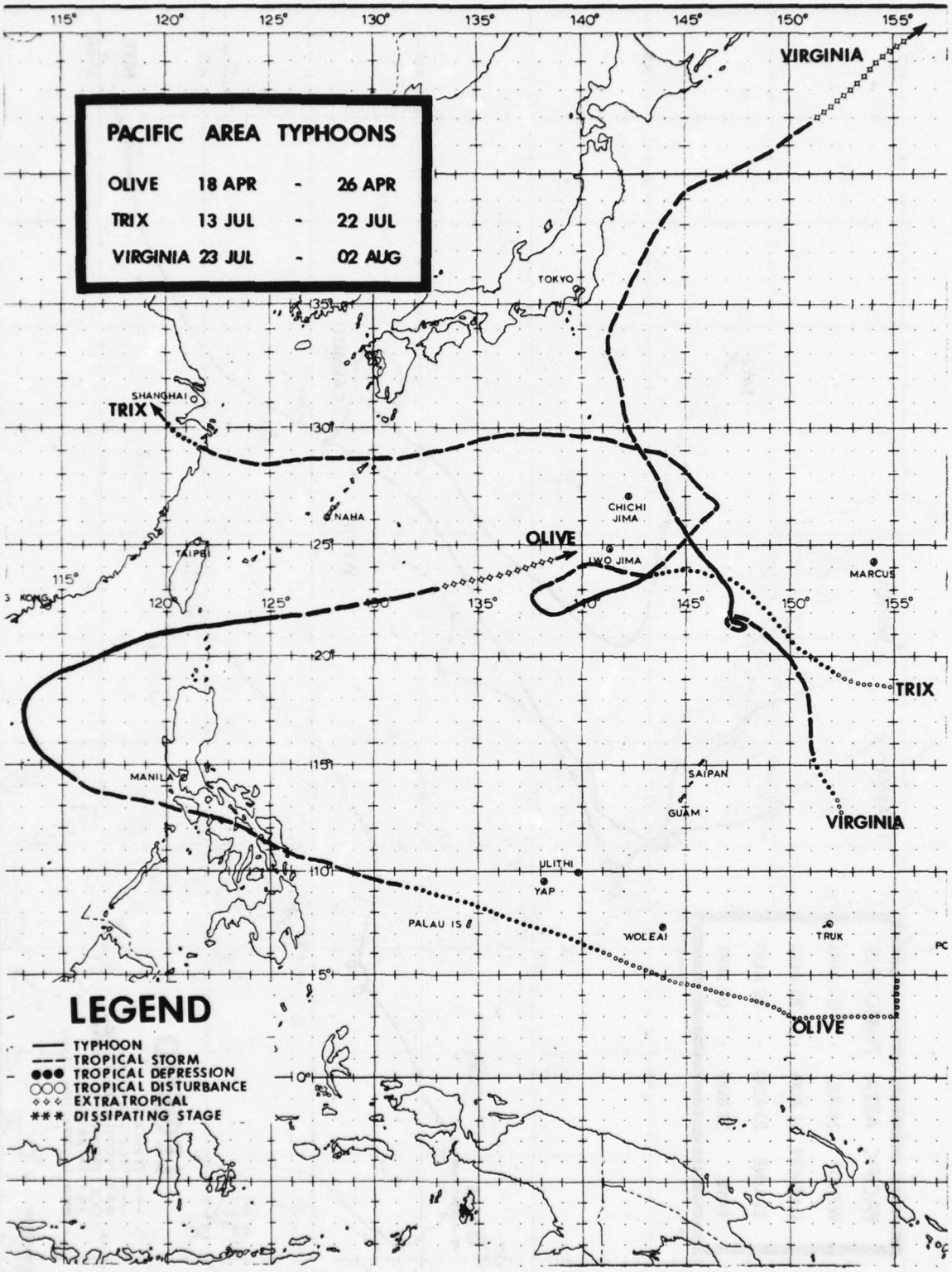

PACIFIC AREA TROPICAL STORMS
NADINE 08 JAN - 13 JAN
POLLY 16 JUN - 20 JUN
ROSE 23 JUN - 24 JUN
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TS POLLY +03
TS ROSE +04
TS NADINE +01
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
KOSRAE
EMIDJ
EMIWETAK
KWAJALEIN
MAJURO
TARAWA

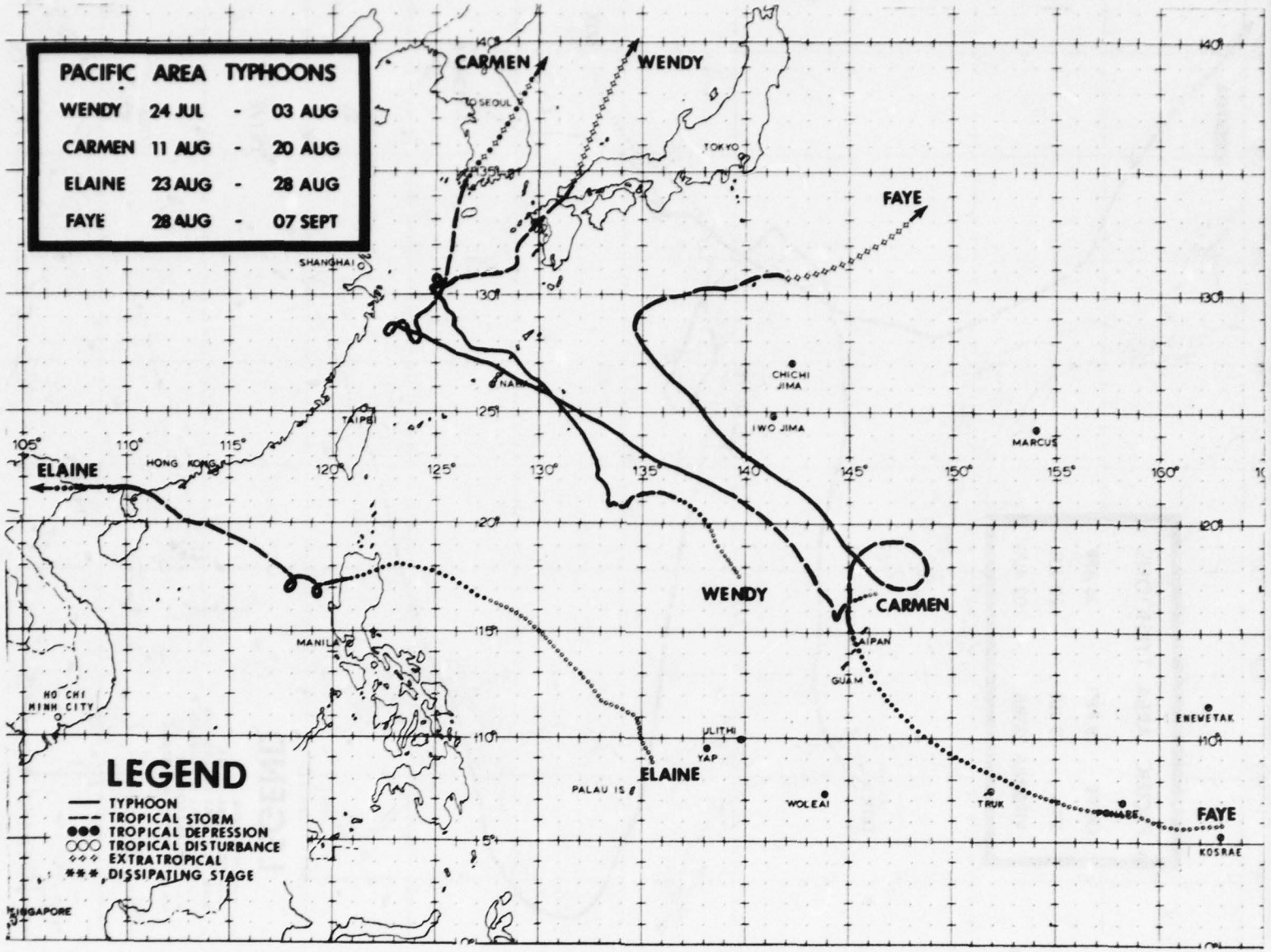

PACIFIC AREA TROPICAL STORMS
SHIRLEY 30 JUN - 30 JUN
AGNES 24 JUL - 30 JUL
BONNIE 10 AUG - 12 AUG
DELLA 11 AUG - 13 AUG
GLORIA 29 AUG - 01 SEPT
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
HONG KONG
TAIPEI
RANGOON
BANGKOK
MANILA
SAIPAN
GUAM
PT. BLAIR
HO CHI MINH CITY
ULITHI
YAP
PALAU IS
WOLEAI
SINGAPORE
TS DELLA +13
13/12Z
TS AGNES +09
30/00Z
TS BONNIE +11
12/06Z
30/18Z
TS SHIRLEY +05
30/06Z
10/06Z
24/18Z
TS 24
TS 08
TS BONNIE +11
TS GLORIA
31/18Z +17
29/06Z
TS GLORIA +17
11/06Z
TS DELLA +13
TS SHIRLEY +05

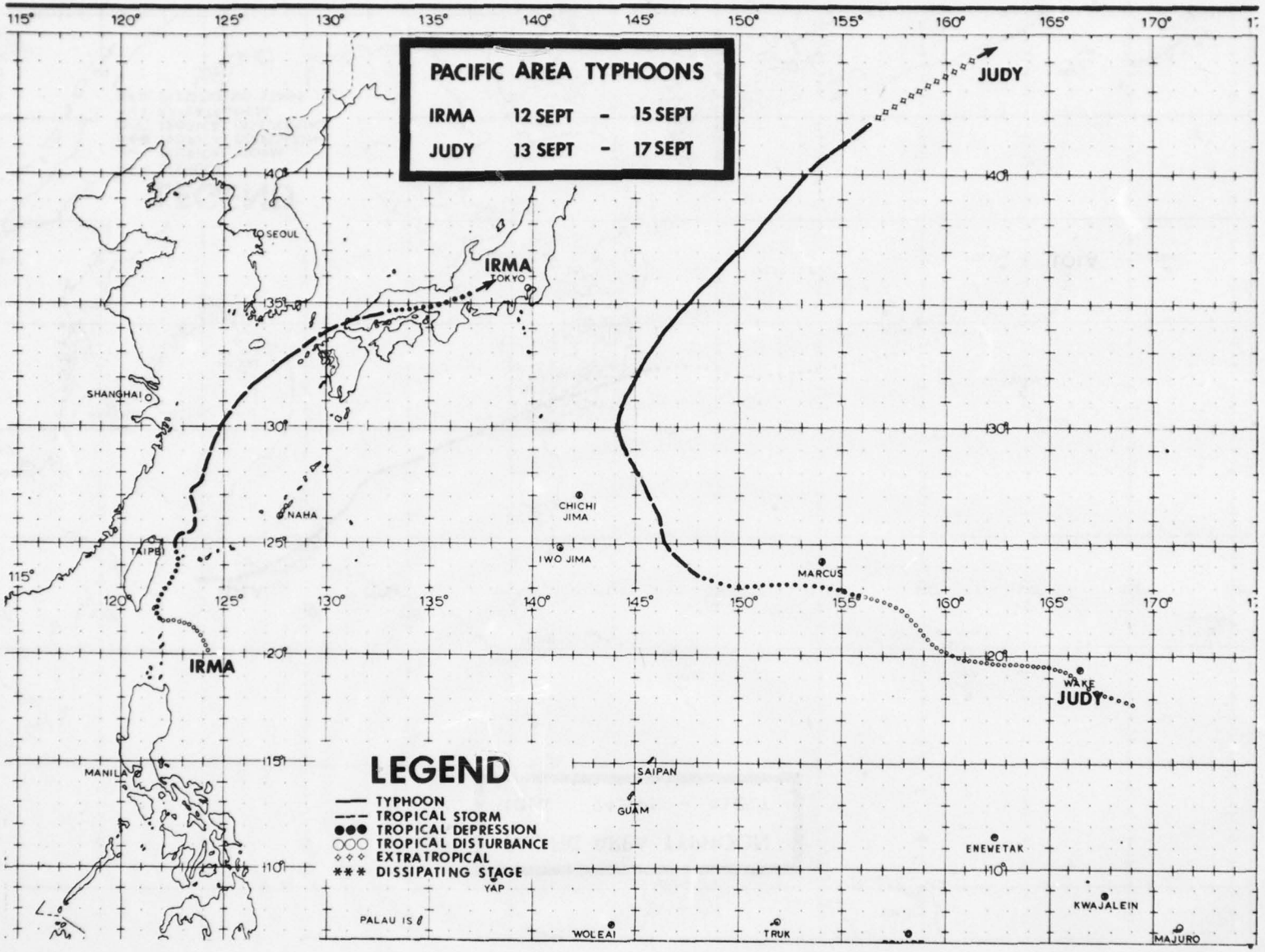

PACIFIC AREA TROPICAL STORMS
HESTER 30 AUG - 01 SEPT
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TS HESTER +18
01/12Z
01
31
30/00Z
29
TS HESTER +18
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
YAP
ENEWETAK
PALAU IS
WOLEAI
TRUK
KWAJALEIN
MAJURO

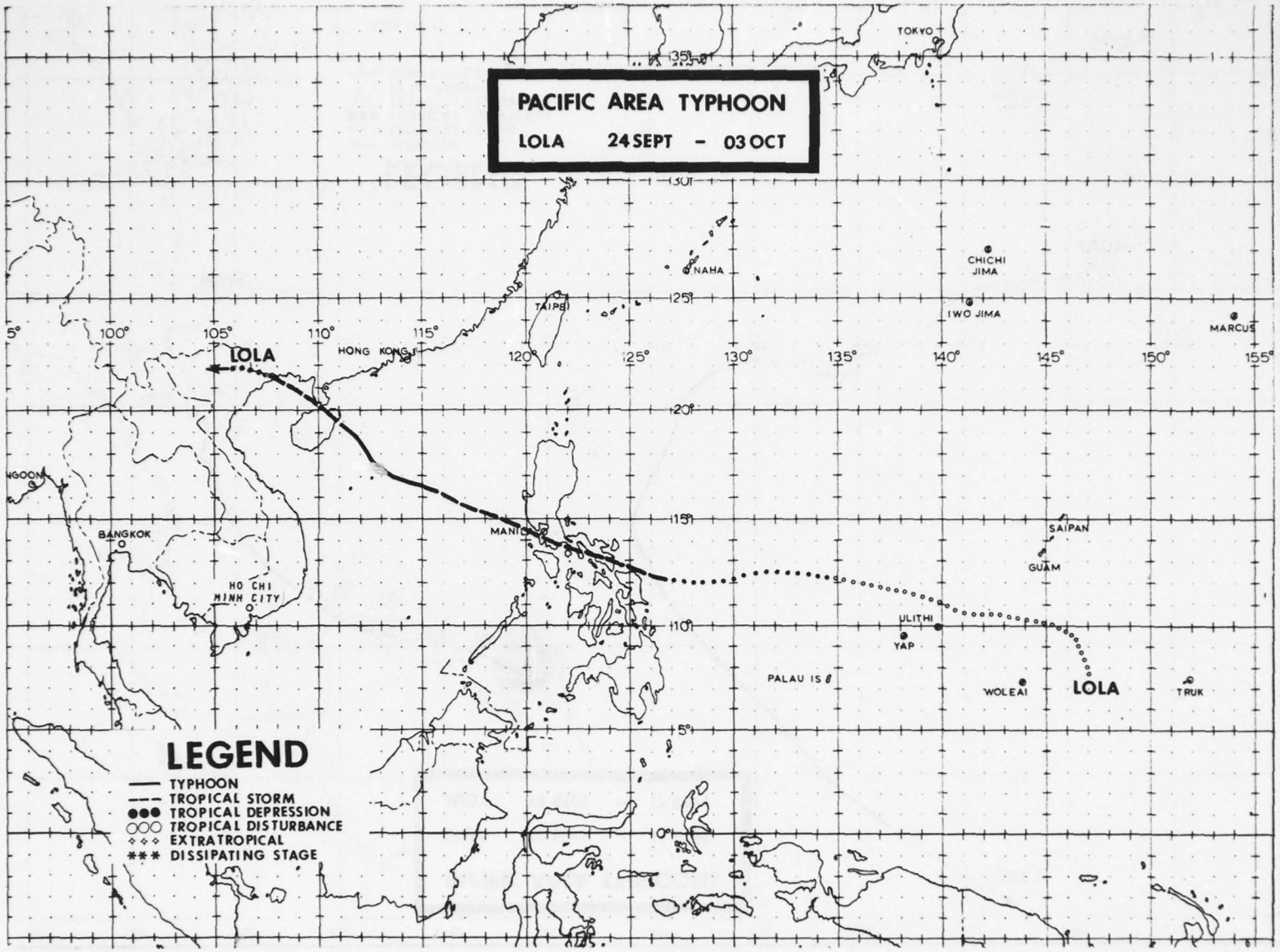

PACIFIC AREA TROPICAL STORMS
KIT 21 SEPT - 26 SEPT
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
DACCA
CALCUTTA
RANGOON
BANGKOK
HO CHI MINH CITY
MANILA
PT. BLAIR
SINGAPORE
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TS KIT +21
26/06Z
26
25
24
23
22
21/06Z
21
20
C
TS KIT + 21
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
TRACK UNCERTAIN
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

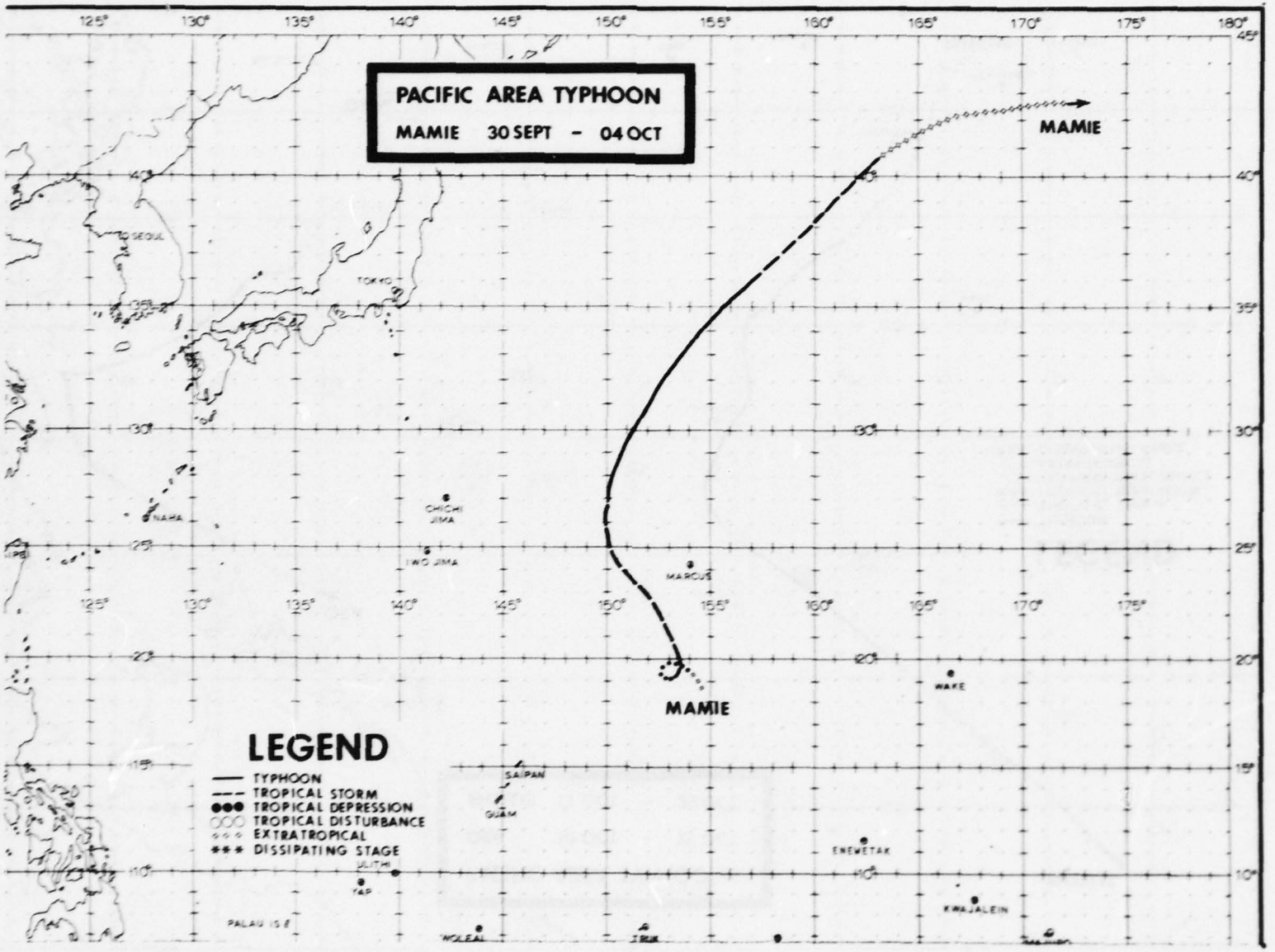

PACIFIC AREA TROPICAL STORMS
NINA 08 OCT - 17 OCT
TESS 01 NOV - 07 NOV
WINNIE 27 NOV - 30 NOV
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TS NINA +24
17/00Z
08/00Z
TS NINA +24
01/18Z
07/00Z
TS TESS +31
27/06Z
TS TESS +31
TS WINNIE +34
30/12Z
TS WINNIE +34
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
YAP
ULITHI
WOLEAI
PALAU IS
TRUK
PONAPE
KOSRAE
ENEWETAK
MARCUS
WAKE
KWAJALEIN

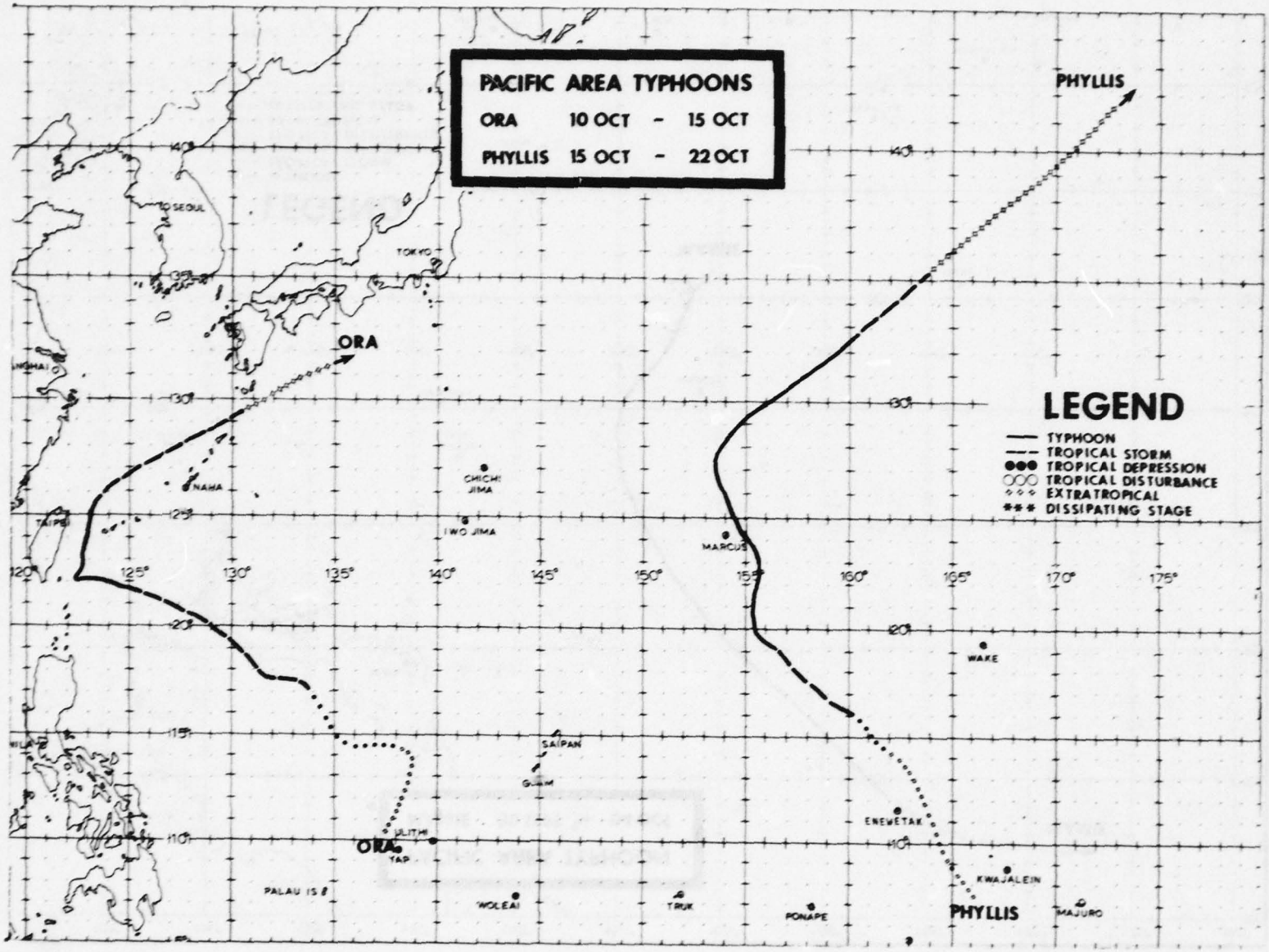

PACIFIC AREA TYPHOONS
OLIVE 18 APR - 26 APR
TRIX 13 JUL - 22 JUL
VIRGINIA 23 JUL - 02 AUG
115°
120°
125°
130°
135°
140°
145°
150°
155°
VIRGINIA
TOKYO
SHANGHAI
TRIX
NAHA
CHICHI JIMA
OLIVE
IWO JIMA
TAIPEI
MARCUS
TRIX
MANILA
SAIPAN
GUAM
VIRGINIA
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
OLIVE
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
*** DISSIPATING STAGE

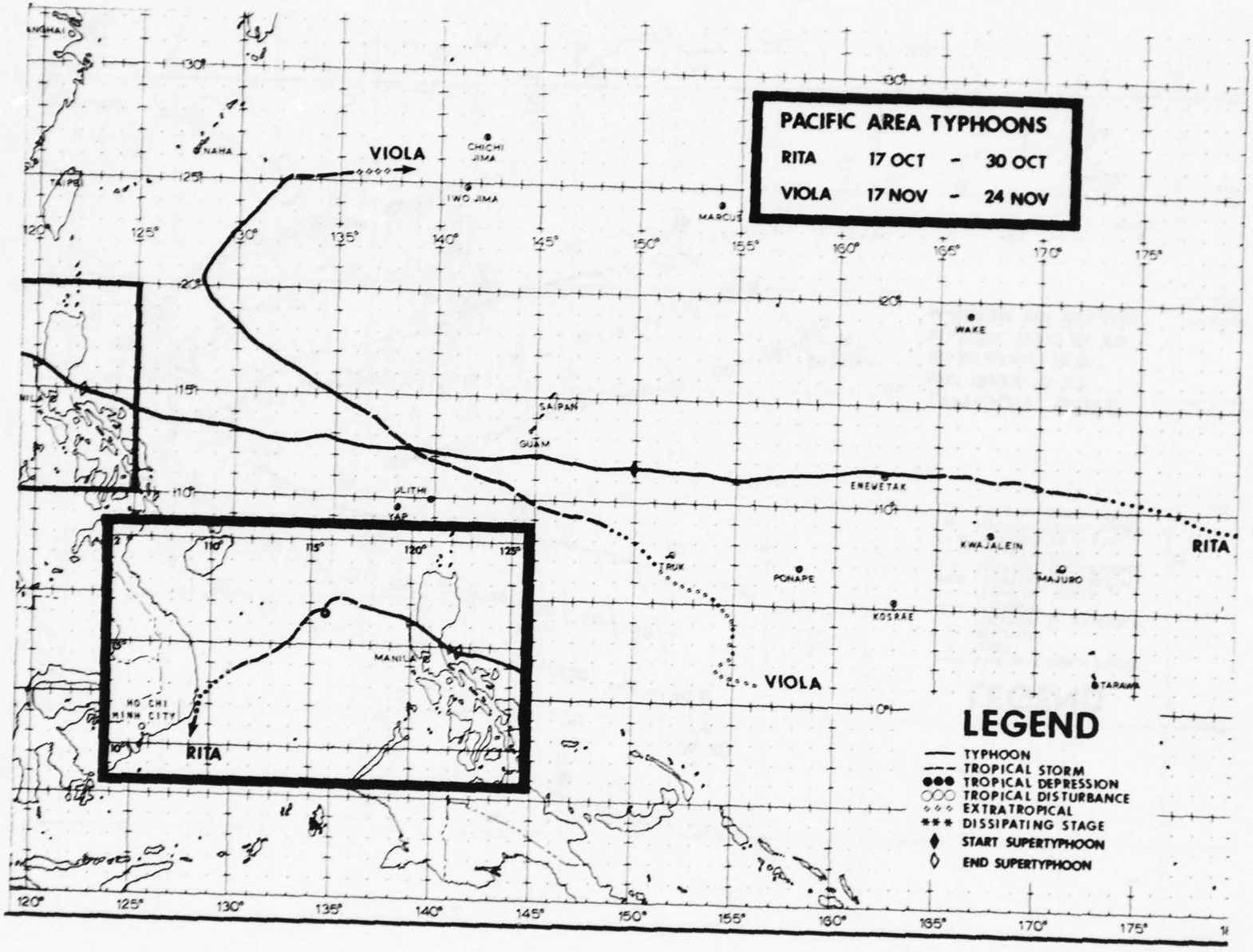

PACIFIC AREA TYPHOONS
WENDY 24 JUL - 03 AUG
CARMEN 11 AUG - 20 AUG
ELAINE 23 AUG - 28 AUG
FAYE 28 AUG - 07 SEPT
CARMEN
WENDY
FAYE
ELAINE
WENDY
CARMEN
ELAINE
SEOUL
TOKYO
SHANGHAI
TAIPEI
HONG KONG
MANILA
HO CHI MINH CITY
SINGAPORE
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
YAP
ULITHI
WOLEAI
TRUK
PONAPE
KOSRAE
ENEWETAK
PALAU IS
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
160°
35°
30°
25°
20°
15°
10°
5°
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE

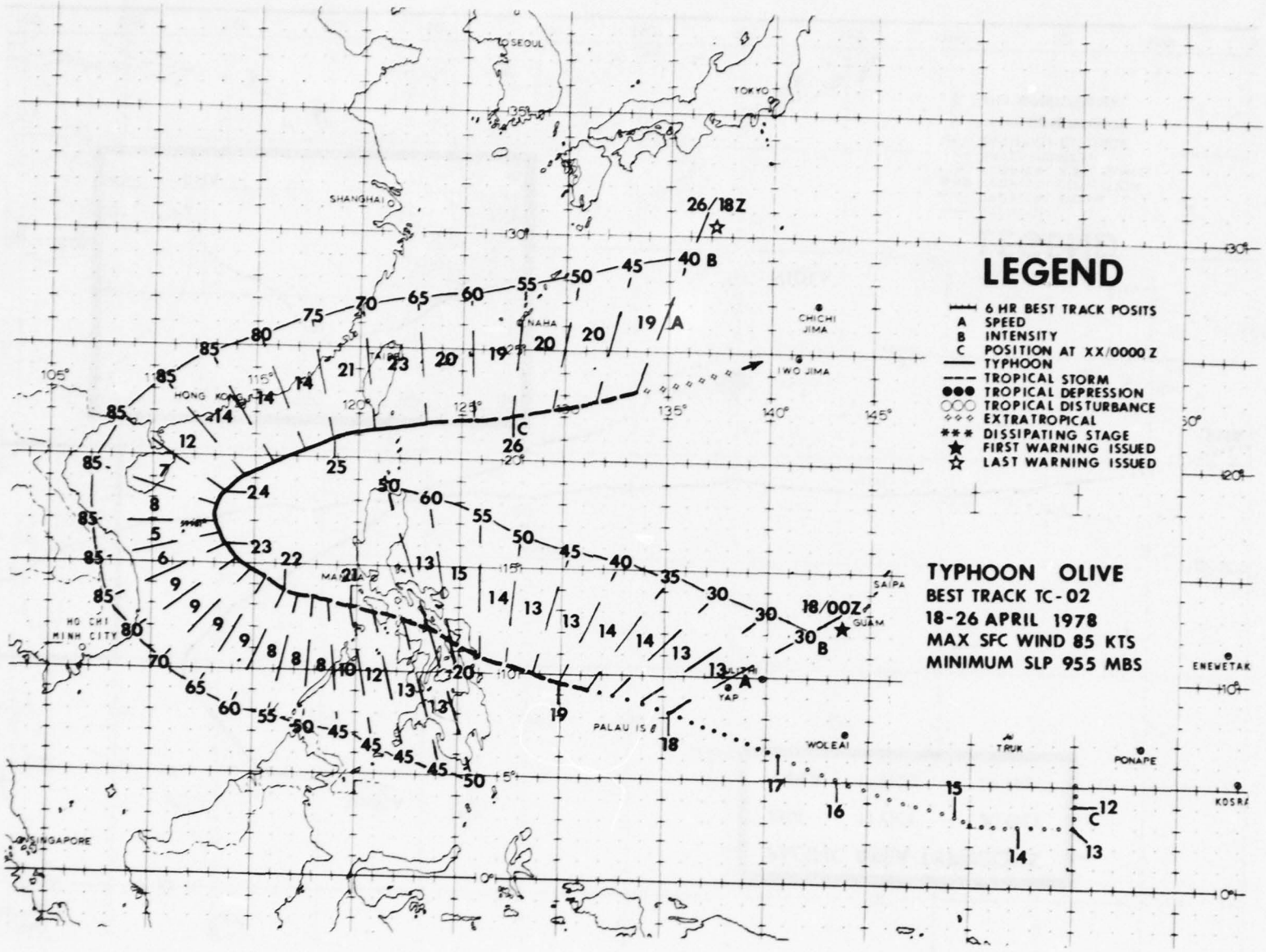

PACIFIC AREA TYPHOONS
IRMA 12 SEPT - 15 SEPT
JUDY 13 SEPT - 17 SEPT
JUDY
IRMA
TOKYO
SEOUL
SHANGHAI
NAHA
TAIPEI
IRMA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
JUDY
MANILA
SAIPAN
GUAM
ENEWETAK
KWAJALEIN
MAJURO
YAP
PALAU IS
WOLEAI
TRUK
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE


PACIFIC AREA TYPHOON
LOLA 24 SEPT - 03 OCT
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
TAIPEI
HONG KONG
LOLA
BANGKOK
HO CHI MINH CITY
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
LOLA
TRUK
100°
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
35°
30°
25°
20°
15°
10°
5°
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE


PACIFIC AREA TYPHOON
MAMIE 30 SEPT - 04 OCT
MAMIE
MAMIE
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ENEWETAK
KWAJALEIN
YAP
ULITHI
PALAU IS
WOLEAI
IRUK
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE


PACIFIC AREA TYPHOONS
ORA 10 OCT - 15 OCT
PHYLLIS 15 OCT - 22 OCT
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
ORA
PHYLLIS
SEOUL
TOKYO
NAHA
TAIPEI
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ENEWETAK
KWAJALEIN
MAJURO
PONAPE
TRUK
WOLEAI
PALAU IS
JALUIT
TAP
120°
125°
130°
135°
140°
145°
150°
155°
160°
165°
170°
175°


PACIFIC AREA TYPHOONS
RITA 17 OCT - 30 OCT
VIOLA 17 NOV - 24 NOV
VIOLA
RITA
NAHA
TAIPEI
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
ENEWETAK
KWAJALEIN
MAJURO
TRUK
PONAPE
KOSRAE
TARAWA
MANILA
HO CHI MINH CITY
LEGEND
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
START SUPERTYPHOON
END SUPERTYPHOON


LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON OLIVE
BEST TRACK TC-02
18-26 APRIL 1978
MAX SFC WIND 85 KTS
MINIMUM SLP 955 MBS
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
HONG KONG
HO CHI MINH CITY
SAIPA
GUAM
TAP
PALAU IS
WOLEAI
TRUK
PONAPE
ENEWETAK
KOSRAE
SINGAPORE
26/18Z
18/00Z

Early April 1978 saw the near-equatorial trough (NET) slowly shift northward and become more active as the sun made its seasonal progression toward summer solstice. Within the NET, a surface circulation was first analyzed on the 11th at 1200Z near 05N-155E and initially meandered southward then westward at approximately 8 kt (15 km/hr) over the next four days. This circulation eventually developed into the first typhoon of the year, Olive.

Anticyclonic outflow at the 200 mb level was first noted in the vicinity over the surface circulation at 131200Z. Although weak, this outflow persisted for the next two days. By the 16th, satellite imagery and synoptic data indicated increased organization. A formation alert was issued at 160600Z and extended for another 24 hours at 170600Z as aircraft and satellite data confirmed that development was slower than expected. Based on satellite and synoptic data, the first warning on Tropical Depression 02 was issued at 180000Z. A subsequent aircraft fix at 180252Z found a central pressure of 1001 mb and estimated the maximum surface winds to be 30-35 kt (15-18 m/sec).

The mid-tropospheric subtropical ridge was well established at this time with the east-west axis varying between 17-20N. This resulted in the cyclone, once organized, tracking west-northwest at speeds faster than climatology. Satellite data indicated good outflow aloft with continuous intensification resulting. The intensification noted in the 24 hours prior to landfall was in good agreement with climatology. TD-02 was upgraded to Tropical Storm Olive on the 18th at 1800Z. Tropical Storm Olive passed through the Leyte Gulf with maximum sustained winds of 60 kt (31 m/sec).

While crossing the central Philippine Islands, Olive continued her 13 kt (24 km/hr) speed but weakened to 45 kt (23 m/sec) intensity. Upper level outflow remained good during the transit and Olive exited intact into the South China Sea after 201800Z. The combination of good outflow aloft and warm water in the South China Sea caused Olive to reintensify and reach typhoon intensity at 220600Z. The storm recurved through a break in the subtropical ridge along 113E that had been forming since 220000Z. Figure 3-1 shows the three-hourly surface reports from the Paracel Islands (WMO 59981) when Olive passed nearby. A maximum intensity of 85 kt (44 m/sec) was reached 12 hours before recurvature and continued until the 24th at 1200Z.

The recurvature was quite sharp due to strong, deep westerly upper-air flow in the latitudes of 20-30N. Figure 3-2 shows the cirrus outflow to the north and northeast of Olive being affected by the strong westerlies. After recurvature, Olive accelerated out to the east-northeast, staying approximately 180 nm (330 km) south of the maximum wind zone. Gradual weakening occurred after recurvature as cooler, drier air was ingested into the storm with Olive finally becoming extratropical over cooler waters at 1800Z on the 26th of April.

Post-analysis showed that numbered warnings should have begun near 170000Z. Although the system was not fully defined at this time and difficult to pinpoint on satellite data, enough information was available to predict storm force winds were possible within 48 hours. Recurvature was considered probable early in Olive's life and discussed on prognostic reasoning messages. However, the recurvature track was much sharper than initially forecast. More emphasis should have been placed on the depth and strength of the westerlies north of the narrow, subtropical ridge and tracks of previous April cyclones (analogs) should have been studied closely.

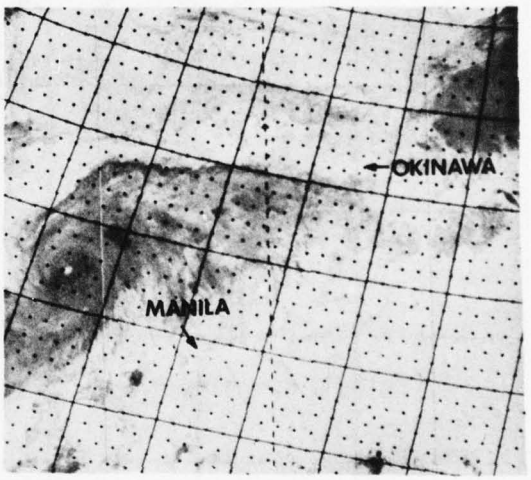
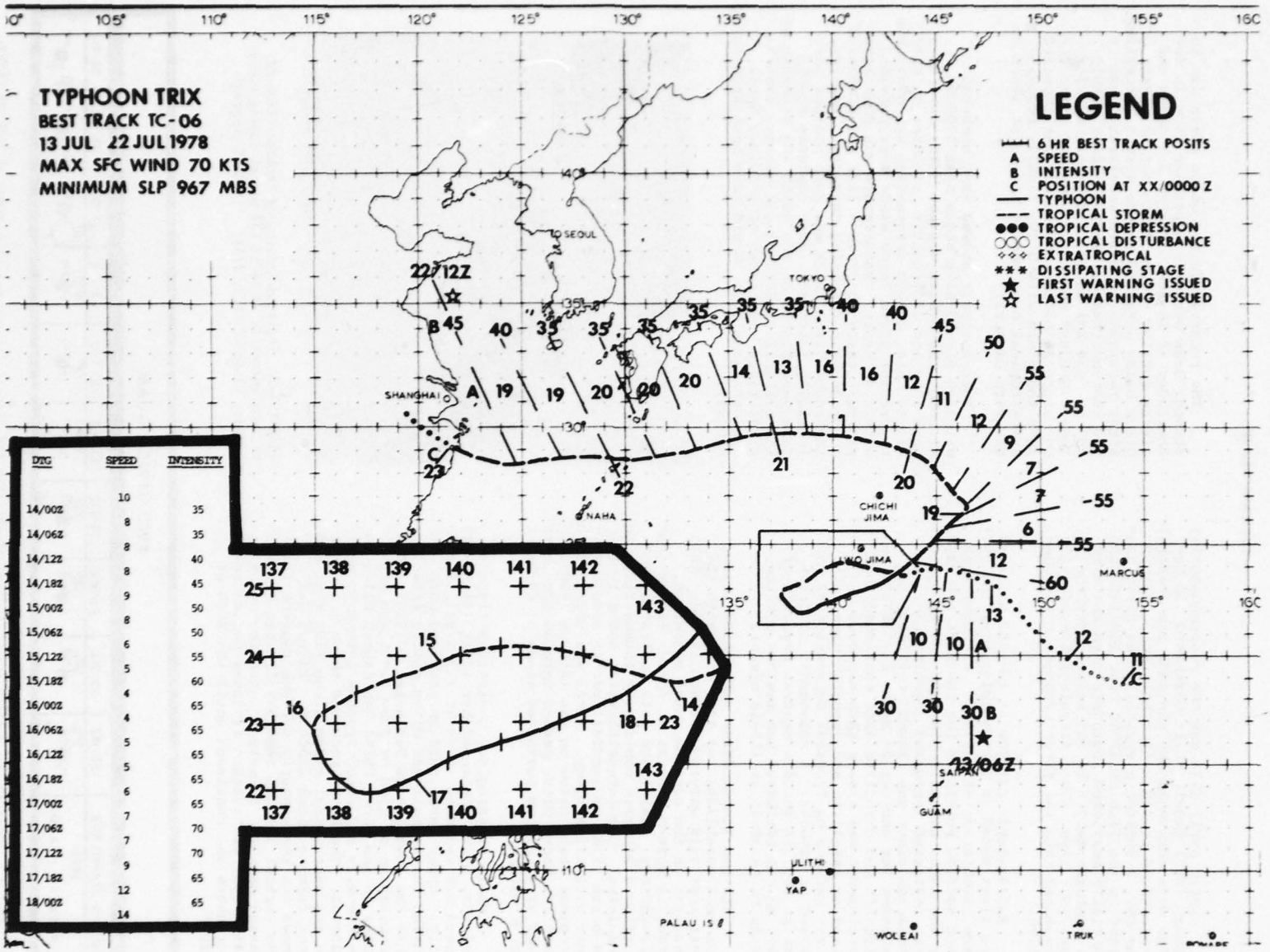


FIGURE 3-2. Infrared imagery of Typhoon Olive at maximum intensity of 85 kt (44 m/sec) during recurvature, 23 April 1978, 1158Z. (NOAA-5 imagery)

FWC/JTWC GUAM

DATE: 22-23 APRIL 1978	22/18Z	22/21Z	23/00Z	23/03Z	23/06Z	23/09Z	23/12Z	23/15Z	23/18Z	23/21Z
59981 PARACEL ISLANDS	053	029	029	009	951	896	916	973	002	015

FIGURE 3-1. Three-hourly surface synoptic observations from the Paracel Islands during passage of Typhoon Olive.


TYPHOON TRIX
BEST TRACK TC-06
13 JUL 22 JUL 1978
MAX SFC WIND 70 KTS
MINIMUM SLP 967 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
DTG SPEED INTENSITY
14/00Z 10
14/06Z 8 35
14/12Z 8 35
14/18Z 8 40
15/00Z 9 45
15/06Z 8 50
15/12Z 6 50
15/18Z 5 55
16/00Z 4 60
16/06Z 4 65
16/12Z 5 65
16/18Z 5 65
17/00Z 6 65
17/06Z 7 65
17/12Z 7 70
17/18Z 9 70
18/00Z 12 65
14 65
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
22/12Z
23/06Z

Trix, 1978's second typhoon, was a difficult tropical cyclone to forecast due to an unusual track which included a four day, 700 nm (1300 km) perimeter, cyclonic loop. The degree of difficulty was reflected in warning statistics such as: eleven warning relocations, two warning amendments, and an average 24 hour forecast error of 174 nm (322 km).

Trix originated from a wave in the easterlies which became significant along 148E from 10N-25N on the 10th of July. A day later, a surface circulation was noted within the wave 550 nm (1000 km) northeast of Guam. Over the next 48 hours, the wave drifted northwest at 05-07 kt (09-13 km/hr) and moved under an area of diffluence caused by a tropical upper tropospheric trough (TUTT) to the west. Potential for development being excellent, a formation alert was issued at 0600Z on the 12th.

The first aircraft reconnaissance flight into the alert area found a cyclonic circulation with a circular area of calm winds, 100 nm (185 km) in diameter. Based on this 130407Z information and continued outflow aloft possible, the first warning was issued at 130600Z on Tropical Depression 06 (TD 06).

Over the next 18 hours, TD 06 moved west at approximately 10 kt (18 km/hr). Subsequent aircraft reconnaissance observed the minimum sea level pressure continuing to decrease; tropical storm intensity was reached on the 14th at 0000Z.

Metsat data at 142220Z (Fig. 3-3) showed Trix to be a very compact tropical storm with outflow only three degrees in diameter. Midget storms have been reviewed in the literature and been found to exhibit erratic intensity trends and Trix held true to form. Figure 3-4 shows the diurnal variation of the sea level pressure as observed by dropsonde. Also shown are the differences between the maximum sustained surface winds as estimated from aircraft reconnaissance and those obtained from an empirically derived JTWC formula:

$$V_{max} = 6.7(1010. - MSLP)^{exp\ 0.644}$$

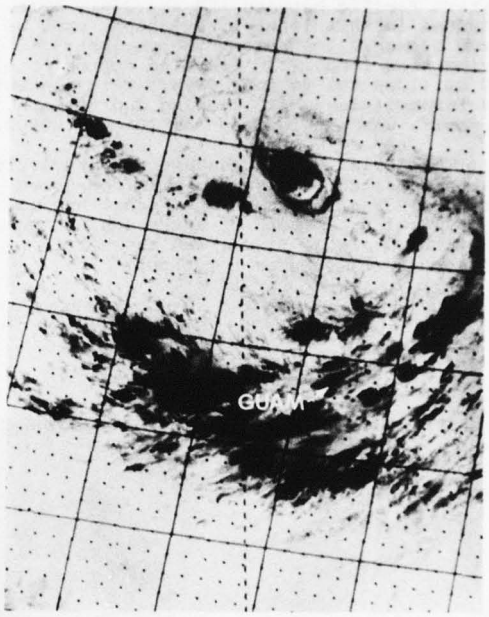


FIGURE 3-3 . Infrared image of Trix at tropical storm intensity, 14 July 1978, 2220Z. The cloudiness over Guam in the deep convergent southwest flow is quite a distance from Trix, signifying the large extent of the cyclonic circulation in which Trix was embedded. (DMSP imagery)

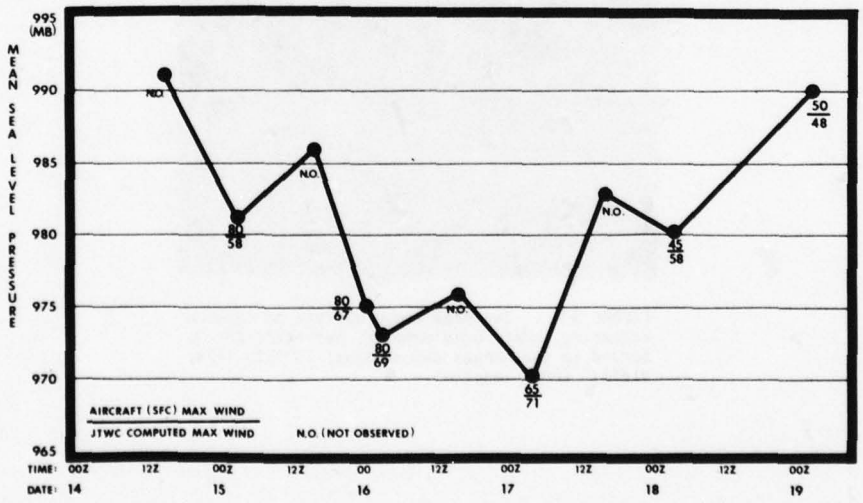


FIGURE 3-4 . Time cross section of Trix's minimum sea level pressure.

These differences may be due to larger gust spreads in compact storms which may give the appearance of stronger maximum surface winds than were actually present.

In addition to erratic intensity trends, Trix's track was quite extraordinary. On the 15th at 0000Z, a large cyclonic circulation dominated the mid-tropospheric flow in the western Pacific between 13N and 23N. Trix, embedded in this large circulation, made a large cyclonic loop along the periphery. During this loop, Trix traveled approximately 700 nm (1300 km) in four days. Trix continued intensifying while looping and typhoon intensity was attained on the 16th at 0000Z.

The Aerial Reconnaissance Weather Officer (ARWO) reported on his post-mission report for the 160326Z fix that "the storm had all the typical parameters of a typhoon but on a miniature scale." Figure 3-5 shows Trix still compact, even as a typhoon.

A large, subtropical high pressure center began building near 40N-170W at 0000Z on the 19th. This feature finally provided the necessary strong easterlies to break Trix out of her loop by 0600Z on the 19th. Prior to this change in track, Trix had weakened again to tropical storm strength (on the 18th at 1200Z).

The subtropical ridge continued building westward over Japan steering Trix westward by 1200Z on the 20th. This was the final, significant change in track. Trix meandered westward thereafter and made landfall on the east coast of China near Linhai.

The 211800Z, official warning indicated downgrading of Trix to tropical depression stage with maximum sustained winds of 30 kt (15 m/sec) as satellite and aircraft reconnaissance data showed a weakening trend. However, post-analysis of synoptic data recieved after-the-fact revealed that Trix maintained minimal tropical storm intensity and reached a secondary maximum intensity just prior to landfall. The aircraft no-fly -line prohibited aircraft reconnaissance from observing this secondary maxima.

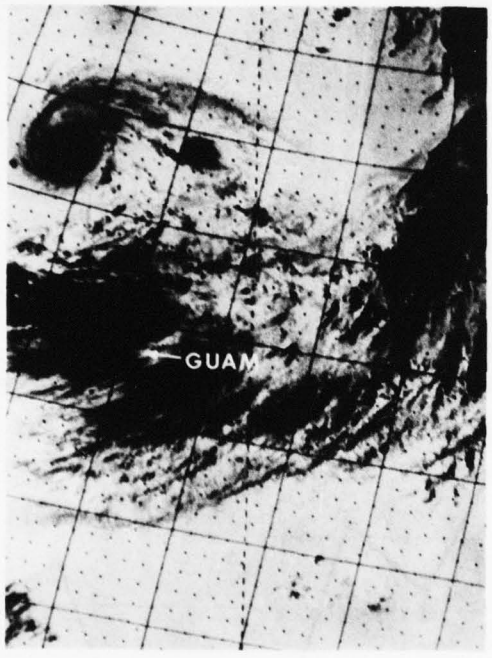
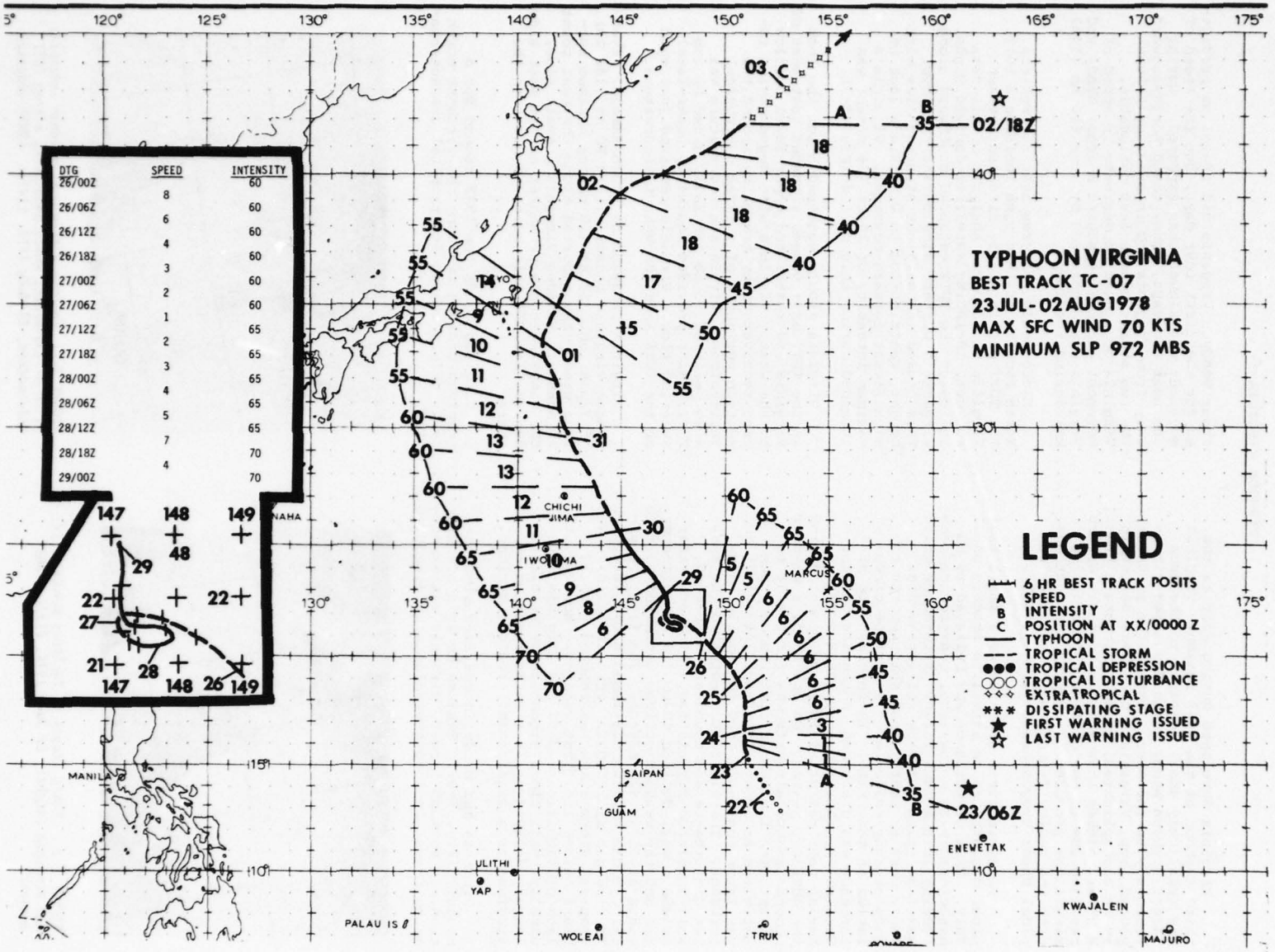


FIGURE 3-5 . Infrared image of Trix at typhoon intensity, still very compact, and still embedded in the larger circulation, 16 July 1978, 0107Z. (DMSP imagery).


TYPHOON VIRGINIA
BEST TRACK TC-07
23 JUL - 02 AUG 1978
MAX SFC WIND 70 KTS
MINIMUM SLP 972 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
DTG SPEED INTENSITY
26/00Z 8 60
26/06Z 6 60
26/12Z 4 60
26/18Z 3 60
27/00Z 2 60
27/06Z 1 65
27/12Z 2 65
27/18Z 3 65
28/00Z 4 65
28/06Z 5 65
28/12Z 7 70
28/18Z 4 70
29/00Z
02/18Z
23/06Z
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
NAHA
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
ENEWETAK
KWAJALEIN
MAJURO

TYPHOON VIRGINIA

Virginia developed during July as the third typhoon of the 1978 season. Virginia was relatively small compared to the much larger Typhoon Wendy which developed simultaneously to the west. Except for an unexpected loop, Virginia's track was definable as an uncomplicated, broad recurvature track. However, higher than average forecast errors resulted due to the difficult forecasting situations produced by complex interactions with the nearby Typhoon Wendy and the Tropical Upper Tropospheric Trough (TUTT).

Virginia first appeared as a small tropical disturbance on satellite imagery on 21 July. This disturbance was believed to be associated with a low-level convergence zone feeding into a much larger disturbance which was developing over the Philippine Sea. There were no nearby land/ship reports to indicate any evidence of a surface circulation at this time. Therefore, this disturbance was discussed in the Significant Tropical Weather Advisory (ABEH PGTW) as having poor potential for development during the advisory period. On the 23rd, a weather reconnaissance aircraft was first sent to investigate the larger disturbance (then estimated at 30 kt (15 m/sec) intensity) and was later sent east into the smaller disturbance. The aircraft penetrated the smaller disturbance and found an unexpected, well-developed circulation. Aircraft radar showed a well-defined 40 nm (74 km) diameter eye and the weather officer estimated surface gusts at 55 kt (28 m/sec). The first tropical cyclone warning was immediately issued on TS Virginia at 230600Z. Post analysis showed tropical storm stage was reached 6 to 12 hours before the first warning. However, the lack of significant data and Virginia's unusually small cloud signature on satellite imagery delayed earlier interpretation of Virginia as a significant tropical cyclone.

Virginia and Wendy intensified simultaneously (Fig. 3-6). Because Wendy's circulation was so much larger, Virginia was expected to travel in a counter-clockwise direction about Wendy. Virginia did travel as predicted for the first four days, but the speed of movement was slower than expected. During the next two days, Wendy moved northwestward away from Virginia and interaction between the two storms became less noticeable. Virginia continued to decrease in speed of movement and then executed a loop; Wendy and Virginia were separated by over 800 nm (1482 km) during the loop.

Macro-scale features over the western North Pacific at this time included a TUTT. The TUTT was initially situated between Virginia and Japan. Analysis of all data sources, including satellite-derived winds, indicated the TUTT extended southward along Virginia's western side during the loop. This caused inconsistent steering flow with height, contributing to Virginia's lack of significant forward movement. Virginia's maximum intensity of 70 kt (36 m/sec) was attained during this period (Fig. 3-7).

Virginia slowly weakened after the loop as the TUTT axis became situated just west of Virginia and restricted upper-level outflow to the west. Virginia also began moving toward recurvature by traveling around the western periphery of a large subtropical anticyclone. Virginia's recurvature was also believed to be partially aided by the TUTT, which provided southerly upper-level steering flow. Virginia remained just east of the TUTT axis throughout recurvature.

Virginia produced no known damage. Even though Virginia passed within 80 nm (148 km) of Japan, only 20 kt (10 m/sec) maximum surface winds were reported along the east coast of Honshu. Besides Virginia's small size, the winds were always weaker on the west side due to the TUTT axis being so close to the storm.

Virginia holds the 1978 record for a tropical cyclone tracking the farthest north (47N) before losing its tropical characteristics.

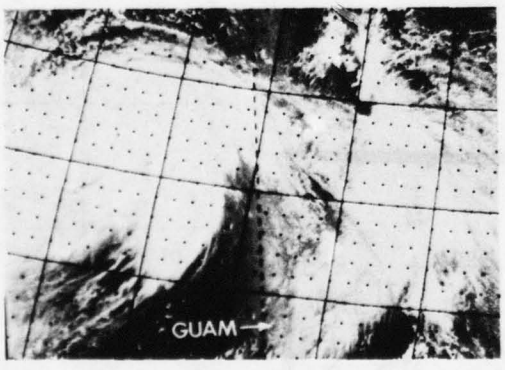


FIGURE 3-6. Early stages of Typhoons Wendy (left) and Virginia (right), 26 July 1978, 0133Z. (DMSP imagery)

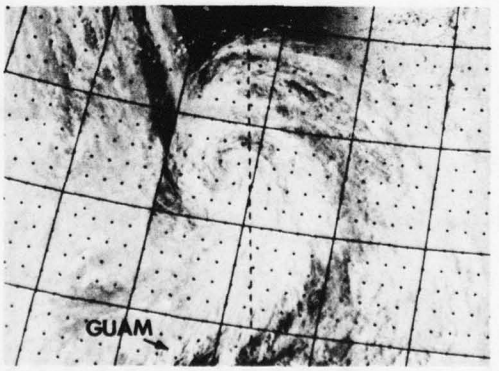
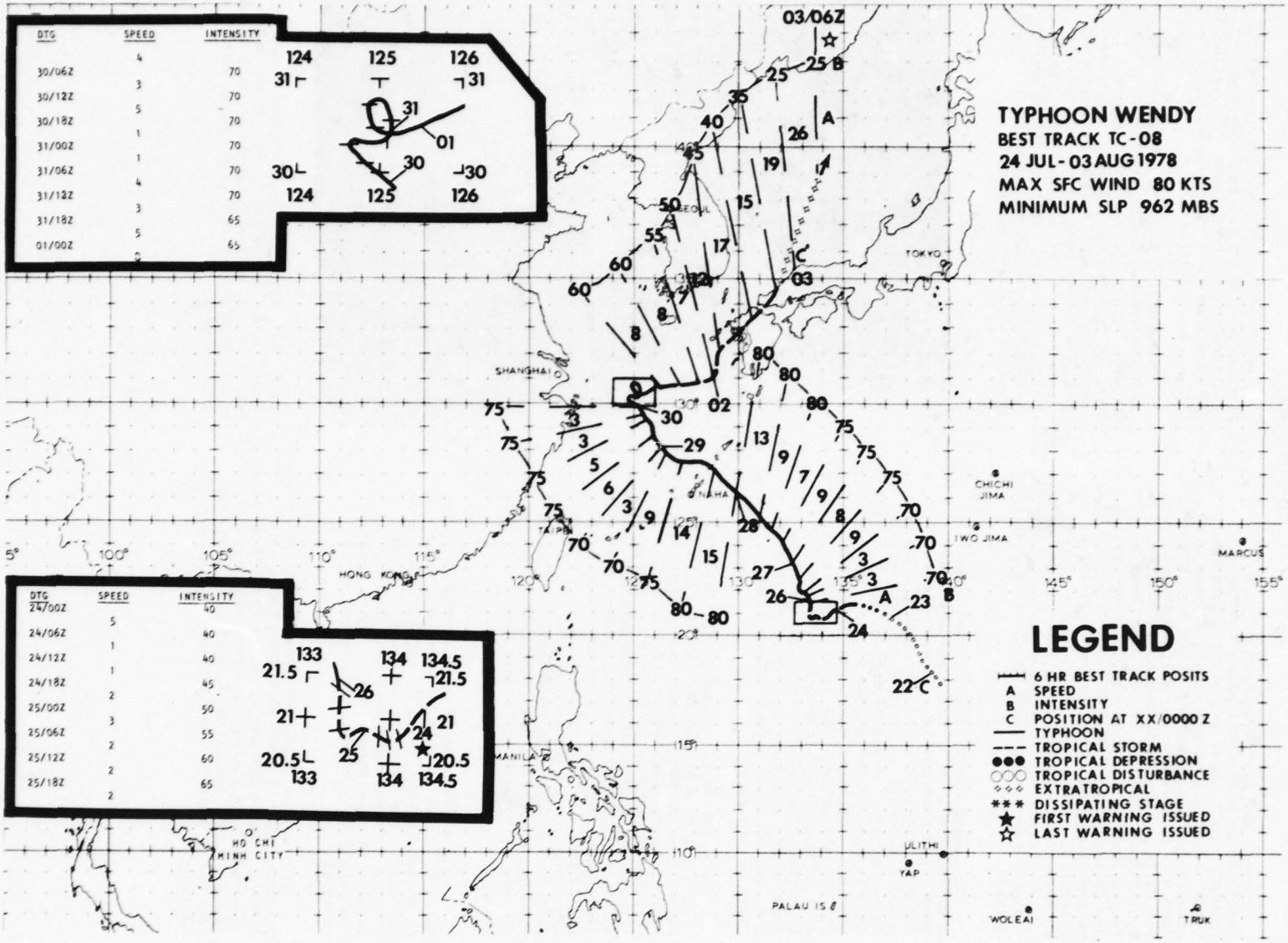


FIGURE 3-7. Typhoon Virginia at maximum intensity of 70 kt (36 m/sec) while undergoing strong TUTT interaction, 28 July 1978, 2141Z. (DMSP imagery)


TYPHOON WENDY
BEST TRACK TC-08
24 JUL - 03 AUG 1978
MAX SFC WIND 80 KTS
MINIMUM SLP 962 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
DTG SPEED INTENSITY
30/06Z 4 70
30/12Z 3 70
30/18Z 5 70
31/00Z 1 70
31/06Z 1 70
31/12Z 4 70
31/18Z 3 65
01/00Z 5 65
DTG SPEED INTENSITY
24/00Z 5 40
24/06Z 1 40
24/12Z 1 45
24/18Z 2 50
25/00Z 3 55
25/06Z 2 60
25/12Z 2 65
25/18Z 2
03/06Z
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
HONG KONG
MANILA
HO CHI MINH CITY
PALAU IS
YAP
ULITHI
WOLEAI
TRUK

TYPHOON WENDY

Wendy, the fourth typhoon of 1978, developed in a well-established monsoon trough. The trough, which had existed for seven to ten days prior to significant tropical cyclone development, laid over WESTPAC from 07N at the Dateline west-northwest over the Mariana Islands to the Luzon Straits. By 1200Z on the 22nd of July, two weak surface circulations were evident in the trough, one centered at 19.8N-138.2E which eventually became Wendy and the other at 14.5N-151.4E (Virginia). With the Tropical Upper Tropospheric Trough (TUTT) lying just to the north of the surface trough, the dynamics for significant tropical cyclone development were present.

Increased organization on the 22nd prompted the initial reconnaissance aircraft launch at 2130Z. The ARWO observed 25-30 kt (13-15 m/sec) surface winds, but could not locate a definable surface circulation center. Based on this aircraft data and the good potential for increased development a formation alert was issued at 230456Z for an area 660 nm (1222 km) northwest of Guam. The tropical cyclone developed rapidly thereafter; it reached tropical storm intensity near 231800Z (Fig. 3-8) and obtained typhoon strength by 1800Z on the 25th.

Wendy meandered westward from the 23rd till the 25th when a break developed in the subtropical ridge with the high center, northeast of Wendy, dominating and building. In response to stronger, mid-level southeasterlies, Wendy accelerated northwestward. Wendy slowly reached her maximum intensity of 80 kt (41 m/sec) during this time and maintained it for 24 hours before she began a slow weakening trend after passing over the Ryukyu Islands. A marked decrease in low-level inflow and convection near the center appeared to have affected Wendy's development at this point.

Wendy stalled again in the central East China Sea, 180 nm (333 km) east-southeast of Shanghai, when steering currents weakened. The cooler and drier environment, the decreased inflow, and finally the decrease in outflow aloft weakened Wendy. Most storms that stall in movement, intensify; Wendy weakened.

Late on the 31st, the break in the subtropical ridge became more pronounced and Wendy began to recurve northeastward at 8 kt (15 km/hr). A succession of minor, mid-level troughs first forced Wendy northward early on the 2nd of August, then accelerated her northeastward.

The cooler environment and increased frictional effects caused Wendy to weaken and lose tropical characteristics by 18Z on the 2nd after existing as a significant tropical cyclone for 10 days.

Twice during Wendy's existence (240000Z to 260000Z and 300600Z to 311800Z), she slowed significantly. The portions of the best track shown for these periods are among many possible solutions. With fix-to-fix movement near to or less than the fix accuracies, it was almost impossible to determine if Wendy just slowed to 1-3 kt (2-6 km/hr), underwent looping, or simply remained "quasi-stationary".

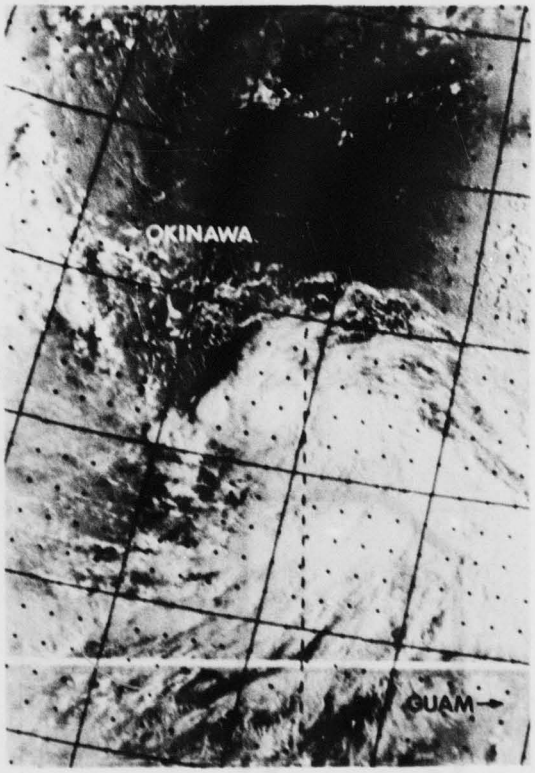
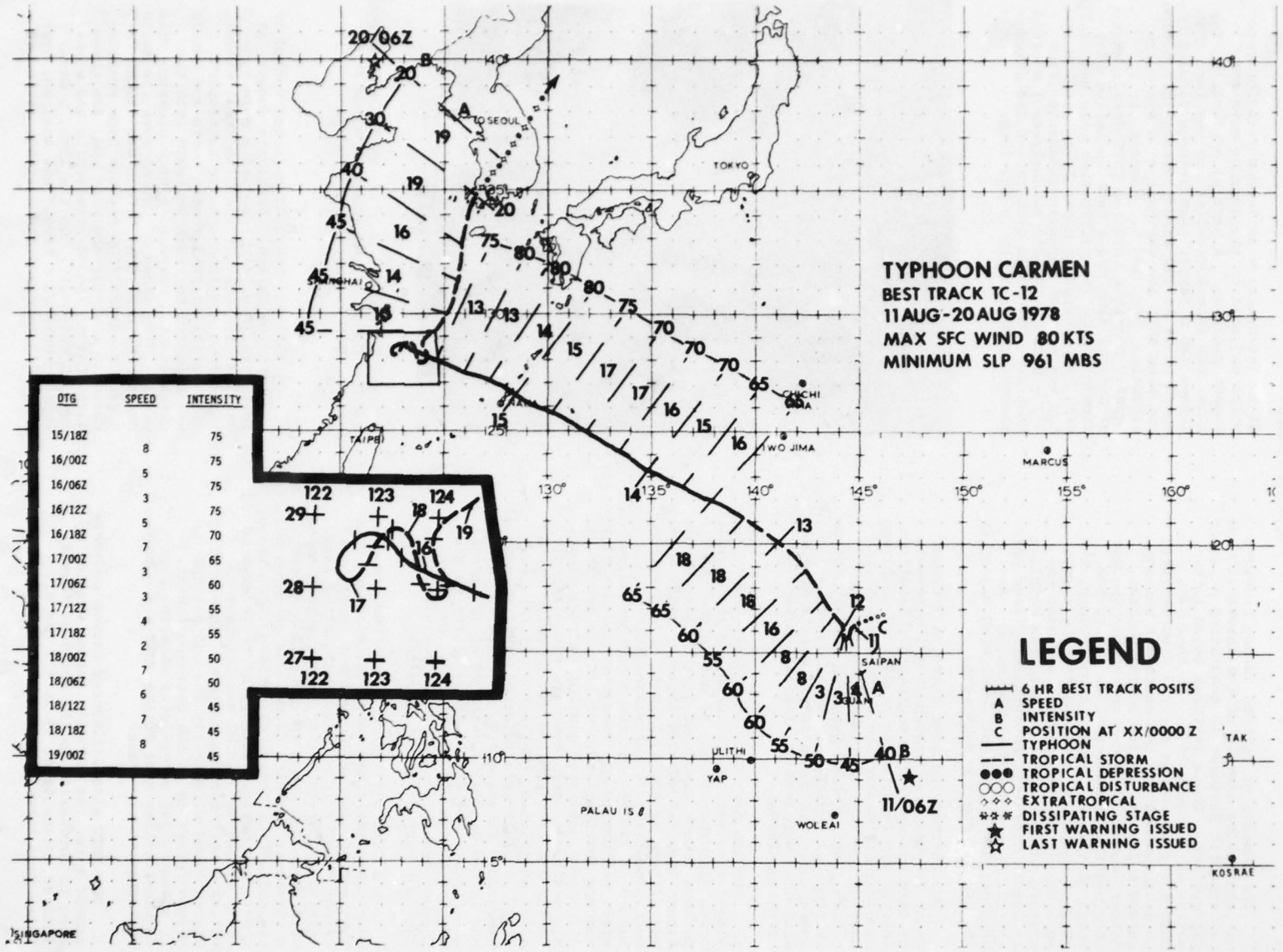


FIGURE 3-8. Wendy as a young tropical storm, 23 July 1978, 2117Z. Typical of circulations in the monsoon trough, maximum cloudiness exists in the deep southwesterlies just south of the trough axis. (DMSP imagery)


TYPHOON CARMEN
BEST TRACK TC-12
11 AUG - 20 AUG 1978
MAX SFC WIND 80 KTS
MINIMUM SLP 961 MBS
DTG SPEED INTENSITY
15/18Z 8 75
16/00Z 5 75
16/06Z 3 75
16/12Z 5 75
16/18Z 7 70
17/00Z 3 65
17/06Z 3 60
17/12Z 4 55
17/18Z 2 55
18/00Z 7 50
18/06Z 6 50
18/12Z 7 45
18/18Z 8 45
19/00Z 45
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
20/06Z
11/06Z
TO SEOUL
TOKYO
SHANGHAI
TAIPEI
IWO JIMA
MARCUS
SAIPAN
GUAM
YAP
ULITHI
WOLEAI
PALAU IS
KOSRAE
SINGAPORE

TYPHOON CARMEN

The genesis of Typhoon Carmen provides an interesting example of the interaction of two synoptic features in generating a tropical cyclone. These features began interacting on 7 August 1978. On that day, Guam's surface winds shifted from easterly to southwesterly as the southwest monsoon surged well east of its normal habitat. Metsat imagery showed a noticeable upsurge in convective activity along and to the south of the low level monsoon trough, the axis of which now extended from Southeast Asia across the Philippines and over the western North Pacific to near the dateline. In Guam's vicinity, southwesterly flow persisted, deepened and strengthened. At 081200Z Guam's gradient level wind was 20 kt (10 m/sec) from the southwest.

During the same time frame, a Tropical Upper Tropospheric Trough (TUTT) northwest of Guam was deepening southward. Satellite derived upper-air winds at 081200Z confirmed considerable divergence existed south and east of the TUTT overlying the monsoon trough just north of Guam and definite signs of tropical cyclone organization were appearing. Six hours later, Guam's gradient wind had increased to 31 kt (16 m/sec) out of the southwest.

For the next day, this upper-level/lower-level interaction persisted and the developing disturbance, one of many along the monsoon trough discussed in the daily Significant Tropical Weather Advisory (ABEH PGTW), was written as having fair to good development potential. A formation alert was issued at 100156Z and two subsequent aircraft reconnaissance missions showed a minimum sea level pressure of 1004 mb and 25 kt (13 m/sec) estimated maximum surface winds. The surface center, however, was difficult to fix and the decision was to reissue the alert at 110134Z. Three hours later, however, aircraft data reported a 992 mb central pressure. Subsequently, the first warning was issued at 110600z with 40 kt (21 m/sec) intensity. Meanwhile, the activity in the monsoon trough had also rapidly organized in another area; Tropical Storm Della was forming just east of the Philippines.

The TUTT's influence on Carmen continued beyond her early developmental stages. TUTT interaction also influenced her track and affected her size and intensification rate. Initially, Carmen's track was expected to be climatological since the overall synoptic environment in which Carmen was situated was typical of the August climatology. A strong, mid-tropospheric, subtropical ridge existed north of her and Carmen was forecast to follow a west-northwest track. In actuality, Carmen moved erratically for one day and then accelerated to the north-northwest. It appears that upper-level steering from southeasterlies east of the TUTT was a major influence on her track.

The TUTT also influenced Carmen's development rate. At 120000Z, Carmen was beginning to accelerate to the north-northwest with an intensity of 55 kt (28 m/sec). Three days later she had only intensified to 80 kt (41 m/sec) - an intensification rate which was half of the average rate for August cyclones. A partial explanation for this slow intensification was the fact that Carmen had a faster than average forward speed of 16 kt (30 km/hr) during this period and also that she was part of a two storm situation (Fig. 3-9). However, it is equally possible that the TUTT (still west of Carmen) also had a part in influencing Carmen's slow intensification rate and small size by restricting upper level outflow in her western and southern quadrants (Figs. 3-9 & 3-10). The 200 mb analyses indicated that the TUTT moved with Carmen and strengthened from the 11th to the 14th.

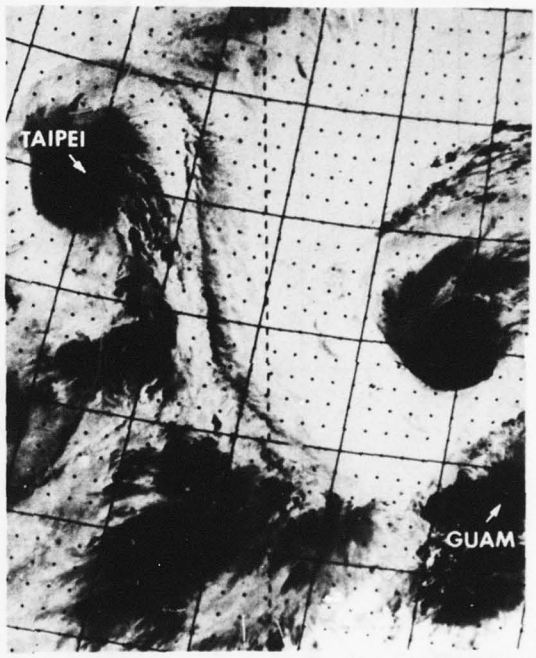


FIGURE 3-9. Infrared image of Typhoon Carmen (right) and Tropical Storm Della (left), 12 August 1978, 2134Z. (DMSP imagery)

By 151200Z, the TUTT axis had curled to the south of Carmen. Satellite imagery at this time (Fig. 3-11) showed a more symmetrical typhoon but small in areal extent. The strong mid-tropospheric subtropical ridge still existed to the north and Carmen was expected to track westward into the China coast. However, a high pressure cell was building ahead of Carmen over the Asian coast. By the 16th, Carmen was caught in a weak steering flow between high pressure cells to the east and west and, for three days, Carmen looped erratically and weakened in intensity. On the 17th, a developing short wave trough was analyzed over the Asian mainland and warnings reflected

recurvature toward Korea. At 181200Z, Carmen did begin to track northward and eventually dissipated over Korea. Despite Carmen's erratic behavior, 24-hour forecast errors matched the average for the year.

During her lifetime, Carmen was responsible for considerable damage. Before dissipating over South Korea, she caused widespread flooding, a reported 21 deaths and $3 million worth of property damage. Saipan, affected by Carmen in her formative stage, reported flooding and property damage and was designated a national disaster area. At maximum intensity of 80 kt (41 m/sec) on August 15, Carmen passed over Okinawa about 26 nm (48 km) north of Kadena AB with little damage to DoD facilities.

The disturbance in the monsoon trough that eventually became Carmen was similar to many others that did and did not develop. And, of those that did develop, many only reached the monsoon depression stage. The difficulty in determining the development potential of these monsoon disturbances affected the timeliness of issuance of the formation alert and initial warning on Carmen. Near perfect forecasting to meet customer requirements would have allowed the initial warning to be issued 48 to 72 hours prior to the actual 110600Z issuance.

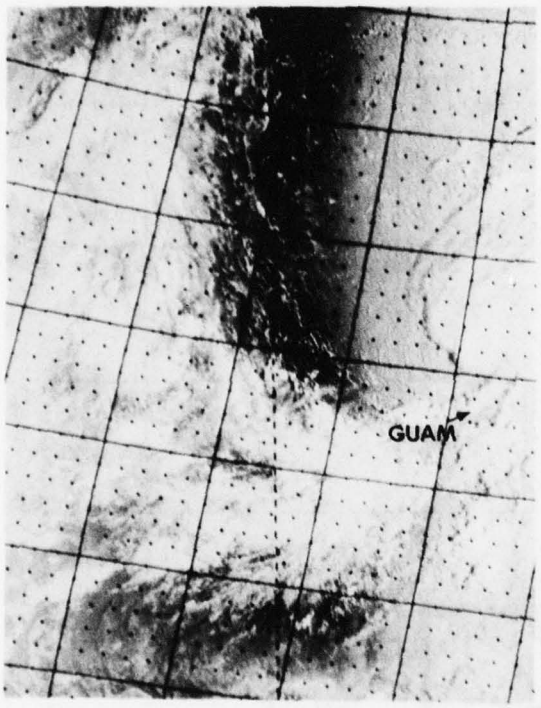


FIGURE 3-10. Restricted upper-level outflow over Carmen's western and southern quadrants, 11 August 1978, 2243Z. (DMSP imagery)

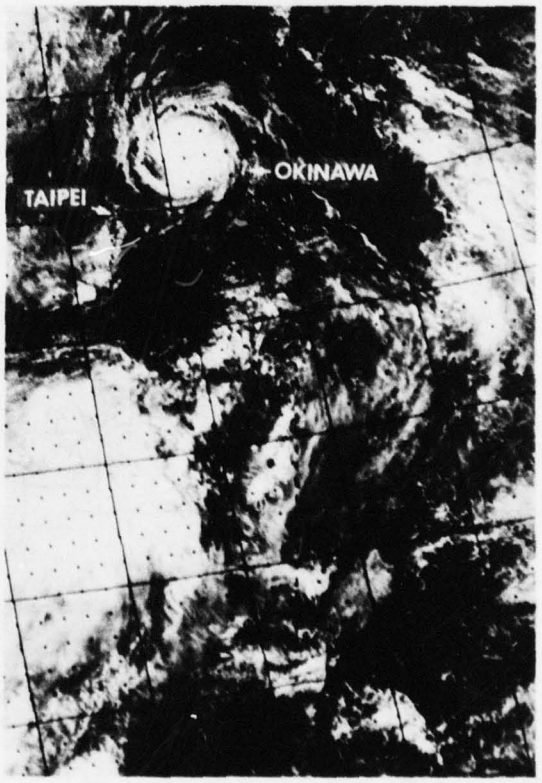
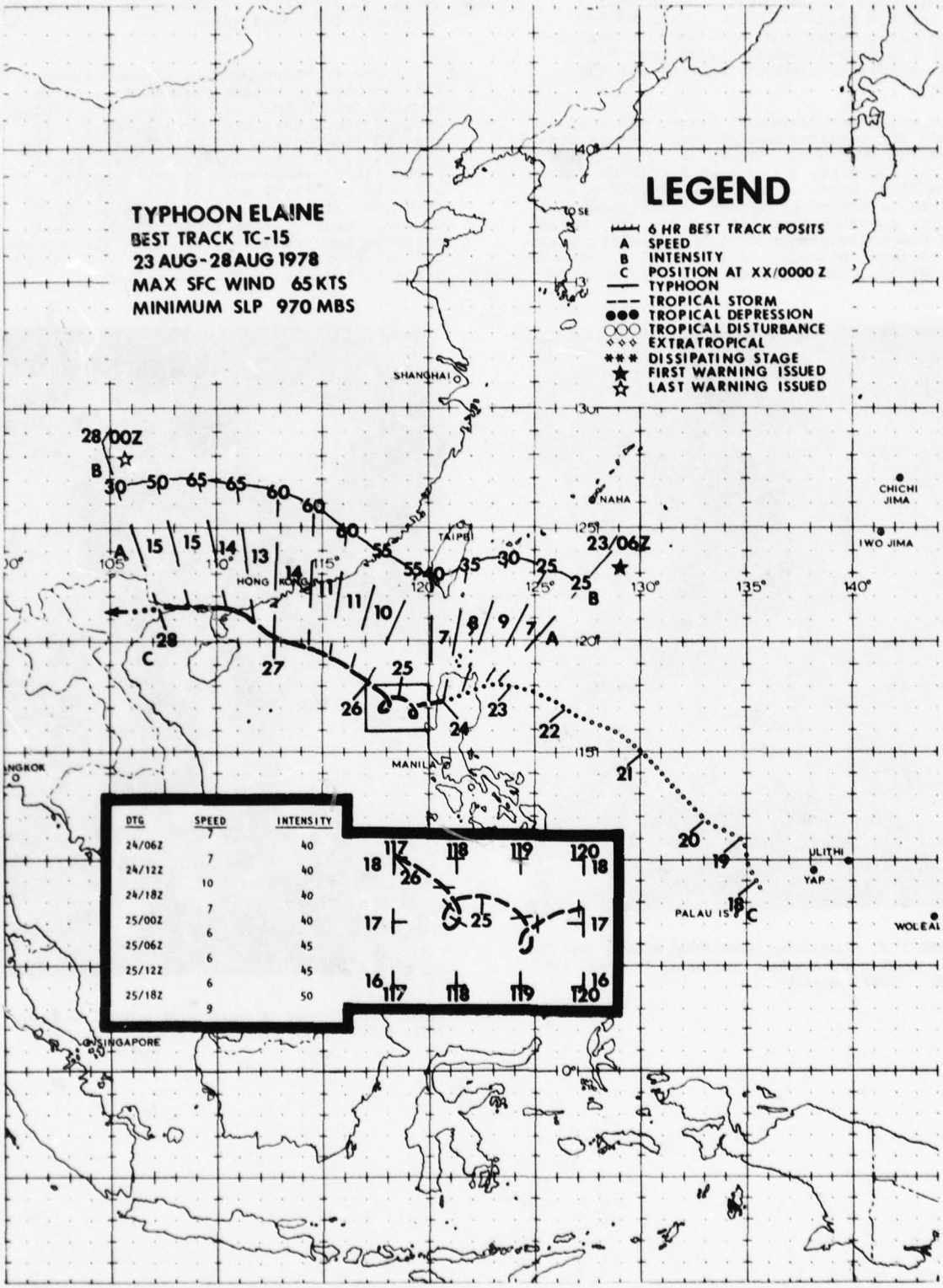


FIGURE 3-11. Carmen's small areal extent, 15 August 1978, 1505Z. (DMSP imagery)


TYPHOON ELAINE
BEST TRACK TC-15
23 AUG - 28 AUG 1978
MAX SFC WIND 65 KTS
MINIMUM SLP 970 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
28/00Z
23/06Z
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
SINGAPORE
PALAU IS
YAP
ULITHI
WOLEAI
CHICHI JIMA
IWO JIMA
DTG SPEED INTENSITY
24/06Z 7 40
24/12Z 7 40
24/18Z 10 40
25/00Z 7 40
25/06Z 6 45
25/12Z 6 45
25/18Z 6 50
9

The 17th of August 1978 saw the monsoon trough extending as far east as 140E providing the breeding ground for Typhoon Elaine. Synoptic and satellite data on the 18th indicated a tropical disturbance, with maximum winds of 15 kt (8 m/sec), organizing to the northeast of Palau. From the 18th through the 20th, this system was discussed on the Significant Tropical Weather Advisory (ABEH PGTW) with poor to fair potential for significant tropical cyclone development. The relative position of the Tropical Upper Tropospheric Trough (TUTT), north of the disturbance during this period, indicated suppression of upper level outflow in the northern portion of the system. Issuance of a Tropical Cyclone Formation Alert was delayed as a result of expected strong upper-level directional shear. The advisories on the 21st and the 22nd carried fair to good potential; however, based on sparse synoptic data and little organization evident on the satellite data, the system was still thought to be in the formative stage. The initial warning was issued at 230600Z by which time increased organization and banding features were indicated on satellite imagery. Post analysis indicated the system was a tropical depression 36 hours prior to this time.

By 240000Z, the mid-tropospheric ridge provided more definitive east-northeast steering flow across northern Luzon resulting in Elaine's southwest track, contrary to a favored climatological track to the west-northwest. Climatological studies also indicate weakening during passage over Luzon. Based on synoptic data, however, Elaine continued to intensify and was upgraded to a tropical storm at 240000Z while still over land 170 nm (315 km) north of Manila. Heavy storm damage was reported in northern Luzon.

As Elaine exited Luzon into the South China Sea, her associated cloud pattern lacked sufficient organization for optimum satellite (Fig. 3-12) and radar fixes; aircraft reconnaissance at low flight levels (restricted at times by terrain) was heavily relied on for definitive surface center fixes. During this same period, 24 - 25 August 1978, Elaine was caught between strong southwest monsoon flow and strong northeast flow. As a result, Elaine looped twice and forecast errors increased considerably.

After completing the second loop, Elaine accelerated to the northwest in response to the mid-tropospheric ridge axis' northward migration. A weakness in this ridge was apparent on the 26th and developed northeast of Vietnam due to a mid-latitude short wave. By the 27th this short wave trough was within 10 degrees of Elaine and a noticeable northward adjustment in her track resulted. The closest point of approach (CPA) to Hong Kong occurred at 270200Z with Elaine 155 nm (287 km) to the southwest.

At 270300Z, the S.S. Seal and Trade located at 21N-113E reported surface winds of 65 kt (33 m/sec) and a surface pressure of 974 mb. Based on this ship report, Elaine was upgraded to typhoon strength just prior to landfall over the southern coast of China near the Luichow Peninsula. Subsequent to landfall, Elaine tracked westward and dissipated rapidly as a result of frictional/terrain effects. Downgrading to tropical storm intensity occurred by 271800Z with the final warning issued at 280000Z.

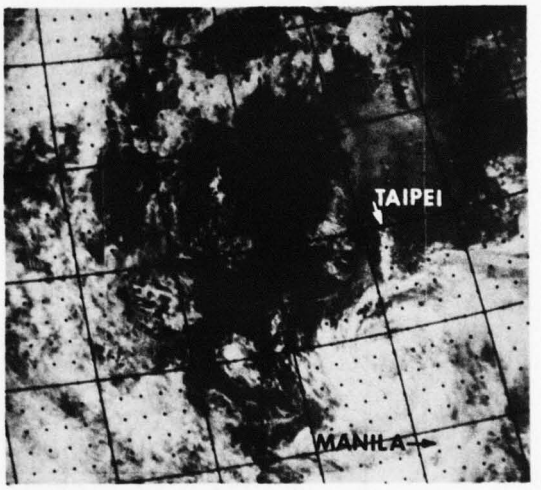
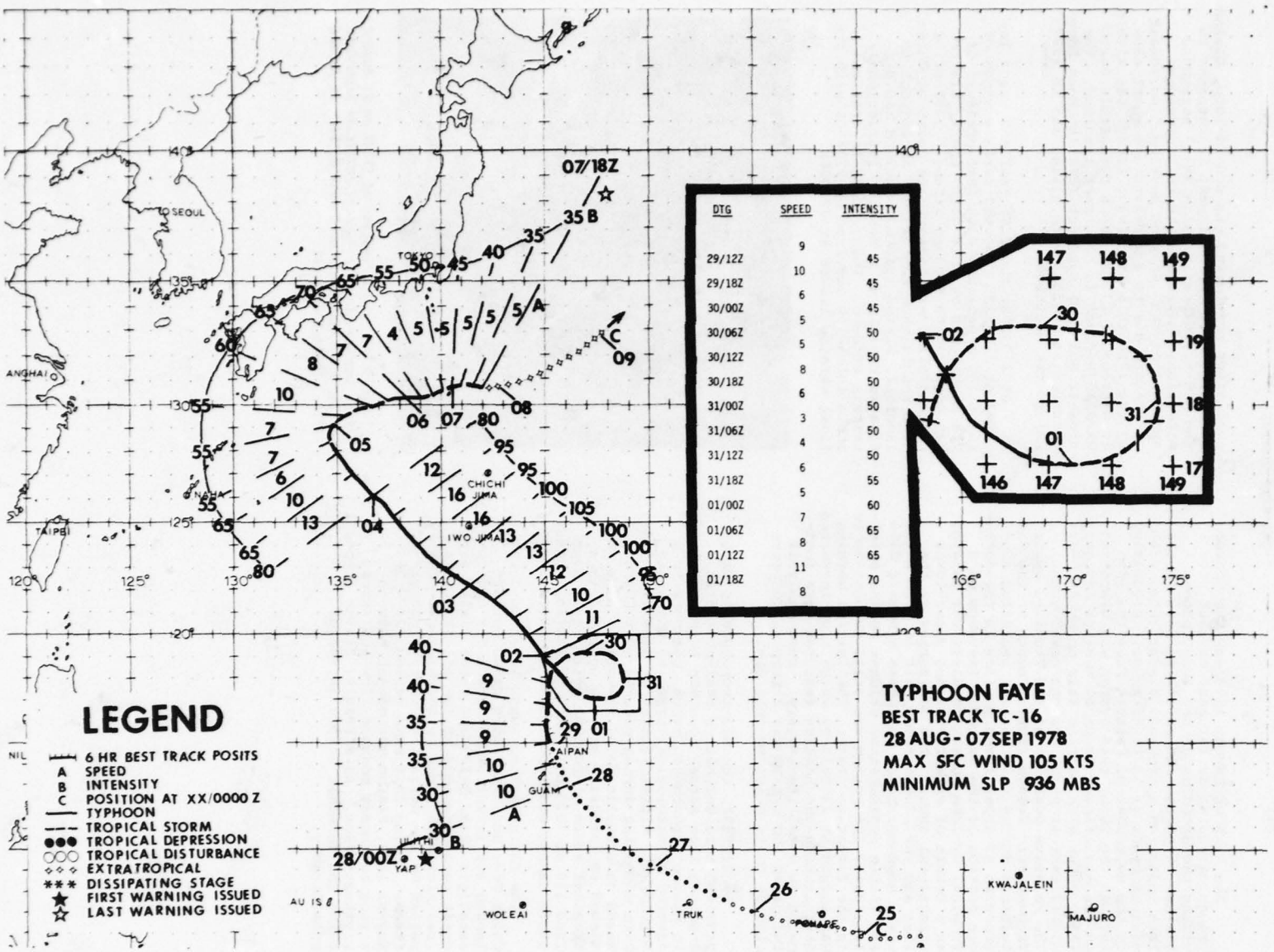


FIGURE 3-12. *Visual imagery at 0134Z on 25 August 1978, showing Elaine's typical satellite signature during her erratic movement period, 24 - 25 August 1978. (NOAA-5 imagery)*


07/18Z
35 B
SEOUL
TOKYO
ANGHAI
NAHA
TAIPEI
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
YAP
WOLEAI
TRUK
POHNPEI
KWAJALEIN
MAJURO
AU IS
28/00Z
DTG SPEED INTENSITY
29/12Z 9 45
29/18Z 10 45
30/00Z 6 45
30/06Z 5 50
30/12Z 5 50
30/18Z 8 50
31/00Z 6 50
31/06Z 3 50
31/12Z 4 50
31/18Z 6 55
01/00Z 5 60
01/06Z 7 65
01/12Z 8 65
01/18Z 11 70
8
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON FAYE
BEST TRACK TC-16
28 AUG - 07 SEP 1978
MAX SFC WIND 105 KTS
MINIMUM SLP 936 MBS

TYPHOON FAYE

Typhoon Faye, the seventh typhoon of the 1978 season, was one of the most interesting, but unfortunately, also one of the year's most difficult typhoons to forecast. Besides executing an uncommon anticyclonic loop early in her development, Faye also unexpectedly reintensified to typhoon strength shortly before becoming extratropical.

The tropical disturbance that was to become Typhoon Faye was first sighted southeast of Ponape at 242142Z, August 1978 by satellite reconnaissance. The disturbance moved west-northwest at 13 kt (24 km/hr) and at 261200Z passed north of Truk. During this period, 200 mb analyses showed a tropical upper tropospheric trough (TUTT) with an imbedded low northwest of the disturbance. This TUTT moved west-northwest in conjunction with the surface circulation thereby keeping excellent upper-level outflow in the diffluent region, southeast of the TUTT cell, over the developing tropical disturbance.

Based on an improved satellite signature and on ship synoptic data, a Tropical Cyclone Formation Alert was issued on the disturbance at 272334Z. Shortly thereafter, a reconnaissance aircraft confirmed the existence of a closed surface circulation with a minimum sea level pressure of 1000 mb. Based on this aircraft data, the disturbance was upgraded to Tropical Depression 16 at 280000Z with max winds of 30 kt (15 m/sec). The 500 mb subtropical ridge axis was at that time oriented east-west along 36N.

At 280600Z, TD-16 passed 60 nm (111 km) to the northeast of Guam and was upgraded to Tropical Storm Faye six hours later. During the next 24 hours the storm moved straight north while slowly intensifying. The 500 mb flow pattern became complex during this period due to the influence of two new developing tropical systems: TS Gloria between Luzon and Japan and TS Hester west of Marcus Island (Fig. 3-13). The 500 mb analysis at 281200Z (Fig. 3-14) showed that the Pacific Ocean south of Japan between Guam and the Philippine Islands was dominated by an elongated monsoon trough holding multiple circulation centers, one of which was to become TS Gloria. High pressure cells were located east of Tokyo and southeast of Marcus Island.

The 281200Z objective steering aids indicated Faye would track northeastward. However, because the initial pattern itself was confused, a more climatological north-northwestward track was forecast.

By 291200Z Faye began to execute a rare, anticyclonic loop. The 300000Z, 500 mb analysis (Fig. 3-15) showed that Faye was now positioned between two high pressure centers: one located between Marcus Island and the Volcano Islands, and the other located south of Guam. This pattern was the result of the combined influence of Gloria, Hester, Faye, and a long-wave, mid-level trough that was developing far to the northeast of Faye. It was now possible for Faye to choose one of two routes: (1) move north-northeast in the weakness between Marcus Island and Wake Island; or (2) move west-northwest along the southern periphery of the high pressure center to her north.

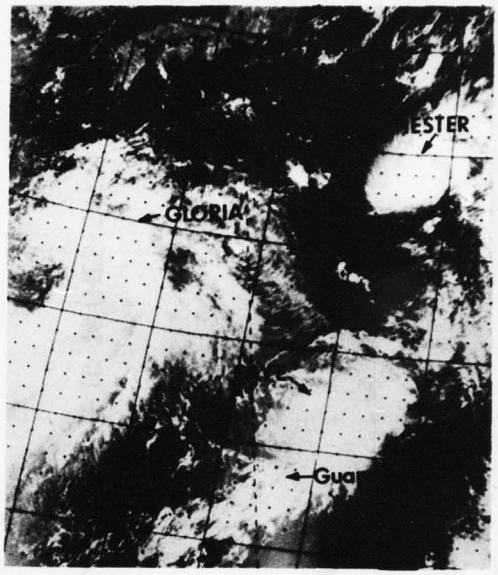


FIGURE 3-13. *Tropical Storm Faye just prior to executing an anticyclonic loop north of Guam, while at an intensity of 40 kt (21 m/sec). TS Gloria is southeast of Okinawa and TS Hester is northwest of Marcus Island, 29 August 1978, 0137Z. (DMSP imagery)*

Unfortunately, by 310000Z, the high pressure center south of Guam shifted further to the west. This change in the flow pattern allowed Faye to swing to the south and thus complete her anticyclonic loop.

Faye reached the southernmost point of her looping track at 010000Z September and six hours later was upgraded to typhoon strength based upon the development of a poorly defined eye and a central pressure drop to 984 mb as reported by reconnaissance aircraft. At 020000Z September, the 500 mb pattern again changed radically (Fig. 3-16). Ridging, albeit weak, now dominated the Pacific east of Faye. Troughing, enhanced by a long wave east of Japan dominated the Pacific west of Typhoon Faye. Faye was now under the influence of southeasterly steering flow and began tracking steadily northwestward around the western periphery of the ridge.

As the ridge strengthened, Faye accelerated from 8 kt (15 km/hr) to 16 kt (30 km/hr) by 031200Z. Thereafter she began to decelerate again and weaken as she approached the axis of the mid-tropospheric subtropical ridge. By 041800Z, Faye

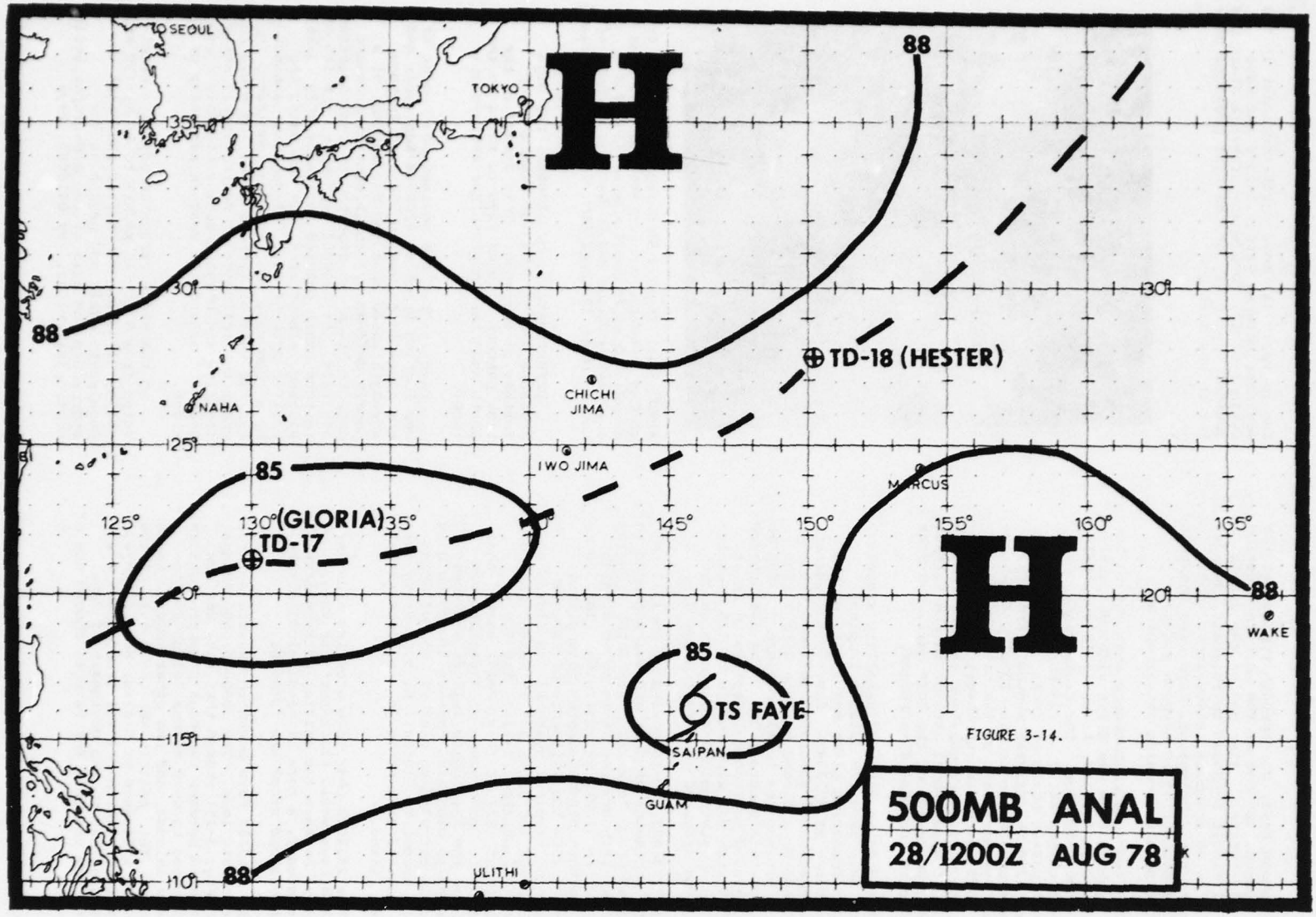

SEOUL
TOKYO
H
88
135°
30°
88
TD-18 (HESTER)
NAHA
CHICHI JIMA
125°
IWO JIMA
MARCUS
85
125°
130°
(GLORIA)
TD-17
135°
145°
150°
155°
160°
165°
H
20°
88
WAKE
85
TS FAYE
SAIPAN
15°
GUAM
88
ULITHI
10°
500MB ANAL
28/1200Z AUG 78

FIGURE 3-14.

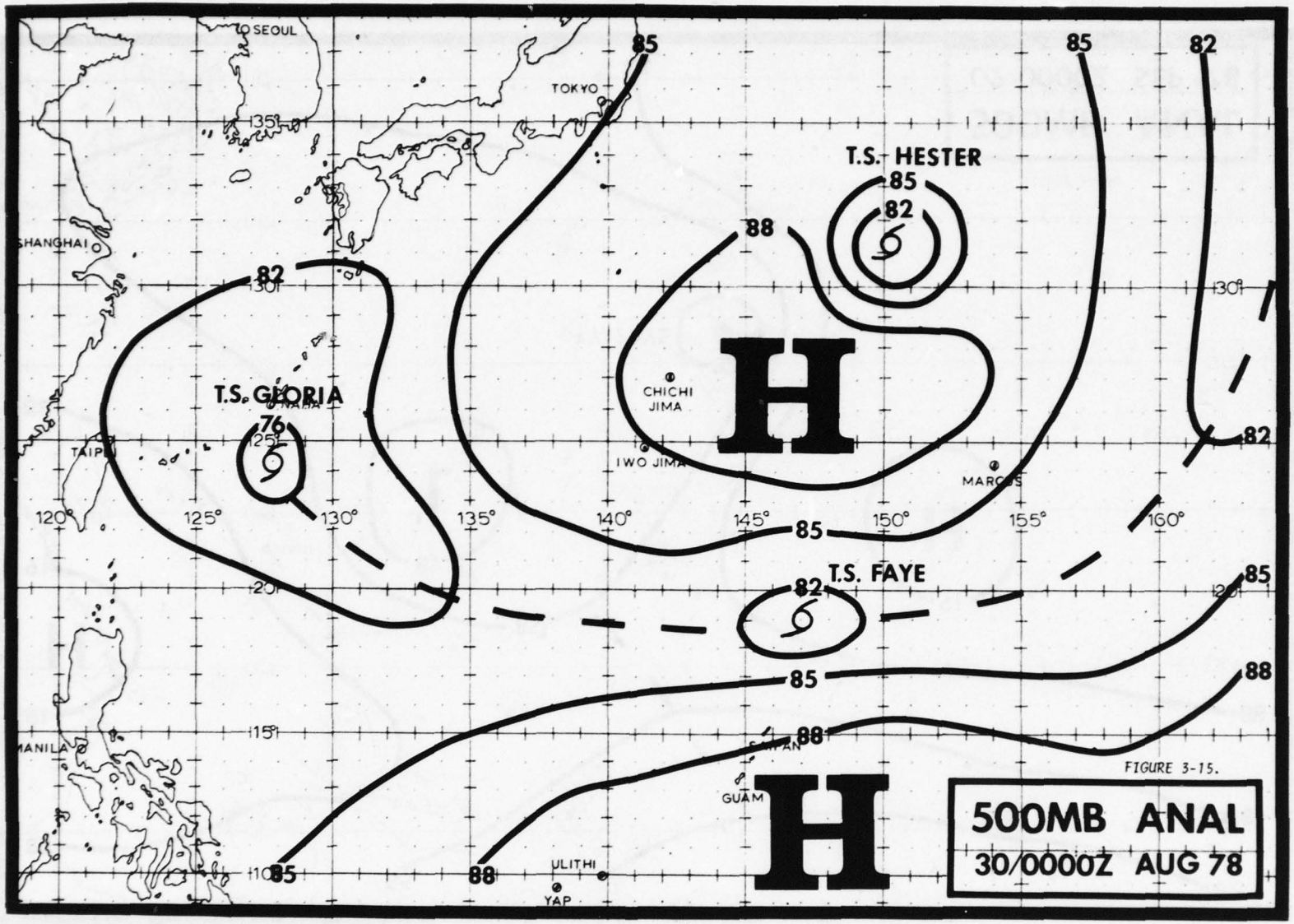

SEOUL
TOKYO
SHANGHAI
TAIPEI
CHICHI JIMA
IWO JIMA
MARCUS
GUAM
SAIPAN
YAP
ULITHI
MANILA
T.S. HESTER
T.S. GLORIA
T.S. FAYE
H
H
H
85
82
88
76
120°
125°
130°
135°
140°
145°
150°
155°
160°
35°
30°
25°
20°
15°
10°
500MB ANAL
30/0000Z AUG 78

FIGURE 3-15.

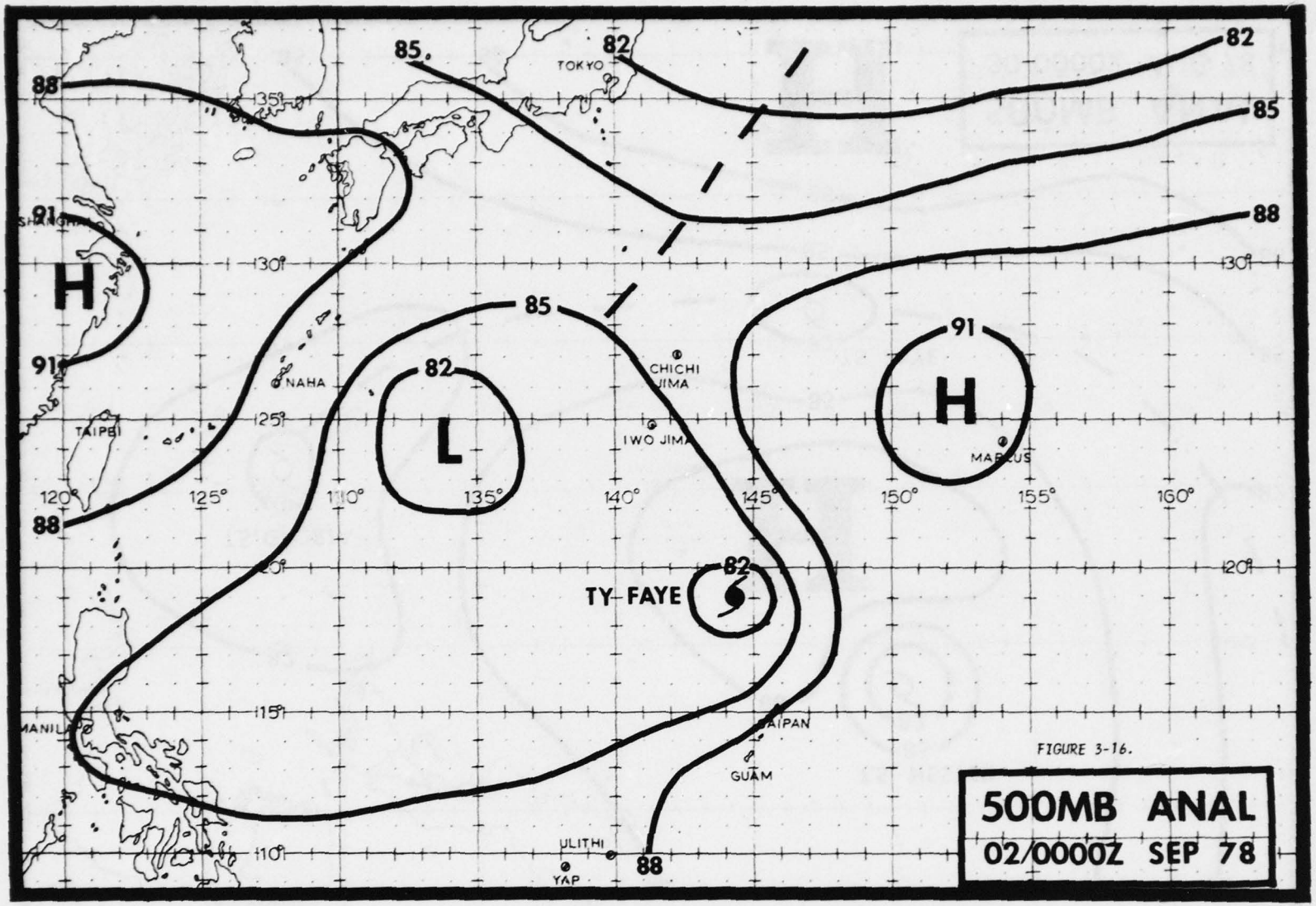

85
82
TOKYO
82
88
85
91
H
88
130°
85
91
CHICHI JIMA
82
L
NAHA
H
TAIPEI
IWO JIMA
MARCUS
125°
120°
125°
110°
135°
140°
145°
150°
155°
160°
88
82
TY-FAYE
120°
115°
SAIPAN
GUAM
ULITHI
YAP
110°
88
500MB ANAL
02/0000Z SEP 78

FIGURE 3-16.

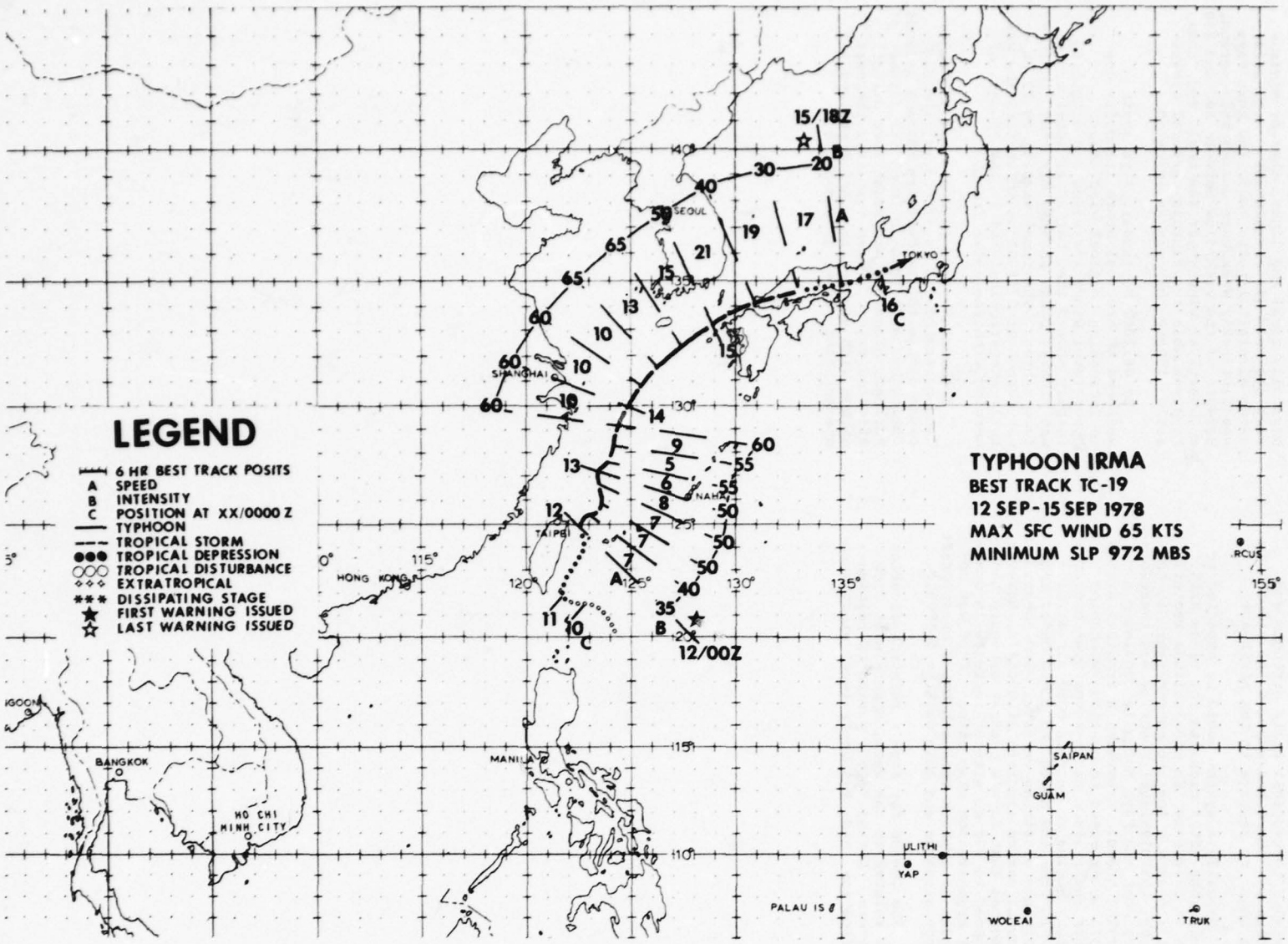
weakened to tropical storm strength and within six hours had crossed the ridge axis and began to recurve to the northeast.

Normally a system would be expected to accelerate after crossing the ridge axis, but in this case the mid-latitude westerly jet stream was located considerably to the north; the mid-level steering was therefore very weak and Faye actually continued a slowing trend. Likewise, a tropical system would be expected to continue weakening after recurvature as it moves over cooler water, begins to entrain cold air at mid-levels from the north and comes under the influence of strong vertical wind shear. A reconnaissance aircraft at 050541Z, however, reported that Faye's central pressure had dropped to 975 mb with an increase in overall organization also noted. Faye was upgraded to typhoon strength based on aircraft reconnaissance and ship data at 051800Z.

The reason for Faye's reintensification was related to the weak, upper-level flow pattern. During Faye's period of reintensification, mid- and upper-level winds were basically zonal and light, thereby minimizing the cold air entrainment. Reconnaissance aircraft reports indicated that Faye was distinctly warm core during this period. Because of the weak flow between 500 and 200 mb, vertical wind shear was small and, thus, Faye was able to maintain vertical organization longer than was anticipated.

By 061200Z September, Faye again weakened to tropical storm intensity due to increasing vertical wind shear. Upper-level winds increased and satellite imagery showed that her upper-level center was finally being sheared off from the surface center. The final warning on TS Faye was issued at 071800Z at which time she was fully extratropical and in the process of merging with the polar front.

Although Typhoon Faye avoided the major land masses of the Pacific area, she did cause damage to the Northern Mariana Islands. During her anticyclonic loop, the islands of Agrihan, Alamagan, and Pagan were directly affected twice. Pagan sustained the most damage with sixty-five homes destroyed and one merchant vessel grounded.


LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON IRMA
BEST TRACK TC-19
12 SEP-15 SEP 1978
MAX SFC WIND 65 KTS
MINIMUM SLP 972 MBS
15/18Z
12/00Z
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
BANGKOK
HO CHI MINH CITY
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
RCUS

TYPHOON IRMA

Irma, the eighth typhoon of the 1978 season, developed in the monsoon trough southeast of Taiwan. Located in the Luzon Straits over the previous week, the monsoon trough slowly drifted northward and a weak surface circulation became evident southeast of Taiwan on the 11th. The monsoon trough at 500 mb was also observed to have shifted well northward signifying the trough becoming vertically aligned with the surface circulation. This northward shift also moved the monsoon circulation under favorable outflow aloft. The mechanism for rapid tropical cyclone development being present, numbered warnings began without the issuance of a formation alert.

Aircraft reconnaissance, at 0935Z on the 12th, confirmed TD-19 had undergone rapid development. Post analysis determined that the cyclone reached tropical storm strength at 120000Z. Due to the lack of a strong subtropical high pressure ridge to the north of Irma and the fact that the southwest monsoon flow was more intense than the easterlies north of the monsoon trough, Irma moved northeast. Then, on the 13th at 1800Z, Irma began accelerating northeastward as mid-level steering strengthened when a short-wave, westerly trough tracked eastward off China. Diffluence aloft, ahead of the short-wave, allowed Irma to reach a maximum intensity of 65 kt (33 m/sec) by 141200Z.

Irma remained a typhoon for only 12 hours becoming the shortest-lived typhoon of the season. The 140000Z, 500 mb analysis indicated that Irma was north of the broad subtropical ridge axis, building in behind her, and she was accelerating northeastward. Her maximum forward speed of 21 kt (39 km/hr) was obtained while tracking through the Tsushima Straits prior to making landfall on Honshu.

In the last 24-36 hours of her existence, Irma experienced increased vertical shear which brought on rapid weakening. The terrain effects of Kyushu and Honshu caused Irma to dissipate near 1200Z on the 15th.

Although remaining a typhoon for only 12 hours and weakening rapidly as she tracked towards southwest Japan, Irma produced widespread damage to Kyushu with estimated gusts in excess of 100 mph (45 m/sec) reported. Irma smashed windows, overturned cars, and capsized several fishing boats. Several athletes at the Japan-China Friendship Track and Field Meet in Kitakyushu were injured when a freak gust blew them ten feet in the air.

Irma exhibited a movement to the northeast similar to previous 1978 recurvers (Olive, Polly, Virginia, Gloria and Hester).

Irma's track indicates she traveled parallel to, but just outside, the 200 mb strong wind flow; actually just outside the 50 kt (26 m/sec) isotach (Fig. 3-17). The observed relationship appears to provide an excellent forecast aid and was particularly important during Irma. All forecasts, however, must take into account the possible northward adjustment of the max wind band as well as the possible deepening of short-wave troughs off the China mainland. An accurate 36-hour to 48-hour, 200 mb prog should help greatly.

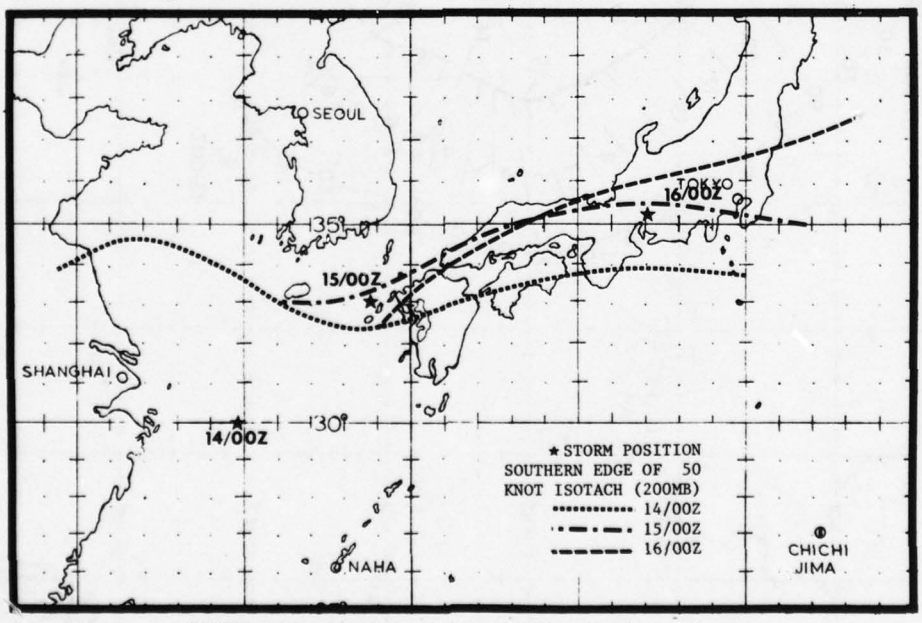
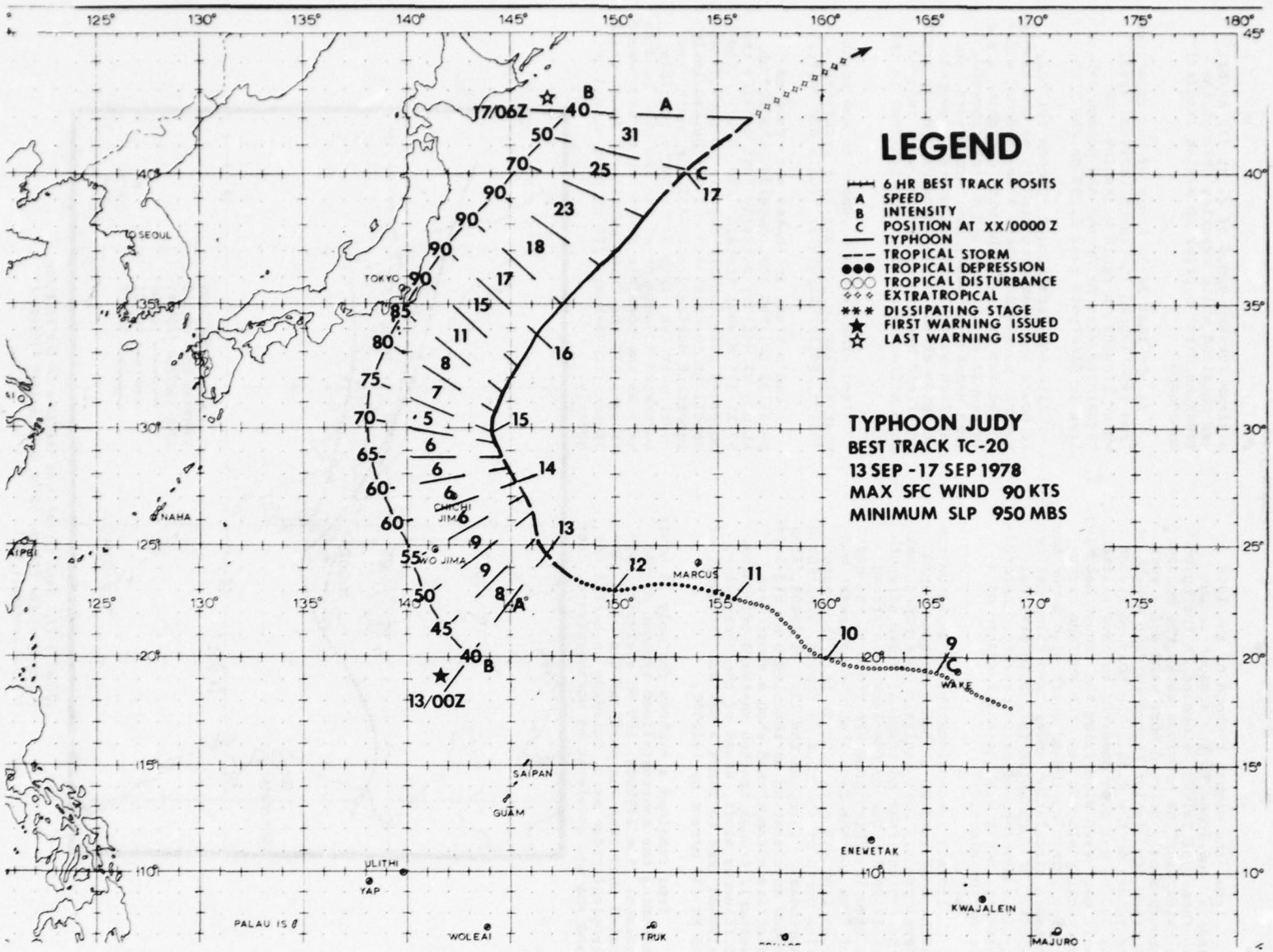


FIGURE 3-17. Irma's positions relative to the southern boundary of the 200 mb, 50 kt isotach from 140000Z to 160000Z September 1978.


LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
*** DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON JUDY
BEST TRACK TC-20
13 SEP - 17 SEP 1978
MAX SFC WIND 90 KTS
MINIMUM SLP 950 MBS
17/06Z
13/00Z
SEOUL
TOKYO
NAHA
TAIPEI
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
ENEWETAK
KWAJALEIN
MAJURO

Typhoon Judy was first evident on satellite imagery as an area of convective activity in the easterlies. Further evidence of the initial disturbance was provided by surface observations from Wake Island during the period of 081200Z to 090000Z September 1978 showing a wind shift, maximum sustained winds of 20 kt (10 m/sec), and a minimum sea level pressure of 1005 mb. For the next three days, the disturbance was monitored by satellite reconnaissance and discussed in the Significant Tropical Weather Advisory (ABEH PGTW). Based on September's climatology for disturbances north of 20N latitude, potential for development was considered to be poor. At times during this period, this potential was supported by satellite imagery showing weak vertical development associated with the disturbance (Fig. 3-18). However, on the 12th, satellite imagery showed increased organization. A Tropical Cyclone Formation Alert was issued as 120440Z and aircraft reconnaissance was scheduled. The first aircraft penetration was 16 hours later and aircraft data along with satellite imagery (Fig. 3-19) supported a cyclone of tropical storm intensity. Consequently, the first warning was issued at 130000Z. Even though Judy was detected very early in her developmental stages, the issuance of an earlier warning was delayed primarily due to a lack of significant skill over climatology in forecasting rapid tropical cyclone development.

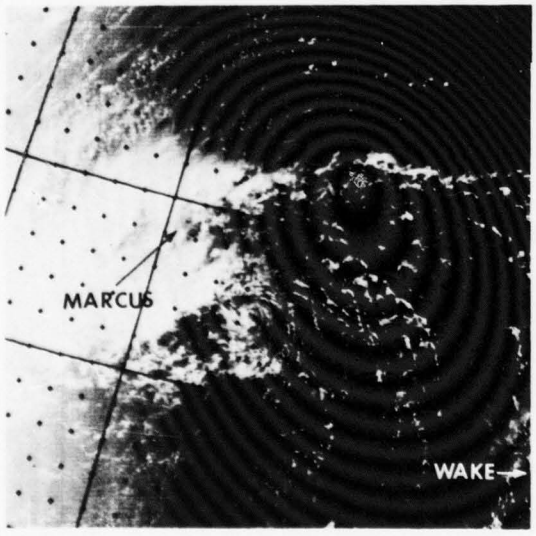


FIGURE 3-18. Tropical Disturbance which developed into Typhoon Judy. At this time the disturbance lacked vertical development, 10 September 1978, 2049Z. (DMSP imagery)

From the time of the first warning until the last, Judy's track was one of classical recurvature, slowing in forward movement to 5 kt (9 km/hr) at the recurvature point and accelerating to 31 kt (57 km/hr) under strong westerly upper-level steering north of the subtropical ridge axis. Although part of a two-storm situation with Typhoon Irma (Fig. 3-20), Judy never appeared to be influenced by Irma's presence. Warnings on Judy showed excellent continuity. From the second warning on, a recurvature path was forecast. This was due in part to the early detection which provided considerable history in Judy's past track before the first warning was issued. As a result, the forecast errors for Typhoon Judy were considerably better than average for cyclones undergoing recurvature. The intensity forecasts for Judy, however, always lagged her true intensification rate. The maximum intensity of 90 kt (46 m/sec) which Judy attained after recurvature was not foreseen, nor was the rate at which Judy weakened.

At the time of the last warning issued on Typhoon Judy at 170600Z, satellite imagery showed that Judy was merging with an extratropical system to the north. The added influx of energy into this system caused it to deepen rapidly in 12 hours from an estimated 1000 mb to 988 mb with observed 50 kt (26 m/sec) surface winds. During her life, no reported damage was done by Typhoon Judy.

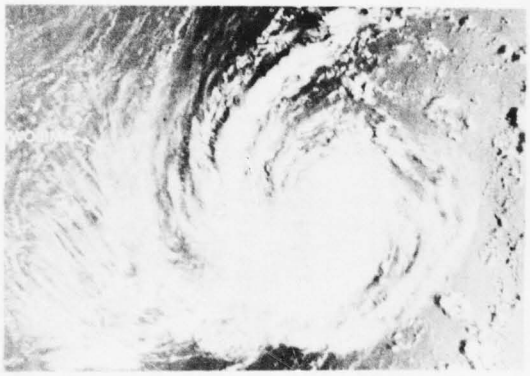


FIGURE 3-19. Judy was at tropical storm intensity at this time, 12 September 1978, 2156Z. (DMSP imagery)

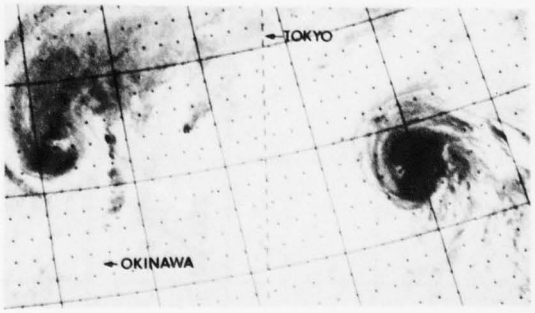
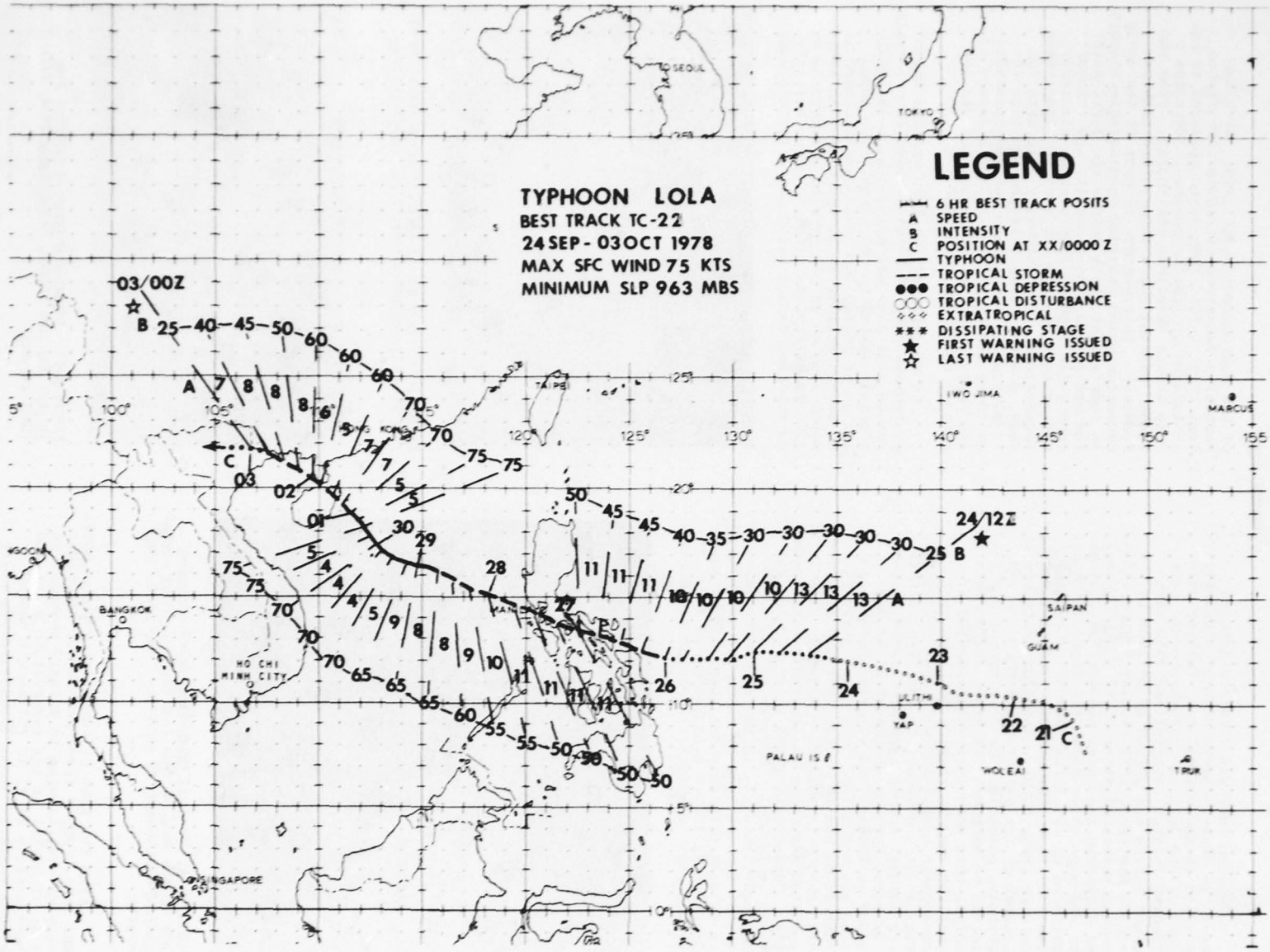


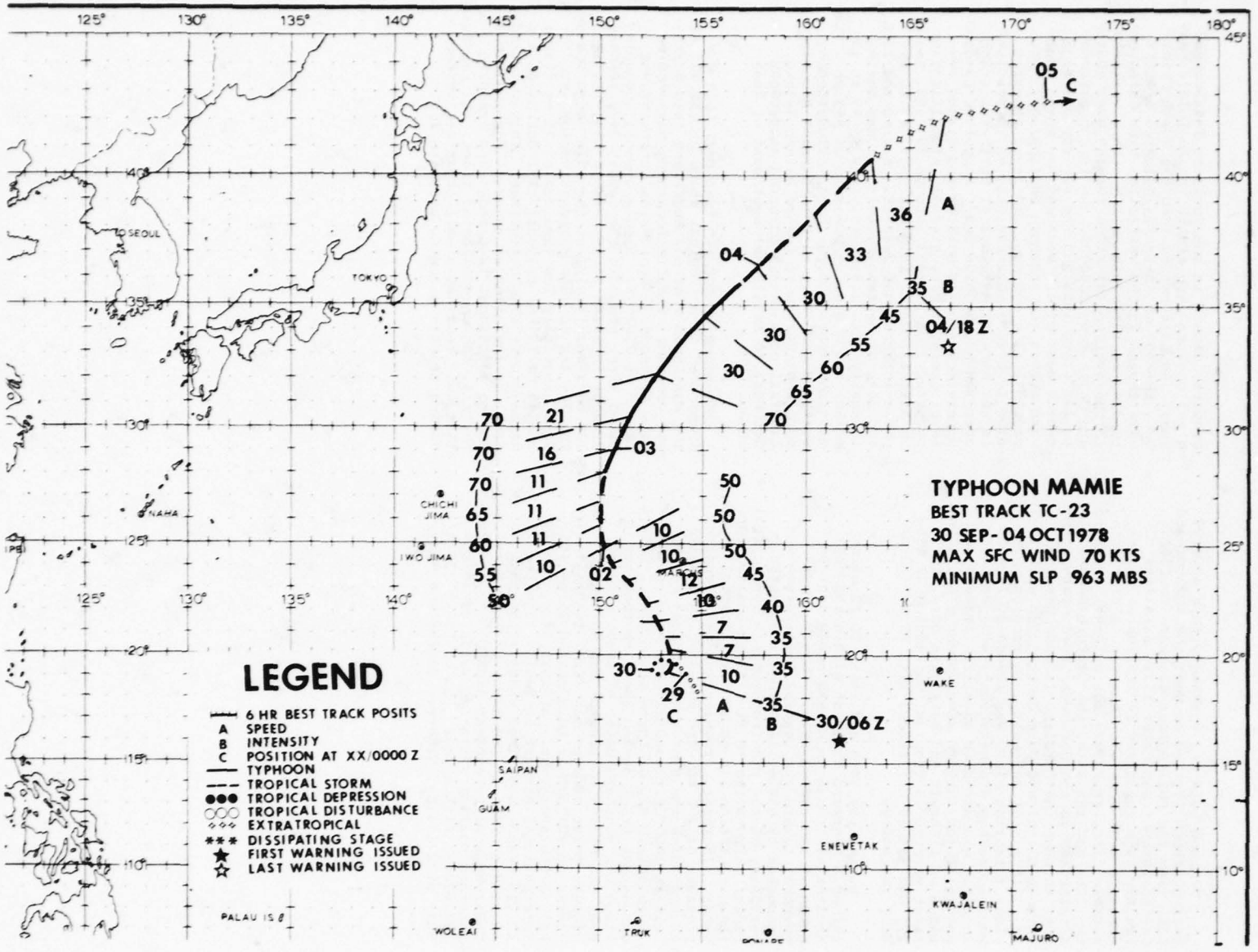
FIGURE 3-20. Infrared imagery of Typhoons Judy (right) and Irma (left), 14 September 1978, 1438Z. (DMSP imagery)


TYPHOON LOLA
BEST TRACK TC-22
24 SEP - 03 OCT 1978
MAX SFC WIND 75 KTS
MINIMUM SLP 963 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
03/00Z
24/12Z
SEOUL
TOKYO
TAIPEI
HONG KONG
IWO JIMA
MARCUS
BANGKOK
HO CHI MINH CITY
SAIPAN
GUAM
ULITHI
YAP
WOLEAI
PALAU IS
TRUK
SINGAPORE

Typhoon Lola was spawned within a very active trough located between the equator and 12N, from the Philippines eastward to 150E. On the 20th of September 1978, satellite imagery gave the first indication of a disturbance near 08N-147E; however, a distinct surface circulation was not evident. Between the 20th and the 24th, the disturbance slowly accelerated to the northwest then west-northwest through the Caroline Islands passing between Ulithi and Guam on the 22nd with 15-20 kt (7-10 m/sec) intensity. A tropical cyclone formation alert was issued at 240600Z when increased organization in feeder band activity was noted on satellite imagery and potential for further development was evident. Based on aircraft and satellite data, the first warning on Tropical Depression 22 (TD-22) was issued at 241200Z with 25 kt (13 m/sec) intensity.

During the 24th and 25th, TD-22 maintained a westward movement within the near equatorial trough on a heading 10 degrees north of the trough axis. This westward movement toward the central Philippines was supported by easterlies along the southern periphery of the mid-tropospheric subtropical ridge. Aircraft data at 252100Z positioned the circulation 110 nm (205 km) east of Samar. Increased organization and a central pressure of 995 mb were noted which resulted in upgrading the system to Tropical Storm Lola at 260000Z. Landfall was made on the southeastern tip of Luzon at 261500Z. Lola's subsequent track during the 27th took her along the southern coast of Luzon passing over the cities of Legaspi and Batangas. The closest point of approach (CPA) to Manila occurred at 271000Z as Lola passed 35 nm (65 km) to the southwest. At this time, the International Airport at Manila reported 30 kt (15 m/sec) sustained winds with gusts to 50 kt (26 m/sec). The Naval Weather Service Environmental Detachment (NWSED) at Cubi Pt. recorded maximum sustained winds of 40 kt (21 m/sec) with a peak gust of 59 kt (30 m/sec) at 271241Z. Nineteen deaths and heavy property damage in the southern Tagaloc and Bical regions were attributed to Lola's passage. As Lola exited into the South China Sea, the 500 mb analysis indicated a short wave trough in the westerlies over China extending as far south as 27N with a weakness in the subtropical ridge forming over southern China. By 280000Z, the trough extended to 23N along 105E and the subtropical high center east of the weakness had moved eastward across the northern Philippines. This caused Lola's dominant mid-level steering flow to become southeasterly which resulted in her more climatological northwest track over the South China Sea. Supported by good upper-tropospheric outflow and strong low-level energy input, gradual intensification occurred from 271800Z through 301800Z. Based on aircraft data, Lola was upgraded to typhoon intensity at 281800Z. During the 29th and 30th of September, Lola reached maximum intensity with sustained winds of 75 kt (39 m/sec) and a minimum pressure of 963 mb. The mid-tropospheric ridge began strengthening westward resulting in Lola's track becoming more west-northwest toward Hainan Island. Landfall over Hainan occurred at 010900Z October, 10 nm (19 km) southeast of Wenchang.

Weakened by terrain features, Lola was downgraded to a tropical storm at 011200Z as she continued west-northwestward into northern Vietnam. The final warning downgrading Lola to tropical depression intensity was issued at 030000Z. Lola's overall uncomplicated track produced the lowest 24-, 48- and 72-hour forecast vector errors (54, 116 and 139 nm respectively) of the 1978 storm season. The 24- and 48-hour forecast vector errors were expecially low (average of 21 nm (39km) and 40 nm (74km) respectively) during Lola's passage over the Philippines. This resulted from the increased accuracy of fix positions due to additional land radar and synoptic reports, the uncomplicated track, and the fact that Lola remained a well-organized system during transit allowing accurate fixing.


TYPHOON MAMIE
BEST TRACK TC-23
30 SEP- 04 OCT 1978
MAX SFC WIND 70 KTS
MINIMUM SLP 963 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
04/18 Z
30/06 Z
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
WAKE
ENEWETAK
KWAJALEIN
MAJURO
WOLEAI
TRUK
PALAU IS

TYPHOON MAMIE

Typhoon Mamie was yet another of the compact typhoons of 1978. Mamie was also an open ocean typhoon (i.e., it formed and dissipated over the ocean, and affected shipping lanes) and never really threatened any land stations.

Tropical Depression 23 (Mamie) developed from a wave in the easterlies. On the 27th of September at 0000Z this wave was approximately 100 nm (185 km) east of Guam and was oriented southwest-northeast from 10N to 25N. Within the wave, there were two disturbance areas. The northernmost area eventually developed when it moved under an upper air difluent region. By the 30th, a compact tropical depression was easily noted on satellite data (Fig. 3-21). Also noted were cirrus cloud streamers showing outflow existed in all quadrants. The first warning on TD-23 was issued immediately thereafter.

Remaining a very compact system (Fig. 3-22), Mamie tracked on a recurvature path along the western periphery of a midtropospheric, subtropical high pressure system whose 500 mb height center was near 25N-175E. The direction-of-track forecasts were good; however, the speed-of-movement forecasts were underestimated. Mamie accelerated much more rapidly than expected (twice climatological speeds) after passing north of 30N. Due to sparse, upper-air reports in the vicinity of the typhoon, analysis and forecast aids did not indicate such a rapid acceleration would occur. Mamie eventually weakened and transitioned into an extratropical system on 4 October 1978. Without satellite reconnaissance it is conceivable that the compact, Typhoon Mamie would not have made history.

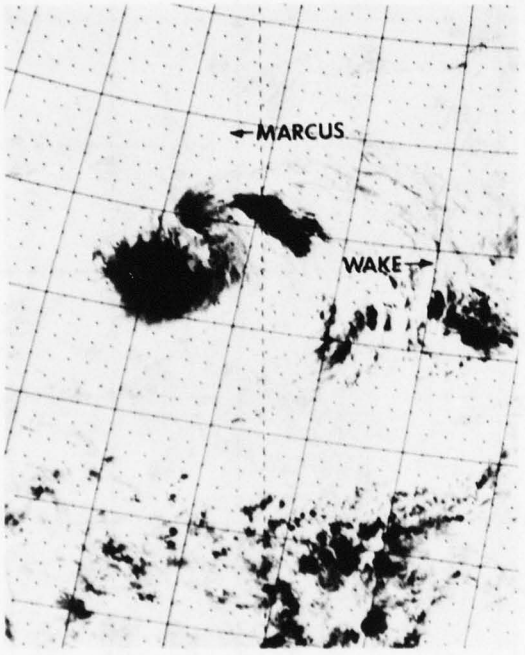


FIGURE 3-21. *Infrared imagery of TD-23 (Mamie) at 30 kt (15 m/sec) intensity, 30 September 1978, 0035Z. (DMSP imagery)*

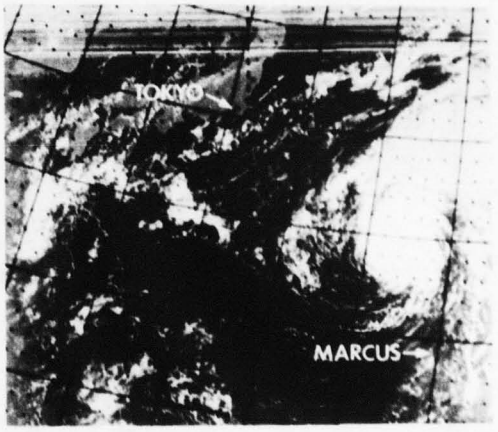
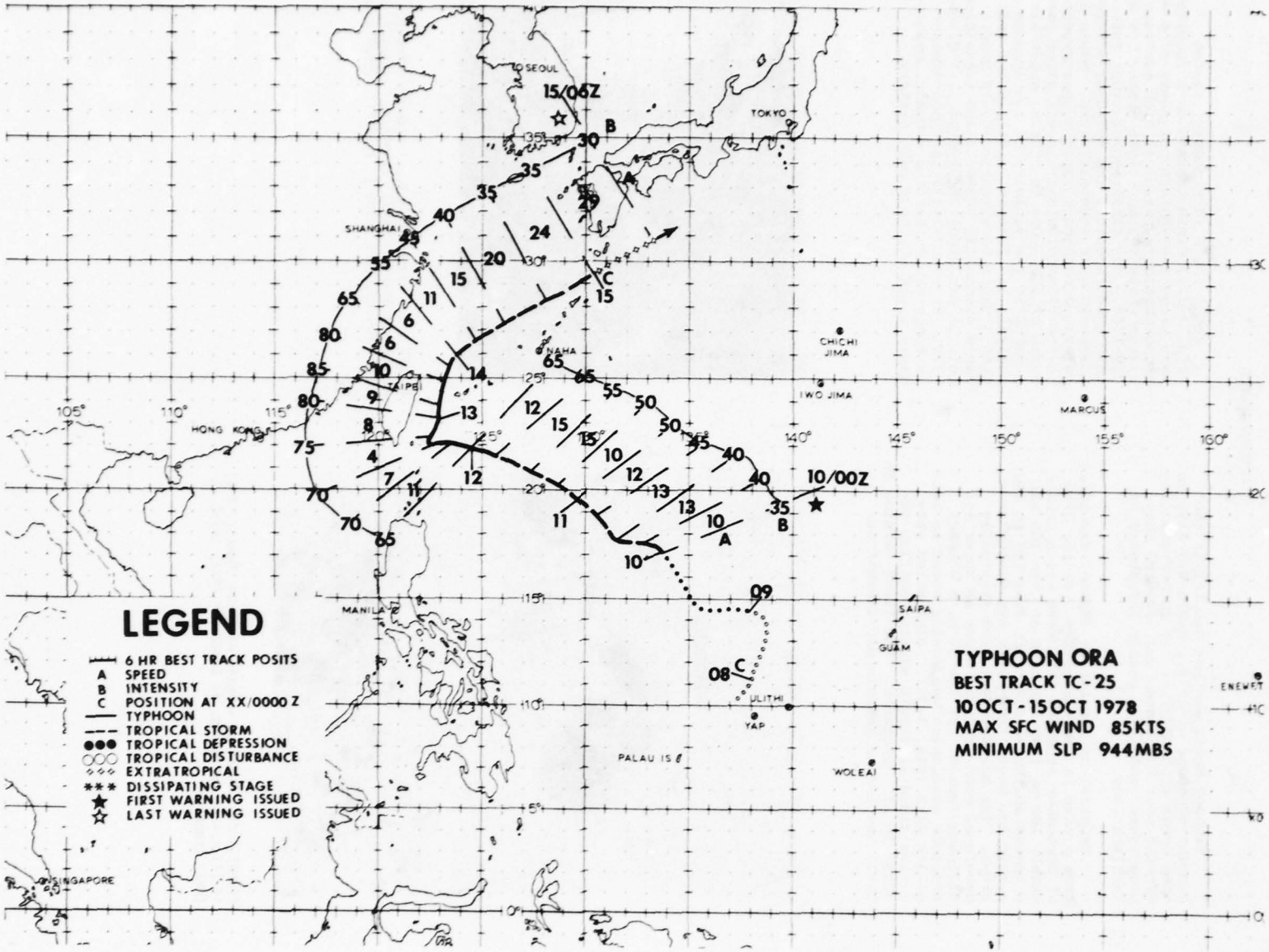


FIGURE 3-22. *Typhoon Mamie, remaining compact, moving northeastward while at maximum intensity of 70 kt (36 m/sec), 03 October 1978, 0123Z. (DMSP imagery)*


SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
HONG KONG
MANILA
SAIPA
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
SINGAPORE
15/06Z
10/00Z
09
08
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
160°
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON ORA
BEST TRACK TC-25
10 OCT - 15 OCT 1978
MAX SFC WIND 85 KTS
MINIMUM SLP 944 MBS

During the early part of October, extensive monsoon troughing existed from the South China Sea, across the Philippine Islands to an area southeast of Guam. The surface analyses for that period showed a combination of strong northeasterlies north of the monsoon trough axis and well defined cross-equatorial flow into the trough from the Southern Hemisphere. The entire area was, therefore, ripe for continued tropical cyclone development and, indeed, by 081200Z, Tropical Storm Nina was gathering strength east of the Philippines. At about the same time an area of convergence about 300 nm (556 km) west-southwest of Guam began to show increased organization.

JTWC began to monitor this area using satellite and ship synoptic data and issued a Tropical Cyclone Formation Alert at 090707Z. Based on reconnaissance aircraft data at 092254Z October, the disturbance was upgraded to Tropical Storm Ora with the first warning valid at 100000Z October 1978.

The 500 mb analysis at this time showed that the mid-tropospheric subtropical ridge axis was broken between Japan and the Philippine Islands, with a high pressure cell centered over Thailand and another located near Marcus Island. This break was created by a deepening long wave trough that was moving into the western Pacific from the Asian mainland. The circulations of Tropical Storm Nina and Tropical Storm Ora also helped to maintain this break.

Computer aids, climatology and the current synoptic situation supported a northward track; the JTWC forecast showed Ora recurving to the north-northeast around the western periphery of the high pressure cell that was centered near Marcus Island.

By 101800Z, however, it became apparent that Ora and Nina were beginning to interact. At this time Nina, the dominant system, was trying to force Ora to follow a westward track, while at the same time the long-wave trough, then over the Sea of Japan, was inducing more northward movement. The net effect of these two steering influences caused Ora to follow an overall northwestward track at a speed of 12-15 kt (22-28 km/hr).

On the 11th, it was apparent that Tropical Storm Nina and Tropical Storm Ora were engaging in a Fujiwhara interaction. Nina would have been expected to move eastward in the classic Fujiwhara style. However, because she was the dominant system, the axis of rotation was closer to her. (Figure 3-23 shows the relative positions of Nina and Ora at 112342Z.) Instead of moving eastward, therefore, she merely stalled and then executed two, small loops while causing Ora to move west-northwestward. During this time period, JTWC continued to forecast Ora to cross the southern tip of Taiwan. This forecast was based on persistence and objective forecast aids which had been verifying quite well up to that point. Tropical Storm Ora then began to show increased organization on satellite and radar data. Aircraft reconnaissance at 120304Z reported the first signs of eye formation and a central pressure of 969.6 mb. Post analysis revealed that typhoon intensity was reached at 111800Z.

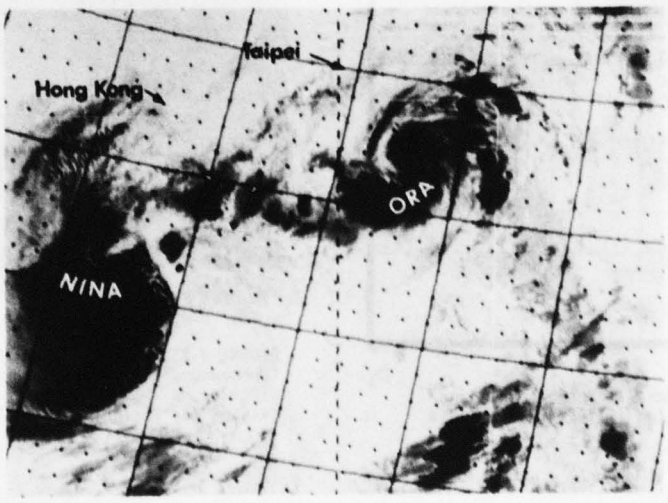


FIGURE 3-23. Infrared image of Typhoon Ora and Tropical Storm Nina during Fujiwhara interaction, 11 October 1978, 23422. Post-analysis showed that when the feeder band connecting the two cyclones disappeared, interaction ceased and Ora later turned north. (DMSP imagery)

As Ora approached the east coast of Taiwan, hourly radar fixes from Ishigaki-Shima, Miyako-Jima and Hua-lien indicated deceleration and by 121200Z, Ora had slowed to 4 kt (7 km/hr). By this time, Tropical Storm Nina had evidently weakened to the point where she no longer had any major influence on Ora's movement. The break in the ridge axis then became the controlling factor in determining Ora's track. Westward movement was forecast, in keeping with the upper-air, numerical progs that showed the ridge building back. Fortunately for Taiwan, this ridge failed to build back and Ora veered sharply to the north never making landfall on Taiwan (Fig. 3-24). When unexpected, northward movement was noted, an amended forecast was issued. Without constant reconnaissance, it is conceivable that the change in Ora's movement would not have been noticed until the next scheduled, 6-hourly fix.

Ora reached her peak intensity of 85 kt (44 m/sec) near 130600Z October as a compact typhoon (Fig. 3-25). By 131800Z, however, reconnaissance aircraft indicated that her central pressure had increased rapidly (44 mb in 17 hours) and there was evidence that her upper level center was beginning to shear off. By 140000Z Ora had weakened to tropical storm strength and was accelerating to the northeast under the influence of strong mid-level westerlies. Tropical Storm Ora then merged with the polar front and was fully extratropical by 150600Z October.

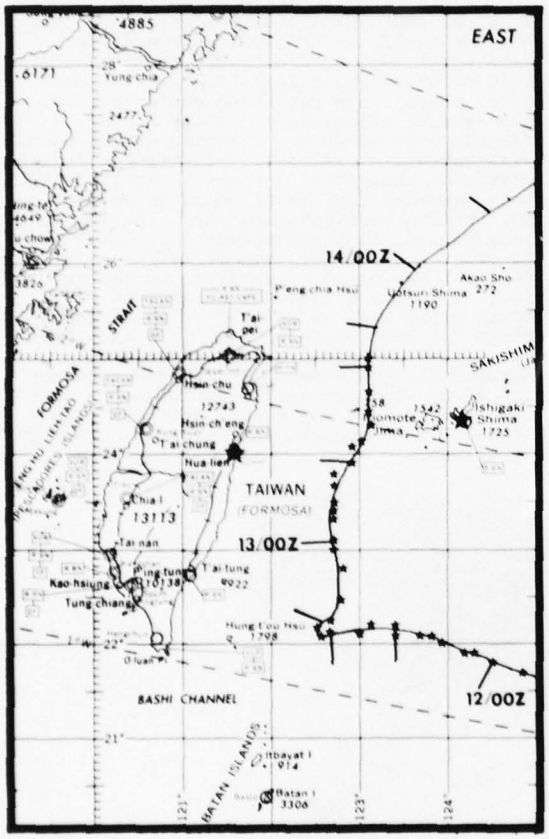


FIGURE 3-24. Hourly radar fixes show Ora's sudden turn to the North after 121200Z October 1978.

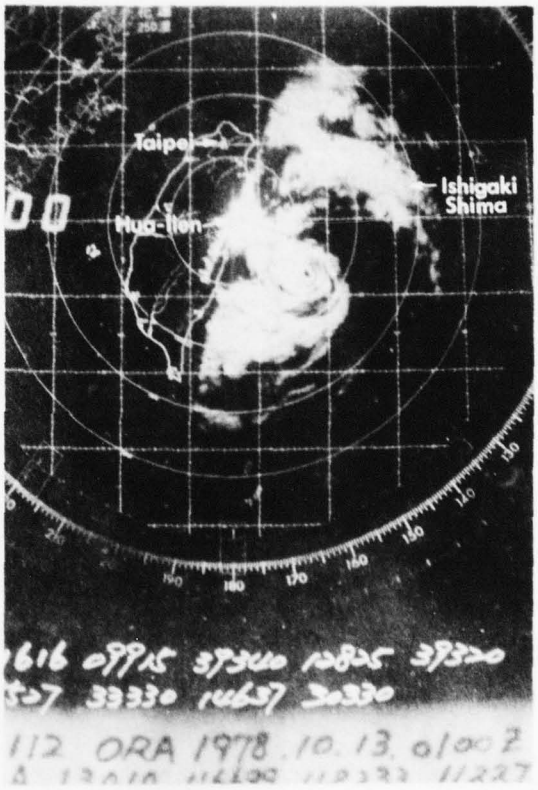
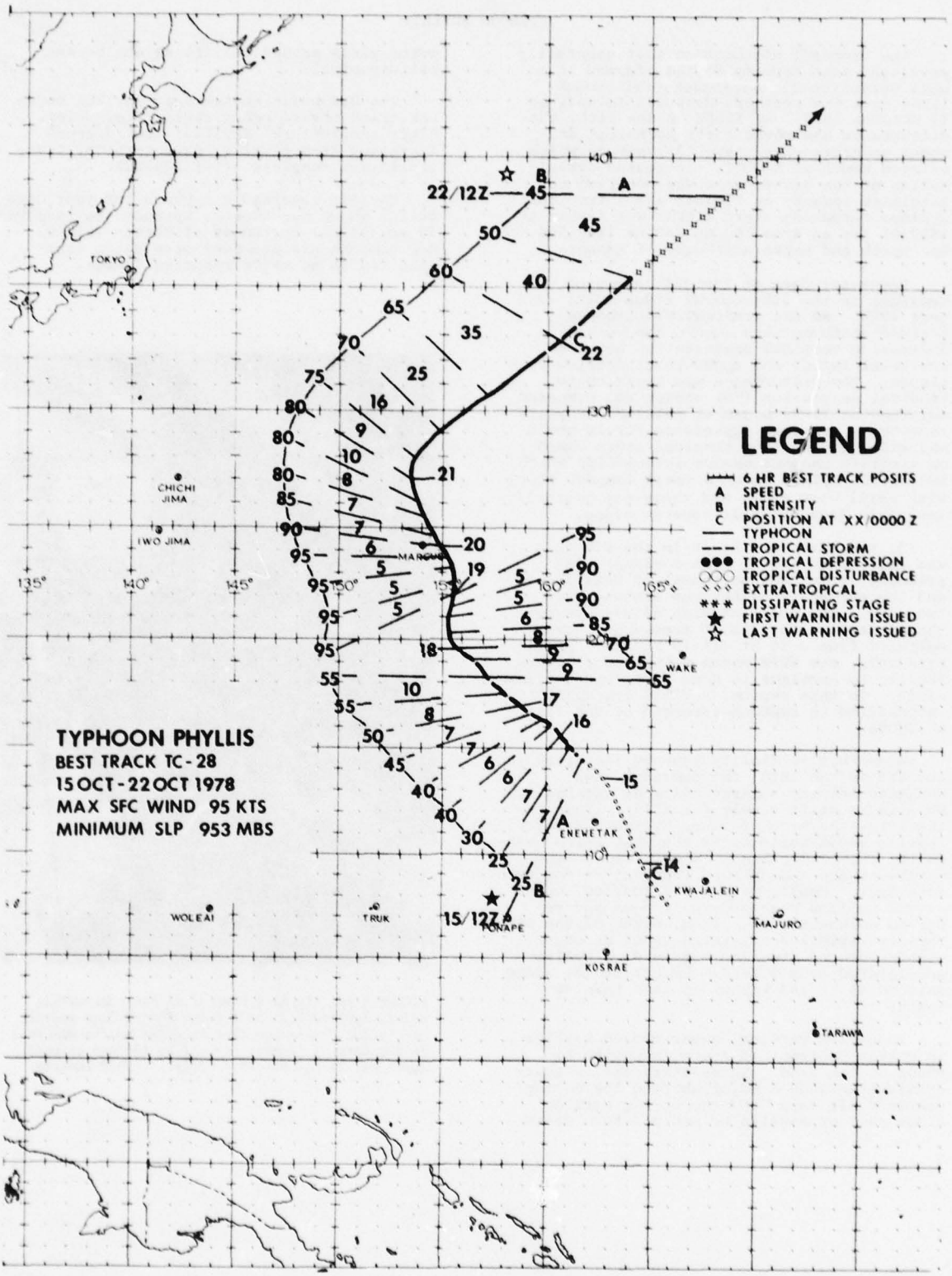


FIGURE 3-25. Hua-Lien radar presentation of Typhoon Ora at 130100Z October just prior to her reaching maximum intensity. (Photograph courtesy of the Central Weather Bureau, Taipei, Taiwan.)


LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON PHYLLIS
BEST TRACK TC-28
15 OCT-22 OCT 1978
MAX SFC WIND 95 KTS
MINIMUM SLP 953 MBS
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
ENEWETAK
KWAJALEIN
MAJURO
WOLEAI
TRUK
PONAPE
KOSRAE
TARAWA
22/12Z
15/12Z
135°
140°
145°
150°
155°
160°
165°
30°
25°
20°

TYPHOON PHYLLIS

The tropical disturbance that eventually developed into Typhoon Phyllis formed in a well established, near-equatorial trough lying over the southern Marshall Islands on 13 October 1978. By 1200Z on the 14th, the disturbance had moved north-northwest and under moderate upper level divergence which existed south of a TUTT. Increased organization of the disturbance was observed on satellite imagery at 142108Z and a Tropical Cyclone Formation Alert (TCFA) was issued at 142235Z for an area 100 to 350 nm (185-556 km) north and north-northwest of Enewetak.

Upper-air data at 150000Z suggested a weakness in the subtropical ridge (STR) axis near 155E. As the tropical disturbance tracked northwestward toward the weakness, increasing vertical organization between low-level inflow and upper-level outflow continued. The disturbance was upgraded to tropical depression (TD) status and numbered warnings on TD-28 began at 151200Z. Phyllis remained a tropical depression for 18 hours and was upgraded to a tropical storm based on aircraft reconnaissance information which indicated Phyllis to be a small compact storm with small wind radii and therefore virtually invisible from synoptic reports alone.

By the 16th, the break in the STR axis was well established. The dominant high pressure center was northeast of Wake Island and the secondary center was southwest of Iwo Jima. The dominant high slowly strengthened causing Phyllis to accelerate northwestward from 6-10 kt (11-19 km/hr). Simultaneously, the TUTT moved northward allowing Phyllis to continue to have excellent outflow aloft. In this regime, Phyllis gradually intensified to typhoon strength by the 17th at 1800Z.

When Phyllis finally reached the break in the STR on the 18th, the dominant high weakened leaving a large col area causing Phyllis to drift slowly for a day. Then on the 19th, the high pressure system east of Phyllis began building to the west which eventually caused Phyllis to slowly accelerate northwestward and delayed recurvature for two more days. Cooler waters and reduced, upper-level outflow weakened Phyllis as she recurved northeastward. Then, north of the STR, Phyllis rapidly accelerated under stronger-than-expected steering currents. Phyllis accelerated from 9 kt (17 km/hr) at the ridge axis to 45 kt (83 km/hr) in less than 30 hours.

Increased vertical shear caused Phyllis to weaken to tropical storm intensity by 0000Z on the 22nd. Thereafter, the pressure gradient between a major surface low moving eastward off Japan and the strong surface ridge east of Phyllis helped maintain storm force winds around Phyllis as she became extratropical.

The STR built westward as Phyllis began her track toward recurvature (Fig. 3-26). After recurvature, Phyllis' foward speed increased dramatically; extratropical transition was complete after 220600Z.

Phyllis remained a typhoon for four days during which her closest approach to land was 40 nm (74 km) northeast of Marcus Island. Her compactness and over-open water track resulted in no major reported damage.

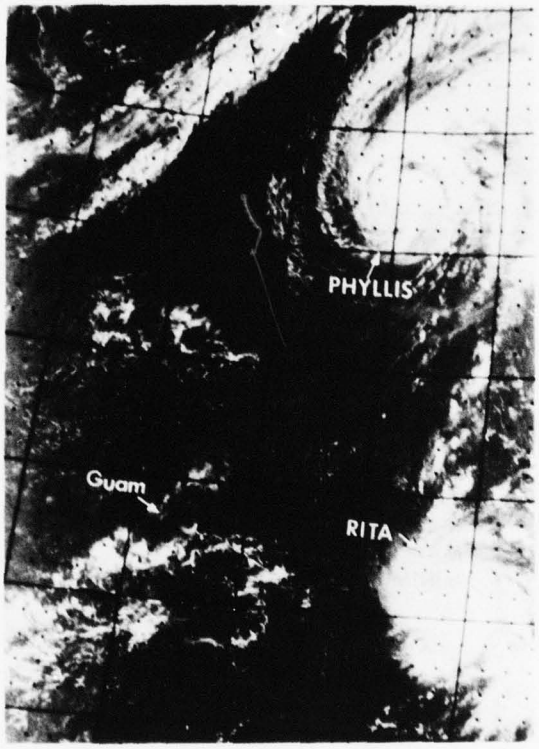
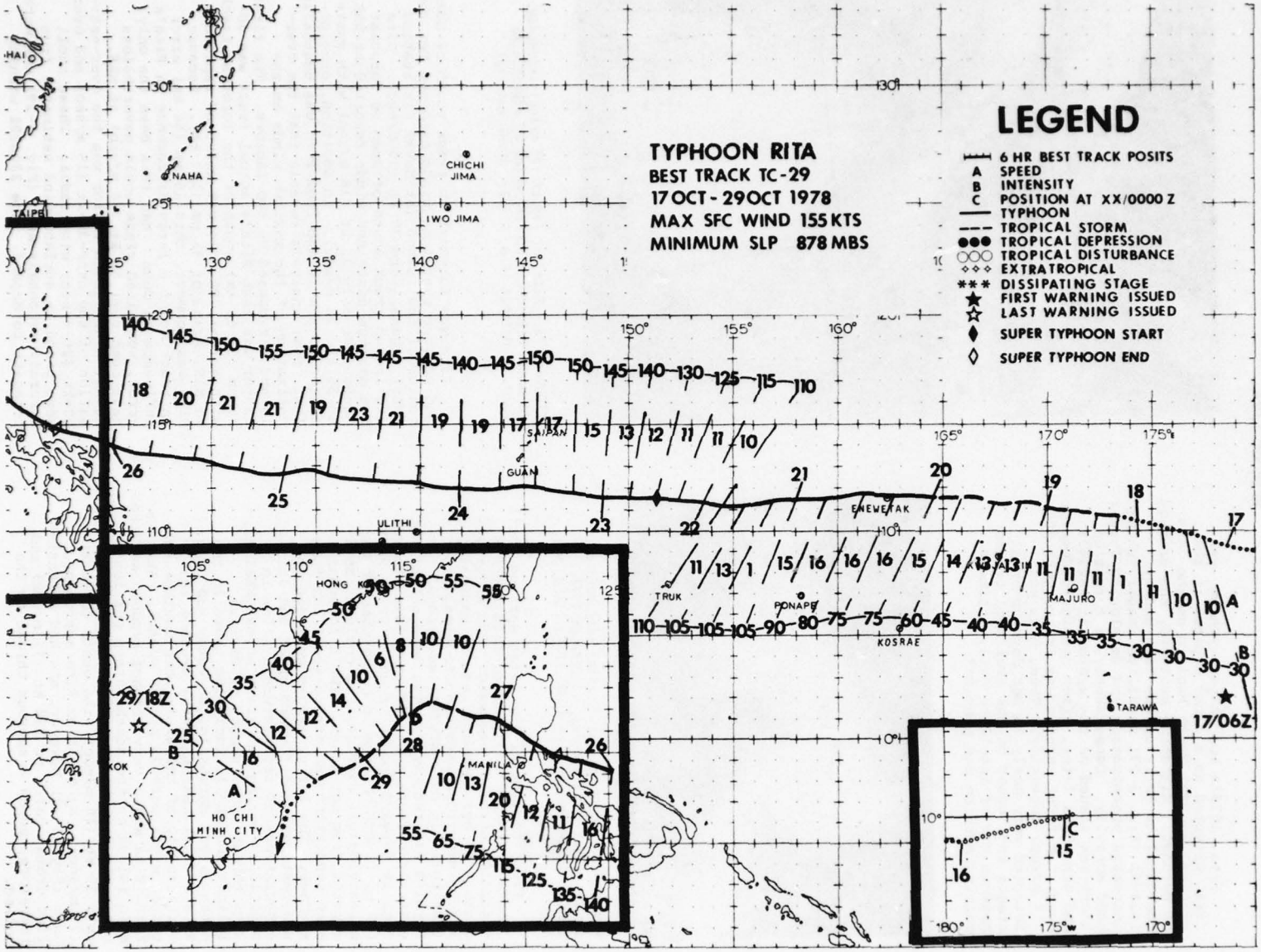


FIGURE 3-26. Typhoon Phyllis at her recurvature point, Typhoon Rita on a track toward Guam and the STR builds in between them as noted by the weakness in the band of showers connecting the two compact typhoons, 21 October 1978, 0106Z. (DMSP imagery)


TYPHOON RITA
BEST TRACK TC-29
17 OCT - 29 OCT 1978
MAX SFC WIND 155 KTS
MINIMUM SLP 878 MBS
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SUPER TYPHOON START
SUPER TYPHOON END
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
SAIPAN
GUAM
ULITHI
ENEWETAK
TRUK
PONAPE
MAJURO
KOSRAE
TARAWA
HONG KONG
MANILA
HO CHI MINH CITY
29/18Z
17/06Z

Rita, 1978's only super typhoon, was first detected as a cloud cluster in the tropical central North Pacific on the 14th of October. Migrating westward, she crossed the dateline early on the 16th and by 162300Z (Fig. 3-27) satellite imagery showed increased organization and developing feeder band activity. Consequently, a formation alert was issued on the system at 162347Z and six hours later, after continued development, the first warning was issued with 30 kt (15 m/sec) intensity. Thus, Rita was detected very early in her developmental stages and, based on the availability and maximum use of satellite data, a timely warning service was provided.

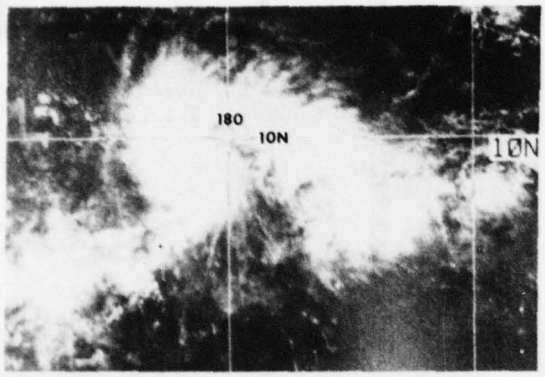


FIGURE 3-27. Rita, as she appeared just before issuance of her first warning, 16 October 1978, 2245Z. (DMSP imagery from AFGWC, Offutt AFB, NE)

From the time of the first warning until landfall on the Philippines, Rita tracked virtually straight westward. The major influence on her movement was the unusually strong mid-tropospheric subtropical ridge that built in over WESTPAC as Typhoon Phyllis was recurving. The strength of the easterly current south of the ridge steered Rita at forward speeds of up to 20 to 23 kt (37 to 43 km/hr); almost twice that of the climatological average. As could be anticipated from her track, JTWC's forecasts were consistent and errors were less than average. The larger errors were due to underestimates of forward speed and initial expectations of recurvature similar to Phyllis'. During her track across WESTPAC, Rita threatened a number of Pacific islands and atolls including those in the northeastern Marshalls, Enewetak and Guam. Rita's track near Enewetak brushed the northern tip of the atoll when maximum sustained winds were 75 kt (39 m/sec). At this time, Rita was a very compact typhoon and the main island on the southeastern portion of the atoll reported maximum sustained winds of only 35 kt (18 m/sec) with gusts to 45 kt (23 m/sec). By the time Rita approached Guam (Fig. 3-28) however, she had intensified dramatically to 150 kt (77 m/sec) and, therefore, posed a serious threat to the island.

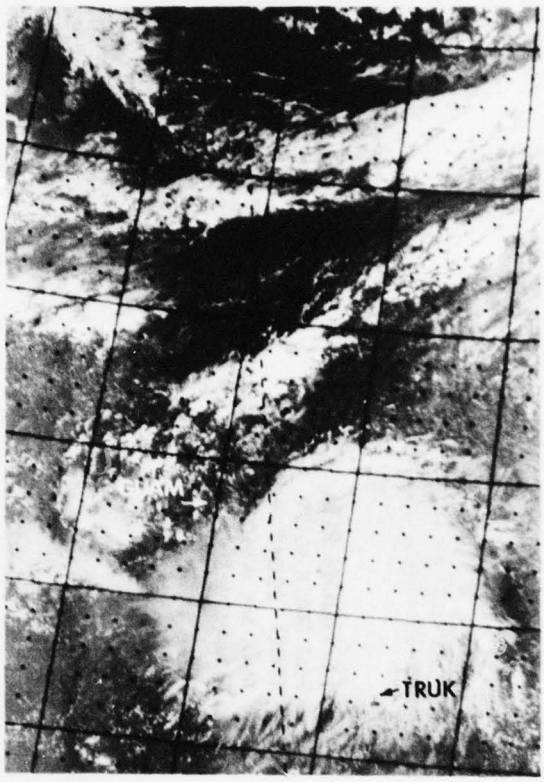


FIGURE 3-28. Rita, at 145 kt (75 m/sec) intensity, 16 hours before her closest point of approach to Guam, 22 October 1978, 2212Z. (DMSP imagery)

Rita was forecast to track south of Guam and maximum sustained winds expected for the center of the island (at Naval Air Station (NAS), Agana) were 70 kt (36 m/sec). Rita did indeed track south of Guam as forecast but maximum sustained winds reported at NAS Agana were only 35 kt (18 m/sec) with gusts to 55 kt (28 m/sec). In addition, precipitation on the island from Rita was unusually low. Post analysis reveals that the overestimation of the maximum winds on the island was caused by two factors. The first factor was that Rita's actual track was 30-35 nm (56-65 km) south of the forecast track with actual CPA (closest point of approach) to NAS, Agana of 85 nm (157 km). Because Rita was compact, this 30 nm (56 km) error in track meant a large difference in Rita's influence on Guam. Had this been the only error, sustained winds would nevertheless have been over 50 kt (26 m/sec) at NAS, Agana. The second factor was the over-estimation of the over-30-kt (15 m/sec) and over-50-kt (26 m/sec) wind radii. These radii were based on surface wind estimates from aircraft reconnaissance (Fig. 3-29) and were forecast to expand. The 230600Z warning

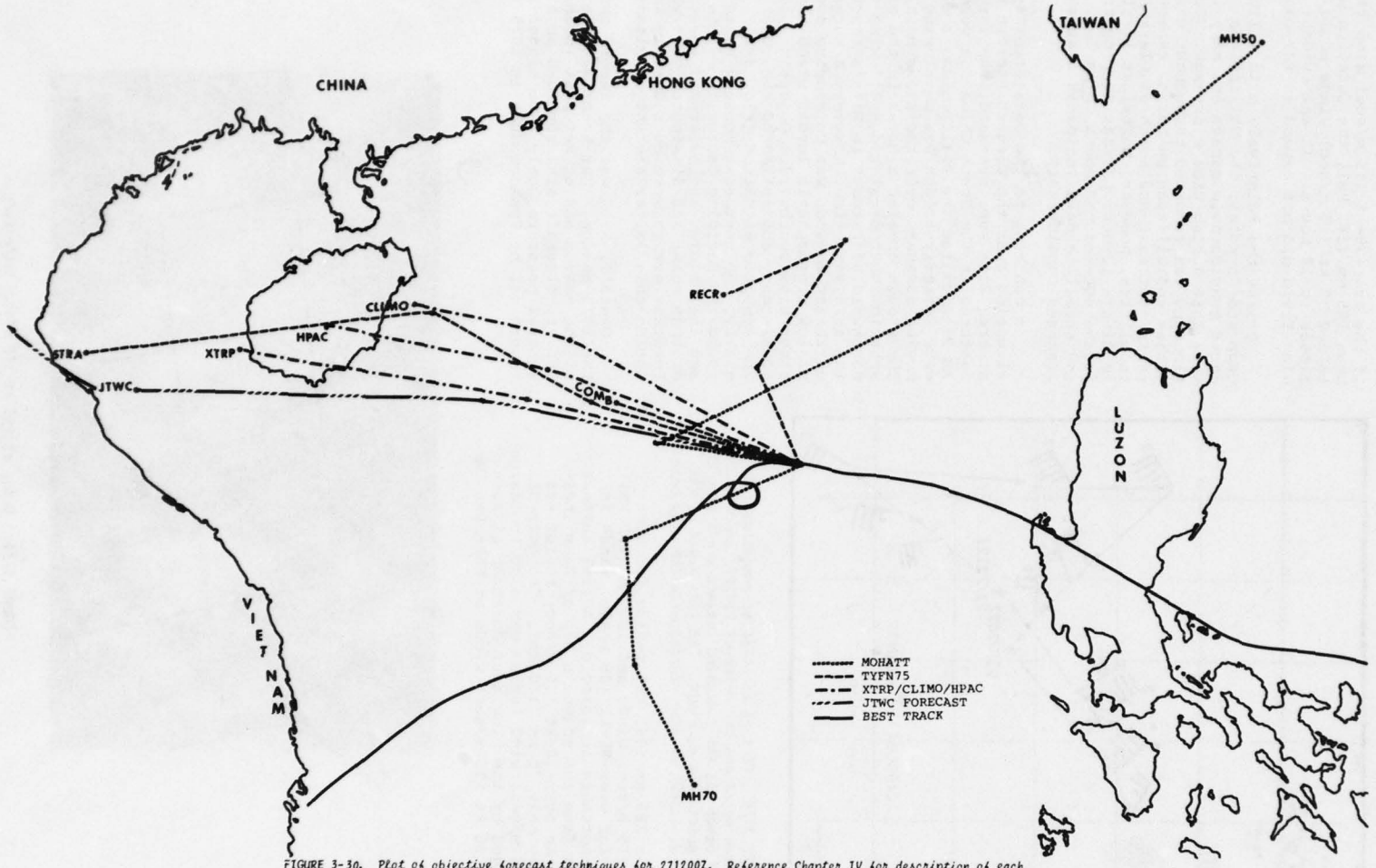


FIGURE 3-30. Plot of objective forecast techniques for 271200Z. Reference Chapter IV for description of each objective technique. Each * represents a 24-hour forecast segment. The solid line represents Rita's best track.

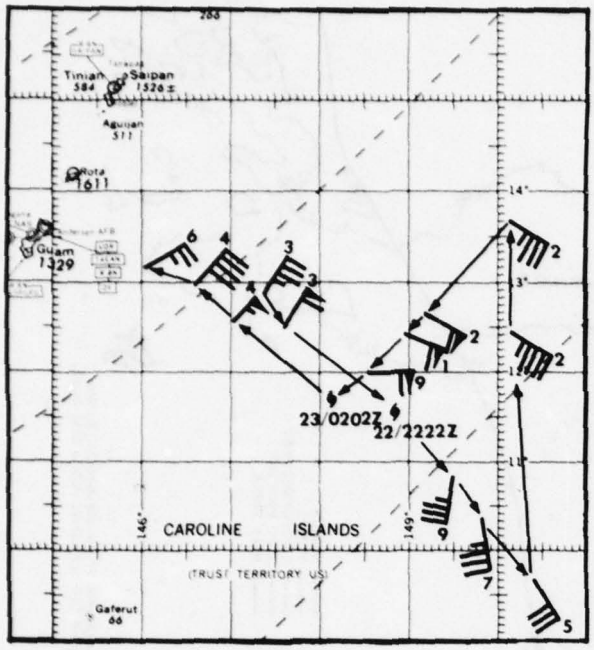


FIGURE 3-29. Plot of aircraft reconnaissance data. Typhoon positions are noted at 2302002 and 2222222. Wind barbs are the estimated surface winds from the ARWO aboard the aircraft. The tens digit of the wind direction is also plotted with the wind barbs.

showed a 185 nm (343 km) radius for over-30-kt (15 m/sec) winds and 100 nm (185 km) radius for over-50-kt (26 m/sec) winds in Rita's northern semicircle. Actual surface reports from the southern tip of Guam indicated the over-50-kt (26 m/sec) radius was actually only 70 nm (130 km). The over-30-kt (15 m/sec) wind radius was also too large as judged by the nine hour duration of sustained 30 kt (15 m/sec) winds at NASA Dan Dan. If the over-30-kt (15 m/sec) wind radius had been 185 nm (343 km), the duration of sustained 30 kt (15 m/sec) winds would have been closer to 19 hours. It was evident that the wind field did not expand as forecast.

Unlike the relatively mild influence on Guam and Enewetak, the Philippines experienced considerable damage and many lives were lost during Rita's passage. Heavy flooding was reported throughout many of the cities and villages on Luzon, especially those just east and north of Clark AB. DoD facilities, however, sustained little damage in Rita's 12-hour passage over central Luzon. As she entered the South China Sea, aircraft and satellite data indicated that she had weakened considerably.

In contrast to the persistent synoptic situation over the Western Pacific which had steered Rita ever westward, the large scale features in the South China Sea were complex. As Rita exited the Philippines, a short-wave westerly trough was developing and moving eastward over the Asian mainland. The trough created a break in the mid-tropospheric subtropical ridge allowing for a northward adjustment in Rita's track. During this same time, however, a surge in the northeast monsoon was developing over China at low tropospheric levels which tended to steer Rita southward. Objective aids lacked consistency and reflected the contrast in the synoptic situation (Fig. 3-30). Eventually, the northeast monsoon surge proved to be the deciding factor in Rita's movement and she tracked southwestward toward the Vietnam coast and dissipated over water. Forecast errors were considerably larger during this latter segment of Rita's track.

Overall, Rita was the record setter for the 1978 season. Her track was the longest of the season and at her peak intensity of 155 kt, aircraft data recorded an 878 mb central pressure, only 2 mb higher than the record set by Typhoon June in 1975 (Fig. 3-31).

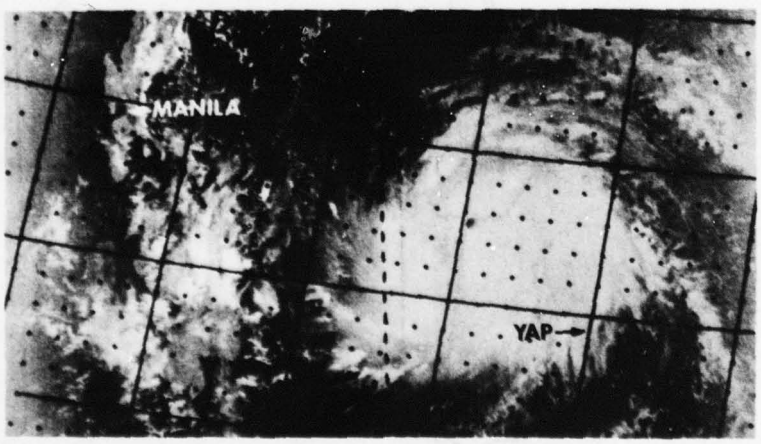
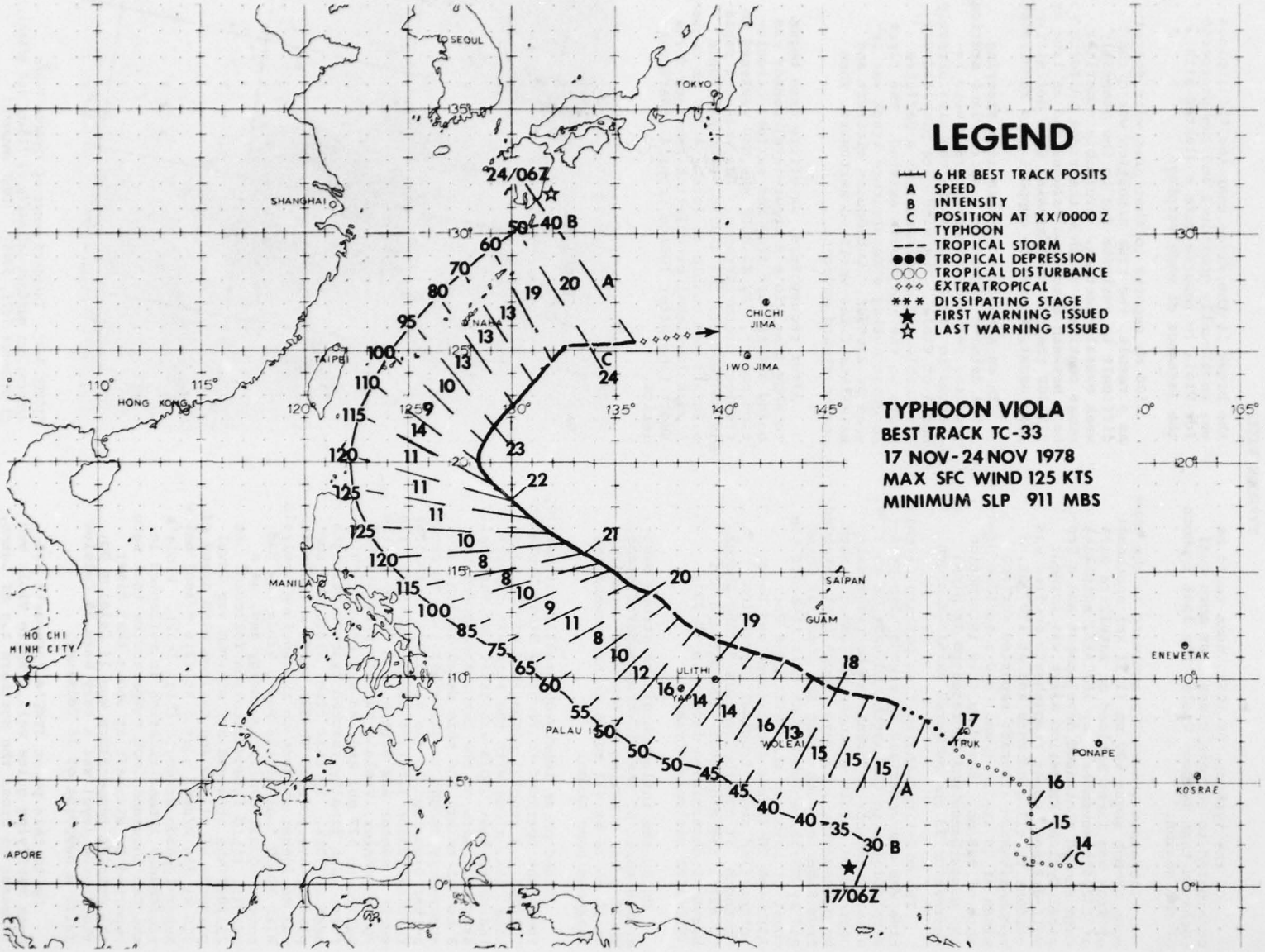


FIGURE 3-31. Rita, at 150 kt (77 m/sec) intensity, 6 hours prior to her peak intensity, 24 October 1978, 23192. (DMSP imagery)


LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TYPHOON VIOLA
BEST TRACK TC-33
17 NOV-24 NOV 1978
MAX SFC WIND 125 KTS
MINIMUM SLP 911 MBS
24/06Z
17/06Z
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
HO CHI MINH CITY
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
ENEWETAK
KOSRAE
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
160°
165°
35°
30°
25°
20°
15°
10°
5°
0°

Of the typhoons of 1978, none could be considered to be more classic or more well-behaved than Typhoon Viola, the last typhoon of the season.

Increased convective activity in the monsoon trough about 600 nm (1111 km) southeast of Truk was first noticed on satellite data at 132159Z November. By 162142Z, satellite data showed continued development and a Tropical Cyclone Formation Alert was issued. Well-defined, upper atmospheric outflow was evident in all quadrants and at 170710Z, a reconnaissance aircraft reported surface winds of 30 kt (15 m/sec) and a surface pressure of 998 mb. Based on this information the disturbance was upgraded to Tropical Depression 33 and numbered warnings began

The mid-tropospheric flow pattern at this time was characterized by strong high pressure ridging to the north and east of TD-33 with a weakness apparent in the ridge axis near Luzon. This weakness was induced both by a deepening long wave trough that extended from Siberia south along the coast of China and by TD-32, which was at this time off the coast of Luzon in the Philippine Sea. Although TD-32 was short-lived and never intensified above tropical depression strength, it nonetheless was strong enough to alter the mid-level flow pattern and become a determining factor in TD-33's (Viola's) ultimate movement.

Under the influence of the strong easterlies south of the mid-tropospheric ridge, TD-33 began tracking to the west-northwest at 12 to 16 kt (22 to 30 km/hr) toward the weakness near Luzon.

Based on an improved satellite signature, TD-33 was upgraded to Tropical Storm Viola at 171200Z. A careful comparison of the satellite data, along with the aircraft reports, indicated that Viola was still not vertically stacked. Late on the 19th, she slowed to 8 kt (15 km/hr) and this deceleration was apparently enough to allow her time to become better organized in the vertical. A 191505Z reconnaissance aircraft confirmed that: the surface center was within 5 nm (9 km) of the 700 mb center; Viola's surface pressure had fallen to 977 mb; and, an eye was beginning to form. She finally reached typhoon strength near 200000Z. By this time, Viola had completely overpowered TD-32, whose circulation was no longer evident on the surface analysis. With TD-32 "out of the way", Viola now had access to all available energy and, as a result, rapid intensification followed. At 211200Z she attained her minimum sea level pressure of 911 mb and maximum wind speed of 125 kt (64 m/sec) just 5 kt (2.6 m/sec) below super-typhoon strength (Fig. 3-32). Viola's tremendous intensification is reflected in the ten thousand foot temperatures that were reported by aircraft at about that time; the outside temperature was 14 Celsius but the inside (eye) was a very warm 29 Celsius (with a dewpoint of 16 Celsius).

Up to this point JTWC's forecasts had been verifying quite well. While Viola was forecast to cross the northern tip of Luzon, the break in the ridge near the Philippines was continually monitored and the prospects for Viola to recurve were evaluated with the issuance of each warning.

500 mb reports in that area were sparse; as a result, the true situation was often difficult to evaluate due to the generally weak overall pattern. Available numerical progs continued to show the ridge building back between Luzon and Taiwan, and as late as 210000Z the 500 mb analysis, more definitive than usual, seemed to support this rebuilding.

In an attempt to obtain more steering level data to augment the sparse land station reports, reconnaissance aircraft were requested to fly at 500 mb in the area directly north of Viola. The wind data provided was invaluable and confirmed that a definite break in the ridge axis existed. The first forecast noting a recurvature track was issued at 220600Z. Subsequent aircraft and satellite fixes verified northward, then northeastward movement.

After recurvature, satellite data began to show that Viola's upper-level center was being sheared off from her surface circulation center. By 231800Z she had weakened to tropical storm strength. She weakened rapidly thereafter; the 240030Z reconnaissance aircraft was unable to locate a 700 mb center. A weak low-level circulation remained for a short time after losing tropical characteristics.

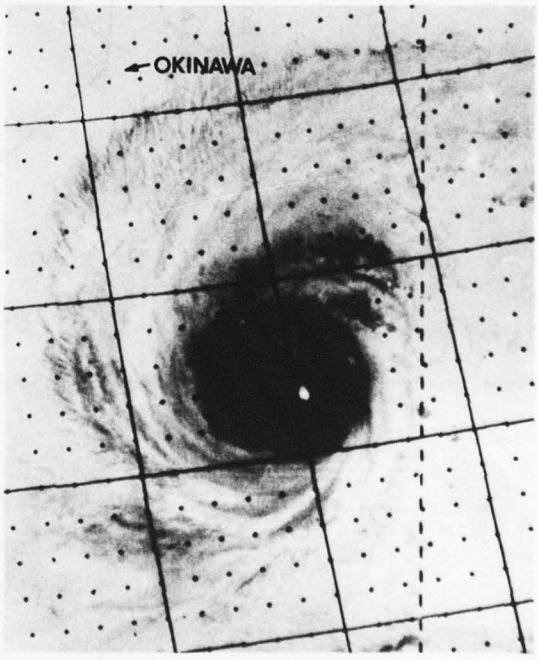


FIGURE 3-32. Infrared image of Typhoon Viola nearing her maximum intensity of 125 kt (64 m/sec), 21 November 1978, 0945Z. (DMSP imagery)

2. NORTH INDIAN OCEAN TROPICAL CYCLONES

During 1978, four significant tropical cyclones occurred in the North Indian Ocean area (Table 3-6). As usual, the transition seasons between the northeast and southwest monsoon periods were the favored "cyclone seasons" (Table 3-7). This year's cyclones lived longer than others on record as noted by the above-average number of warnings shown in Table 3-8.

Tropical Cyclone (TC) 18-78 occurred just prior to the start of the southwest monsoon season over Southeast Asia. Steering flow was weak which caused forecasting the speed of movement to be difficult. The lack of surface observations forced reliance on the interpretation of satellite data for position and intensity. TC 18-78 made landfall on Burma with estimated, maximum sustained winds of 50 kt (26 m/sec). News reports stated, " the town of Kyaukpyu reported 90% property damage and the coastal village of Narakway was demolished when estimated peak wind gusts of 80 to 100 mph were experienced." These extreme winds, although estimated, could have been produced by squall lines or tornados.

TC 19-78 dissipated prior to making landfall on Bangladesh; no "ground truth" reports were received confirming it's strength.

TABLE 3-6.

NORTH INDIAN OCEAN AREA

1978 TROPICAL CYCLONES

CYCLONE	PRD OF WARNING	CALENDAR DAYS OF WARNING	MAX SFC WIND	EST MIN SLP	NO. OF WARNINGS	DISTANCE TRAVELLED
TC 18-78	15 MAY-17 MAY	3	60	955	4	362
TC 19-78	26 OCT-28 OCT	3	40	995	7	451
TC 20-78	06 NOV-11 NOV	6	80	965	12	1213
TC 21-78	20 NOV-29 NOV	10	95	955	19	1397
	1978 TOTALS	22			42	

TABLE 3-7.

FREQUENCY OF NORTH INDIAN OCEAN CYCLONES BY MONTH AND YEAR

YEAR*	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1971	**	**	**	**	**	0	0	0	0	1	1	0	2
1972	0	0	0	1	0	0	0	0	2	0	1	0	4
1973	0	0	0	0	0	0	0	0	0	1	2	1	4
1974	0	0	0	0	0	0	0	0	0	0	1	0	1
1975	1	0	0	0	2	0	0	0	0	1	2	0	6
1976	0	0	0	1	0	1	0	0	1	1	0	1	5
1977	0	0	0	0	1	1	0	0	0	1	2	0	5
1978	0	0	0	0	1	0	0	0	0	1	2	0	4
AVERAGE (1971-78)	0.1	0	0	0.3	0.5	0.3	0	0	0.4	0.8	1.4	0.3	3.9

*1971-1974 REPRESENT BAY OF BENGAL CYCLONES ONLY

**JTWC RESPONSIBILITY FOR BAY OF BENGAL CYCLONES BEGAN ON 4 JUNE 1971

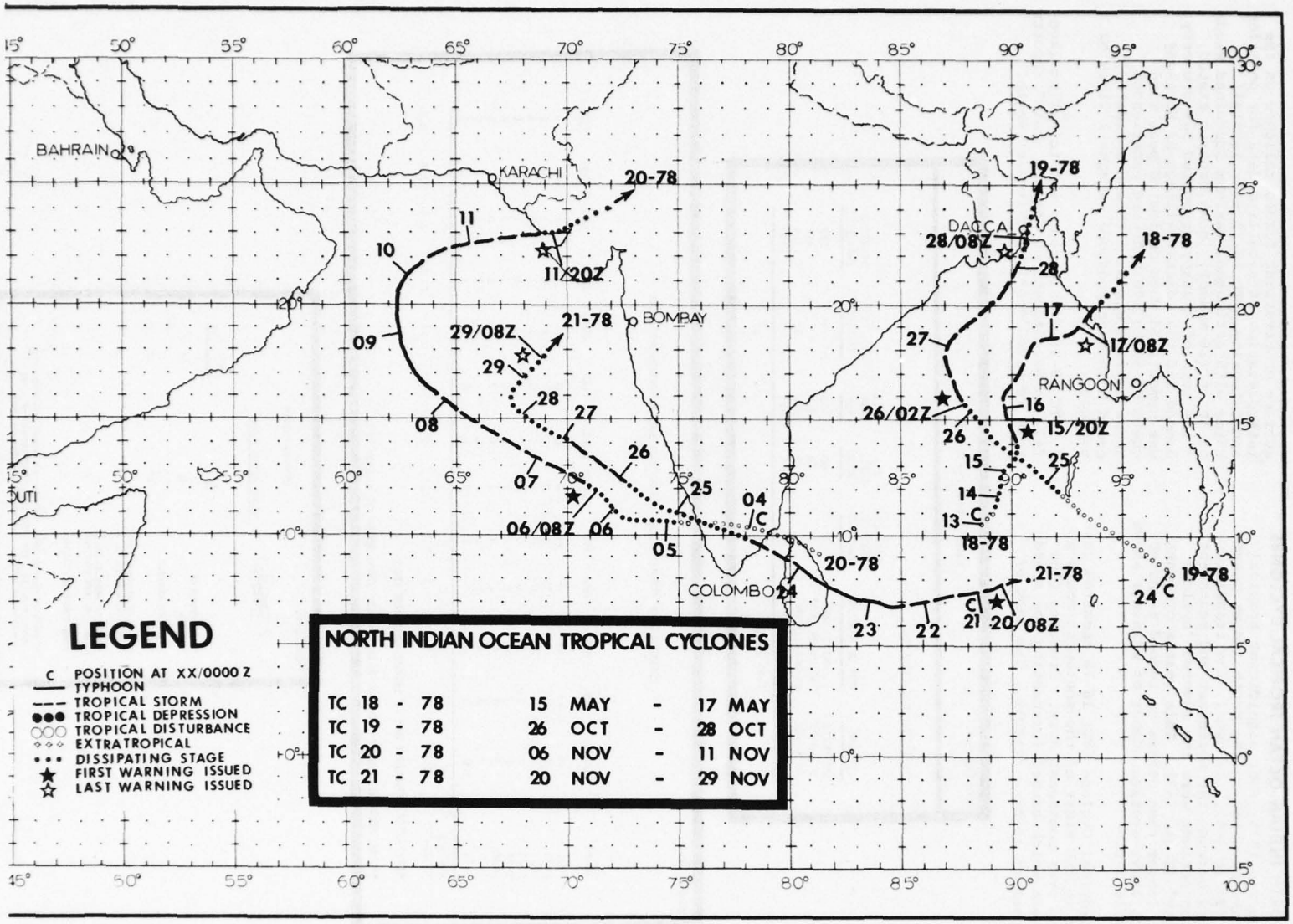
TABLE 3-8.

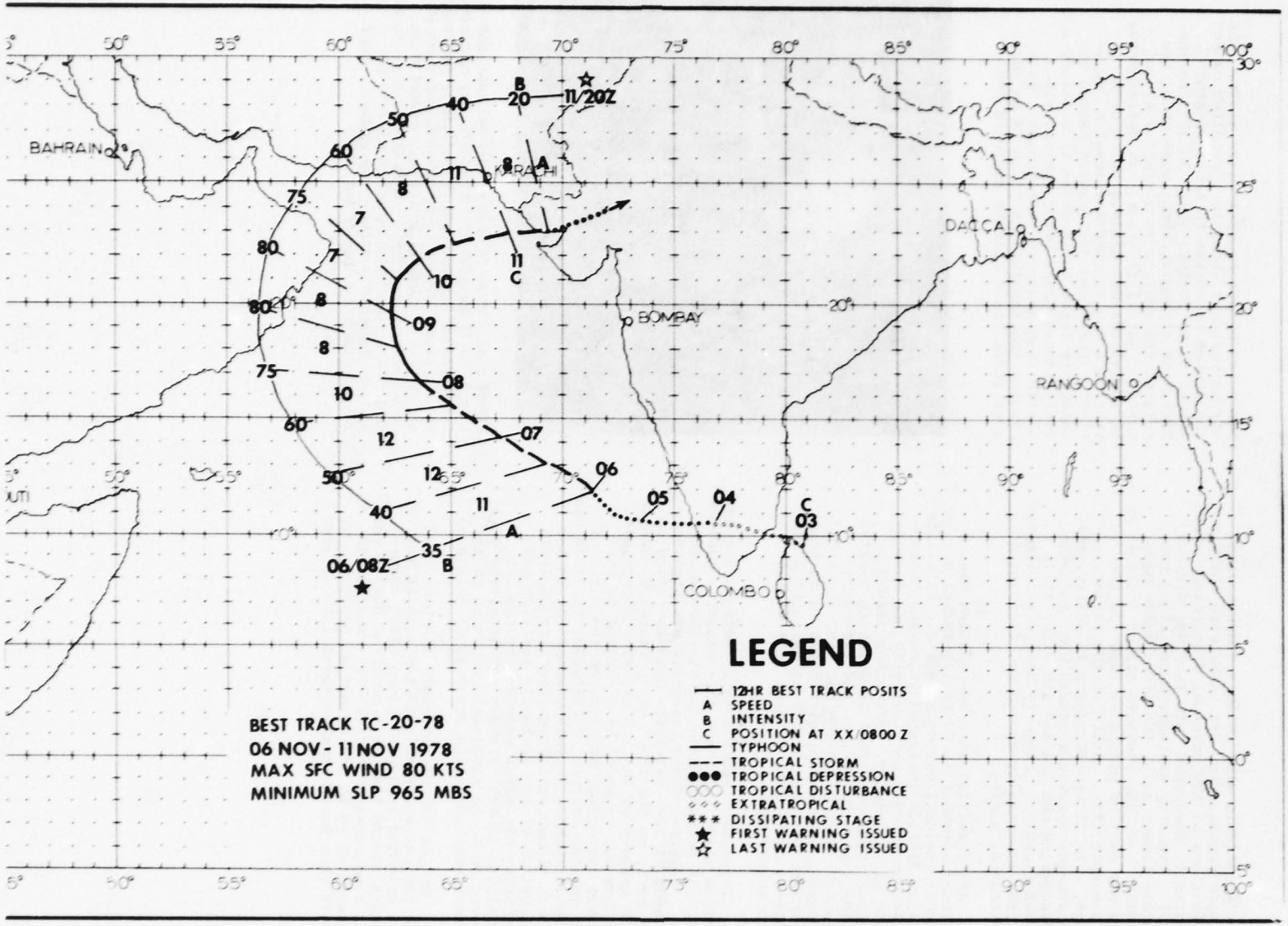
WARNING SUMMARY

NORTH INDIAN OCEAN

	1978	AVERAGE 1971-1977*
TOTAL NUMBER OF WARNINGS	42	29
NUMBER OF WARNING DAYS	22	17
NUMBER OF WARNING DAYS WITH 2 OR MORE CYCLONES	0	2
NUMBER OF WARNING DAYS WITH 3 OR MORE CYCLONES	0	0
TOTAL TROPICAL CYCLONES	4	4

*From 1971 through 1974, only Bay of Bengal cyclones were considered; the JTWC area of responsibility was extended in 1975 to include Arabian Sea cyclones.


BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
DUTI
20-78
19-78
18-78
21-78
19-78
11/20Z
28/08Z
29/08Z
17/08Z
26/02Z
15/20Z
06/08Z
20/08Z
24
C
LEGEND
C POSITION AT XX/0000 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
NORTH INDIAN OCEAN TROPICAL CYCLONES
TC 18 - 78 15 MAY - 17 MAY
TC 19 - 78 26 OCT - 28 OCT
TC 20 - 78 06 NOV - 11 NOV
TC 21 - 78 20 NOV - 29 NOV


BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
BEST TRACK TC-20-78
06 NOV - 11 NOV 1978
MAX SFC WIND 80 KTS
MINIMUM SLP 965 MBS
LEGEND
12HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0800 Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
06/08Z
11/20Z

(NEW 2-76)

A cyclonic wind shift and decreasing surface pressures on Sri Lanka were the first indications of the tropical disturbance which eventually developed into Tropical Cyclone 20-78. Tracking west-northwest along the monsoon trough axis, the disturbance made landfall over the southern tip of India 66 nm (122 km) east of Madura at 1800Z on the 3rd of November 1978. Still in the formative stage, with 20 kt (10 m/sec) intensity, the disturbance tracked westward over southern India during the 3rd and 4th with little intensification. Property damage was limited to, and essentially caused by, flooding on the coastal plains.

After exiting into the Arabian Sea, a westward movement at 07 kt (13 km/hr) and gradual intensification occurred. Satellite data at 050647Z indicated increased organization and feeder band activity had formed south of the center. JTWC thus issued a Tropical Cyclone Formation Alert at 051239Z as the system moved into the Laccadive Islands. During the 5th and 6th, the mid-tropospheric subtropical ridge axis shifted northward from 16N to 20N allowing TC 20-78 to track more north of west from 051400Z through 082000Z.

Increased feeder band activity and good outflow aloft indicated that steady intensification occurred from the 5th through the 8th. Tropical storm intensity was attained by 060800Z with satellite data revealing an eye early on the 7th. As indicated by satellite imagery on the 7th and 8th, upper-level outflow was enhanced by a channel to the strong westerlies existing to the north of the cyclone center. By 080200Z, TC 20-78 had reached typhoon intensity according to the Dvorak visual satellite intensity analysis. Evaluation of the cyclone's position and intensity estimates provided by the USS LaSalle's (AGF-3) TIROS-N APT satellite data proved to be an invaluable addition to the normal DMSP satellite coverage of this area.

By the 9th of November, the mid-level subtropical ridge axis in the Arabian Sea was oriented east-west along 19N. Recurvature around this axis occurred during the 9th concurrent with TC 20-78's maximum intensity of 80 kt (41 m/sec) at 090900Z. TC 20-78 then moved northeastward into an area dominated by strong westerlies aloft. The strong vertical shear that resulted caused the system to weaken to tropical storm intensity by 100800Z (Fig. 3-33). By the 11th, the strong vertical wind shear had reduced the cyclone to a shallow system noted on satellite imagery as spiral bands of low clouds and minimum to no deep convection - "an exposed low level circulation". Continued dissipation caused the satellite fixes to decrease in accuracy and conventional data, being sparse, aided little in pinpointing the center. As a result, the landfall of TC 20-78 on northwest Irdia could only be approximated.

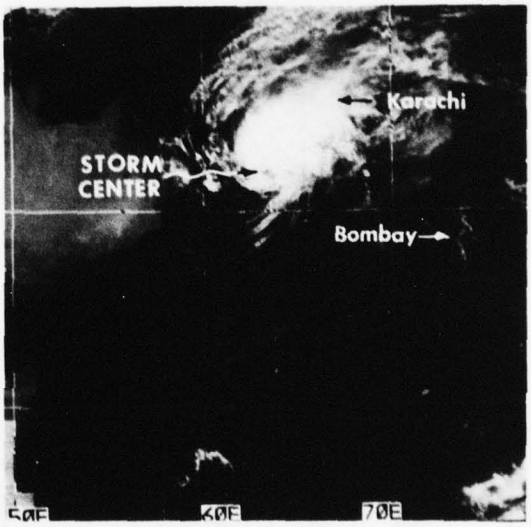
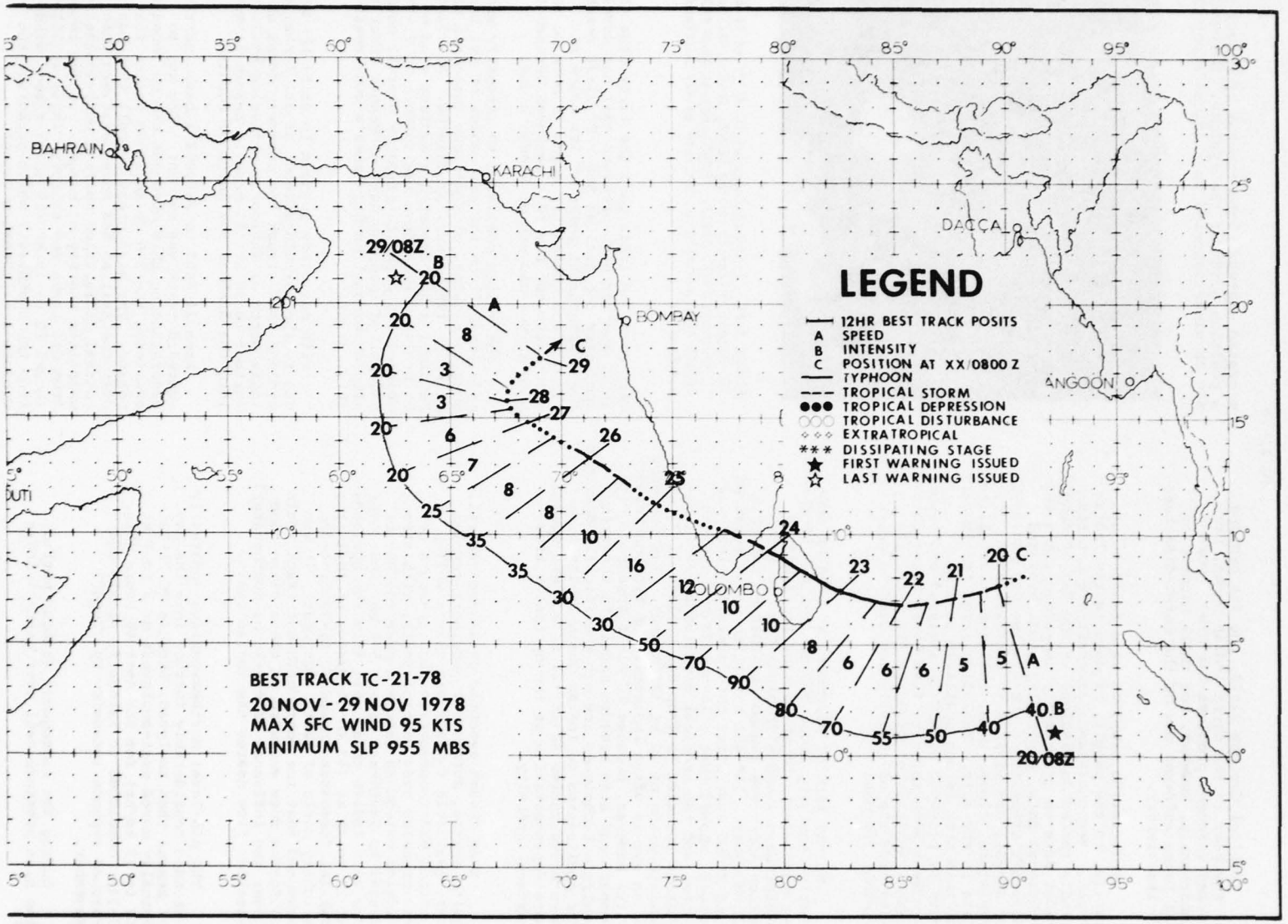


FIGURE 3-33. TC 20-78, 260 nm (482 km) southwest of Karachi on 10 November 1978 at 0659Z. The concentration of convective activity to one side of the cyclone and the cirrus showing unidirectional, upper-air flow are typical of cyclones in strong, vertical shear environments. A cyclonic circulation is becoming evident in the orientation of low clouds over the southern "exposed" portion of the cyclone. (DMSP imagery from AFGWC, Offutt AFB, NE)


LEGEND
12HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0800Z
TYPHOON
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
29/08Z
20/08Z
BEST TRACK TC-21-78
20 NOV - 29 NOV 1978
MAX SFC WIND 95 KTS
MINIMUM SLP 955 MBS

(NEW 2-76)

Tropical Cyclone 21-78, the 4th cyclone of the year in the north Indian Ocean, presented forecast problems for JTWC. More importantly, however, the small country of Sri Lanka suffered one of the worst disasters in its history.

Forecasting problems were related, primarily, to the paucity of data in the Indian Ocean. Reconnaissance aircraft are not routinely tasked on missions in the Bay of Bengal. Radar data is practically unheard of, and conventional data, especially from ships and aircraft transitting the Arabian Sea and Bay of Bengal, are minimal to non-existent. Therefore, almost total reliance on satellite data is the rule. Real-time satellite imagery of this area is not available at JTWC. Data is received at AFGWC, analyzed and reports are sent some three to five hours after data time. Analysis of TIROS-N, APT satellite data from the USS LaSalle was used to supplement fix data.

On the 19th of November, an area of convective activity about 300 nm (556 km) northwest of Sumatra began to show increased organization, and a Tropical Cyclone Formation Alert was issued at 0705Z on the 20th of November. 200542Z satellite data, received from AFGWC just after the formation alert was issued, showed that a 15 nm (28 km) eye had formed and the tropical disturbance was immediately upgraded to Tropical Cyclone 21-78 with maximum winds of 40 kt (21 m/sec). The presence of an eye is often indicative of typhoon intensity; however, because TC 21-78 appeared quite compact and also because satellite intensity analysis techniques are not specifically designed for application to Indian Ocean cyclones, a more conservative 40 kt (21 m/sec) was deemed more representative of the cyclone's true surface intensity.

Even though synoptic data were generally quite sparse, sufficient upper-air reports were available to indicate that a well-defined mid-tropospheric high pressure cell was situated over central India, with strong ridging extending eastward over the Bay of Bengal to Southeast Asia. 500 mb winds over the east Indian coast were from the northeast at 25 to 30 kt (13 to 15 m/sec) at that time. Initial forecasts showed TC 21-78 tracking slightly north of west, then west. It was reasoned that the west-northwest track would be forced more westward as the cyclone came under the influence of mid-level northeasterly steering flow nearer the Indian coast.

The mid-level northeasterlies apparently extended considerably further into the Bay of Bengal than analyzed, because TC 21-78 actually moved west-southwest at 5 to 7 kt (9 to 13 km/hr) for the next 48 hours (Fig. 3-34), continued to intensify slowly and reached typhoon intensity by 220800Z November.

During the subsequent 48-hour period, the high pressure cell over central India migrated eastward into the Bay of Bengal to a position north of the cyclone. Northerly 500 mb winds reported by stations along the

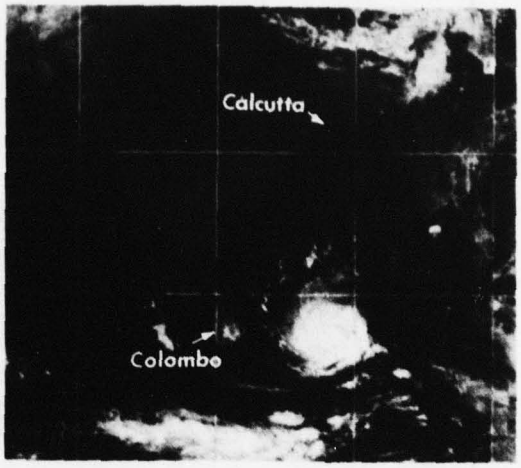


FIGURE 3-34. Infrared image of TC 21-78 at 50 kt (26 m/sec) intensity moving slowly toward Sri-Lanka, 21 November 1978, 0542Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska as received by FWF Suitland, Maryland)

west coast of India were the first clue that still another high pressure cell had developed over the Arabian Sea. TC 21-78 reached the southernmost point of its track at 220900Z and thereafter began to move to the west-northwest toward a weakness between the Arabian Sea and Bay of Bengal highs.

The system continued to intensify and made landfall on the east coast of Sri Lanka, near Batticaloa, with maximum sustained winds of 95 kt (49 m/sec), at 231400Z. At 231200Z, Batticaloa had reported a surface wind of 85 kt (44 M/sec) from the north. TC 21-78 crossed Sri Lanka in slightly over 12 hours and exited into the Gulf of Mannar (near the city of Mannar) on Sri Lanka's west coast (Fig. 3-35).

With max winds reduced to 45 kt (23 m/sec) due to the terrain effects of Sri Lanka, the cyclone then struck the southern coast of India north of Tuticorin weakening still further to 30 kt (15 m/sec), before it moved into the Arabian Sea north of Cochin.

From 240000Z to 280000Z a basic northwestward track was evident. The key to understanding this movement can be found by examining the 500 mb analyses during that period. The high pressure cell that was over the Arabian Sea moved eastward into central India, then shifted east-southeastward into the Bay of Bengal. 500 mb reports from Sri Lanka and southern India at 251200Z showed 20 to 25 kt (10 to 13 m/sec) winds from the southeast, which supported the cyclone's northwest movement.

TC 21-78 did not reintensify significantly after its passage across Sri Lanka and India. (It was expected to reintensify once it was again over warm water, but reintensification was slight and the system never again developed above tropical storm strength.) By 270600Z the cyclone's upper level center began to shear off from its surface center and satellite data revealed only low-level cloudiness signifying a low-level circulation. Warnings continued on the cyclone until 290800Z because it was felt that regeneration was still possible. By the 29th, satellite data indicated that TC 21-78 had weakened to the point that it was no longer a significant tropical circulation.

TC 21-78 was one of the most destructive storms of the year in either the Indian Ocean or West Pacific. Approximately one thousand people were killed and thousands of acres of crops were destroyed in Sri Lanka by the cyclone's winds, rain, and associated storm surge. In southern India only 10 people were killed; however, eighteen to twenty-five foot waves produced by the storm surge submerged 45 villages. Luckily, because of ample advance warning, the inhabitants were evacuated in time.

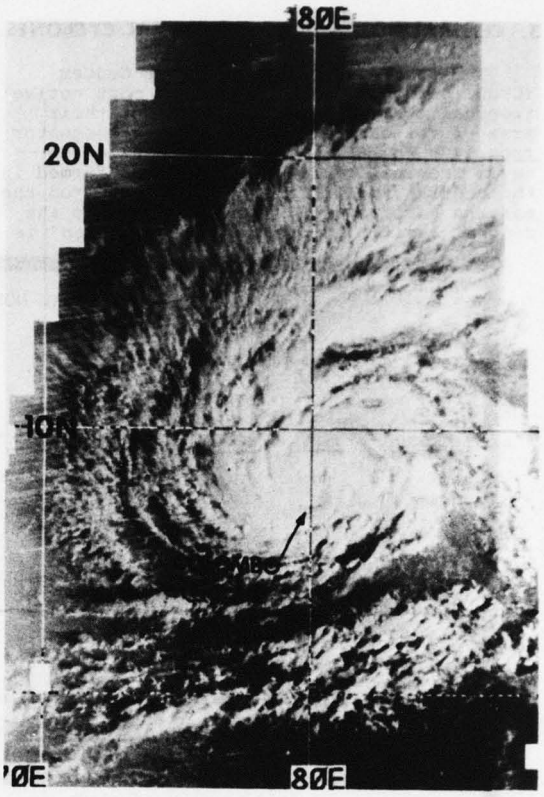


FIGURE 3-35. TC 21-78 located over north-central Sri-Lanka, 24 November 1978, 0118Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)

3. CENTRAL NORTH PACIFIC TROPICAL CYCLONES

The Central Pacific Hurricane Center (CPHC) personnel saw 1978 as the most active tropical cyclone year on record for their area of responsibility (north of the equator from 140W to 180). Table 3-9 details the seven tropical cyclones that either formed in the central Pacific area or moved in from the eastern Pacific area. Table 3-10 shows the central Pacific tropical cyclone "season" is well-defined and that 1978 was a record year for the number of tropical storms and hurricanes. This season not only set a record number of occurrences but also produced a cyclone with an exceptional length of travel and persistence of hurricane intensity (Fico), as well as one of the two most intense hurricanes on record in the central Pacific (Susan). Table 3-11 is a warning summary for the central North Pacific.

TABLE 3-9.

CENTRAL NORTH PACIFIC

1978 SIGNIFICANT TROPICAL CYCLONES

CYCLONE	TYPE	NAME	PRD OF WARNING*	CALENDAR DAYS OF WARNING	MAX SFC WIND	MIN OBS SLP	NO. OF WARNINGS TOTAL	NO. OF WARNINGS AS HU
07	HU	FICO	17 JUL - 28 JUL	12	100	955	43	39
10A**	TD	TD 10A	07 AUG - 09 AUG	3	30	-	11	-
12	HU	JOHN	23 AUG - 31 AUG	9	90	965	31	8
13	TS	KRISTY	26 AUG - 28 AUG	3	50	-	11	-
14	TS	LANE	20 AUG - 24 AUG	5	50	-	18	-
15	TS	MIRIAM	28 AUG - 01 SEP	5	55	-	18	-
30**	HU	SUSAN	18 OCT - 24 OCT	7	120	954	24	15
			1978 TOTALS	35***			156	62

* Warning period while in central Pacific area.

** Cyclones that formed in the central Pacific area; all others began in the eastern Pacific area. Tropical Depression 10A was given the "A" suffix to clarify its individuality when Tropical Depression 10 formed in the eastern Pacific area.

*** Overlapping days included once in sum.

TABLE 3-10.

FREQUENCY OF CENTRAL PACIFIC STORMS BY MONTH AND YEAR

(NUMBERS IN PARENTHESES INDICATE STORMS REACHING HURRICANE INTENSITY)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1967	0	0	0	0	0	0	0	0	0	1	0	0	1
1968	0	0	0	0	0	0	0	2	0	0	0	0	2
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	1	0	0	0	0	1(1)
1971	0	0	0	0	0	0	1(1)	1	0	0	0	0	2(1)
1972	0	0	0	0	0	0	0	3(1)	1	0	0	0	4(1)
1973	0	0	0	0	0	0	1(1)	0	0	0	0	0	1(1)
1974	0	0	0	0	0	0	0	2(1)	0	0	0	0	2(1)
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	1(1)	0	0	0	1(1)
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	1(1)	4(1)	0	1(1)	0	0	6(3)
AVERAGE (1967-78)	0	0	0	0	0	0	.3(.3)	1.1(.3)	.2(.1)	.2(.1)	0	0	1.8(.8)

TABLE 3-11.

WARNING SUMMARY

CENTRAL NORTH PACIFIC

	1978	AVERAGE 1971-1977
TOTAL NUMBER OF WARNINGS	156	30
NUMBER OF WARNING DAYS	35	9
NUMBER OF WARNING DAYS WITH 2 OR MORE CYCLONES	8	1
NUMBER OF WARNING DAYS WITH 3 OR MORE CYCLONES	1	0
TROPICAL DEPRESSIONS	1	1
TROPICAL STORMS	3	1
HURRICANES	3	1
TOTAL TROPICAL CYCLONES	7	3

JTWC

Hurricane Fico, 9-28 July, was the longest lived and most intense eastern Pacific cyclone of historical record. Fico reached hurricane strength at 111 degrees west longitude and maintained winds in excess of 65 kt (33 m/sec) for 18 days while traveling 4,200 miles (6758 km) westward to 176W, near Midway Island. Although Fico's maximum intensity of 115 kt (59 m/sec) occurred just prior to entering the central Pacific (140W), Hurricane Susan, in October attained winds of 120 kt (62 m/sec) while 360 miles (579 km) southeast of Hilo, Hawaii, making her the strongest tropical cyclone ever observed near the Hawaiian Islands.

Hurricane John and Tropical Storm Kristy were named at the same time, 0000 GMT, 19 August 1978, while in the eastern Pacific. At this time Tropical Storm Lane was centered further west than the others, thereby explaining why it entered the central Pacific out of alphabetical order.

GOES-3 imagery (Fig. 3-36) depicts three cyclones; John, Kristy, and Miriam. At the time of this satellite photograph, John was at tropical storm intensity and subsequently weakened further and meandered west-southwestward to 170W.

With the demise of Tropical Storm Miriam, the Honolulu staff felt that the central Pacific season was likely over. But on the 18th of October, a suspicious area southeast of Hawaii rapidly developed into a full-fledged tropical storm. This was the capricious Susan, the last storm of the season. Susan attained tropical storm intensity at precisely the same location where the first eastern Pacific storm of the season, to threaten the central Pacific area, Bud, dissipated; near 10N-145W. Continuing to intensify, by the 21st, Susan became one of the two most intense hurricanes on record in the central Pacific. Maximum sustained winds of 120 kt (62 m/sec) equaled those attained by Celeste in August of 1972. Figure 3-37 depicts Susan at 220016Z during peak intensity while a very real threat to the Hawaiian Islands. After reaching a point 220 nm (408 km) southeast of the Big Island, however, Susan turned sharply to the southwest, very rapidly dissipated, and luckily the Hawaiian Islands were once again spared.

An individual summary of Hurricane Fico follows.

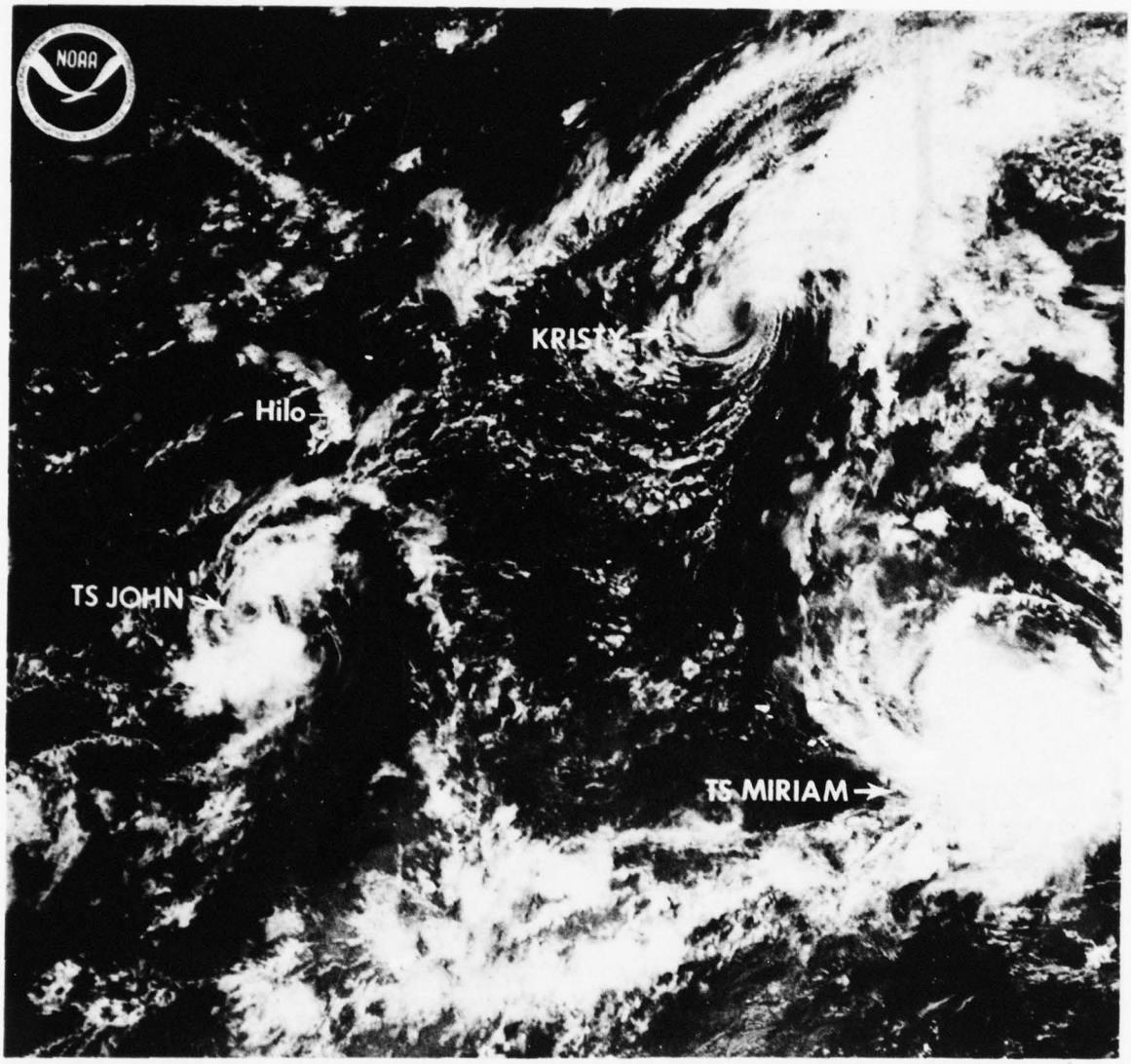


FIGURE 3-36. Tropical Storm John (downgraded from Hurricane John) is centered 240 nm (417 km) south-southwest of South Point, Hawaii. Kristy, downgraded to a tropical disturbance, 600 nm (1120 km) east-northeast of Hilo, Hawaii, and Tropical Storm Miriam 925 nm (1714 km) southeast of Hilo, Hawaii, 27 August 1978, 2315Z. (GOES imagery from SFSS, Honolulu, Hawaii)

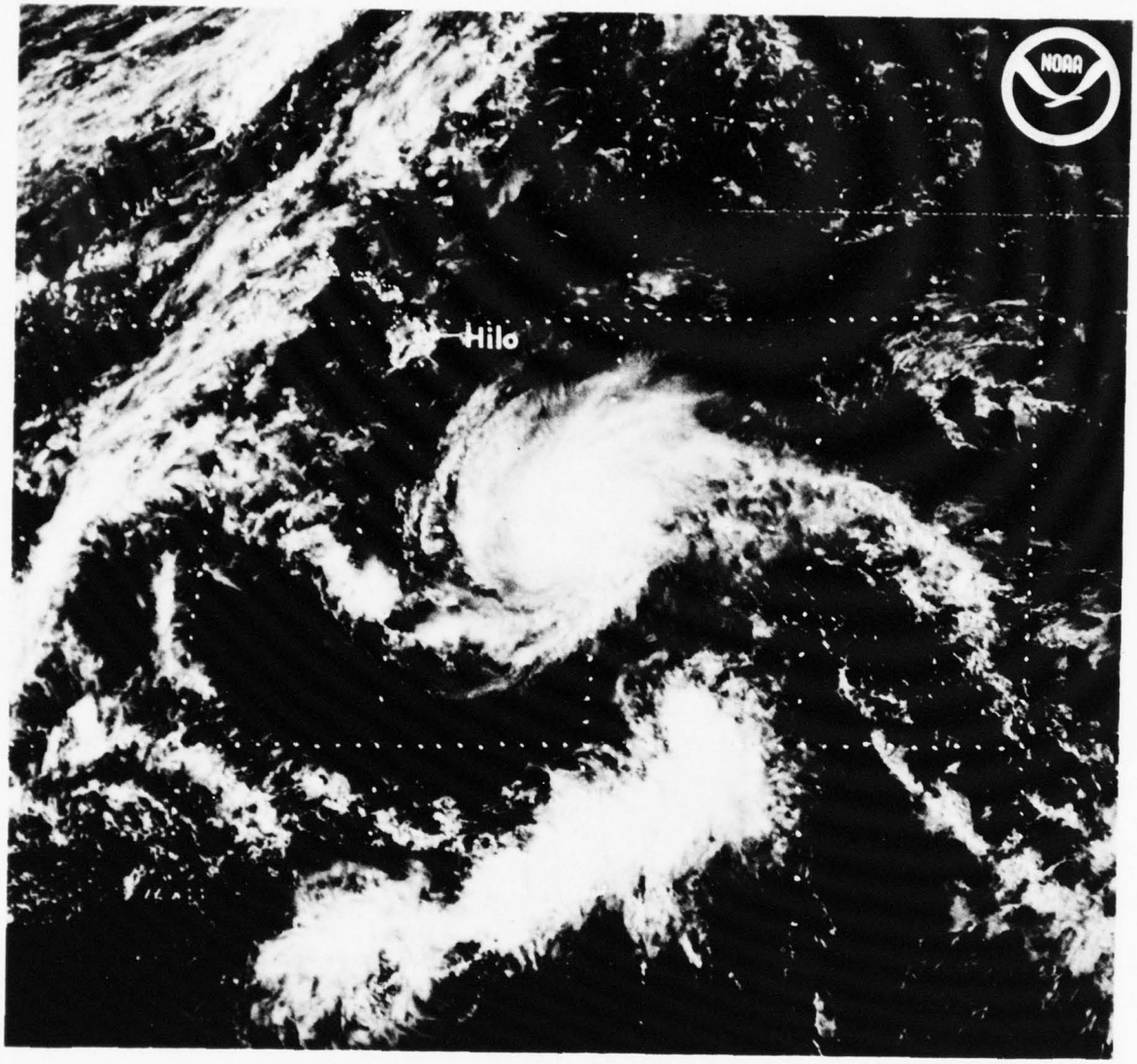
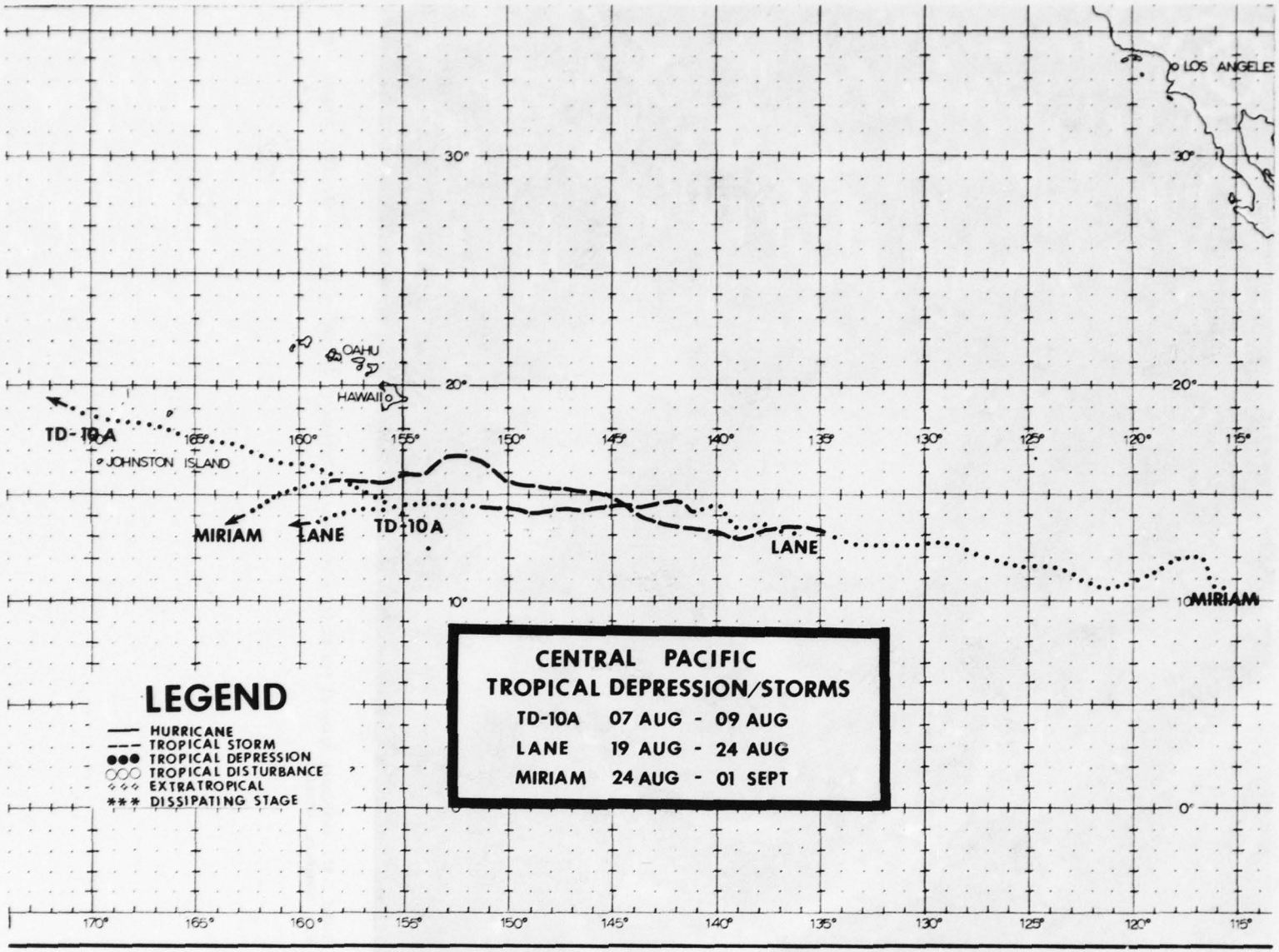
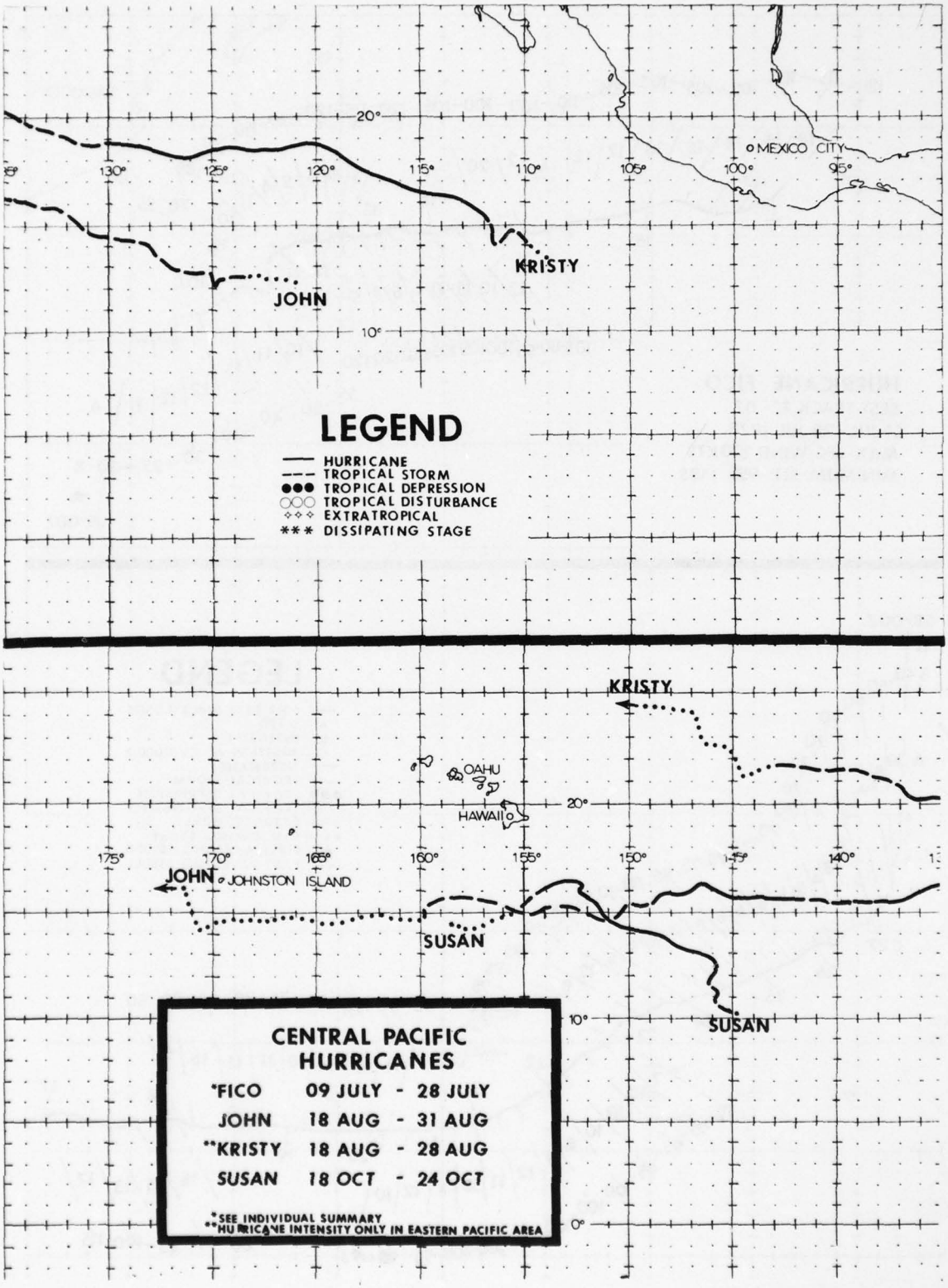
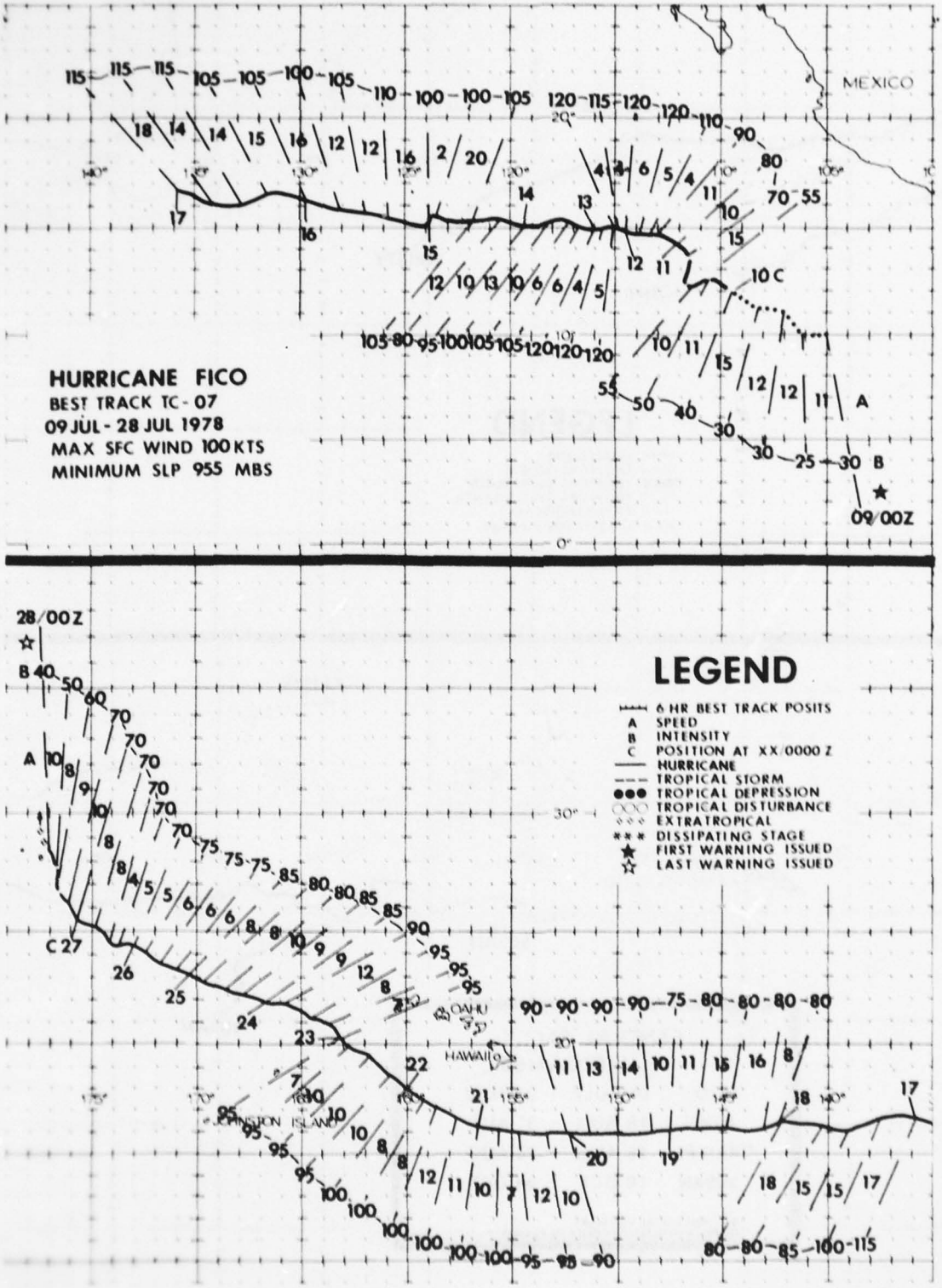


FIGURE 3-37. Hurricane Susan at 120 kt (62 m/sec) maximum intensity, 22 October 1978, 0016Z. (GOES imagery from SFSS, Honolulu, Hawaii)


LOS ANGELES
OAHU
HAWAII
TD-10A
JOHNSTON ISLAND
MIRIAM
LANE
TD-10A
LANE
MIRIAM
30°
20°
10°
0°
170°
165°
160°
155°
150°
145°
140°
135°
130°
125°
120°
115°
LEGEND
HURRICANE
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
*** DISSIPATING STAGE
CENTRAL PACIFIC
TROPICAL DEPRESSION/STORMS
TD-10A 07 AUG - 09 AUG
LANE 19 AUG - 24 AUG
MIRIAM 24 AUG - 01 SEPT


20°
130°
125°
120°
115°
110°
105°
100°
95°
MEXICO CITY
KRISTY
JOHN
10°
LEGEND
HURRICANE
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
*** DISSIPATING STAGE
KRISTY
OAHU
HAWAII
20°
175°
170°
165°
160°
155°
150°
145°
140°
JOHN
JOHNSTON ISLAND
SUSAN
SUSAN
10°
0°
CENTRAL PACIFIC HURRICANES
*FICO 09 JULY - 28 JULY
JOHN 18 AUG - 31 AUG
**KRISTY 18 AUG - 28 AUG
SUSAN 18 OCT - 24 OCT
*SEE INDIVIDUAL SUMMARY
**HURRICANE INTENSITY ONLY IN EASTERN PACIFIC AREA


HURRICANE FICO
BEST TRACK TC-07
09 JUL - 28 JUL 1978
MAX SFC WIND 100 KTS
MINIMUM SLP 955 MBS
MEXICO
09/00Z
28/00Z
OAHU
HAWAII
JOHNSTON ISLAND
LEGEND
6 HR BEST TRACK POSITS
A SPEED
B INTENSITY
C POSITION AT XX/0000 Z
HURRICANE
TROPICAL STORM
TROPICAL DEPRESSION
TROPICAL DISTURBANCE
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

Hurricane Fico entered the Central Pacific at 16N-140W on 17 July 1978 with maximum sustained winds near 80 kt (41 m/sec). Fico attained a maximum intensity of 115 kt (59 m/sec) while still in the Eastern Pacific east of 140W. Fico proceeded along the 16th parallel to a point due south of South Point, Hawaii. U. S. Air Force aircraft and satellite reconnaissance and NESS satellite imagery showed a steady increase in Fico's intensity during its travel from 140W to its position south of South Point.

Surf due to open ocean swell from Fico began to rise on the 18th, with some beach road flooding along the southeast coast of the Big Island when Fico was 500 nm (927 km) to the southeast. Higher than normal surf at this time was also enhanced by southerly swell from a southern hemisphere storm. By the morning of the 19th, Civil Defense officials reported 30 foot (9.1 m) surf breaking well offshore with smaller 15 to 20 foot (4.6 to 6.1 m) short period surf doing considerable damage to beachfront homes and roads on the Big Island. Eight to 12 foot (2.4 to 3.7 m) surf was observed on Eastern Maui by noon of the 19th, with water over roads but no damage reported. Very short period surf of similar heights reached southern Oahu and southern Kauai on the following day.

On July 20 (Fig. 3-38), the hurricane was 175 nm (324 km) south-southeast of South Point with maximum sustained winds of 100 kt (51 m/sec). Late on the 20th, Fico began moving northwestward and maintained 100 kt (51 m/sec) winds until 190 nm (325 km) due south of Kauai. A strong trade wind gradient, increased by the proximity of Fico, caused strong gusty winds over all the Hawaiian Islands with numerous reports of 50 kt (26 m/sec) or more, accompanied by falling trees and power line outages.

Fico maintained hurricane intensity for 17 days and was tracked by the Honolulu and San Francisco National Weather Service forecast offices (with much support from respective NESS units) for approximately 5000 nm (9266 km). The effects of Fico were felt during and after extratropical transition; remnants of Fico, enmeshed in a strong cold frontal system, inflicted heavy rain and up to 40 kt (21 m/sec) winds on ships southeast of Cold Bay in the Aleutians on July 31.

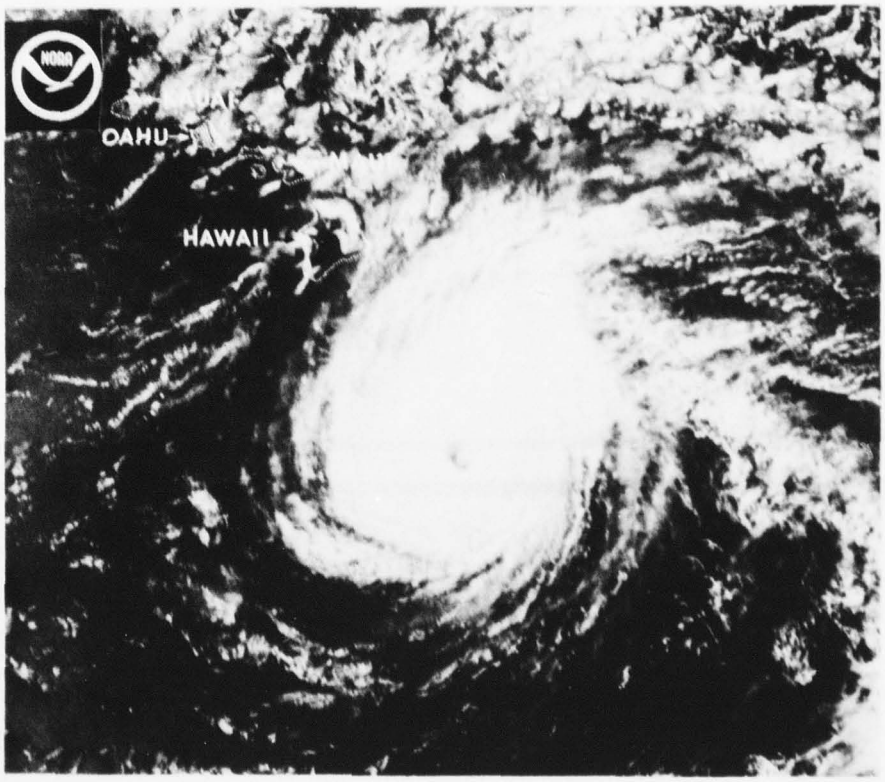


FIGURE 3-38. Hurricane Fico threatening Hawaii, 20 July 1978, 0115Z. (GOES imagery from SFSS, Honolulu, HI)

CHAPTER IV - SUMMARY OF FORECAST VERIFICATION

1. ANNUAL FORECAST VERIFICATION

a. Western North Pacific Area

Forecast positions at warning times and 24-, 48- and 72-hour valid times were verified against corresponding best tracks and vector errors and right angle errors were calculated (Table 4-1). Annual, mean errors are listed in Table 4-2 for comparison. Frequency distributions of the vector errors of the 24-, 48- and 72-hour forecasts on all 1978 cyclones are shown in Figure 4-1 and annual, mean vector errors are graphed in Figure 4-2. Previous reports have shown a graph of the annual, mean vector errors for typhoons when best track intensity at verifying time was 35 kt or greater. This, subset, error graph is shown in Figure 4-3. Mean vector errors shown in Figure 4-3 are lower than those depicted in Figure 4-2; nonetheless, similar trends are evident from year to year.

TABLE 4-1. FORECAST ERROR SUMMARY FOR THE 1978 WESTERN NORTH PACIFIC SIGNIFICANT TROPICAL CYCLONES.

		WARNING			24 HOUR			48 HOUR			72 HOUR		
	CYCLONE	POSIT ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# WRNGS
1.	TS NADINE	23	15	20	185	109	16	568	381	12	980	708	8
2.	TY OLIVE	14	10	36	100	62	32	224	129	28	328	215	20
3.	TS POLLY	16	10	16	93	50	12	139	93	8	208	97	2
4.	TS ROSE	37	21	7	235	142	3						
5.	TS SHIRLEY	24	15	3									
6.	TY TRIX	21	17	38	174	122	35	425	298	30	657	531	24
7.	TY VIRGINIA	20	12	43	112	63	39	231	127	35	399	283	31
8.	TY WENDY	21	12	40	112	75	36	235	188	30	328	188	30
9.	TS AGNES	10	7	22	97	59	19	243	191	12	410	309	3
10.	TS BONNIE	31	20	8	121	36	4						
11.	TY CARMEN	19	10	36	124	56	30	250	125	19	429	266	12
12.	TS DELLA	29	20	10	116	73	6	217	131	2			
13.	TD-14	25	23	6	169	127	2						
14.	TY ELAINE	22	15	20	132	77	16	278	157	12	263	174	8
15.	TY FAYE	15	12	44	158	113	40	360	285	36	514	396	29
16.	TS GLORIA	21	13	11	138	79	7	496	331	3			
17.	TS HESTER	34	17	9	198	28	5	300	52	1			
18.	TY IRMA	14	12	15	92	44	12	134	31	8	154	67	4
19.	TY JUDY	19	12	18	127	51	14	242	131	10	346	185	6
20.	TS KIT	32	16	21	165	84	18	231	134	10	295	210	7
21.	TY LOLA	13	9	34	54	40	30	112	79	26	134	88	17
22.	TY MAMIE	25	14	18	182	68	14	386	143	10	722	327	6
23.	TS NINA	19	16	35	120	94	31	240	212	27	382	340	22
24.	TY ORA	19	14	21	124	99	17	314	239	11	460	391	5
25.	TD-26	40	10	7	218	22	4						
26.	TD-27	38	30	6	175	168	3						
27.	TY PHYLLIS	22	13	28	132	86	24	263	198	20	436	377	15
28.	ST RITA	15	10	51	107	60	47	214	114	43	301	157	39
29.	TS TESS	29	21	20	108	53	16	194	127	12	367	237	8
30.	TD-32	50	33	12	133	108	9	401	349	5	973	871	1
31.	TY VIOLA	19	10	29	96	51	25	269	172	21	434	338	17
32.	TS WINNIE	34	16	12	238	81	8	614	274	4			
ALL FORECASTS		21	13	696	127	75	574	271	179	435	410	297	304

JTWC

TABLE 4-2. ANNUAL MEAN FORECAST ERRORS FOR THE WESTERN NORTH PACIFIC.

	24-HR		48-HR		72-HR	
YEAR	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1970	104	-	190	-	279	-
1971	111	64	212	118	317	177
1972	117	72	245	146	381	210
1973	108	74	197	134	253	162
1974	120	78	226	157	348	245
1975	138	84	288	181	450	290
1976	117	71	230	132	338	202
1977	148	83	283	157	407	228
1978	127	75	271	179	410	297

JTWC

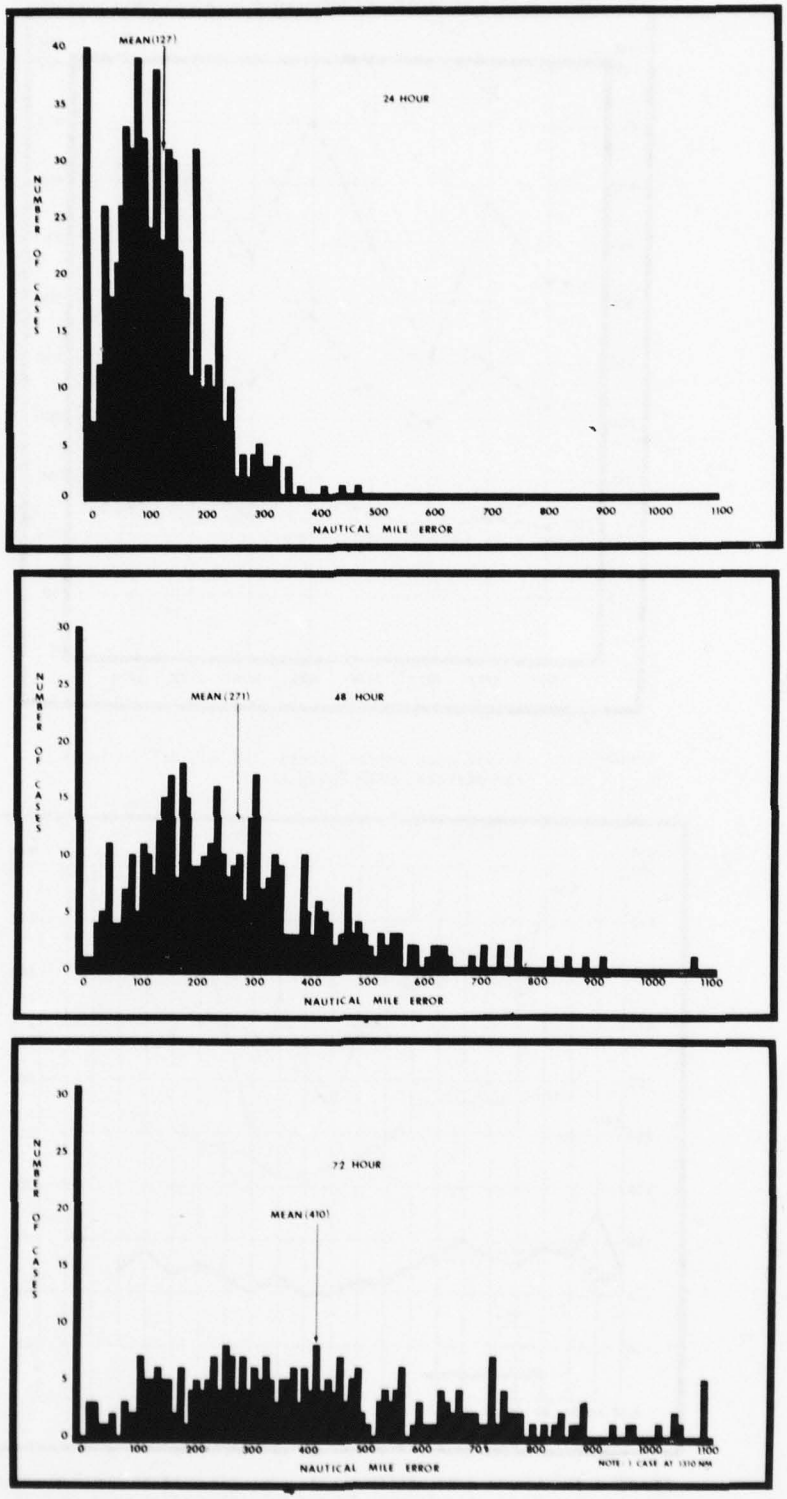


FIGURE 4-1. Frequency distribution of 1978 24-, 48-, and 72-hour forecast vector errors for all significant tropical cyclones in the western North Pacific.

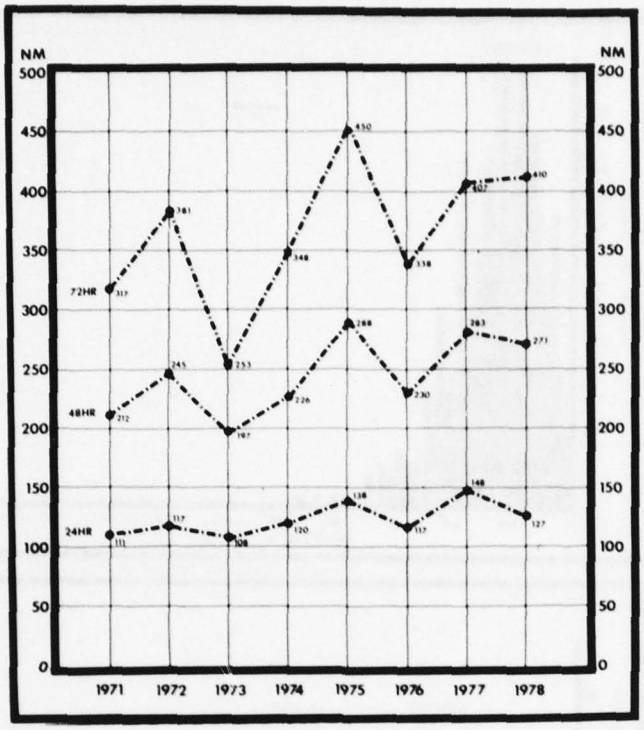


FIGURE 4-2. Annual mean vector errors (nm) for all cyclones in the western North Pacific.

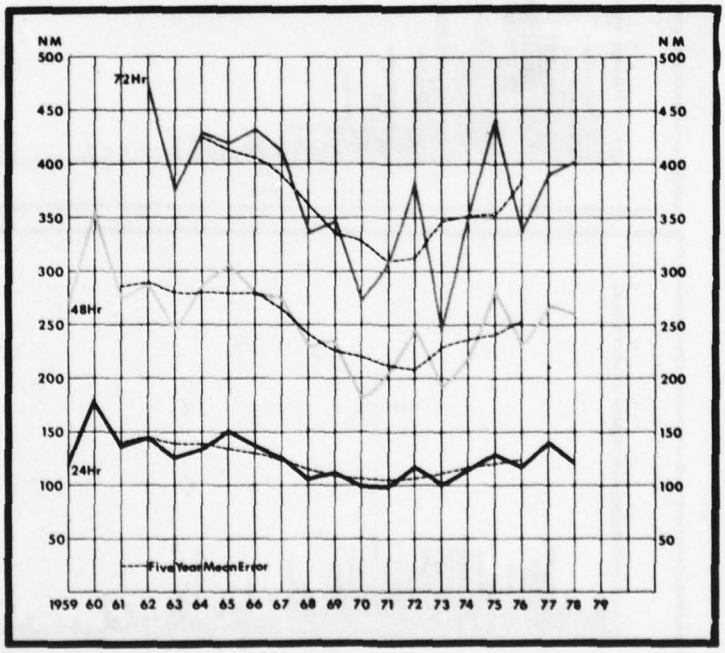


FIGURE 4-3. Annual mean vector errors (nm) for western North Pacific typhoons only when best track intensities were greater than 34 knots at time of verification.

Intensity verification statistics for all significant, tropical cyclones in the western North Pacific area are depicted in Figures 4-4 and 4-5. The average absolute magnitude of the intensity error as well as the intensity bias (algebraic average) are graphically depicted. An analysis of the errors indicates that JTWC intensity forecasts often lag the true intensity; in an intensifying situation, JTWC underforecasts, and in a weakening situation, JTWC overforecasts thereby causing large average magnitude error but small average bias. Objective intensity forecasting aids verification is also depicted in Figures 4-4 and 4-5. (An explanation of the objective forecasting aids can be found in this chapter, Section 2 - Comparison Of Objective Techniques.) It is interesting to note that the objective intensity forecasting aids consistently overforecast by approximately 10 knots.

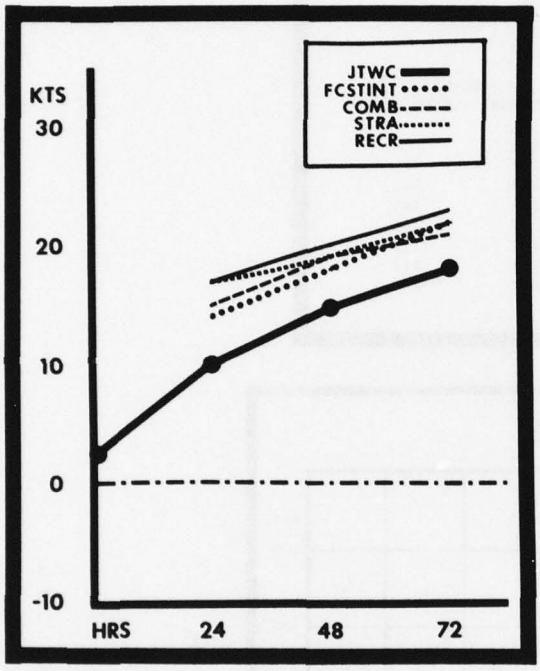


FIGURE 4-4. Comparison of average intensity errors (magnitude) for all cyclones in the western North Pacific.

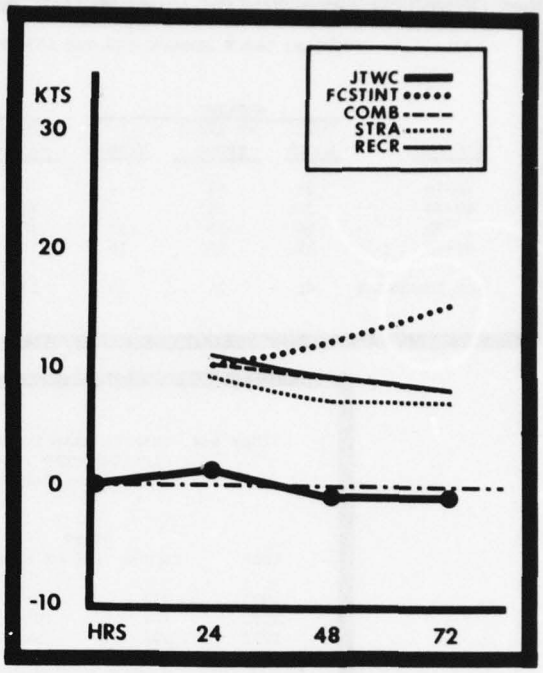


FIGURE 4-5. Comparison of average intensity errors (biases) for all cyclones in the western North Pacific.

b. North Indian Ocean Area

Forecast postions at warning times and 24- and 48-hour valid times were verified by the same methods used for the western North Pacific area verification. Table 4-3 is the forecast error summary for the four significant tropical cyclones in the North Indian Ocean area. Table 4-4 contains the annual average of forecast errors back through 1971. Vector errors are plotted in Figure 4-6.

Forecast intensities were not verified.

TABLE 4-3. FORECAST ERROR SUMMARY FOR THE 1978 NORTH INDIAN OCEAN SIGNIFICANT TROPICAL CYCLONES.

	WARNING			24 HOUR			48 HOUR		
CYCLONE	POSIT ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# WRNGS
18-78	55	51	4	88	41	3	78	45	1
19-78	35	25	7	203	183	3			
20-78	54	25	12	165	101	9	205	102	5
21-78	31	18	16	104	62	13	213	147	11
ALL FORECASTS	41	25	39	133	86	28	202	128	17

JTWC

TABLE 4-4. ANNUAL MEAN FORECAST ERRORS FOR THE NORTH INDIAN OCEAN (THE ARABIAN SEA WAS NOT INCLUDED PRIOR TO 1975).

	24-HR		48-HR	
YEAR	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1971	232	-	410	-
1972	224	101	292	112
1973	182	99	299	160
1974	137	81	238	146
1975	145	99	228	144
1976	138	108	204	159
1977	122	94	292	214
1978	133	86	202	128

JTWC

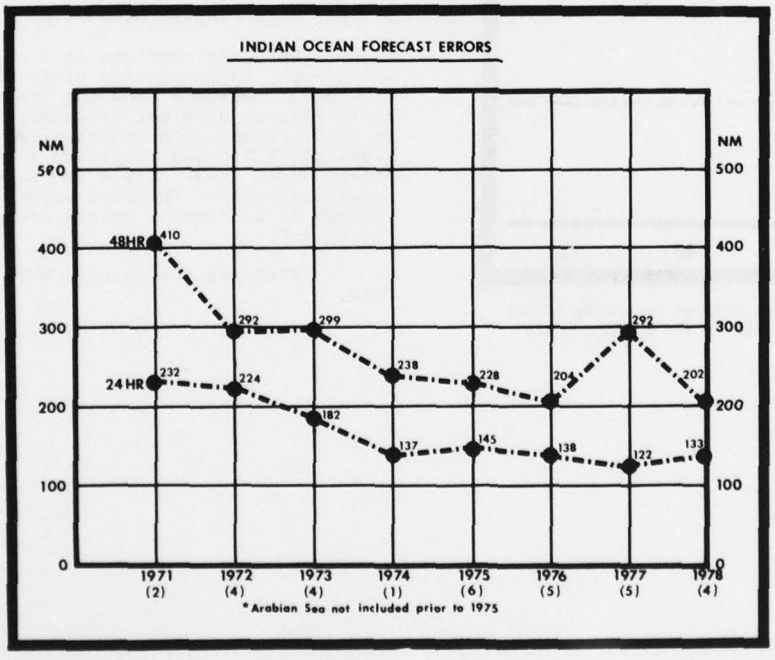


FIGURE 4-6. Annual mean vector errors (nm) for all cyclones in the North Indian Ocean.

2. COMPARISON OF OBJECTIVE TECHNIQUES

a. General

Objective techniques employed by JTWC are divided into four main categories: (1) climatological and analog techniques; (2) extrapolation; (3) steering techniques; and, (4) a dynamical model. The analog technique provides three movement forecasts, one for straight moving cyclones, one for recurving cyclones and one combining the tracks of straight, recurving and cyclones that do not meet the criteria of straight or recurving analogs. All techniques were executed using the operational data available at the warning time.

b. Description of Objective Techniques

(1) TYFN75 - Analog program which scans history tapes for cyclones similar (within a specified acceptance envelope) to the current cyclone. Three 24-, 48-, and 72-hour position and intensity forecasts are provided.

(2) MOHATT 700/500 - Steering program which advects a point vortex on a preselected analysis and smoothed prognostic fields at designated levels in 6-hour time steps through 72 hours. Utilizing the previous 12-hour history position, MOHATT computes the 12-hour forecast error and applies a bias correction to the forecast position.

(3) TCM - Tropical Cyclone Forecast Model is a coarse mesh (220 km) PE Model, with the digitized storm warning position bogused at the 850 mb level of the FNWC Global Band Analysis utilizing wind and temperature fields. Boundary conditions permit no mass transfer across north or south walls, and east/west boundaries are cyclical.

(4) FCSTINT - Intensity forecast program which utilizes statistical regression equations to provide 24-, 48-, and 72-hour forecast intensities.

(5) 12-HR EXTRAPOLATION - A track through current warning position and 12-hour old preliminary best track position is linearly extrapolated to 24 and 48 hours.

(6) HPAC - Mean 24 and 48 hour forecast positions are derived by averaging the 24 and 48 hour positions from the 12-HR EXTRAPOLATION track and a track based on climatology.

(7) INJAH74 - Analog program for North Indian Ocean. Similar to TYFN75, except tracks are not segregated.

(8) TYAN - An updated analog program which combines TYFN75, INJAH74, and other analog programs for the remaining northern/southern Pacific Ocean areas and the South Indian Ocean.

(9) CYCLOPS - An updated version of MOHATT program which has the capability to select steering forecasts at the 1000, 850, 700, 500, 400, 300 and 200 mb levels.

c. Testing and Results

A comparison of selected techniques is included in Table 4-5 for all western Pacific cyclones and Table 4-6 for Indian Ocean cyclones. In Tables 4-5 and 4-6 "X-AXIS" refers to techniques listed horizontally across the top, while "Y-AXIS" refers to techniques listed vertically. The example in Table 4-5 compares COMB to MH70. In the 407 cases available for comparison the average 24-hour vector error for COMB was 139 nm, while that for MH70 was 140 nm. The difference of 1 nm is shown in the lower right. (Differences are not always exact due to computational round off.)

TABLE 4-5.

24-HOUR

	JTWC		STRA		RECR		COMB		MH70		MH50		TCMW		TCMD		XTRP		HPAC	
JTWC	574	127																		
	127	0																		
STRA	462	120	465	147																
	147	27	147	0																
RECR	509	126	442	148	511	141														
	140	14	138	-10	141	0														
COMB	516	125	445	147	496	140	519	137												
	136	11	134	-12	137	-2	137	0												
MH70	440	126	373	150	402	143	407	139	442	140										
	140	14	134	-15	141	-1	140	1	140	0										
MH50	374	125	318	148	341	143	347	139	375	135	375	145								
	145	20	140	-7	147	3	145	7	145	10	145	0								
TCMW	128	122	111	150	120	135	116	137	99	138	97	147	128	175						
	175	53	156	6	172	37	175	38	180	42	182	35	175	0						
TCMD	117	121	102	149	110	135	111	141	92	136	89	142	82	172	117	237				
	237	116	213	64	235	100	236	96	251	115	253	111	251	79	237	0				
XTRP	564	127	458	147	506	140	513	137	435	140	371	146	126	173	117	237	567	137		
	137	11	128	-17	137	-2	137	0	137	-2	134	-11	129	-43	130	-106	137	0		
HPAC	538	127	444	147	486	141	492	137	423	139	360	143	123	170	115	231	541	138	541	137
	137	9	128	-18	136	-4	136	-1	135	-3	133	-9	127	-42	129	-100	137	0	137	0

NUMBER OF CASES | X-AXIS TECHNIQUE ERROR | Y-AXIS TECHNIQUE ERROR | ERROR DIFFERENCE Y-X

48-HOUR

	JTWC		STRA		RECR		COMB		MH70		MH50		TCMW		TCMD		XTRP		HPAC	
JTWC	435	271																		
	271	0																		
STRA	368	262	388	304																
	301	39	304	0																
RECR	389	264	368	310	405	268														
	262	-1	267	-42	268	0														
COMB	390	263	369	303	394	265	410	254												
	251	-11	252	-50	256	-8	254	0												
MH70	325	270	307	316	314	281	316	264	343	293										
	289	18	284	-31	293	12	291	27	293	0										
MH50	278	269	264	313	267	283	271	265	294	290	294	288								
	288	19	290	-23	293	10	289	24	288	-1	288	0								
TCMW	89	262	85	295	86	256	81	243	71	269	69	270	92	284						
	284	22	275	-19	287	31	284	41	302	32	304	35	284	0						
TCMD	84	266	80	308	83	260	82	251	69	260	67	263	56	298	87	363				
	362	96	354	47	364	104	362	111	385	125	385	122	370	72	363	0				
XTRP	425	270	374	302	393	264	397	253	329	291	285	288	88	281	85	362	438	294		
	291	21	289	-12	293	29	291	39	301	10	297	8	286	5	303	-59	294	0		
HPAC	394	276	354	305	367	266	368	257	314	290	271	287	86	283	82	364	406	298	407	263
	262	-13	247	-57	258	-6	256	0	260	-29	257	-29	245	-37	257	-106	263	-34	263	0

JTWC - OFFICIAL JTWC FORECAST
STRA - STRAIGHT (TYPN 75)
RECR - RECURVE (TYPN 75)
COMB - COMBINED (TYPN 75)
MH70 - MOHATT 700-MB PROG
MH50 - MOHATT 500-MB PROG
TCMW - TROPICAL CYCLONE MODEL (SAME WARNING)
TCMD - TROPICAL CYCLONE MODEL (SAME DATA)
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIMATOLOGY

72-HOUR

	JTWC		STRA		RECR		COMB		MH70		MH50		TCMW		TCMD	
JTWC	304	410														
	410	0														
STRA	258	391	306	422												
	412	21	422	0												
RECR	275	403	288	429	320	359										
	341	-61	350	-79	359	0										
COMB	276	400	292	421	313	358	324	334								
	325	-74	325	-95	336	-21	334	0								
MH70	211	412	229	431	458	373	235	342	255	449						
	446	34	442	11	233	85	454	112	449	0						
MH50	183	407	200	433	203	378	204	341	220	434	221	430				
	438	32	430	-1	433	55	427	86	429	-4	430	0				
TCMW	60	414	62	402	63	356	60	339	51	414	49	430	68	458		
	452	38	447	45	466	110	452	113	495	81	490	59	458	0		
TCMD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

24-HOUR

	JTWC	INJA	MH7Ø	MH5Ø	XTRP	HPAC
JTWC	28 133 133 0					
INJA	20 136 117 -18	23 132 132 0				
MH7Ø	9 128 222 95	8 122 245 123	10 219 219 0			
MH5Ø	7 131 251 120	6 117 282 165	7 236 251 15	7 251 251 0		
XTRP	25 119 137 18	22 128 159 31	9 203 133 -69	6 231 109 -123	28 151 151 0	
HPAC	22 117 114 -1	18 119 124 5	6 246 134 -111	3 331 105 -225	24 144 123 -20	24 123 123 0

NUMBER OF CASES	X-AXIS TECHNIQUE ERROR
Y-AXIS TECHNIQUE ERROR	ERROR DIFFERENCE Y-X

48-HOUR

	JTWC	INJA	MH7Ø	MH5Ø	XTRP	HPAC
JTWC	17 202 202 0					
INJA	11 194 202 8	14 231 231 0				
MH7Ø	3 99 149 49	3 270 263 -6	4 224 224 0			
MH5Ø	3 168 246 78	3 310 270 -39	3 279 186 -93	4 243 243 0		
XTRP	16 200 244 44	13 214 298 85	3 149 304 155	3 246 330 84	19 286 286 0	
HPAC	15 205 191 -13	12 211 225 13	2 82 88 6	2 287 201 -85	18 276 221 -54	18 221 221 0

JTWC - OFFICIAL JTWC FORECAST
INJA - ANALOG
MH7Ø - MOHATT 700-MB PROG
MH5Ø - MOHATT 500-MB PROG
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIMATOLOGY

TABLE 4-6.

CHAPTER V – RESEARCH & DEVELOPMENT SUMMARY

1. GENERAL

Part of the mission of the Joint Typhoon Warning Center is to conduct applied tropical cyclone research as time and resources permit; the objective of this research being the improvement of operational forecasts. This year, due to the installation of the Naval Environmental Display Station (NEDS), the JTWC staff devoted considerable time and effort in converting and updating operational programs and streamlining operational procedures for compatibility with the NEDS. The following abstracts summarize the year's research and development projects completed or still in progress.

2. TROPICAL CYCLONE MINIMUM SEA LEVEL PRESSURE - MAXIMUM SUSTAINED WIND RELATIONSHIP

(Shewchuk, J. D and Lubeck, O. M., FLEWEACEN/JTWC)

The pressure-wind relationship developed by Atkinson and Holliday, Tropical Cyclone Minimum Sea Level Pressure - Maximum Sustained Wind Relationship for Western North Pacific (FLEWEACEN TECH NOTE: JTWC 75-1), is a primary tropical cyclone intensity determination tool used for JTWC operations. The current research is an attempt to update and refine the Atkinson and Holliday study using the original data plus new data from 1975 to present. The current regression equation will be re-evaluated using new cases as an independent data set.

3. EQUIVALENT POTENTIAL TEMPERATURE/MINIMUM SEA LEVEL PRESSURE RELATIONSHIPS TO FORECASTING TROPICAL CYCLONE INTENSIFICATION

(Hassebrock, A. W. and Dunnavan, G., FLEWEACEN/JTWC)

The relationship between equivalent potential temperature at 700 mb in the center of developing tropical cyclones and associated intensity changes was first explored by Sikora (ATR 1975) with a follow-on study by Milwer (ATR 1976). These two studies produced conflicting results, but a subsequent study by Hassebrock (ATR 1977) showed that there was a relationship between changes in equivalent potential temperature and subsequent changes in tropical cyclone intensity. The tropical cyclones of 1976-78 have been used to evaluate the relationship and there is evidence that the techniques developed by Hassebrock have some merit. In order to widen the data base, the techniques will be evaluated for the 1979 tropical cyclone season, and also for tropical cyclones occurring prior to 1976.

4. OBJECTIVE TROPICAL CYCLONE INITIAL POSITIONING WITH A WEIGHTED LEAST SQUARES ALGORITHM

(Lubeck, O. M. and Shewchuk, J. D., FLEWEACEN/JTWC)

Recent studies indicate tropical cyclone forecast errors through 72 hours can be reduced by more accurate initial warning position estimates. This study is an attempt to develop an objective and standardized method of determining initial position based on all available fix information and their respective accuracies. The method employed is a least squares fit to the available fix data with a weighting scheme which is inversely proportional to the stated fix accuracies. This method can also be extended to objectively determine tropical cyclone best tracks.

5. ESTABLISHMENT OF THE JTWC TROPICAL CYCLONE DATA BASE

(Curry, W. T., FLEWEACEN/JTWC)

A data base of climatological data related to each tropical cyclone in the western North Pacific, Arabian Sea and Bay of Bengal from 1966 through 1978 is being established on FNWC computer mass storage systems. Included are 6-hour best track positions (intensities, direction and speed of movement); 24-, 48-, 72-hour objective technique forecasts and official forecasts of JTWC; and tropical cyclone fix data (position, intensities, platform, etc.). This data will be maintained on disk and tape files at FNWC Monterey, California and updated annually.

6. NEDS/COMPUTER APPLICATIONS

(Staff, FLEWEACEN/JTWC)

The advent of the Naval Environmental Display Station (NEDS) at FLEWEACEN Guam has provided the JTWC access to the large general purpose computer system at FNWC. Impact of the NEDS on operations at the JTWC has been studied and a NEDS implementation plan has been drawn up which includes existing operational requirements as well as future capabilities allowed by the NEDS.

Considerable automation of time consuming computational tasks has been accomplished with computer programs written to execute at FNWC. Existing post-analysis programs originally coded to execute on FWC Guam's CDC 3100 computer have been converted to execute at FNWC. In addition, numerous new features have been added to the programs.

NEDS graphics capability is being developed to depict forecast tracks from objective techniques. Establishment of a tropical cyclone data base on FNWC mass storage devices has been initiated and contract work has resulted in conversion of JTWC's objective techniques to execute on FNWC computers. Considerable effort has been expended to evaluate and monitor the program conversions.

7. BASIC STREAMLINE ANALYSIS AND TROPICAL CYCLONE FORECASTING TECHNIQUES GUIDE

(Guay, G., FLEWEACEN/JTWC)

A case study taken from an active tropical cyclone period has been initiated. The study will be worked into a guide to train new assignees in streamline analysis and the use of all available tropical cyclone forecasting techniques. The guide will also be used in STORMEX training (training scenarios for Det 4 HQAWS, 54 WRS, JTWC and AJTWC personnel).

8. STATISTICAL EVALUATION OF JTWC OBJECTIVE TECHNIQUES

(Lubeck, O. M., FLEWEACEN/JTWC)

Present forecast aids used by the typhoon duty officer include many objective techniques. Little information beyond annual average errors, however, is known about the techniques. A statistical evaluation is being accomplished in hopes of finding systematic biases and confirming/denying previous subjective determinations.

9. JTWC FORECAST CONFIDENCE STATEMENTS

(Hassebrock, A. W., Ihli, C. B., Jr. and Lubeck, O. M., FLEWEACEN/JTWC)

JTWC developed and implemented procedures for computing objective, probability confidence statements as a result of requirements stated at the 1978 Tropical Cyclone Conference. Forecast error probabilities were appended to Prognostic Reasoning Messages during the 1978 season. An evaluation of these confidence statements and Strike Probability Program (STRIKP) information (provided by NEPRF and FNWC Monterey) was performed and published in the 1979 Pacific Command Tropical Cyclone Conference Proceedings Report.

10. THE TRANSITIONING OF TROPICAL CYCLONES TO EXTRATROPICAL CYCLONES

(Guard, C. P., FLEWEACEN/JTWC and Brand, Samson, NEPRF)

Results of the examination of the post-recurvature transition of tropical cyclones to extratropical cyclones were published as NAVENVPREDRSCHFAC Technical Report TR 78-02, Extratropical Storm Evolution from Tropical Cyclones in the Western North Pacific Ocean in July 1978. Capt. Guard, now of AFGWC, Offutt AFB, NE, presented further results at the 12th Technical Conference on Hurricanes and Tropical Meteorology in April 1979 at New Orleans, LA. His report was entitled The Intensity of Recurving Western North Pacific Tropical Cyclones: A New Look. During 1979, the JTWC staff will be evaluating the rules-of-thumb generated from the research results.

ANNEX A – TROPICAL CYCLONE TRACK DATA

1. WESTERN NORTH PACIFIC CYCLONE TRACK DATA

TROPICAL STORM NADINE

(January)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
160106	7.5	164.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
160706	7.0	164.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
161206	7.0	163.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
161712	6.0	163.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
161806	8.5	162.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
162006	9.0	162.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
162106	9.2	162.0	30	9.3	161.7	25.	19.	-5.	10.4	159.7	30.	129.	0.	10.2	155.9	35.	342.	-5.	8.6	150.8	40.	702.	-5.
162712	9.5	162.4	30	9.3	161.7	25.	43.	-5.	10.1	161.2	30.	17.	0.	10.2	158.7	35.	186.	-5.	9.0	154.8	40.	566.	-10.
162806	9.8	162.9	30	9.3	161.7	25.	77.	-5.	10.4	160.7	30.	25.	-5.	10.0	158.3	35.	239.	-10.	8.9	154.5	40.	654.	-15.
163006	10.2	162.8	30	10.2	163.1	25.	18.	-5.	11.3	161.3	30.	21.	-5.	10.6	157.3	35.	280.	-10.	9.5	153.4	40.	779.	-15.
163106	10.3	161.9	30	10.5	161.7	25.	32.	-5.	10.3	157.6	30.	220.	-10.	9.8	153.5	35.	325.	-10.	9.7	149.4	40.	1092.	-15.
163712	10.2	161.5	30	10.3	161.3	30.	13.	0.	10.4	157.1	35.	291.	-5.	10.3	153.0	40.	585.	-10.	10.7	149.0	45.	1230.	-15.
163806	10.1	161.0	35	10.0	160.7	30.	19.	-5.	9.8	156.7	40.	311.	-5.	10.2	152.4	45.	707.	-10.	10.8	148.1	45.	1420.	-15.
164006	11.0	161.1	35	11.1	161.5	35.	24.	0.	12.0	158.8	40.	196.	-5.	12.4	154.8	45.	603.	-10.	12.2	150.8	50.	1396.	0.
164106	11.4	161.1	40	11.6	161.2	35.	19.	-5.	12.2	157.4	45.	230.	0.	12.8	154.0	50.	769.	-5.	0.0	0.0	0.	-0.	0.
164712	12.7	160.6	40	12.3	160.7	40.	25.	0.	14.3	157.4	45.	223.	-5.	13.6	153.7	50.	918.	-10.	0.0	0.0	0.	-0.	0.
164806	13.0	160.1	45	13.5	159.9	45.	13.	0.	15.2	156.9	50.	342.	-5.	13.8	153.2	50.	1079.	-10.	0.0	0.0	0.	-0.	0.
165006	14.9	160.1	45	14.2	160.1	45.	12.	0.	17.2	160.2	40.	239.	-15.	20.5	162.7	35.	589.	-15.	0.0	0.0	0.	-0.	0.
165106	15.2	160.6	45	15.1	161.0	45.	24.	0.	18.3	164.0	35.	139.	-20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
165712	15.9	161.4	50	16.0	161.4	45.	8.	-5.	19.1	164.4	45.	230.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
165806	16.5	162.7	55	16.8	162.7	55.	8.	0.	18.9	167.1	45.	222.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
166006	17.1	164.3	55	17.4	164.2	55.	19.	0.	19.6	170.3	45.	192.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
166106	17.8	166.3	55	17.7	166.1	55.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
166712	18.8	168.6	60	18.6	168.6	55.	59.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
166806	20.2	170.8	60	20.3	170.7	60.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
167006	21.6	173.2	50	21.6	173.0	50.	11.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	AVG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	23.	185.	568.	980.
AVG RIGHT ANGLE ERROR	15.	109.	381.	708.
AVG INTENSITY MAGNITUDE ERROR	2.	7.	9.	11.
AVG INTENSITY BIAS	-2.	-7.	-9.	-11.
NUMBER OF FORECASTS	20	16	12	8

TYPHOON OLIVE

(April)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
150006	3.5	149.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
150606	3.8	147.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
151212	4.3	146.2	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
151818	4.7	144.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
160006	5.0	143.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
160606	5.3	142.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
161212	5.6	142.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
161818	5.8	141.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
162006	6.2	140.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
162606	6.8	139.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
163212	7.4	137.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
163818	7.9	136.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
164006	8.2	135.2	30	8.5	135.0	30.	13.	0.	10.5	130.3	40.	59.	0.	12.9	125.6	55.	88.	-5.	13.0	121.5	65.	105.	0.
164606	8.7	133.9	30	8.9	134.0	30.	13.	0.	11.4	129.8	45.	90.	0.	13.5	125.1	55.	138.	5.	14.0	121.3	50.	151.	5.
165212	9.0	132.8	30	9.2	132.9	30.	21.	0.	11.2	128.4	45.	70.	-5.	12.9	124.5	55.	137.	10.	14.2	120.5	50.	156.	0.
165818	9.4	131.2	35	9.2	131.5	35.	21.	0.	10.6	126.5	50.	32.	-5.	12.7	122.6	55.	99.	10.	14.3	118.9	55.	112.	0.
170006	9.6	129.9	40	9.7	129.5	35.	24.	-5.	11.4	124.5	40.	8.	-20.	12.5	120.7	40.	72.	-5.	14.0	116.8	50.	26.	-10.
170606	10.0	128.6	45	10.1	128.4	45.	13.	0.	11.8	123.2	45.	13.	-5.	12.8	119.3	40.	42.	-5.	14.5	115.6	50.	12.	-15.
171212	10.4	127.4	50	10.4	127.3	50.	6.	0.	12.0	122.4	45.	30.	0.	13.2	118.5	40.	39.	-10.	15.0	114.9	50.	12.	-20.
171818	10.8	126.0	55	10.9	126.2	50.	13.	-5.	12.3	122.0	40.	71.	-5.	13.5	118.4	45.	76.	-10.	15.1	115.6	50.	76.	-30.
172006	11.3	124.8	60	11.3	124.8	60.	12.	0.	12.2	121.4	40.	116.	-5.	13.9	117.6	45.	70.	-15.	16.0	114.1	50.	29.	-35.
172606	11.9	123.4	50	11.5	123.2	50.	27.	0.	12.8	118.9	45.	30.	0.	14.2	115.0	50.	35.	-15.	15.6	111.2	55.	124.	-30.
173212	12.4	122.1	45	12.3	122.2	45.	8.	0.	13.4	117.7	45.	13.	-5.	14.6	113.8	50.	65.	-20.	16.1	110.1	55.	180.	-30.
173818	12.8	120.9	45	12.9	121.0	45.	8.	0.	14.4	116.4	50.	63.	-5.	15.7	112.8	55.	90.	-25.	17.1	109.3	60.	225.	-25.
174006	13.2	119.7	45	13.2	119.6	45.	6.	0.	14.8	114.7	55.	113.	-5.	16.2	110.8	60.	102.	-25.	17.4	107.3	60.	357.	-25.
174606	13.3	118.4	45	13.1	118.8	50.	12.	5.	13.5	114.5	60.	80.	-5.	15.4	110.3	65.	177.	-20.	18.0	107.2	65.	419.	-20.
175212	13.5	117.9	50	13.5	117.8	55.	8.	5.	14.3	113.9	65.	65.	-5.	16.6	109.5	65.	252.	-20.	0.0	0.0	0.	-0.	0.
175818	13.8	117.1	55	13.5	116.9	55.	13.	0.	14.4	112.6	65.	116.	-15.	16.8	108.1	90.	340.	-65.	0.0	0.0	0.	-0.	0.
180006	13.8	116.4	60	13.9	116.4	60.	6.	0.	15.1	113.3	65.	51.	-20.	16.9	110.1	70.	228.	-15.	17.8	107.5	70.	665.	-5.
180606	14.3	115.6	65	14.2	115.5	65.	8.	0.	15.5	112.5	75.	87.	-10.	16.8	110.1	80.	285.	-5.	18.3	107.9	80.	745.	10.

822122	14.8	114.9	70	14.8	114.7	70.	12.	0.	16.5	111.8	75.	80.	-10.	18.2	109.4	80.	383.	-5.	20.1	107.4	80.	886.	15.
822182	15.3	114.3	80	15.5	114.2	80.	13.	0.	18.0	111.7	80.	87.	-5.	20.6	110.2	80.	398.	-20.	0.0	0.0	0.	-0.	0.
823002	15.9	113.6	85	16.0	113.5	85.	8.	0.	18.4	111.3	85.	125.	0.	21.0	110.4	85.	464.	-10.	23.4	112.1	40.	847.	-15.
823062	16.4	113.2	85	16.7	113.0	85.	21.	0.	19.1	111.2	85.	180.	0.	21.7	111.1	80.	940.	-10.	0.0	0.0	0.	-0.	0.
823122	17.0	113.1	85	17.0	112.8	85.	17.	0.	19.2	111.4	85.	261.	0.	21.7	110.1	75.	505.	10.	24.1	110.3	65.	726.	20.
823182	17.7	113.2	85	17.4	113.2	85.	18.	0.	19.7	113.5	80.	219.	0.	22.3	116.1	70.	516.	15.	25.0	120.2	65.	721.	25.
824002	18.4	113.5	85	18.5	113.4	85.	8.	0.	21.7	116.1	80.	157.	5.	24.5	120.3	70.	417.	15.	0.0	0.0	0.	-0.	0.
824062	19.1	114.5	85	19.1	114.5	85.	0.	0.	21.4	119.0	80.	101.	10.	23.3	125.0	65.	252.	15.	0.0	0.0	0.	-0.	0.
824122	19.7	116.0	85	19.7	115.7	85.	17.	0.	21.9	120.8	75.	135.	10.	23.9	127.2	65.	243.	20.	0.0	0.0	0.	-0.	0.
824182	20.2	117.3	80	20.2	117.3	80.	0.	0.	22.4	123.2	65.	129.	5.	24.5	130.5	55.	169.	15.	0.0	0.0	0.	-0.	0.
825002	20.7	118.7	75	20.9	118.7	75.	12.	0.	23.1	125.7	60.	115.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
825062	21.2	120.8	70	21.4	120.2	70.	35.	0.	23.8	127.0	50.	150.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
825122	21.5	123.2	65	21.5	123.7	65.	28.	0.	23.6	130.0	45.	143.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
825182	21.7	125.4	60	21.8	125.9	60.	28.	0.	23.8	137.0	45.	205.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826002	22.0	127.4	55	22.0	127.5	55.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826062	22.5	129.5	50	22.2	129.3	50.	21.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826122	22.9	131.5	45	22.8	131.3	45.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826182	23.3	133.3	40	23.3	133.8	40.	27.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	#RNG	24-HR	48-HR	72-HR	#RNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	14.	100.	224.	328.	14.	100.	224.	328.
AVG RIGHT ANGLE ERROR	10.	62.	129.	215.	9.	62.	124.	215.
AVG INTENSITY MAGNITUDE ERROR	1.	5.	14.	17.	1.	5.	14.	17.
AVG INTENSITY BIAS	0.	-3.	-6.	-9.	0.	-3.	-6.	-9.
NUMBER OF FORECASTS	36	32	28	20	33	32	28	20

TROPICAL STORM POLLY

(June)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
813122	20.3	138.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
813182	21.2	137.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814002	22.2	136.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814062	23.0	135.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814122	23.8	134.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814182	24.3	133.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815002	24.1	133.1	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815062	23.7	132.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815122	23.3	132.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815182	22.8	132.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816002	22.4	132.4	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816062	23.0	132.4	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816122	23.5	131.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816182	23.9	129.7	30	23.7	129.4	30.	20.	0.	25.5	124.7	40.	124.	15.	28.3	123.5	45.	181.	5.	30.9	126.7	35.	37.	-15.
817002	24.4	128.9	30	24.3	128.3	30.	33.	0.	28.0	124.0	40.	167.	10.	32.2	127.0	40.	285.	0.	35.7	133.0	35.	378.	-10.
817062	24.6	128.2	30	25.0	128.2	30.	24.	0.	27.4	126.0	30.	90.	-5.	29.6	124.7	30.	111.	-15.	0.0	0.0	0.	-0.	0.
817122	25.0	127.4	25	24.9	127.6	30.	12.	5.	27.1	125.1	30.	64.	-5.	29.2	124.0	30.	125.	-20.	0.0	0.0	0.	-0.	0.
817182	25.4	127.0	25	25.4	126.8	30.	11.	5.	28.0	124.7	30.	99.	-10.	30.8	125.1	25.	78.	-25.	0.0	0.0	0.	-0.	0.
818002	26.1	126.3	30	26.5	125.8	30.	36.	0.	29.7	124.4	30.	150.	-10.	31.6	125.1	25.	112.	-20.	0.0	0.0	0.	-0.	0.
818062	25.9	126.1	35	25.8	126.0	35.	8.	0.	28.8	124.9	45.	72.	0.	32.3	126.4	35.	127.	-5.	0.0	0.0	0.	-0.	0.
818122	26.5	126.1	35	26.6	126.0	35.	8.	0.	29.3	125.7	45.	38.	-5.	32.9	128.2	40.	114.	10.	0.0	0.0	0.	-0.	0.
818182	26.9	126.1	40	27.0	126.1	40.	6.	0.	30.5	126.6	50.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819002	27.5	126.0	40	27.4	126.0	40.	6.	0.	29.8	126.3	50.	119.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819062	28.2	126.1	45	27.9	126.1	45.	18.	0.	31.7	127.4	50.	90.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819122	29.1	126.4	50	29.1	126.5	50.	5.	0.	33.0	128.7	45.	88.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819182	30.3	126.5	50	30.1	126.8	50.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820002	31.5	127.3	45	31.7	127.2	45.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820062	32.5	128.9	40	32.5	128.4	45.	25.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820122	33.4	130.4	30	33.2	130.5	30.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	#RNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	16.	93.	139.	208.
AVG RIGHT ANGLE ERROR	10.	50.	93.	97.
AVG INTENSITY MAGNITUDE ERROR	1.	8.	13.	13.
AVG INTENSITY BIAS	1.	2.	-9.	-13.
NUMBER OF FORECASTS	16	12	8	2

AD-A070 904 FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER FP--ETC F/G 4/2
ANNUAL TYPHOON REPORT, 1978.(U)
1978 D R MORFORD, J K LAVIN

UNCLASSIFIED NL

2 OF 2
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END
8-79

TROPICAL STORM ROSE

(June)

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
021006Z	10.0	130.9	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
021006Z	10.1	129.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
021112Z	11.3	129.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
021118Z	10.0	128.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
022000Z	10.1	127.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
022006Z	10.0	127.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
022112Z	10.0	126.9	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
022118Z	10.0	125.6	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
023000Z	10.0	124.8	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
023006Z	10.1	124.0	40	10.5	124.1	35.	10.	-5.	10.2	121.5	05.	10.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
023012Z	10.0	123.4	40	10.5	123.5	40.	0.	0.	10.5	120.3	05.	220.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
023018Z	20.5	122.4	40	10.7	123.0	40.	10.	0.	10.5	120.1	05.	225.	40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
024000Z	21.9	122.5	35	21.3	122.5	35.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
024006Z	22.3	122.0	35	22.5	122.2	35.	32.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
024012Z	23.2	121.3	30	22.4	121.7	35.	21.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
024018Z	24.3	121.1	20	24.1	121.1	25.	16.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	17.	235.	0.	0.
AVG RIGHT ANGLE ERROR	21.	142.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	2.	35.	0.	0.
AVG INTENSITY BIAS	1.	35.	0.	0.
NUMBER OF FORECASTS	7	3	0	0

TROPICAL STORM SHIRLEY

(June)

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
026000Z	11.1	129.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
026006Z	11.2	128.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
026012Z	11.3	127.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
026018Z	11.3	126.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
027000Z	11.3	125.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
027006Z	11.3	124.1	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
027012Z	11.3	122.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
027018Z	11.1	121.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
028000Z	10.7	119.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
028006Z	10.4	117.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
028012Z	10.3	117.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
028018Z	10.8	117.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
029000Z	10.5	117.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
029006Z	10.8	116.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
029012Z	11.4	115.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
029018Z	12.1	113.6	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
030000Z	12.8	112.2	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
030006Z	13.3	110.7	35	13.4	111.3	35.	35.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
030012Z	13.5	109.3	35	13.4	109.5	45.	13.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
030018Z	14.1	108.1	30	13.7	108.1	30.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	24.	0.	0.	0.
AVG RIGHT ANGLE ERROR	15.	0.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	0.	0.	0.
AVG INTENSITY BIAS	3.	0.	0.	0.
NUMBER OF FORECASTS	3	0	0	0

TYPHOON TRIX

(July)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
71100Z	18.0	153.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71106Z	18.4	153.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71112Z	19.0	152.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71118Z	19.3	152.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71200Z	19.6	151.4	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71206Z	20.5	150.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71212Z	21.4	149.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71218Z	22.3	148.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71300Z	23.1	147.6	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
71306Z	23.5	146.5	30	23.7	146.7	25.	18.	-5.	26.8	142.7	35.	180.	0.	29.1	139.2	40.	329.	-10.	30.4	135.4	45.	488.	-20.
71312Z	23.8	145.4	30	24.5	145.5	25.	42.	-5.	27.2	141.7	35.	191.	-5.	28.7	137.4	40.	320.	-15.	30.4	133.3	45.	556.	-20.
71318Z	23.8	144.3	30	24.1	144.5	25.	21.	-5.	25.5	140.2	35.	88.	-10.	26.6	136.0	40.	228.	-20.	27.0	131.7	45.	483.	-20.
71400Z	23.6	143.3	35	24.3	143.3	25.	42.	-10.	25.5	139.0	35.	97.	-15.	26.5	134.7	40.	266.	-25.	26.8	130.1	45.	564.	-20.
71406Z	23.8	142.4	35	24.0	142.3	30.	13.	-5.	25.3	138.1	40.	110.	-10.	26.0	133.5	45.	310.	-20.	26.4	129.1	50.	629.	-20.
71412Z	24.0	141.6	40	23.9	141.7	30.	8.	-10.	24.6	137.7	40.	79.	-15.	25.2	133.2	45.	321.	-20.	25.4	128.3	50.	690.	-20.
71418Z	24.1	140.7	45	23.9	140.8	35.	11.	-10.	24.0	136.8	40.	77.	-20.	24.1	132.1	45.	381.	-20.	23.9	127.5	50.	769.	-15.
71500Z	24.0	139.7	50	24.2	140.0	35.	20.	-15.	24.6	136.5	45.	110.	-20.	24.7	132.6	50.	389.	-15.	24.7	128.1	55.	799.	-10.
71506Z	23.6	138.9	50	23.8	138.9	00.	12.	10.	24.3	135.0	05.	183.	0.	24.8	130.7	70.	515.	0.	24.7	126.3	75.	961.	15.
71512Z	23.4	138.3	55	23.5	137.9	00.	23.	5.	23.3	134.0	05.	232.	0.	23.7	129.7	70.	601.	0.	24.4	125.4	75.	1057.	20.
71518Z	23.2	137.9	60	23.3	137.8	00.	18.	0.	22.9	134.4	05.	239.	0.	23.4	130.2	70.	621.	5.	24.3	126.1	75.	1047.	20.
71600Z	22.9	137.6	65	22.8	137.1	00.	28.	-5.	22.2	134.7	05.	243.	0.	22.2	131.4	70.	627.	5.	22.2	127.8	75.	1018.	20.
71606Z	22.5	137.7	65	22.6	137.4	05.	13.	0.	22.6	137.9	15.	100.	5.	22.9	137.4	80.	372.	20.	22.3	134.6	80.	691.	25.
71612Z	22.1	138.0	65	22.1	138.2	05.	11.	0.	22.1	138.2	15.	134.	5.	22.4	136.9	80.	457.	25.	22.3	134.6	80.	667.	25.
71618Z	21.9	138.6	65	21.8	138.3	05.	18.	0.	21.8	138.3	15.	191.	10.	22.4	138.0	80.	434.	25.	22.8	136.0	80.	569.	30.
71700Z	22.1	139.1	65	22.0	138.8	05.	18.	0.	22.7	139.8	15.	166.	10.	24.7	141.2	80.	272.	25.	27.0	141.4	80.	162.	35.
71706Z	22.4	139.8	70	22.5	139.8	10.	6.	0.	24.6	141.0	40.	102.	30.	27.7	140.9	95.	300.	40.	30.7	139.8	95.	157.	55.
71712Z	22.7	140.6	70	23.2	140.4	10.	34.	0.	26.3	141.3	40.	205.	35.	29.4	140.4	95.	301.	40.	32.1	139.2	95.	164.	55.
71718Z	23.0	141.5	65	22.9	141.4	10.	8.	5.	25.5	143.4	15.	108.	20.	28.5	142.8	80.	101.	30.	31.4	141.6	80.	180.	45.
71800Z	23.5	142.7	65	23.7	142.3	10.	25.	5.	27.0	143.7	15.	134.	20.	30.0	143.2	80.	69.	35.	32.5	143.0	80.	337.	45.
71806Z	24.4	144.0	60	24.4	144.2	05.	11.	5.	27.2	147.5	00.	69.	5.	31.2	147.2	55.	280.	15.	34.0	147.6	50.	663.	15.
71812Z	25.2	144.9	55	25.6	145.1	00.	24.	5.	30.2	146.8	35.	184.	-20.	33.6	146.6	30.	392.	-10.	35.6	146.5	20.	765.	-15.
71818Z	25.6	145.4	55	26.0	146.0	55.	40.	0.	29.3	148.0	35.	185.	-15.	32.9	147.3	30.	479.	-5.	0.0	0.0	0.	-0.	0.
71900Z	26.1	146.0	55	25.5	145.9	55.	36.	0.	27.5	147.5	40.	222.	-5.	30.9	148.0	35.	560.	0.	33.8	148.7	25.	1046.	-10.
71906Z	26.6	146.4	55	26.7	146.7	55.	17.	0.	30.8	148.2	40.	320.	0.	34.1	149.1	35.	735.	0.	36.7	151.3	25.	1312.	-15.
71912Z	27.3	145.6	55	27.7	146.5	55.	53.	0.	32.2	148.6	40.	349.	0.	35.8	147.8	35.	826.	0.	0.0	0.0	0.	-0.	0.
71918Z	28.2	144.7	50	28.2	144.5	55.	11.	5.	32.3	142.2	45.	237.	10.	35.5	143.5	35.	737.	0.	0.0	0.0	0.	-0.	0.
72000Z	28.9	143.6	45	29.3	143.8	50.	24.	5.	33.8	141.5	40.	329.	5.	37.1	143.7	35.	890.	0.	0.0	0.0	0.	-0.	0.
72006Z	29.6	142.3	40	29.4	142.3	40.	12.	0.	31.8	137.8	35.	167.	0.	33.0	132.2	30.	374.	-10.	0.0	0.0	0.	-0.	0.
72012Z	29.6	140.5	40	30.2	140.8	40.	36.	0.	32.4	135.0	35.	217.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72018Z	29.7	138.7	35	29.7	138.8	35.	8.	0.	31.2	132.0	30.	158.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72100Z	29.8	137.2	35	29.7	137.3	35.	8.	0.	29.7	131.4	30.	137.	-5.	29.0	126.8	30.	277.	0.	0.0	0.0	0.	-0.	0.
72106Z	29.6	135.6	35	29.8	135.8	35.	16.	0.	29.5	130.2	30.	179.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72112Z	29.0	133.5	35	29.8	133.8	35.	50.	0.	29.3	128.2	35.	189.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72118Z	28.6	131.4	35	28.5	131.0	30.	22.	-5.	28.4	126.7	40.	122.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72200Z	28.6	129.1	35	28.5	128.9	30.	12.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72206Z	28.7	126.9	40	28.8	126.9	30.	6.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72212Z	28.5	124.7	45	28.7	124.4	30.	20.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72218Z	28.7	123.0	45	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72300Z	29.3	121.5	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	21.	174.	425.	657.
AVG RIGHT ANGLE ERROR	17.	122.	298.	531.
AVG INTENSITY MAGNITUDE ERROR	4.	10.	15.	25.
AVG INTENSITY BIAS	-2.	-1.	3.	9.
NUMBER OF FORECASTS	38	35	30	24

	TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR
	20.	174.	431.	657.
	16.	122.	308.	531.
	4.	10.	15.	25.
	0.	-1.	3.	9.
	35	35	29	24

TYPHOON VIRGINIA

(July-August)

	BEST TRACK			WARNING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS			ERRORS				ERRORS				ERRORS	
	POSIT	WIND	POSIT	WIND	DIST	WIND	POSIT	WIND	DIST	WIND	POSIT	WIND	DIST	WIND	POSIT	WIND	DIST	WIND
7AUG00Z	13.7 152.0	25	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
7AUG06Z	14.1 151.7	25	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
7AUG12Z	14.6 151.4	30	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
7AUG18Z	15.1 151.1	30	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
8AUG00Z	15.5 151.1	35	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
8AUG06Z	15.9 151.0	35	16.1 150.9	40.	11.	5.	18.2 149.2	30.	119.	5.	20.0 148.5	80.	289.	-5.	21.2 147.0	70.	295.	10.
8AUG12Z	16.1 151.0	40	16.5 150.7	55.	29.	5.	18.5 149.0	35.	121.	5.	20.3 148.3	80.	191.	-5.	21.3 147.6	70.	240.	10.
8AUG18Z	16.3 151.0	40	16.6 150.8	50.	20.	10.	18.7 149.3	40.	87.	5.	20.8 148.7	85.	151.	0.	21.3 147.0	70.	240.	10.
9AUG00Z	16.6 151.0	45	16.8 151.0	50.	0.	5.	17.5 150.9	80.	87.	0.	19.3 149.3	85.	98.	5.	19.6 148.9	70.	126.	10.
9AUG06Z	17.2 151.0	45	17.1 151.0	55.	6.	10.	18.5 150.5	85.	69.	0.	19.8 148.6	70.	120.	10.	19.5 149.7	70.	143.	10.
9AUG12Z	17.8 151.0	50	17.5 151.0	55.	18.	5.	19.2 150.3	85.	93.	0.	20.1 148.0	70.	96.	10.	20.3 149.5	70.	115.	5.
9AUG18Z	18.4 150.8	55	18.0 150.8	55.	0.	0.	19.9 149.9	85.	93.	0.	20.6 148.0	70.	119.	10.	20.9 149.0	75.	251.	10.
10AUG00Z	18.9 150.5	60	19.0 150.5	55.	6.	-5.	20.5 149.8	85.	69.	0.	21.6 148.0	70.	63.	10.	21.7 149.1	75.	267.	10.
10AUG06Z	19.6 150.1	65	19.9 150.0	65.	13.	0.	21.2 149.0	70.	61.	10.	22.6 148.2	70.	118.	15.	23.2 148.0	75.	316.	10.
10AUG12Z	20.1 149.7	65	20.3 149.4	65.	24.	0.	22.8 148.1	75.	119.	15.	24.0 147.5	80.	302.	15.	24.5 138.8	80.	408.	15.
10AUG18Z	20.5 149.4	65	20.7 149.2	65.	18.	0.	22.8 147.6	75.	96.	15.	23.9 146.1	80.	289.	15.	24.7 140.8	80.	376.	10.
11AUG00Z	20.9 148.9	60	21.2 149.0	65.	19.	5.	23.0 147.7	75.	87.	15.	24.5 145.1	80.	289.	15.	25.0 140.2	80.	401.	10.
11AUG06Z	21.4 148.1	60	21.4 148.5	65.	11.	5.	23.1 147.0	85.	108.	5.	24.8 144.9	70.	283.	5.	25.0 139.7	85.	435.	-5.
11AUG12Z	21.7 147.8	60	22.0 147.9	65.	19.	5.	23.8 145.1	85.	104.	0.	24.8 142.0	70.	302.	5.	24.9 137.8	85.	466.	0.
11AUG18Z	21.9 147.3	60	21.9 147.2	65.	11.	5.	23.1 144.8	85.	104.	0.	24.0 141.3	80.	330.	-10.	24.3 137.0	85.	468.	-10.
12AUG00Z	22.1 147.0	60	22.3 146.8	65.	8.	5.	23.1 144.3	85.	222.	0.	24.5 141.3	80.	337.	-10.	25.0 137.0	85.	433.	-10.
12AUG06Z	22.5 147.1	60	22.1 147.2	65.	34.	5.	23.7 145.5	85.	183.	0.	25.3 142.8	80.	259.	-10.	26.8 138.7	85.	336.	-5.
12AUG12Z	23.0 147.2	65	22.0 146.9	65.	40.	0.	23.1 145.1	85.	150.	0.	25.4 142.9	80.	205.	-5.	26.8 139.0	85.	298.	-5.
12AUG18Z	23.3 147.4	65	22.0 146.9	65.	50.	0.	23.5 145.8	85.	113.	-5.	25.7 143.1	80.	150.	-5.	26.9 138.8	85.	252.	-5.
13AUG00Z	23.3 147.7	65	21.8 147.5	65.	21.	0.	22.5 147.0	85.	133.	-5.	24.8 145.1	80.	68.	-5.	26.5 142.3	80.	140.	0.
13AUG06Z	23.5 147.8	65	21.5 147.5	65.	17.	0.	22.4 147.8	85.	133.	-5.	24.5 146.5	80.	150.	0.	26.6 143.9	80.	264.	5.
13AUG12Z	23.6 147.3	65	22.1 147.1	65.	32.	0.	23.6 145.8	85.	265.	0.	25.3 143.5	80.	126.	0.	26.7 141.5	80.	249.	5.
13AUG18Z	23.2 147.1	70	22.2 147.0	65.	6.	-5.	23.6 145.8	85.	133.	0.	24.5 143.7	80.	240.	0.	25.8 141.6	80.	212.	5.
14AUG00Z	23.7 147.1	70	22.3 146.8	70.	24.	0.	23.2 145.6	75.	133.	10.	24.6 143.6	75.	248.	15.	26.0 141.5	75.	494.	20.
14AUG06Z	23.3 146.9	70	22.9 146.9	70.	24.	0.	24.2 145.9	70.	149.	10.	25.8 144.1	75.	313.	20.	27.0 141.9	75.	478.	20.
14AUG12Z	23.9 146.3	85	24.0 146.5	70.	12.	5.	26.2 145.1	75.	100.	15.	27.0 142.7	75.	289.	20.	27.2 140.1	75.	551.	25.
14AUG18Z	24.6 145.6	85	24.7 145.8	70.	12.	5.	26.5 143.9	75.	120.	15.	27.1 141.6	75.	335.	20.	27.4 139.3	75.	649.	30.
15AUG00Z	25.4 145.0	85	25.4 145.0	70.	0.	5.	27.5 142.1	75.	121.	15.	29.1 139.4	75.	284.	20.	29.9 138.1	75.	649.	35.
15AUG06Z	26.3 144.4	80	26.0 144.4	70.	18.	10.	28.2 142.0	75.	147.	20.	29.7 139.5	75.	333.	20.	30.6 138.6	75.	748.	35.
15AUG12Z	27.0 143.8	80	26.9 143.9	70.	30.	10.	29.3 141.0	70.	131.	15.	30.7 138.3	75.	389.	25.	31.7 139.5	75.	862.	35.
15AUG18Z	28.5 143.2	80	28.0 143.2	65.	30.	5.	30.4 140.7	65.	142.	10.	32.0 138.1	65.	428.	20.	33.5 139.5	65.	843.	30.
16AUG00Z	29.5 142.5	80	29.1 142.7	65.	26.	5.	30.8 140.9	65.	180.	10.	32.1 140.9	55.	410.	15.	0.0 0.0	0.	-0.	0.
16AUG06Z	30.7 142.0	55	30.8 141.8	65.	12.	10.	33.7 140.6	65.	77.	10.	34.1 142.8	50.	195.	10.	0.0 0.0	0.	-0.	0.
16AUG12Z	31.7 141.9	55	31.9 141.9	65.	24.	10.	35.8 140.7	65.	90.	15.	34.1 142.9	50.	293.	10.	0.0 0.0	0.	-0.	0.
16AUG18Z	32.7 141.4	55	32.9 141.4	65.	12.	10.	36.8 141.6	60.	101.	15.	34.7 144.7	50.	311.	15.	0.0 0.0	0.	-0.	0.
17AUG00Z	33.6 141.2	55	33.8 140.9	65.	19.	10.	37.5 141.9	60.	190.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
17AUG06Z	34.9 141.9	55	34.7 141.8	65.	19.	10.	38.1 140.3	55.	106.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
17AUG12Z	36.2 142.5	50	35.8 142.7	65.	24.	15.	38.8 140.0	55.	122.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
17AUG18Z	37.7 143.4	45	37.4 143.1	65.	19.	20.	39.8 139.8	50.	131.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
18AUG00Z	39.1 144.9	40	39.1 144.4	60.	23.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
18AUG06Z	39.9 146.9	40	40.1 147.1	55.	15.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
18AUG12Z	40.7 149.0	40	40.5 148.9	55.	13.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
18AUG18Z	41.8 151.0	35	41.2 151.4	50.	40.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	20.	112.	231.	394.	20.	112.	231.	394.
AVG RIGHT ANGLE ERROR	12.	63.	127.	283.	12.	63.	127.	283.
AVG INTENSITY MAGNITUDE ERROR	6.	8.	11.	13.	6.	8.	11.	13.
AVG INTENSITY BIAS	0.	7.	8.	10.	0.	7.	8.	10.
NUMBER OF FORECASTS	43	39	35	31	43	39	35	31

TYPHOON WENDY

(July-August)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
72600Z	18.4	139.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72606Z	19.0	138.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72612Z	19.8	138.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72618Z	20.5	137.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
73000Z	20.9	137.2	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
73006Z	21.2	136.7	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
73012Z	21.4	136.2	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
73018Z	21.5	135.4	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
74000Z	21.2	134.4	40	21.4	133.5	30.	5.	-10.	21.7	129.7	45.	220.	-5.	23.2	125.6	55.	443.	-15.	25.2	123.0	70.	530.	-5.
74006Z	20.8	134.1	40	20.8	134.1	35.	0.	-5.	20.9	131.4	45.	116.	-10.	21.8	127.7	55.	311.	-15.	23.8	124.6	70.	404.	-5.
74012Z	20.7	134.0	40	20.8	133.5	40.	20.	0.	21.0	130.5	50.	106.	-10.	22.3	126.8	60.	349.	-10.	24.4	123.9	70.	413.	-10.
74018Z	20.8	133.9	45	20.5	134.4	45.	33.	0.	20.9	133.5	55.	23.	-10.	21.0	130.3	60.	168.	-15.	22.3	126.8	70.	291.	-10.
75000Z	20.9	133.7	50	20.9	133.6	50.	6.	0.	21.0	132.0	60.	83.	-10.	21.3	128.7	70.	242.	-5.	22.8	125.2	75.	338.	-5.
75006Z	20.9	133.4	55	20.9	133.3	55.	6.	0.	21.0	131.8	65.	90.	-5.	21.4	128.0	75.	243.	0.	22.8	125.1	80.	327.	0.
75012Z	21.1	133.4	60	20.9	133.1	60.	21.	0.	21.1	131.8	70.	87.	0.	21.7	128.4	75.	243.	-5.	23.2	124.9	80.	293.	5.
75018Z	21.3	133.4	65	21.0	133.7	65.	25.	0.	21.1	132.1	70.	90.	-5.	21.8	130.1	75.	215.	-5.	22.4	127.2	80.	331.	10.
76000Z	21.5	133.4	70	21.6	134.0	65.	34.	-5.	22.8	132.8	75.	34.	0.	22.9	130.5	75.	211.	-5.	22.9	128.2	85.	334.	15.
76006Z	21.6	133.3	70	21.7	133.1	70.	13.	0.	21.9	130.9	80.	139.	5.	22.1	129.1	85.	305.	5.	22.4	126.6	90.	373.	15.
76012Z	21.9	133.1	70	22.0	132.8	70.	18.	0.	22.4	130.5	80.	142.	0.	22.7	128.2	85.	247.	10.	23.0	125.5	90.	382.	15.
76018Z	22.0	132.8	75	22.3	132.3	75.	33.	0.	22.7	130.2	80.	101.	0.	23.1	128.1	85.	301.	15.	23.5	125.5	90.	365.	15.
77000Z	23.3	132.5	75	23.3	132.3	75.	11.	0.	25.0	130.5	80.	88.	0.	26.5	128.3	85.	151.	15.	27.7	125.5	90.	133.	15.
77006Z	24.0	132.0	75	24.0	132.2	75.	11.	0.	26.0	130.2	80.	107.	0.	27.4	128.0	85.	136.	10.	29.0	125.5	90.	75.	20.
77012Z	24.6	131.5	80	24.4	131.8	75.	20.	-5.	26.5	129.6	80.	139.	5.	27.8	127.2	85.	131.	10.	29.4	125.0	90.	58.	20.
77018Z	25.3	131.0	80	25.3	130.9	80.	5.	0.	27.3	128.2	85.	102.	15.	28.8	124.6	85.	60.	10.	29.0	120.5	70.	251.	0.
78000Z	26.4	130.0	80	26.2	130.1	80.	13.	0.	28.8	126.8	85.	40.	15.	30.2	122.5	85.	130.	10.	30.4	118.0	50.	366.	-20.
78006Z	27.2	128.7	80	27.1	128.6	75.	8.	-5.	29.4	124.3	75.	96.	0.	30.5	120.2	50.	238.	-20.	0.0	0.0	0.	-0.	0.
78012Z	27.6	127.3	75	27.7	127.5	75.	12.	0.	30.0	123.1	75.	130.	0.	30.7	118.6	20.	310.	-50.	0.0	0.0	0.	-0.	0.
78018Z	27.9	126.4	70	28.1	126.1	70.	20.	0.	30.0	121.6	50.	193.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
79000Z	28.2	126.2	70	28.3	125.7	70.	27.	0.	30.0	121.6	50.	181.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
79006Z	28.6	125.8	75	28.7	125.6	70.	12.	-5.	30.4	123.7	70.	60.	0.	31.4	121.6	50.	185.	-20.	0.0	0.0	0.	-0.	0.
79012Z	29.4	125.5	75	29.1	125.9	70.	27.	-5.	31.0	125.2	70.	52.	0.	32.4	122.9	70.	144.	0.	32.8	120.1	50.	375.	-10.
79018Z	29.6	125.3	75	29.8	125.6	70.	20.	-5.	31.7	124.1	70.	98.	0.	32.6	121.6	70.	214.	5.	0.0	0.0	0.	-0.	0.
80000Z	29.9	125.1	75	30.2	125.1	70.	18.	-5.	31.8	123.0	70.	136.	0.	32.6	120.3	50.	293.	-15.	0.0	0.0	0.	-0.	0.
80006Z	30.1	124.8	70	30.4	124.8	70.	18.	0.	31.4	122.8	70.	127.	0.	32.1	120.3	50.	307.	-10.	0.0	0.0	0.	-0.	0.
80012Z	30.3	124.6	70	30.4	124.8	70.	12.	0.	31.4	123.1	70.	74.	0.	32.4	121.0	50.	325.	-10.	0.0	0.0	0.	-0.	0.
80018Z	30.3	125.1	70	30.3	124.9	70.	10.	0.	31.0	124.3	65.	47.	0.	32.1	122.5	50.	294.	-5.	32.9	119.9	30.	590.	-5.
81000Z	30.5	125.1	70	30.3	124.9	70.	16.	0.	31.7	125.2	65.	73.	0.	33.4	120.3	50.	182.	10.	0.0	0.0	0.	-0.	0.
81006Z	30.6	125.1	70	30.3	124.7	70.	27.	0.	31.7	125.6	60.	65.	0.	33.4	126.6	50.	145.	15.	0.0	0.0	0.	-0.	0.
81012Z	30.7	124.9	70	30.4	125.2	70.	19.	0.	32.3	125.7	60.	119.	0.	34.5	127.6	50.	156.	20.	0.0	0.0	0.	-0.	0.
81018Z	30.5	125.0	65	30.5	125.0	65.	0.	0.	31.1	125.2	60.	145.	5.	32.6	125.9	50.	308.	25.	0.0	0.0	0.	-0.	0.
82100Z	30.5	125.5	65	30.5	125.2	65.	15.	0.	31.1	125.3	60.	179.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
82106Z	30.7	126.1	60	30.7	125.9	65.	16.	5.	32.3	127.2	60.	90.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
82112Z	30.8	127.1	60	30.8	126.3	60.	41.	0.	32.1	127.8	60.	159.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
82118Z	30.9	128.1	55	31.1	127.2	60.	48.	5.	33.3	128.9	55.	155.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
83000Z	31.2	128.8	50	31.5	128.5	50.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
83006Z	32.2	129.1	45	32.3	129.0	45.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
83012Z	33.5	130.5	40	32.8	129.4	45.	55.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
83018Z	34.0	131.6	35	33.8	131.4	40.	49.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	21.	112.	235.	328.	21.	112.	235.	328.
AVG RIGHT ANGLE ERROR	12.	75.	188.	269.	12.	75.	188.	269.
AVG INTENSITY MAGNITUDE ERROR	2.	6.	12.	11.	2.	6.	12.	11.
AVG INTENSITY BIAS	-1.	0.	-2.	3.	0.	0.	-2.	3.
NUMBER OF FORECASTS	40	36	30	19	40	36	30	19

TROPICAL STORM AGNES

(July)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
29/00Z	10.5	114.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
29/06Z	17.3	115.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
29/12Z	18.0	115.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
29/18Z	18.8	115.8	30	18.8	115.4	30.	23.	0.	20.8	113.8	40.	101.	0.	21.8	111.2	30.	142.	-20.	0.0	0.0	0.	-0.	0.
29/00Z	19.3	115.9	30	19.4	115.9	30.	36.	0.	21.8	113.8	40.	90.	-5.	22.8	111.1	25.	139.	-20.	0.0	0.0	0.	-0.	0.
29/06Z	20.1	115.8	35	20.8	115.8	30.	18.	-5.	22.8	113.7	35.	70.	-10.	25.0	110.1	20.	134.	-25.	0.0	0.0	0.	-0.	0.
29/12Z	21.2	115.7	35	21.0	115.7	30.	12.	-5.	23.8	113.4	40.	132.	-30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
29/18Z	21.9	115.5	40	21.5	115.5	35.	8.	-5.	23.3	113.4	40.	137.	-30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
30/00Z	21.5	114.8	45	21.8	114.4	45.	8.	0.	22.7	113.0	35.	83.	-10.	23.7	111.0	20.	176.	-25.	0.0	0.0	0.	-0.	0.
30/06Z	21.3	114.4	45	21.7	114.5	45.	13.	0.	22.7	112.9	30.	82.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
30/12Z	21.3	114.0	50	21.5	113.8	50.	14.	0.	21.1	111.2	35.	86.	10.	20.8	109.0	45.	184.	0.	20.9	107.0	45.	+15.	0.
30/18Z	21.3	113.7	50	21.4	113.7	55.	6.	5.	21.2	112.0	50.	21.	-5.	21.0	110.0	45.	139.	-5.	20.6	107.9	45.	+43.	0.
31/00Z	21.3	113.3	45	21.3	113.3	55.	0.	10.	21.2	111.8	45.	17.	0.	21.0	109.8	40.	187.	-5.	20.8	107.5	35.	+27.	-5.
31/06Z	21.3	112.7	45	21.3	112.8	50.	6.	5.	21.5	111.8	40.	70.	-5.	22.1	108.6	30.	248.	-15.	0.0	0.0	0.	-0.	0.
31/12Z	21.6	112.3	45	21.3	112.3	50.	6.	5.	21.8	111.3	40.	117.	-5.	22.2	108.4	30.	345.	-15.	0.0	0.0	0.	-0.	0.
31/18Z	20.9	111.8	45	21.1	111.7	50.	13.	5.	21.2	109.3	40.	180.	-10.	21.8	108.8	20.	432.	-25.	0.0	0.0	0.	-0.	0.
01/00Z	20.9	111.9	45	20.9	111.9	50.	0.	5.	21.0	110.3	40.	140.	-5.	21.5	107.9	30.	395.	-10.	0.0	0.0	0.	-0.	0.
01/06Z	20.8	111.8	45	20.8	111.8	50.	0.	5.	20.8	111.8	45.	100.	0.	21.8	110.3	40.	271.	10.	0.0	0.0	0.	-0.	0.
01/12Z	20.9	112.0	45	20.7	112.0	50.	14.	5.	20.7	112.0	45.	196.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
01/18Z	20.9	112.4	50	20.9	112.4	50.	0.	0.	20.9	112.4	45.	159.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
02/00Z	20.5	112.4	45	20.8	112.4	45.	8.	0.	22.0	110.0	35.	87.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
02/06Z	20.8	113.7	45	20.8	113.7	45.	0.	0.	22.5	110.0	45.	81.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
02/12Z	21.5	114.4	45	21.5	114.4	45.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
02/18Z	22.1	114.8	45	22.1	114.9	45.	17.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
03/00Z	22.8	114.9	40	22.8	114.8	40.	17.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
03/06Z	23.9	115.1	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	#AVG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	10.	97.	283.	*10.
AVG RIGHT ANGLE ERROR	7.	59.	191.	364.
AVG INTENSITY MAGNITUDE ERROR	3.	8.	15.	6.
AVG INTENSITY BIAS	1.	-5.	-13.	-6.
NUMBER OF FORECASTS	22	19	12	3

TROPICAL STORM BONNIE

(August)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
06/00Z	22.5	122.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
06/06Z	22.2	120.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
06/12Z	21.8	119.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
06/18Z	21.5	118.4	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
07/00Z	21.2	117.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
07/06Z	20.8	116.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
07/12Z	20.2	115.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
07/18Z	19.5	115.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
08/00Z	18.9	114.5	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
08/06Z	18.4	113.4	30	18.3	113.8	30.	13.	0.	18.2	112.8	35.	232.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
08/12Z	18.2	112.3	30	18.3	112.2	30.	8.	0.	18.1	109.0	40.	99.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
08/18Z	18.0	111.2	35	18.2	111.3	35.	13.	0.	18.4	107.9	40.	100.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
09/00Z	17.8	110.0	35	18.3	109.5	35.	41.	0.	18.5	105.3	30.	56.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
09/06Z	17.7	108.7	40	18.1	109.0	40.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
09/12Z	17.7	107.4	40	18.0	107.9	40.	36.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
09/18Z	17.7	106.3	40	18.1	106.9	40.	42.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10/00Z	17.6	105.0	25	18.1	106.0	35.	64.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	#AVG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	31.	121.	0.	0.
AVG RIGHT ANGLE ERROR	20.	36.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	3.	0.	0.
AVG INTENSITY BIAS	1.	0.	0.	0.
NUMBER OF FORECASTS	8	4	0	0

TYPHOON CARMEN

(August)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
810122	10.0	145.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810182	10.0	145.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
811002	10.2	144.9	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
811062	13.9	144.0	40	15.5	144.3	40.	29.	0.	15.5	142.3	35.	110.	-5.	16.7	139.7	05.	263.	0.	18.4	136.9	10.	392.	0.
811122	13.6	144.4	45	15.7	144.0	45.	24.	0.	15.9	141.9	00.	120.	0.	17.0	139.0	10.	305.	5.	18.5	136.1	15.	453.	5.
811182	13.8	144.4	50	15.8	144.2	45.	11.	-5.	15.8	143.0	00.	192.	5.	16.0	141.4	10.	484.	5.	16.9	139.2	15.	734.	0.
812002	10.1	144.4	55	15.9	144.3	55.	13.	0.	15.8	143.0	05.	288.	5.	16.0	141.4	10.	573.	0.	16.9	139.2	15.	817.	-5.
812062	16.7	143.9	60	16.5	144.0	55.	13.	-5.	18.1	142.0	05.	230.	0.	19.8	140.3	10.	460.	0.	20.7	137.6	15.	690.	-5.
812122	17.4	143.3	60	17.8	143.6	55.	29.	-5.	20.4	141.4	05.	217.	0.	22.0	138.2	10.	389.	0.	22.5	134.7	15.	562.	-5.
812182	18.0	142.4	55	18.5	142.8	55.	21.	0.	20.8	139.5	05.	203.	0.	21.9	136.2	10.	405.	-5.	22.7	132.8	15.	564.	0.
813002	20.0	141.1	60	19.8	141.2	55.	13.	-5.	22.6	138.9	05.	120.	-5.	23.8	132.9	10.	278.	-10.	24.2	128.7	15.	359.	0.
813062	21.1	139.5	65	20.9	139.7	05.	16.	0.	23.5	136.6	10.	75.	0.	24.9	129.6	15.	203.	-5.	25.2	124.6	15.	207.	0.
813122	22.0	137.9	65	22.0	138.0	05.	6.	0.	23.9	132.0	10.	70.	0.	24.8	127.0	15.	172.	-5.	26.5	122.2	15.	142.	0.
813182	22.0	136.4	65	22.2	136.5	05.	13.	0.	24.2	130.8	10.	107.	-5.	25.1	125.2	15.	170.	0.	27.4	120.7	15.	131.	5.
814002	23.4	134.9	70	23.2	134.6	10.	20.	0.	24.7	127.9	10.	120.	-10.	26.8	121.5	15.	191.	0.	0.0	0.0	0.	-0.	0.
814062	24.1	133.4	70	24.2	133.4	10.	6.	0.	26.7	120.4	15.	34.	-5.	30.3	121.2	30.	157.	-25.	0.0	0.0	0.	-0.	0.
814122	25.0	131.9	70	24.9	131.7	10.	12.	0.	27.3	124.4	15.	34.	-5.	31.4	120.1	30.	227.	-45.	0.0	0.0	0.	-0.	0.
814182	25.4	130.2	75	25.8	130.1	10.	8.	-5.	29.0	124.0	15.	00.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815002	26.5	128.7	80	26.6	128.6	15.	8.	-5.	29.8	122.5	15.	116.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815062	27.1	127.3	80	27.2	127.2	15.	8.	-5.	29.8	121.6	00.	122.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815122	27.5	125.9	80	27.6	125.8	15.	8.	-5.	29.6	120.4	30.	150.	-45.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815182	28.0	124.6	75	28.0	124.6	15.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816002	28.3	123.8	75	28.3	123.6	15.	11.	0.	29.7	120.3	10.	150.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816062	28.5	123.4	75	28.5	122.9	15.	26.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816122	28.7	123.2	75	28.5	122.8	15.	24.	0.	29.7	120.5	30.	140.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816182	28.7	122.7	70	28.9	122.8	05.	13.	-5.	29.9	121.0	40.	137.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817002	28.6	122.6	65	28.7	122.5	05.	30.	0.	29.4	123.5	00.	30.	10.	32.0	126.0	30.	184.	5.	34.8	129.5	40.	132.	10.
817062	28.3	122.8	60	28.5	122.7	00.	13.	0.	29.5	123.5	35.	84.	5.	32.0	126.0	30.	128.	5.	0.0	0.0	0.	-0.	0.
817122	28.0	123.0	55	28.5	122.8	35.	12.	0.	29.4	123.5	30.	84.	5.	32.1	126.1	45.	49.	0.	0.0	0.0	0.	-0.	0.
817182	28.0	123.3	55	28.6	123.0	35.	20.	0.	29.8	123.9	30.	60.	5.	32.7	126.8	45.	52.	5.	0.0	0.0	0.	-0.	0.
818002	28.8	123.5	50	29.2	123.5	30.	24.	0.	30.6	124.8	45.	84.	0.	33.5	127.7	40.	89.	10.	0.0	0.0	0.	-0.	0.
818062	28.1	123.7	50	28.7	123.6	30.	36.	0.	30.6	124.6	45.	99.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818122	28.1	124.1	45	28.3	124.0	45.	13.	0.	30.1	125.1	45.	86.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818182	28.7	124.0	45	28.4	124.1	45.	19.	0.	30.3	125.2	40.	150.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819002	29.2	124.5	45	29.2	124.2	45.	16.	0.	31.5	125.8	40.	203.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819062	30.0	125.1	45	29.6	124.7	45.	32.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819122	31.4	125.6	45	30.8	125.5	45.	48.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819182	32.9	125.8	40	31.8	126.0	40.	66.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820002	34.0	126.8	30	34.7	126.4	35.	21.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	124.	250.	429.	19.	122.	259.	456.
AVG RIGHT ANGLE ERROR	10.	56.	129.	268.	10.	58.	131.	278.
AVG INTENSITY MAGNITUDE ERROR	1.	6.	7.	3.	1.	6.	7.	2.
AVG INTENSITY BIAS	-1.	-3.	-3.	0.	0.	-3.	-4.	-0.
NUMBER OF FORECASTS	36	30	19	12	35	29	18	11

TROPICAL STORM ~~DELLA~~

(August)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
810002	12.7	128.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810062	13.8	129.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810122	14.8	129.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810182	15.5	129.4	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
811002	16.3	128.7	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
811062	17.2	127.8	30	17.1	127.9	30.	8.	0.	19.4	125.2	40.	143.	0.	21.3	122.4	55.	248.	25.	0.0	0.0	0.	-0.	0.
811122	18.3	126.9	30	18.4	127.0	30.	8.	0.	20.8	123.3	50.	98.	5.	22.2	119.1	00.	180.	35.	0.0	0.0	0.	-0.	0.
811182	19.4	126.0	30	19.2	126.2	30.	16.	0.	21.6	122.8	50.	115.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
812002	20.7	125.2	35	20.0	125.2	30.	42.	-5.	22.4	121.0	45.	115.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
812062	21.7	124.5	40	21.9	124.4	40.	13.	0.	26.0	121.0	80.	58.	50.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
812122	22.4	123.4	45	23.4	123.7	45.	62.	0.	27.7	120.4	00.	167.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
812182	23.1	121.5	45	23.1	122.6	45.	60.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
813002	24.1	122.0	45	23.8	121.8	45.	21.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
813062	25.1	120.6	30	25.4	120.5	30.	19.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
813122	25.3	118.8	25	25.5	119.5	25.	40.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	29.	116.	217.	0.
AVG RIGHT ANGLE ERROR	20.	73.	131.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	16.	30.	0.
AVG INTENSITY BIAS	-1.	16.	30.	0.
NUMBER OF FORECASTS	10	6	2	0

TROPICAL DEPRESSION 14

(August)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS			48 HOUR FORECAST		ERRORS			72 HOUR FORECAST		ERRORS		
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND		POSIT	WIND	DST	WIND		POSIT	WIND	DST	WIND	
814Z08	9.0	162.2	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814Z08	9.8	161.0	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814Z12	10.8	159.6	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
814Z18	11.8	158.6	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815Z00	12.7	157.5	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815Z06	13.6	156.7	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815Z12	14.5	155.8	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
815Z18	15.4	155.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816Z00	16.1	154.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816Z06	17.0	153.0	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816Z12	17.8	152.2	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
816Z18	18.7	151.3	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817Z00	19.6	150.7	10	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817Z06	20.0	150.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817Z12	20.6	149.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817Z18	21.3	149.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818Z00	21.9	148.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818Z06	23.0	147.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818Z12	23.9	145.4	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
818Z18	24.7	143.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819Z00	25.6	141.1	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819Z06	26.7	139.1	30	26.7	139.0	30.	5.	0.	30.9	132.9	35.	10.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819Z12	28.0	137.5	30	27.8	137.4	30.	13.	0.	32.2	132.0	35.	10.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
819Z18	29.4	136.1	30	28.4	135.2	30.	76.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820Z00	30.9	135.0	30	31.0	135.1	30.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820Z06	32.6	134.5	25	32.3	134.5	25.	18.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820Z12	34.6	134.5	20	34.5	133.9	25.	30.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WARNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	25.	169.	0.	0.
AVG RIGHT ANGLE ERROR	23.	127.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	13.	0.	0.
AVG INTENSITY BIAS	1.	13.	0.	0.
NUMBER OF FORECASTS	6	2	0	0

TYPHOON ELAINE

(August)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT		WIND	POSIT		DST	WIND	POSIT		DST	WIND	POSIT		DST	WIND	POSIT		DST	WIND
810000	9.0	135.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810006	9.5	135.2	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810012	10.0	135.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
810018	10.5	134.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817006	11.0	134.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817006	11.2	134.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817012	11.3	134.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
817018	11.5	133.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820000	11.8	133.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820006	12.0	132.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820012	13.0	131.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
820018	14.1	130.9	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
821000	14.9	130.1	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
821006	15.7	129.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
821012	16.1	128.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
821018	16.6	127.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
822000	16.9	126.5	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
822006	17.4	125.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
822012	17.7	125.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
822018	17.9	124.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
823000	18.0	123.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
823006	18.1	123.1	25	18.2	123.2	25.	8.	0.	19.8	120.1	30.	132.	+10.	20.6	117.0	40.	204.	-5.	21.0	113.6	45.	291.	-10.
823012	18.0	122.4	25	18.3	122.3	25.	19.	0.	19.3	119.1	30.	138.	+10.	20.1	115.8	40.	221.	-5.	20.8	112.6	45.	176.	-15.
823018	17.8	121.5	30	18.4	121.4	30.	48.	0.	19.3	118.3	35.	139.	-5.	19.9	115.0	40.	214.	-10.	20.5	111.9	45.	141.	-15.
824000	17.4	120.7	35	17.6	120.3	35.	26.	0.	18.1	117.0	40.	93.	0.	18.8	113.7	45.	195.	-10.	19.4	110.4	50.	141.	-10.
824006	17.3	120.0	40	17.1	119.7	40.	21.	0.	16.8	115.9	45.	110.	0.	16.8	112.6	50.	242.	-5.	17.2	109.4	55.	259.	-10.
824012	17.0	119.3	40	16.9	119.2	40.	8.	0.	16.5	115.4	45.	158.	0.	16.6	111.7	50.	260.	-10.	17.3	108.0	55.	285.	-10.
824184	17.1	119.1	40	16.6	118.8	40.	34.	0.	15.4	116.4	45.	149.	-5.	15.0	112.7	50.	301.	-10.	15.4	109.0	55.	365.	5.
825000	17.5	118.5	40	17.1	118.8	40.	29.	0.	17.1	118.8	50.	114.	-5.	17.2	117.2	50.	303.	-10.	17.2	115.4	55.	533.	25.
825006	17.3	117.9	45	17.4	118.1	45.	13.	0.	17.5	117.6	50.	107.	-5.	17.4	115.7	55.	303.	-10.	0.0	0.0	0.	-0.	0.
825012	17.1	118.1	45	17.2	118.1	45.	6.	0.	17.5	117.4	50.	106.	-10.	17.4	115.8	55.	390.	-10.	0.0	0.0	0.	-0.	0.
825184	17.5	117.8	50	17.2	118.1	50.	25.	0.	17.7	117.2	55.	208.	-5.	17.9	115.2	60.	424.	10.	0.0	0.0	0.	-0.	0.
826000	18.1	117.1	55	18.3	116.8	55.	21.	0.	17.9	112.9	65.	142.	5.	17.5	109.5	65.	274.	35.	0.0	0.0	0.	-0.	0.
826006	18.8	116.3	55	18.5	115.7	55.	38.	0.	18.4	111.4	65.	151.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826012	19.3	115.3	60	19.3	115.2	60.	6.	0.	21.3	111.6	65.	60.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
826184	19.8	114.3	60	20.2	114.2	60.	25.	0.	21.6	112.0	65.	183.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
827000	20.1	112.8	60	20.2	112.9	60.	8.	0.	21.0	108.1	50.	63.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
827006	20.9	111.8	65	20.7	111.8	65.	12.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
827122	21.5	110.4	65	21.6	110.8	65.	23.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
827184	21.5	108.7	50	21.8	109.5	50.	48.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
828002	21.5	107.1	30	21.7	106.7	30.	25.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	22.	132.	278.	263.	21.	137.	278.	224.
AVG RIGHT ANGLE ERROR	15.	77.	157.	174.	12.	80.	149.	156.
AVG INTENSITY MAGNITUDE ERROR	0.	6.	11.	13.	0.	5.	9.	11.
AVG INTENSITY BIAS	0.	-1.	-3.	-5.	0.	-2.	-7.	-9.
NUMBER OF FORECASTS	20	16	12	8	16	15	11	7

TYPHOON FAYE

(August-September)

	BEST TRACK		WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
					ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
060000Z	9.7	140.1	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
060600Z	9.1	138.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
061200Z	8.3	137.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
061800Z	8.5	136.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070000Z	7.0	135.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070600Z	7.0	133.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
071200Z	7.4	132.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
071800Z	8.5	131.4	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080000Z	9.1	130.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080600Z	9.9	129.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081200Z	10.0	128.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081800Z	11.9	127.0	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090000Z	13.0	126.0	30	12.9	125.9	30.	0.	0.	16.0	123.0	45.	127.	5.	18.0	119.7	35.	410.	10.	21.2	117.2	65.	680.	15.
090600Z	14.0	125.5	30	14.1	125.4	30.	0.	0.	18.3	123.5	45.	100.	5.	22.0	121.0	35.	380.	5.	25.5	120.2	65.	667.	15.
091200Z	15.0	125.2	35	15.0	125.1	35.	0.	0.	17.9	124.0	45.	80.	0.	21.2	122.5	50.	330.	0.	24.6	121.1	55.	630.	5.
091800Z	15.7	125.0	35	16.0	124.8	35.	11.	0.	19.6	122.8	45.	140.	0.	22.9	120.5	50.	499.	0.	25.0	118.1	55.	725.	0.
100000Z	16.0	125.1	40	16.7	124.9	45.	11.	5.	20.1	123.9	55.	101.	10.	23.1	121.7	60.	522.	10.	26.2	118.2	90.	758.	0.
100600Z	17.0	125.1	40	17.7	125.0	45.	8.	5.	21.0	124.0	55.	229.	5.	24.1	121.0	60.	555.	10.	26.3	118.1	80.	727.	-5.
101200Z	18.4	125.4	45	18.3	125.0	45.	23.	0.	21.4	124.3	55.	240.	5.	24.3	122.2	60.	560.	10.	26.7	118.7	80.	662.	-5.
101800Z	19.1	126.2	45	19.0	126.0	45.	32.	0.	23.5	126.5	55.	360.	5.	27.0	125.0	60.	634.	5.	31.0	123.5	80.	777.	-10.
110000Z	19.2	126.9	45	19.9	126.6	45.	50.	0.	23.0	127.5	55.	327.	5.	27.3	127.2	55.	615.	-5.	30.8	127.9	80.	723.	-10.
110600Z	19.2	127.5	50	19.2	127.2	55.	17.	5.	20.4	129.0	65.	172.	15.	23.8	131.0	65.	407.	0.	27.3	130.8	70.	566.	-25.
111200Z	19.0	127.9	50	19.3	128.0	55.	14.	5.	19.9	130.6	65.	190.	15.	21.9	133.0	65.	311.	0.	25.0	135.7	70.	719.	-30.
111800Z	18.7	128.5	50	18.7	128.7	55.	11.	5.	17.8	131.0	65.	182.	10.	17.5	133.1	65.	441.	-5.	17.8	135.1	70.	742.	-30.
120000Z	18.0	128.8	50	17.7	129.2	55.	29.	5.	16.1	130.9	65.	206.	5.	15.8	133.0	65.	500.	-5.	16.7	134.9	70.	811.	-35.
120600Z	17.8	128.7	50	17.7	128.9	55.	14.	5.	15.8	129.7	65.	189.	0.	15.1	131.5	65.	508.	-30.	15.8	133.6	70.	870.	-30.
121200Z	17.3	128.5	50	17.2	128.8	55.	18.	5.	15.3	129.3	65.	230.	0.	14.8	130.0	65.	511.	-35.	14.7	130.8	70.	874.	-25.
121800Z	17.0	127.0	55	17.2	128.1	55.	17.	0.	17.1	128.2	55.	90.	-15.	14.3	129.0	60.	225.	-40.	14.8	129.2	65.	447.	-30.
130000Z	17.0	127.5	60	16.8	127.4	55.	13.	-5.	16.3	125.0	60.	101.	-10.	17.0	122.8	65.	293.	-40.	19.0	121.0	70.	443.	-10.
130600Z	17.1	126.7	65	17.1	126.7	65.	0.	0.	18.0	124.0	70.	160.	-25.	19.2	122.2	75.	250.	-25.	20.7	119.8	80.	438.	-15.
131200Z	17.5	126.0	65	17.5	126.1	65.	6.	0.	18.8	124.6	70.	119.	-30.	20.5	122.7	75.	230.	-20.	21.7	119.6	80.	391.	-15.
131800Z	18.4	125.4	70	18.3	125.2	65.	13.	-5.	20.7	126.2	70.	51.	-30.	22.8	128.1	75.	140.	-20.	24.6	123.9	80.	231.	-25.
140000Z	19.0	124.9	70	19.0	124.8	70.	6.	0.	22.0	122.6	85.	76.	-20.	24.9	121.0	90.	237.	10.	27.5	120.8	95.	325.	40.
140600Z	20.0	124.2	95	19.8	124.1	95.	13.	0.	22.8	122.1	130.	110.	30.	25.7	120.8	130.	280.	05.	28.5	120.8	130.	249.	75.
141200Z	20.7	123.5	100	20.8	123.4	100.	8.	0.	24.2	121.2	130.	131.	35.	27.7	120.8	130.	307.	05.	31.0	121.2	130.	249.	70.
141800Z	21.5	122.5	100	21.5	122.8	105.	17.	5.	25.2	120.9	130.	151.	35.	28.7	120.2	130.	289.	75.	31.9	121.7	130.	265.	65.
150000Z	22.1	121.3	105	22.2	121.2	110.	8.	5.	25.7	118.5	165.	90.	45.	28.7	118.2	115.	179.	60.	31.4	119.7	105.	105.	35.
150600Z	22.9	120.1	100	22.8	120.1	110.	6.	10.	26.1	120.8	115.	80.	50.	29.1	120.0	105.	93.	50.	31.7	117.7	95.	112.	30.
151200Z	24.0	118.8	95	23.8	119.1	110.	20.	15.	27.2	120.2	105.	72.	40.	30.3	120.0	100.	19.	40.	32.4	119.1	95.	127.	40.
151800Z	25.2	117.6	95	25.1	117.8	100.	12.	5.	29.5	115.7	90.	84.	35.	32.6	117.3	90.	169.	25.	34.9	120.6	85.	236.	35.
160000Z	26.1	116.6	80	26.1	116.8	80.	0.	0.	30.2	115.2	70.	88.	15.	33.1	117.5	65.	177.	-5.	35.1	122.5	80.	281.	15.
160600Z	27.0	115.7	65	27.0	115.7	65.	0.	0.	30.6	112.0	60.	157.	5.	34.1	114.5	50.	329.	-25.	0.0	0.0	0.	-0.	0.
161200Z	27.8	115.0	65	28.0	115.1	55.	11.	-10.	32.4	113.9	45.	141.	-15.	35.3	117.5	35.	315.	-20.	0.0	0.0	0.	-0.	0.
161800Z	28.4	114.7	55	28.7	114.5	55.	21.	0.	32.3	114.2	45.	252.	-20.	35.3	117.8	25.	307.	-25.	0.0	0.0	0.	-0.	0.
170000Z	29.1	114.9	55	29.4	114.7	50.	21.	-5.	33.0	114.5	40.	100.	-30.	35.8	118.0	35.	424.	-10.	0.0	0.0	0.	-0.	0.
170600Z	29.8	115.4	55	30.0	115.4	50.	24.	-5.	33.0	118.0	40.	175.	-25.	36.0	121.8	35.	460.	-5.	0.0	0.0	0.	-0.	0.
171200Z	30.0	116.5	60	30.3	115.8	45.	40.	-15.	32.8	120.0	35.	140.	-20.	35.4	121.5	30.	412.	-5.	0.0	0.0	0.	-0.	0.
171800Z	30.1	117.4	65	30.2	117.1	80.	8.	-5.	31.2	126.7	30.	142.	0.	32.8	131.2	40.	485.	5.	0.0	0.0	0.	-0.	0.
180000Z	30.2	118.2	70	30.2	118.2	85.	0.	-5.	31.3	123.2	80.	143.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
180600Z	30.2	119.0	85	30.2	119.0	70.	0.	5.	31.0	124.6	55.	180.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
181200Z	30.3	119.5	55	30.2	119.8	70.	17.	15.	31.3	125.5	50.	209.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
181800Z	30.5	120.0	50	30.2	120.5	65.	31.	15.	31.0	128.1	45.	216.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
190000Z	30.7	120.5	45	30.4	120.7	55.	21.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
190600Z	30.7	121.1	40	30.6	120.9	45.	12.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
191200Z	30.6	121.6	35	30.6	121.5	40.	13.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
191800Z	30.6	122.0	35	30.7	122.2	40.	12.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	15.	158.	380.	514.	15.	158.	380.	514.
AVG RIGHT ANGLE ERROR	12.	113.	285.	396.	12.	113.	285.	396.
AVG INTENSITY MAGNITUDE ERROR	4.	17.	21.	26.	5.	17.	21.	26.
AVG INTENSITY BIAS	2.	5.	3.	9.	0.	5.	3.	9.
NUMBER OF FORECASTS	44	40	36	29	42	40	36	29

TROPICAL STORM GLORIA

(August-September)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
260122	20.9	130.4	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
260186	20.9	129.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270062	21.0	129.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270062	21.5	128.5	25	21.3	128.7	30.	16.	5.	22.1	125.9	40.	200.	0.	23.5	122.8	55.	480.	25.	0.0	0.0	0.	-0.	0.
270122	22.2	128.0	30	21.6	128.2	30.	38.	0.	22.3	126.5	40.	210.	0.	23.5	123.8	55.	499.	25.	0.0	0.0	0.	-0.	0.
270186	23.1	128.0	35	22.5	127.4	35.	49.	0.	23.8	125.8	45.	221.	10.	25.1	123.5	55.	510.	30.	0.0	0.0	0.	-0.	0.
280062	23.8	128.3	40	24.2	128.8	40.	36.	0.	27.7	130.7	45.	75.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280062	24.6	128.5	40	24.6	128.5	40.	0.	0.	27.8	129.8	45.	29.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280122	25.4	128.0	40	25.2	128.9	40.	20.	0.	28.1	129.4	40.	71.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280186	26.3	128.8	35	26.4	128.5	35.	17.	0.	30.3	128.8	35.	149.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290062	27.2	129.4	30	27.5	129.2	30.	21.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290062	28.0	130.2	30	28.0	130.1	30.	5.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290122	28.8	131.0	30	28.7	130.8	30.	12.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290186	29.7	131.6	25	29.5	131.3	30.	20.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WARNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	21.	138.	496.	0.
AVG RIGHT ANGLE ERROR	13.	79.	331.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	9.	27.	0.
AVG INTENSITY BIAS	1.	9.	27.	0.
NUMBER OF FORECASTS	11	7	3	0

TROPICAL STORM HESTER

(August-September)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
260062	26.8	150.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
260122	27.7	150.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
260186	28.2	149.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270062	28.9	149.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270062	29.6	149.0	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270122	30.1	149.1	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270186	30.6	149.4	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280062	31.4	149.8	40	31.3	150.3	40.	26.	0.	34.1	153.8	45.	89.	-5.	37.2	158.3	45.	300.	5.	0.0	0.0	0.	-0.	0.
280062	32.2	150.2	45	32.4	150.5	40.	19.	-5.	35.6	154.3	45.	63.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280122	33.0	150.7	45	33.0	150.8	45.	5.	0.	35.7	154.2	40.	156.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280186	33.8	151.4	50	33.6	151.2	45.	16.	-5.	36.0	153.5	45.	315.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290062	34.6	152.1	50	34.4	152.3	45.	15.	-5.	37.1	155.5	40.	405.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290062	35.8	153.7	45	35.7	152.9	45.	39.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290122	37.1	156.0	45	36.6	156.0	45.	30.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
290186	38.7	159.2	40	38.0	158.1	45.	66.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
300062	40.8	162.8	40	39.7	161.6	40.	85.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WARNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	34.	198.	300.	0.
AVG RIGHT ANGLE ERROR	17.	28.	52.	0.
AVG INTENSITY MAGNITUDE ERROR	2.	3.	5.	0.
AVG INTENSITY BIAS	-1.	-1.	5.	0.
NUMBER OF FORECASTS	9	5	1	0

TYPHOON IRMA

(September)

	BEST TRACK			WARNING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
					ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
90Y12Z	21.0 123.8	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
90Y18Z	21.0 123.3	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W00Z	21.0 122.8	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W06Z	21.0 122.5	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W12Z	21.5 122.2	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W18Z	21.0 121.9	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V00Z	21.0 121.6	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V06Z	22.5 121.8	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V12Z	23.6 122.3	30	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V18Z	24.1 122.7	30	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W00Z	24.9 122.8	35	25.0 122+9	30.	17.	-5.	28+4	12+7	+0.	+10.	32.1	127.9	95.	200.	-15.	36.2	133.0	35.	277.	-15.
91W06Z	25.4 123.0	40	25.8 122+8	30.	26.	-10.	28+1	12?+4	35.	85.	31.4	127.5	90.	113.	0.	34.9	130.7	50.	43.	10.
91W12Z	25.9 123.5	50	25.8 124+0	45.	24.	-5.	28.7	12?+7	35.	95.	31.9	127.8	90.	90.	-5.	35.3	131.3	50.	91.	20.
91W18Z	26.6 123.9	50	26.9 123+9	45.	29.	-5.	29.2	12?+2	35.	95.	32.9	127.3	90.	6.	-5.	35.7	130.9	45.	205.	25.
91X00Z	27.3 123.9	50	27.2 123+2	45.	12.	-5.	30.0	12?+1	35.	31.	-5.	33.0	127.2	55.	80.	5.	0+0	0.0	0.	-0.	0.
91X06Z	27.7 123.9	55	27.8 124+0	50.	R.	-5.	30.4	12?+6	80.	290	0.	33.5	128+0	55.	150.	15.	0+0	0.0	0.	-0.	0.
91X12Z	28.3 124.0	55	28.4 124+2	50.	12.	-5.	31+0	12?+1	80.	30?	-5.	33.8	129+3	50.	190.	20.	0+0	0.0	0.	-0.	0.
91X18Z	29.1 124.4	60	29.2 124+5	55.	R.	-5.	32+2	12?+8	80.	30?	-5.	34.3	130+3	95.	230.	25.	0+0	0.0	0.	-0.	0.
91Y00Z	30.0 124.7	60	29.9 124+7	55.	R.	-5.	32+R	12?+2	80.	135?	10.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Y06Z	30.8 125.4	60	30.8 125+2	60.	10.	0.	33+R	12?+9	85.	150?	25.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Y12Z	31.5 126.1	65	31.8 126+0	65.	19.	0.	34+R	12?+3	85.	180?	35.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Y18Z	32.3 127.3	65	32.2 127+0	65.	16.	0.	35+2	13?+9	80.	200?	40.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Z00Z	33.1 128.8	50	33.0 128+7	65.	R.	15.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Z06Z	34.2 130.4	40	34.2 130+7	50.	10.	10.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Z12Z	34.7 133.0	30	34.7 133+0	30.	0.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Z18Z	34.9 135.0	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	14.	92.	136.	156.	15.	71.	100.	100.
AVG RIGHT ANGLE ERROR	12.	44.	31.	47.	13.	42.	34.	86.
AVG INTENSITY MAGNITUDE ERROR	5.	12.	11.	18.	5.	7.	8.	13.
AVG INTENSITY BIAS	-2.	7.	5.	10.	0.	1.	-1.	-3.
NUMBER OF FORECASTS	18	12	8	4	14	10	6	2

TYPHOON JUDY

(September)

	BEST TRACK			WARNING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
					ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
90V06Z	19.5 164.7	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
90V12Z	19.6 163.1	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
90V18Z	19.7 161.5	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91U00Z	20.0 160.3	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91U06Z	20.6 159.3	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91U12Z	21.5 158.3	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91U18Z	22.2 157.4	20	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V00Z	22.7 155.8	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V06Z	23.1 154.3	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V12Z	23.3 152.7	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91V18Z	23.2 151.2	25	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W00Z	23.1 149.9	30	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W06Z	23.3 148.9	30	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W12Z	23.6 148.0	35	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W18Z	24.0 147.0	40	0.0 0+0	0.	-0.	0.	0+0	0+0	0.	-0?	0.	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91X00Z	24.6 146.7	40	24.6 146+6	50.	5.	10.	26.4	14?+3	85.	85?	5.	27.6	141.7	70.	180.	-5.	28.8	139.3	70.	454.	-20.
91X06Z	25.4 146.3	45	25.2 146+2	50.	13.	5.	27.5	14?+8	85.	5??	5.	29.6	143.3	70.	79.	-10.	32.2	144.1	70.	234.	-20.
91X12Z	26.3 146.0	50	26.6 146+2	50.	21.	0.	30+0	14?+0	70.	105?	5.	32.2	147.6	65.	160.	-20.	33.7	151.7	55.	207.	-35.
91X18Z	27.0 145.5	55	27.2 145+7	55.	16.	0.	30+9	14?+0	70.	65?	0.	32.6	147.2	65.	101.	-25.	33.8	150.3	50.	267.	-20.
91Y00Z	27.6 145.3	60	27.8 145+4	60.	13.	0.	30+9	14?+0	85.	5??	-10.	32.7	147.5	60.	92.	-30.	33.9	153.0	50.	371.	0.
91Y06Z	28.3 145.0	60	28.6 145+1	60.	19.	0.	30+5	14?+2	85.	8??	-15.	32.7	145+9	55.	156.	-35.	33.9	151.3	40.	544.	0.
91Y12Z	28.8 144.6	65	28.4 145+0	65.	32.	0.	30+7	14?+4	85.	5??	-20.	31.6	148+8	55.	293.	-35.	0+0	0.0	0.	-0.	0.
91Y18Z	29.4 144.3	70	29.3 144+3	65.	R.	-5.	31+4	14?+7	85.	6??	-25.	32.7	148+4	50.	357.	-20.	0+0	0.0	0.	-0.	0.
91Z00Z	29.8 144.2	75	29.8 144+2	70.	0.	-5.	32+1	14?+9	85.	9??.	-25.	33.0	151+3	50.	430.	0.	0+0	0.0	0.	-0.	0.
91Z06Z	30.6 144.3	80	30.6 144+1	75.	10.	-5.	32+3	14?+0	80.	10??	-30.	33.2	152+4	45.	562.	5.	0+0	0.0	0.	-0.	0.
91Z12Z	31.4 144.6	85	31.1 144+R	75.	21.	-10.	32+7	14R+5	80.	23??	-30.	0.0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91Z18Z	32.4 145.2	90	32.3 144+9	90.	16.	0.	35+4	14R+3	75.	22??	5.	0.0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W00Z	33.7 146.1	90	33.4 145+6	90.	31.	0.	36+2	14?+2	85.	30??	15.	0.0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W06Z	35.0 147.4	90	34.9 147+2	90.	11.	0.	38+3	15?+4	85.	20??	45.	0.0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W12Z	36.5 149.2	90	36.6 149+5	90.	16.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91W18Z	38.2 151.3	70	37.7 150+7	70.	41.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91X00Z	40.1 153.4	50	40.0 154+0	50.	28.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.
91X06Z	42.0 156.6	40	41.9 155+9	40.	40.	0.	0+0	0+0	0.	-0?	0.	0+0	0+0	0.	-0.	0.	0+0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	127.	262.	346.	19.	127.	266.	386.
AVG RIGHT ANGLE ERROR	12.	51.	131.	185.	12.	51.	131.	185.
AVG INTENSITY MAGNITUDE ERROR	2.	17.	19.	16.	2.	17.	19.	16.
AVG INTENSITY BIAS	-1.	-5.	-18.	-16.	0.	-5.	-18.	-16.
NUMBER OF FORECASTS	18	14	10	5	18	14	10	6

TROPICAL STORM KIT

(September)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
760000	13.0	133.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
760006	13.5	132.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
760012	13.9	131.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
760018	13.9	130.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
761000	13.9	129.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
761006	13.8	128.0	20	13.5	128.6	20.	35.	0.	14.2	126.7	30.	187.	5.	15.0	126.3	40.	407.	10.	15.7	121.1	45.	478.	5.
761012	14.0	127.0	25	13.8	128.1	25.	68.	0.	14.3	126.1	35.	225.	10.	15.2	123.4	40.	401.	5.	15.8	120.3	40.	478.	0.
761118	14.4	125.8	25	13.8	127.6	25.	105.	0.	14.6	125.5	35.	438.	5.	15.0	122.6	40.	401.	5.	16.0	119.4	40.	462.	-10.
762000	14.7	124.9	25	14.8	125.1	25.	13.	0.	14.1	124.9	30.	272.	0.	14.9	117.3	40.	224.	5.	17.4	113.1	45.	136.	-5.
762006	15.1	123.6	25	14.8	123.6	25.	18.	0.	15.8	118.5	30.	177.	0.	15.5	113.8	40.	75.	0.	16.9	109.2	45.	213.	0.
762124	15.5	122.4	25	15.2	122.1	25.	25.	0.	15.8	117.1	40.	102.	5.	15.0	112.8	50.	109.	10.	15.1	108.2	40.	202.	0.
762182	16.3	118.1	30	16.5	119.0	30.	53.	0.	16.7	114.7	40.	84.	5.	16.0	110.1	50.	107.	0.	0.0	0.0	0.	-0.	0.
763000	15.0	116.2	30	17.0	117.3	30.	105.	0.	17.4	113.1	40.	103.	5.	17.0	109.4	50.	87.	0.	17.0	106.1	40.	100.	0.
763006	14.0	115.7	30	14.4	115.0	30.	42.	0.	14.0	110.0	40.	216.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
763124	15.3	115.4	35	15.2	115.1	35.	8.	0.	15.3	110.8	50.	131.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
763182	15.3	114.6	35	15.3	114.7	35.	6.	0.	15.7	110.6	50.	125.	0.	16.0	106.7	50.	136.	-10.	0.0	0.0	0.	-0.	0.
764000	15.7	113.6	35	15.4	113.5	35.	19.	0.	16.3	109.1	50.	109.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
764006	16.3	112.8	40	16.2	112.8	40.	6.	0.	16.1	109.1	50.	49.	5.	16.0	106.7	50.	153.	-10.	0.0	0.0	0.	-0.	0.
764124	17.1	112.1	40	17.1	111.9	40.	11.	0.	19.8	108.7	35.	85.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
764182	17.6	111.5	50	17.8	111.5	50.	12.	0.	20.5	108.9	35.	130.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
765000	18.0	110.8	50	18.1	111.1	50.	18.	0.	20.7	109.3	35.	191.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
765006	18.6	109.9	45	18.4	110.2	45.	17.	0.	20.5	107.0	35.	102.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
765124	18.6	109.0	40	18.3	108.8	40.	13.	0.	19.9	106.8	30.	148.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
765182	18.3	108.3	40	18.8	107.8	40.	41.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
770000	18.0	107.5	40	18.3	107.0	40.	19.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
770006	17.8	106.8	40	18.3	106.4	40.	32.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
770124	17.7	106.0	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS

	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	32.	165.	231.	295.
AVG RIGHT ANGLE ERROR	16.	80.	136.	210.
AVG INTENSITY MAGNITUDE ERROR	0.	4.	6.	5.
AVG INTENSITY BIAS	0.	1.	2.	-1.
NUMBER OF FORECASTS	21	18	10	7

TYPHOON LOLA

(September-October)

	BEST TRACK			WARNING				24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
						ERRORS				ERRORS					ERRORS					ERRORS		
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
260122	7.0	147.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
260218	8.5	146.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
261006	9.6	146.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
261106	9.8	146.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
261122	10.0	145.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
261218	10.1	144.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270006	10.3	143.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270106	10.4	142.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270122	10.5	142.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
270218	10.7	140.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
271006	11.0	139.9	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
271106	11.4	138.4	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
271122	11.7	137.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
271218	11.9	136.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280006	12.1	135.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280106	12.2	134.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
280122	12.3	133.7	25	12.3	133.7	25.	0.	0.	13.4	129.9	35.	115.	5.	15.2	125.0	40.	153.	-5.	18.5	120.9	45.	145.	-5.
280218	12.9	132.3	30	12.8	132.8	30.	21.	0.	13.4	128.4	40.	120.	10.	15.4	124.1	45.	140.	0.	18.5	120.0	50.	115.	0.
290006	12.9	131.0	30	12.8	131.4	30.	35.	0.	14.0	126.8	40.	108.	5.	15.8	121.0	50.	130.	0.	18.0	116.7	50.	102.	-5.
290106	12.2	129.8	30	12.2	129.8	30.	0.	0.	13.2	125.0	45.	83.	5.	14.5	119.8	40.	102.	-10.	16.7	114.8	50.	145.	-5.
290122	12.2	128.8	30	12.2	128.9	30.	6.	0.	13.0	125.0	40.	21.	-5.	14.0	121.2	35.	50.	-15.	16.6	117.2	45.	48.	-15.
290218	12.1	127.7	30	12.2	127.7	30.	6.	0.	12.7	123.7	35.	30.	-10.	13.5	119.7	40.	75.	-10.	14.9	116.0	50.	44.	-15.
290006	12.2	126.8	35	12.2	126.7	35.	6.	0.	13.1	122.6	40.	25.	-10.	14.3	118.3	50.	48.	-5.	16.4	114.5	60.	24.	-5.
290106	12.5	125.8	40	12.4	125.8	40.	6.	0.	13.5	121.8	45.	29.	-5.	14.6	117.5	60.	51.	5.	16.7	113.8	70.	18.	5.
290122	12.8	124.7	45	12.7	124.8	45.	6.	0.	13.7	120.5	45.	30.	-5.	14.3	116.2	60.	40.	0.	17.0	112.8	70.	54.	0.
290218	13.2	123.8	45	13.4	123.8	45.	17.	0.	14.7	119.3	50.	0.	0.	14.5	115.3	65.	31.	0.	17.1	112.1	70.	130.	0.
290006	13.5	122.5	50	13.6	122.4	50.	13.	0.	15.1	118.3	65.	0.	10.	17.1	114.9	75.	40.	10.	20.1	111.7	80.	173.	10.
290106	13.8	121.4	50	13.8	121.5	50.	13.	0.	14.9	117.6	65.	30.	10.	17.2	114.3	75.	20.	10.	20.1	111.7	80.	152.	5.
290122	14.3	120.4	50	14.1	120.4	55.	12.	5.	15.8	116.5	70.	0.	10.	17.7	113.5	75.	42.	5.	20.3	111.6	80.	141.	5.
290218	14.7	119.3	50	14.5	119.0	55.	21.	5.	16.9	114.9	70.	63.	5.	19.2	112.1	75.	135.	5.	22.2	111.2	80.	225.	-15.
300006	15.1	118.2	55	15.0	117.9	55.	14.	0.	16.9	114.8	70.	25.	5.	19.0	112.2	75.	101.	5.	21.9	111.0	80.	145.	-10.
300106	15.4	117.2	55	15.6	117.1	55.	13.	0.	17.4	114.0	70.	30.	5.	19.7	111.7	75.	130.	0.	22.7	110.8	90.	198.	-30.
300122	15.9	116.5	60	15.9	116.4	60.	6.	0.	18.2	113.8	75.	74.	5.	20.8	111.9	80.	157.	5.	0.0	0.0	0.	-0.	0.
300218	16.3	115.8	65	16.4	115.8	65.	6.	0.	18.7	113.2	75.	90.	5.	21.6	111.9	75.	185.	0.	0.0	0.0	0.	-0.	0.
310006	16.5	114.9	65	16.6	114.8	65.	8.	0.	18.3	111.1	75.	111.	5.	19.0	107.0	65.	266.	-5.	0.0	0.0	0.	-0.	0.
310106	16.8	114.1	65	16.7	114.0	70.	18.	5.	17.7	111.7	80.	51.	5.	18.7	107.8	65.	191.	-5.	19.8	103.7	30.	323.	-20.
310122	17.0	113.5	70	17.2	113.7	75.	17.	5.	18.7	111.0	85.	79.	10.	19.8	107.3	65.	180.	5.	0.0	0.0	0.	-0.	0.
310218	17.2	113.2	70	17.2	112.8	75.	34.	5.	18.1	109.0	75.	172.	0.	18.8	105.4	65.	280.	5.	0.0	0.0	0.	-0.	0.
310006	17.4	112.8	70	17.2	112.8	75.	17.	5.	17.8	110.7	70.	87.	0.	18.4	108.0	65.	150.	5.	0.0	0.0	0.	-0.	0.
310106	17.7	112.6	75	17.6	112.6	75.	13.	0.	18.5	110.4	65.	87.	-5.	19.0	107.5	55.	141.	5.	0.0	0.0	0.	-0.	0.
310122	18.2	112.3	75	18.3	112.2	75.	8.	0.	19.5	110.4	65.	13.	5.	21.6	107.9	65.	29.	20.	0.0	0.0	0.	-0.	0.
310218	18.5	112.0	75	18.6	112.0	75.	6.	0.	20.2	110.8	65.	40.	5.	21.7	108.0	55.	30.	15.	0.0	0.0	0.	-0.	0.
1006006	18.9	111.7	70	18.9	111.6	70.	6.	0.	20.5	110.4	65.	45.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006106	19.4	111.1	70	19.2	111.2	70.	13.	0.	21.0	109.4	50.	23.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006122	19.7	110.5	60	19.7	110.4	65.	6.	5.	21.4	108.3	50.	0.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006218	20.1	110.1	60	20.0	110.0	65.	8.	5.	21.8	107.7	45.	21.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006006	20.4	109.6	60	20.2	109.6	60.	12.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006106	20.9	109.0	50	20.7	109.2	55.	16.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006122	21.3	108.3	45	21.6	108.4	50.	19.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1006218	21.5	107.5	40	21.7	107.2	40.	21.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WARNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	13.	56.	112.	134.
AVG RIGHT ANGLE ERROR	9.	40.	79.	88.
AVG INTENSITY MAGNITUDE ERROR	1.	6.	8.	9.
AVG INTENSITY BIAS	1.	3.	2.	-6.
NUMBER OF FORECASTS	34	30	26	17

TYPHOONS WHILE OVER 35 KTS	WARNG	24-HR	48-HR	72-HR
	13.	49.	116.	134.
	9.	36.	79.	88.
	2.	5.	8.	9.
	0.	3.	4.	-6.
	28	24	20	11

TYPHOON MAMIE

(September-October)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
26Y00Z	19.1 154.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
26Y06Z	19.6 153.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
26Y12Z	19.9 153.3	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
26Y18Z	19.8 152.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
27J00Z	19.4 152.6	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
27J06Z	19.2 153.3	35	19.3	152.4	30.	51.	-5.	19.6	150.9	45.	185.	0.	20.0	147.7	50.	341.	-5.	21.8	144.5	55.	647.	-15.
27J12Z	20.2 153.2	35	19.5	153.0	35.	43.	0.	19.8	152.1	50.	229.	0.	20.0	149.6	60.	413.	0.	20.6	147.4	65.	758.	-5.
27J18Z	20.9 152.9	35	19.6	152.8	35.	78.	0.	19.7	151.9	50.	271.	0.	20.1	149.5	60.	474.	-5.	20.7	147.3	65.	932.	0.
100100Z	21.6 152.8	40	21.1	153.1	35.	34.	-5.	23.7	151.9	50.	117.	0.	26.3	150.5	60.	162.	-10.	28.6	148.6	65.	661.	5.
100106Z	22.9 152.3	45	22.9	152.3	35.	0.	-10.	26.0	150.7	50.	38.	-5.	29.3	149.4	55.	139.	-15.	32.4	150.4	60.	614.	5.
100112Z	23.9 151.5	50	23.5	151.9	40.	23.	-10.	26.9	150.2	50.	5.	-10.	30.0	149.2	60.	234.	-10.	33.3	151.3	60.	722.	15.
100118Z	24.1 150.7	50	24.3	150.7	45.	12.	-5.	27.5	148.1	60.	120.	-5.	30.5	148.6	60.	412.	-5.	0.0	0.0	0.	-0.	0.
100200Z	24.9 150.2	50	24.7	150.0	30.	16.	0.	27.4	147.8	60.	180.	-10.	30.9	148.4	65.	573.	5.	0.0	0.0	0.	-0.	0.
100206Z	25.9 150.0	55	25.8	149.8	30.	12.	-5.	29.2	148.8	60.	169.	-10.	32.5	151.1	60.	584.	5.	0.0	0.0	0.	-0.	0.
100212Z	26.9 150.1	60	26.8	150.3	30.	12.	-10.	30.8	151.8	60.	100.	-10.	34.4	155.4	60.	531.	15.	0.0	0.0	0.	-0.	0.
100218Z	28.0 150.3	65	27.8	150.7	30.	24.	-15.	31.7	152.8	60.	213.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100300Z	29.0 150.8	70	28.7	150.8	60.	18.	-10.	32.4	153.4	60.	328.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100306Z	30.5 151.7	70	30.1	151.6	70.	24.	0.	34.6	156.0	60.	328.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100312Z	32.3 152.9	70	31.7	153.0	65.	36.	-5.	36.9	161.0	65.	234.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100318Z	34.7 155.1	65	34.7	155.0	65.	5.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100400Z	36.6 157.7	60	36.4	157.8	60.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100406Z	38.7 160.4	55	38.6	160.2	55.	11.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100412Z	40.8 163.2	45	40.2	163.1	40.	36.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	25.	182.	386.	722.
AVG RIGHT ANGLE ERROR	14.	68.	143.	327.
AVG INTENSITY MAGNITUDE ERROR	5.	4.	8.	8.
AVG INTENSITY BIAS	-5.	-4.	-3.	1.
NUMBER OF FORECASTS	18	14	10	6

	TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR
	25.	182.	386.	722.
	14.	68.	143.	327.
	5.	4.	8.	8.
	0.	-4.	-3.	1.
	18	14	10	6

TROPICAL STORM NINA

(October)

	OBST INFO			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
	POSIT			POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
10060600	19.0	141.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10060606	19.0	139.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10060612	19.0	137.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10060618	19.0	135.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10070600	19.0	134.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10070606	19.0	132.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10070612	19.0	131.0	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10070618	19.0	130.0	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10080600	19.0	129.1	30	19.2	129.1	30.	0.	0.	19.8	127.7	45.	70.	0.	18.6	118.0	50.	150.	5.	17.7	113.5	50.	285.	-5.
10080606	19.1	128.0	35	19.2	127.9	35.	0.	0.	19.8	126.1	45.	95.	0.	18.6	117.0	50.	100.	-5.	17.2	112.5	50.	149.	-10.
10080612	19.2	126.9	40	19.2	127.0	40.	10.	0.	19.8	124.8	55.	65.	0.	17.5	116.1	50.	150.	0.	17.1	110.4	50.	266.	0.
10080618	19.3	125.7	45	19.2	126.0	45.	35.	0.	19.8	123.4	55.	90.	0.	17.5	113.3	50.	180.	-5.	17.2	110.2	60.	273.	0.
10090600	19.8	124.1	45	19.8	124.1	45.	0.	0.	18.7	120.2	50.	100.	0.	18.0	117.1	50.	230.	-5.	18.3	113.1	60.	312.	0.
10090606	19.2	123.8	45	19.1	123.7	45.	0.	0.	17.1	120.0	45.	140.	0.	19.8	110.9	50.	250.	-10.	20.0	113.7	60.	340.	5.
10090612	19.1	122.7	50	19.3	122.8	50.	11.	0.	17.1	119.2	50.	140.	0.	19.8	110.7	65.	250.	5.	20.7	113.7	70.	352.	15.
10090618	19.0	121.5	50	19.2	121.5	50.	12.	0.	17.8	119.1	60.	180.	0.	19.8	110.1	70.	260.	10.	20.8	112.9	75.	389.	20.
10100600	19.9	120.7	45	19.7	120.2	50.	31.	5.	18.5	116.2	60.	105.	5.	18.8	112.9	65.	210.	5.	19.6	109.5	75.	307.	20.
10100606	19.7	120.0	45	19.7	120.0	50.	0.	5.	18.5	116.2	60.	80.	0.	18.8	112.9	65.	205.	10.	19.6	109.5	75.	347.	20.
10100612	19.0	119.3	50	19.5	119.3	50.	8.	0.	19.8	115.9	60.	140.	0.	19.1	111.3	65.	290.	10.	19.8	107.3	75.	524.	20.
10100618	19.7	118.8	55	19.8	118.8	55.	8.	0.	19.8	115.1	65.	115.	5.	19.1	111.1	70.	300.	15.	19.8	107.3	90.	471.	0.
10110600	19.1	117.7	55	19.8	117.1	55.	50.	0.	19.8	113.1	65.	200.	5.	19.5	109.0	70.	430.	15.	17.3	105.0	90.	541.	-10.
10110606	19.0	117.0	60	19.0	117.0	60.	12.	0.	18.3	110.0	70.	190.	10.	17.3	109.9	75.	389.	20.	19.1	105.8	90.	519.	0.
10110612	19.0	117.0	60	19.0	117.0	55.	12.	-5.	18.2	115.8	70.	30.	10.	17.6	112.7	70.	230.	20.	17.9	108.5	75.	313.	25.
10110618	19.0	117.0	60	19.0	117.0	55.	8.	-5.	18.1	116.0	65.	140.	10.	16.8	110.8	70.	270.	20.	17.6	108.8	70.	417.	20.
10120600	19.0	116.0	60	19.0	116.0	60.	8.	0.	18.7	113.0	65.	100.	10.	16.8	109.9	65.	310.	15.	18.0	108.2	55.	428.	-15.
10120606	19.0	116.0	55	19.3	115.9	60.	58.	5.	18.3	112.5	65.	220.	10.	16.3	108.8	65.	381.	15.	0.0	0.0	0.	-0.	0.
10120612	19.0	116.0	55	19.3	115.9	60.	29.	5.	18.7	110.5	65.	111.	10.	16.9	110.8	65.	261.	15.	18.3	108.9	55.	468.	-10.
10120618	19.0	116.0	55	19.3	115.9	60.	29.	5.	18.7	110.2	65.	70.	10.	18.0	110.5	65.	238.	15.	18.3	108.8	55.	357.	-10.
10130600	19.0	116.0	55	19.5	116.0	60.	24.	5.	19.8	114.2	50.	30.	0.	18.0	111.0	55.	190.	-5.	18.3	107.3	55.	370.	-5.
10130606	19.0	116.0	55	19.5	116.0	55.	24.	0.	19.8	114.2	45.	80.	-5.	18.0	111.0	50.	188.	-10.	18.3	107.3	50.	419.	-5.
10130612	19.0	116.0	55	19.5	116.0	45.	24.	-10.	19.8	114.9	40.	120.	-10.	18.0	111.1	35.	201.	-10.	18.3	107.3	30.	451.	0.
10130618	19.0	115.5	50	19.5	115.7	45.	21.	-5.	19.7	114.7	35.	140.	-10.	18.0	110.9	35.	180.	-10.	0.0	0.0	0.	-0.	0.
10140600	18.4	115.3	50	18.1	115.0	45.	29.	-5.	18.7	113.5	40.	90.	-10.	17.5	111.5	35.	178.	-5.	0.0	0.0	0.	-0.	0.
10140606	17.0	115.2	50	16.8	114.5	45.	42.	-5.	19.1	111.5	45.	59.	-5.	21.1	108.2	35.	247.	0.	0.0	0.0	0.	-0.	0.
10140612	17.0	115.0	50	17.7	115.2	45.	13.	-5.	20.1	113.8	45.	102.	0.	22.8	110.1	30.	140.	0.	0.0	0.0	0.	-0.	0.
10140618	18.0	114.1	50	18.1	114.8	45.	40.	-5.	20.1	116.1	45.	49.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10150600	18.3	113.3	50	18.2	113.1	50.	13.	0.	19.4	109.6	40.	100.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10150606	18.0	112.5	50	18.0	112.1	50.	26.	0.	19.8	108.1	35.	209.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10150612	19.2	112.2	45	19.1	111.9	45.	18.	0.	20.5	108.8	35.	243.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10150618	19.5	112.1	45	19.4	111.8	45.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10160600	20.4	112.2	40	20.3	112.2	35.	8.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10160606	21.1	112.6	35	21.5	112.8	35.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10160612	21.6	113.0	30	21.7	113.0	35.	6.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	120.	290.	382.
AVG RIGHT ANGLE ERROR	16.	94.	212.	360.
AVG INTENSITY MAGNITUDE ERROR	2.	5.	10.	10.
AVG INTENSITY BIAS	-0.	3.	5.	3.
NUMBER OF FORECASTS	35	31	27	22

TYPHOON ORA

(October)

	BEST TRACK			WARNING				24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
						ERRORS					ERRORS					ERRORS					ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
100800Z	11.3	138.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100806Z	12.1	138.4	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100812Z	12.9	138.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100818Z	13.8	138.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100900Z	14.6	137.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100906Z	14.6	136.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100912Z	14.5	135.4	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100918Z	15.4	134.7	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101000Z	17.2	133.4	35	17.2	133.4	35.	0.	0.	20.7	131.2	30.	110.	0.	24.5	130.1	85.	367.	0.	27.9	132.3	75.	541.	-5.
101006Z	17.6	132.9	40	17.7	133.0	40.	0.	0.	21.0	130.2	30.	100.	0.	24.9	129.9	85.	369.	-5.	28.3	131.9	75.	549.	-10.
101012Z	17.7	131.5	40	18.4	132.1	40.	7.	0.	22.4	129.0	80.	120.	5.	25.9	128.0	85.	394.	-5.	28.9	131.5	75.	547.	-5.
101018Z	18.0	130.5	45	18.5	130.3	40.	21.	-5.	21.5	128.9	80.	33.	0.	24.3	127.1	85.	123.	-10.	26.0	117.6	30.	148.	-45.
101100Z	19.5	129.6	50	19.3	129.1	40.	21.	-10.	22.0	127.9	80.	91.	-5.	24.9	126.9	90.	140.	-30.	26.8	116.5	25.	143.	-30.
101106Z	20.1	128.7	50	20.1	128.8	30.	6.	0.	22.5	127.0	85.	96.	-5.	24.8	121.3	95.	102.	-40.	26.0	117.0	25.	134.	-20.
101112Z	20.9	127.8	55	21.0	127.8	30.	6.	-5.	23.5	124.7	85.	100.	-5.	25.2	120.7	95.	131.	-35.	0.0	0.0	0.	-0.	0.
101118Z	21.5	125.8	60	21.3	125.8	35.	12.	-5.	22.8	120.7	80.	107.	-15.	23.8	113.9	95.	416.	-20.	0.0	0.0	0.	-0.	0.
101200Z	21.8	124.5	65	22.0	124.2	40.	20.	-5.	23.2	118.8	30.	222.	-30.	23.5	113.6	25.	573.	-30.	0.0	0.0	0.	-0.	0.
101206Z	22.1	123.4	70	22.3	123.3	65.	13.	-5.	23.5	118.0	30.	287.	-35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101212Z	22.1	122.7	70	22.5	122.4	70.	24.	0.	23.3	118.0	30.	299.	-30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101218Z	22.3	122.6	75	22.1	122.0	70.	34.	-5.	22.7	119.0	55.	208.	-10.	23.5	114.7	65.	767.	-10.	0.0	0.0	0.	-0.	0.
101300Z	23.1	122.7	80	23.0	123.0	70.	14.	-10.	26.0	125.0	70.	84.	15.	28.8	128.9	35.	84.	20.	0.0	0.0	0.	-0.	0.
101306Z	23.9	122.9	85	23.8	122.7	80.	12.	-5.	27.2	124.3	75.	96.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101312Z	24.9	123.1	80	24.8	123.1	80.	14.	0.	27.7	126.9	75.	240.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101318Z	25.5	123.2	85	25.5	123.2	80.	0.	15.	28.2	127.0	70.	53.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101400Z	26.0	123.8	55	26.2	123.7	80.	13.	5.	28.9	127.9	40.	130.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101406Z	26.6	124.7	45	26.5	124.4	45.	17.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101412Z	27.3	126.0	40	27.1	126.0	40.	12.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101418Z	28.2	128.0	35	28.0	127.5	40.	24.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101500Z	29.5	130.3	35	29.3	129.8	35.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	124.	314.	460.	19.	124.	314.	460.
AVG RIGHT ANGLE ERROR	14.	99.	239.	341.	14.	99.	239.	341.
AVG INTENSITY MAGNITUDE ERROR	4.	15.	19.	18.	4.	15.	19.	18.
AVG INTENSITY BIAS	-1.	-1.	-15.	-18.	0.	-1.	-15.	-14.
NUMBER OF FORECASTS	21	17	11	6	21	17	11	6

TROPICAL DEPRESSION 26

(October)

	BEST TRACK			WARNING				24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
						ERRORS					ERRORS					ERRORS					ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
100818Z	19.3	163.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100900Z	19.9	163.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100906Z	20.5	162.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100912Z	21.1	162.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100918Z	21.5	162.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101000Z	21.9	161.6	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101006Z	22.1	161.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101012Z	22.1	160.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101018Z	22.1	159.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101100Z	22.0	158.8	25	22.2	158.4	25.	25.	0.	22.9	156.6	35.	119.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101106Z	22.0	157.6	25	22.0	159.0	25.	78.	0.	22.5	156.5	35.	303.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101112Z	22.1	156.1	25	22.0	157.8	25.	96.	0.	22.5	154.9	35.	298.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101118Z	22.0	154.4	25	22.2	155.1	25.	45.	0.	23.8	151.2	35.	159.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101200Z	23.4	152.6	30	23.5	152.5	30.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101206Z	23.7	151.1	30	24.1	151.0	30.	25.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101212Z	24.2	149.8	25	24.1	149.8	25.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101218Z	24.8	148.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	40.	218.	0.	0.
AVG RIGHT ANGLE ERROR	10.	22.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	9.	0.	0.
AVG INTENSITY BIAS	0.	9.	0.	0.
NUMBER OF FORECASTS	7	4	0	0

TROPICAL DEPRESSION 27

(October)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
10100Z	9.0	153.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10106Z	9.0	152.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10112Z	9.0	151.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10118Z	8.8	150.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10200Z	7.3	149.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10206Z	7.8	149.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10212Z	8.2	147.9	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10218Z	8.5	146.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10300Z	8.7	145.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10306Z	9.0	144.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10312Z	9.0	142.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10318Z	9.7	140.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10400Z	10.0	139.1	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10406Z	10.4	137.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10412Z	11.0	136.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10418Z	11.5	135.1	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10500Z	12.1	134.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10506Z	12.6	133.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10512Z	13.2	132.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10518Z	13.7	131.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10600Z	14.1	131.1	20	14.3	131.0	20.	13.	0.	16.4	127.8	30.	137.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10606Z	14.6	130.4	20	14.8	130.2	20.	17.	0.	17.1	127.0	30.	184.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10612Z	15.0	130.2	20	15.3	129.3	20.	55.	0.	17.8	126.5	30.	205.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10618Z	15.5	130.1	20	15.9	128.7	20.	84.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10700Z	15.9	130.1	20	16.3	127.4	20.	47.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10706Z	16.3	130.1	15	16.5	130.0	15.	11.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
10712Z	16.7	130.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	18.	175.	0.	0.
AVG NIGHT ANGLE ERROR	10.	168.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	13.	0.	0.
AVG INTENSITY BIAS	0.	13.	0.	0.
NUMBER OF FORECASTS	6	3	0	0

TYPHOON PHYLLIS

(~~October~~) LINE FOR 33⅓% REDUCTION

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
101312Z	7.0	165.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101318Z	8.0	165.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101400Z	9.5	164.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101406Z	10.5	164.1	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101412Z	11.0	163.7	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101418Z	12.0	163.2	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101500Z	13.0	162.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101506Z	14.0	162.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101512Z	14.5	161.6	25	14.7	161.5	25.	13.	0.	17.2	158.4	30.	93.	-10.	18.8	154.5	40.	157.	-15.	19.8	150.5	45.	277.	-45.
101518Z	15.0	161.2	25	14.9	161.1	25.	8.	0.	17.1	158.3	30.	82.	-15.	18.8	154.9	40.	87.	-25.	19.8	150.5	45.	287.	-45.
101600Z	15.0	160.7	30	15.6	160.6	30.	6.	0.	17.5	158.2	35.	40.	-15.	19.6	154.8	40.	47.	-30.	20.2	150.7	45.	285.	-50.
101606Z	16.0	160.2	40	16.2	160.2	40.	12.	0.	18.3	157.9	50.	48.	-5.	20.1	154.6	55.	41.	-30.	20.6	150.3	60.	312.	-35.
101612Z	16.2	159.7	40	15.7	159.5	40.	32.	0.	17.8	158.5	30.	46.	-5.	19.0	153.0	55.	172.	-35.	19.1	148.7	60.	448.	-35.
101618Z	16.4	159.1	45	16.4	159.2	45.	6.	0.	17.5	158.5	60.	90.	-5.	18.7	153.5	65.	195.	-25.	19.1	149.3	70.	428.	-25.
101700Z	16.9	158.5	50	16.8	158.5	50.	6.	0.	17.9	158.0	60.	104.	-10.	19.0	152.8	65.	235.	-30.	19.6	148.6	70.	441.	-20.
101706Z	17.5	157.9	55	17.3	157.9	55.	12.	0.	18.8	155.5	65.	90.	-20.	20.1	152.0	65.	245.	-30.	20.7	147.8	70.	437.	-15.
101712Z	18.2	157.2	55	18.0	156.8	55.	26.	0.	19.7	153.6	65.	119.	-25.	20.6	149.5	65.	305.	-30.	20.7	145.2	70.	569.	-10.
101718Z	19.1	156.4	65	18.8	156.3	65.	19.	0.	20.5	152.4	80.	172.	-10.	20.6	148.2	80.	432.	-15.	20.6	143.9	80.	639.	0.
101800Z	19.6	155.6	70	19.7	155.6	70.	6.	0.	21.5	152.2	80.	181.	-15.	21.9	147.8	85.	412.	-5.	22.0	143.2	85.	637.	5.
101806Z	20.3	155.3	85	20.3	155.3	85.	0.	0.	23.6	154.9	95.	66.	0.	26.0	156.9	95.	176.	10.	29.3	161.2	85.	496.	10.
101812Z	20.9	155.3	90	21.1	155.3	90.	12.	0.	24.7	155.9	95.	98.	0.	28.0	159.6	85.	327.	5.	30.4	165.5	75.	554.	5.
101818Z	21.5	155.3	90	21.6	155.3	90.	6.	0.	25.0	156.0	90.	96.	-5.	28.2	159.9	80.	343.	0.	30.5	166.0	70.	452.	5.
101900Z	22.1	155.4	95	22.1	155.4	95.	0.	0.	25.1	156.7	85.	115.	-5.	27.8	160.5	70.	373.	-10.	29.4	166.6	50.	375.	-10.
101906Z	22.6	155.5	95	22.7	155.5	95.	6.	0.	25.5	157.0	85.	140.	0.	28.0	160.9	70.	385.	-5.	0.0	0.0	0.	-0.	0.
101912Z	23.1	155.5	95	23.1	155.7	95.	11.	0.	25.7	157.3	85.	168.	5.	28.2	161.2	70.	335.	0.	0.0	0.0	0.	-0.	0.
101918Z	23.6	155.3	95	23.7	155.9	95.	33.	0.	26.4	158.1	85.	220.	5.	28.7	163.0	65.	324.	0.	0.0	0.0	0.	-0.	0.
102000Z	24.1	154.9	90	24.3	155.5	90.	35.	0.	27.6	156.4	75.	157.	-5.	29.8	161.2	50.	189.	-10.	0.0	0.0	0.	-0.	0.
102006Z	24.6	154.5	85	24.6	154.4	85.	5.	0.	27.6	152.9	75.	44.	0.	31.0	157.4	50.	422.	0.	0.0	0.0	0.	-0.	0.
102012Z	25.4	154.2	80	25.5	154.2	80.	6.	0.	29.3	154.4	70.	27.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102018Z	26.1	153.9	80	26.0	154.0	80.	8.	0.	29.8	154.4	65.	154.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102100Z	27.1	153.5	80	27.0	153.5	80.	6.	0.	31.0	154.0	60.	340.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102106Z	28.0	153.0	75	28.4	152.8	75.	58.	0.	33.9	154.8	55.	461.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102112Z	29.2	154.9	70	28.8	153.8	70.	62.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102118Z	30.7	157.2	65	29.6	155.8	65.	98.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102200Z	32.9	160.5	60	31.4	158.8	60.	124.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102206Z	35.4	164.0	50	35.5	164.1	50.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	22.	132.	263.	436.	24.	132.	263.	436.
AVG RIGHT ANGLE ERROR	13.	86.	198.	377.	14.	NA.	198.	377.
AVG INTENSITY MAGNITUDE ERROR	0.	7.	16.	21.	0.	7.	19.	21.
AVG INTENSITY BIAS	0.	-6.	-14.	-18.	0.	-6.	-19.	-18.
NUMBER OF FORECASTS	28	24	20	15	25	24	20	15

SUPER TYPHOON RITA

(October)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
101500Z	10.0	145.0	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101506Z	9.7	144.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101512Z	9.5	143.6	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101518Z	9.3	142.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101600Z	9.1	141.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101606Z	8.9	140.8	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101612Z	9.0	139.7	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101618Z	9.1	139.1	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101700Z	9.3	138.5	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101706Z	9.4	137.5	30	9.6	137.8	30.	11.	0.	10.6	137.8	90.	31.	5.	10.3	137.2	90.	100.	10.	10.0	136.7	80.	210.	-15.
101712Z	10.0	136.5	30	10.1	137.8	30.	14.	0.	11.0	137.8	95.	90.	10.	11.8	137.2	90.	172.	5.	12.0	136.5	80.	310.	-20.
101718Z	10.3	135.4	30	10.2	135.4	30.	8.	0.	11.0	137.8	95.	91.	10.	11.8	137.8	90.	113.	-5.	12.8	137.3	85.	211.	-25.
101800Z	10.5	134.3	30	10.4	134.4	30.	30.	0.	11.1	137.9	95.	82.	-5.	12.0	137.9	90.	171.	-20.	12.8	137.5	85.	320.	-40.
101806Z	10.7	133.3	35	10.7	133.1	35.	0.	0.	11.8	136.3	90.	37.	10.	12.5	136.3	90.	150.	-15.	12.7	136.3	70.	241.	-35.
101812Z	10.7	132.2	35	10.9	132.1	35.	14.	0.	11.8	136.8	90.	71.	-5.	12.5	136.8	90.	193.	-20.	13.0	136.5	70.	311.	-35.
101818Z	10.9	131.1	35	11.0	131.1	35.	6.	0.	11.9	136.1	95.	74.	-5.	12.8	136.2	95.	220.	-25.	13.1	135.3	70.	385.	-40.
101900Z	11.1	130.0	40	11.0	130.0	40.	6.	0.	11.2	136.0	90.	91.	-25.	11.7	136.1	95.	249.	-50.	12.5	136.1	70.	280.	-45.
101906Z	11.3	128.7	40	11.3	128.8	40.	8.	0.	11.9	136.3	90.	90.	-25.	12.7	136.0	95.	210.	-50.	13.6	136.0	70.	253.	-55.
101912Z	11.3	127.3	45	11.2	127.6	40.	19.	-5.	12.1	136.2	95.	117.	-25.	13.0	136.9	90.	220.	-45.	13.7	136.5	70.	230.	-60.
101918Z	11.3	126.9	60	11.5	126.1	45.	12.	-15.	12.3	136.3	95.	110.	-35.	13.0	136.6	95.	184.	-45.	14.0	136.0	70.	214.	-70.
102000Z	11.0	126.3	75	11.7	126.3	70.	13.	-5.	12.5	136.7	85.	74.	-20.	14.2	136.3	95.	180.	-20.	15.6	137.9	100.	262.	-45.
102006Z	11.0	126.8	75	11.7	126.8	75.	6.	0.	12.8	137.3	85.	74.	-20.	14.0	137.5	95.	139.	-30.	16.8	140.2	100.	192.	-50.
102012Z	11.7	127.2	80	11.8	127.1	75.	6.	-5.	12.8	137.6	85.	91.	-20.	14.1	137.8	95.	176.	-35.	15.5	138.0	100.	219.	-50.
102018Z	11.5	127.5	90	11.8	127.6	80.	8.	-10.	12.7	137.2	90.	122.	-20.	13.9	137.2	95.	213.	-45.	15.3	137.5	100.	242.	-45.
102100Z	11.9	128.1	105	11.9	128.2	95.	6.	-10.	11.7	128.5	115.	90.	0.	13.6	129.0	125.	142.	-20.	14.1	131.3	135.	128.	-5.
102106Z	11.3	126.7	105	11.9	126.8	100.	8.	-5.	12.0	127.2	120.	74.	-5.	13.7	128.7	125.	165.	-25.	14.1	130.1	135.	102.	-10.
102112Z	11.2	125.5	105	11.2	125.6	105.	8.	0.	12.3	127.9	120.	87.	-10.	13.8	129.5	125.	114.	-25.	14.2	130.9	135.	118.	-10.
102118Z	11.1	124.5	110	11.1	124.5	105.	0.	-5.	12.4	127.6	115.	93.	-5.	13.7	129.4	120.	112.	-25.	14.2	130.9	130.	122.	-15.
102200Z	11.2	123.5	115	11.1	123.1	110.	13.	-5.	11.9	127.9	115.	69.	-30.	12.8	129.6	120.	176.	-20.	13.2	130.1	125.	197.	-25.
102206Z	11.9	122.3	125	11.3	122.1	120.	8.	-5.	12.1	127.9	125.	93.	-15.	12.9	129.5	120.	212.	-5.	13.3	129.0	125.	260.	-10.
102212Z	11.0	121.2	130	11.5	121.0	125.	13.	-5.	12.4	127.2	135.	90.	-15.	13.1	128.5	130.	223.	-5.	13.8	128.7	135.	247.	-5.
102218Z	11.0	120.0	140	11.7	120.1	130.	19.	-10.	12.4	127.1	135.	100.	-10.	13.2	128.2	130.	239.	-5.	13.7	128.2	135.	240.	0.
102300Z	11.0	118.8	145	11.8	118.5	135.	8.	-10.	12.2	127.3	135.	94.	-5.	12.9	128.1	130.	280.	0.	13.8	128.9	130.	253.	10.
102306Z	11.7	117.1	150	11.9	117.1	140.	12.	-10.	12.5	127.1	130.	120.	-5.	13.2	127.0	130.	344.	0.	13.9	131.9	130.	282.	25.
102312Z	12.1	115.6	150	12.0	115.7	145.	10.	-5.	12.8	126.0	130.	132.	-5.	13.8	128.0	130.	291.	10.	14.8	128.0	130.	323.	35.
102318Z	12.0	113.6	145	12.3	113.7	140.	10.	-5.	13.1	126.8	135.	80.	-10.	13.8	130.3	135.	198.	-10.	14.0	129.4	130.	198.	15.
102400Z	12.0	111.7	140	11.8	111.9	140.	17.	0.	11.5	134.9	135.	110.	-15.	11.7	128.4	135.	240.	-5.	13.0	122.6	130.	261.	55.
102406Z	12.4	109.9	145	12.1	110.1	140.	21.	-5.	12.0	133.2	135.	139.	-20.	12.8	120.7	135.	210.	0.	13.5	120.5	120.	226.	55.
102412Z	12.8	107.7	145	12.4	107.8	140.	13.	-5.	12.5	129.5	135.	91.	-15.	13.2	121.8	140.	102.	-5.	14.9	115.2	120.	178.	65.
102418Z	12.7	105.4	145	12.5	105.1	140.	21.	-5.	12.5	126.8	135.	72.	-10.	13.8	119.3	140.	150.	5.	15.3	112.5	120.	251.	65.
102500Z	12.7	103.3	150	13.0	103.0	145.	25.	-5.	13.8	124.3	145.	90.	-5.	15.0	117.1	100.	174.	25.	17.1	111.7	100.	218.	50.
102506Z	12.9	101.1	155	12.9	101.0	145.	8.	-10.	13.9	122.6	100.	71.	-35.	14.8	115.7	100.	142.	35.	17.7	110.7	100.	268.	50.
102512Z	13.9	99.0	150	13.1	99.1	145.	19.	-5.	13.9	120.7	100.	116.	-25.	15.1	113.0	100.	220.	45.	17.4	108.7	100.	354.	50.
102518Z	13.7	96.9	145	13.6	96.7	140.	13.	-5.	14.1	118.4	100.	185.	-15.	15.2	111.5	100.	305.	45.	15.3	105.8	35.	490.	-10.
102600Z	14.1	95.1	140	13.8	95.1	140.	18.	0.	14.3	118.0	90.	109.	15.	15.2	111.9	100.	665.	30.	15.5	105.7	90.	435.	0.
102606Z	14.0	93.6	135	14.7	93.1	135.	14.	0.	14.1	116.3	110.	120.	45.	17.3	110.2	100.	293.	50.	19.4	104.4	90.	539.	5.
102612Z	13.8	92.4	125	14.7	92.2	135.	11.	10.	15.4	116.3	110.	91.	55.	18.8	110.3	110.	259.	80.	18.4	104.2	90.	671.	10.
102618Z	13.4	91.3	115	15.3	91.5	120.	13.	5.	15.9	117.5	110.	100.	55.	18.3	112.8	110.	109.	85.	17.1	108.9	80.	310.	35.
102700Z	10.5	119.7	75	10.4	119.8	95.	8.	20.	17.0	112.9	100.	150.	50.	17.9	108.0	100.	339.	80.	0.0	0.0	0.	-0.	0.
102706Z	10.7	118.4	65	10.8	118.0	90.	24.	25.	17.0	111.3	100.	229.	50.	18.1	108.9	70.	401.	35.	0.0	0.0	0.	-0.	0.
102712Z	11.0	117.4	55	10.9	117.0	75.	24.	20.	17.0	111.0	100.	187.	50.	18.0	108.7	80.	348.	35.	0.0	0.0	0.	-0.	0.
102718Z	11.2	116.4	55	11.1	116.5	85.	8.	10.	18.0	112.0	85.	190.	20.	18.2	107.0	90.	367.	25.	0.0	0.0	0.	-0.	0.
102800Z	10.7	115.5	50	11.2	115.2	85.	34.	15.	17.9	114.5	55.	240.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102806Z	10.8	115.3	50	10.8	115.8	90.	20.	0.	16.3	114.5	45.	187.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102812Z	10.4	114.8	50	10.4	114.9	90.	6.	0.	15.8	112.6	45.	159.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102818Z	10.7	114.1	45	10.1	114.1	95.	24.	0.	15.1	111.1	90.	189.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102900Z	10.7	113.2	40	10.3	114.0	90.	58.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102906Z	10.6	112.1	35	10.5	112.7	85.	30.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102912Z	10.7	110.8	30	11.8	111.2	80.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
102918Z	10.5	109.4	25	12.8	109.4	65.	18.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS

	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	15.	107.	214.	301.
AVG RIGHT ANGLE ERROR	10.	60.	116.	181.
AVG INTENSITY MAGNITUDE ERROR	5.	19.	26.	32.
AVG INTENSITY BIAS	-1.	0.	0.	-5.
NUMBER OF FORECASTS	51	47	43	39

TYPHOONS WHILE OVER 35 KTS

	WRNG	24-HR	48-HR	72-HR
	15.	105.	207.	296.
	10.	60.	103.	145.
	6.	20.	29.	32.
	0.	-0.	-1.	-6.
	45	45	41	37

TROPICAL STORM TESS

(November)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
1031002	13.8	147.5	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1031062	13.9	146.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1031122	14.0	146.4	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1031182	14.1	146.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1101002	14.0	145.6	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1101062	14.0	145.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1101122	14.0	144.9	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1101182	15.2	144.5	25	15.4	142.7	25.	104.	0.	15.9	140.7	40.	287.	5.	17.3	138.2	50.	497.	0.	19.8	135.5	60.	725.	0.
1102002	15.4	144.2	30	15.5	144.2	30.	24.	0.	16.0	143.3	40.	191.	0.	17.3	140.8	50.	397.	-5.	19.2	138.7	60.	618.	0.
1102062	15.0	144.4	30	15.4	144.0	30.	33.	0.	15.4	143.7	40.	132.	-5.	21.1	143.4	50.	203.	-5.	23.8	143.8	60.	324.	0.
1102122	17.0	144.0	30	17.4	144.1	30.	31.	0.	19.8	144.1	40.	125.	-5.	22.5	144.2	50.	174.	-10.	25.8	145.7	60.	262.	0.
1102182	18.0	145.0	35	18.6	145.0	30.	12.	-5.	21.3	145.8	40.	88.	-10.	24.5	148.0	50.	24.	-10.	27.7	151.7	60.	180.	0.
1103002	18.9	145.5	40	18.8	145.1	35.	33.	-5.	21.0	148.2	45.	21.	-10.	24.0	148.1	50.	84.	-10.	26.8	151.0	55.	241.	-5.
1103062	18.8	146.0	45	19.0	145.8	45.	16.	0.	21.3	148.5	55.	53.	0.	24.2	148.3	65.	158.	5.	27.0	151.2	75.	325.	15.
1103122	19.5	146.3	45	19.8	146.1	45.	6.	0.	22.3	148.2	55.	89.	-5.	25.3	150.9	65.	176.	5.	28.3	154.3	70.	316.	15.
1103182	20.3	146.6	50	19.9	146.8	50.	33.	0.	21.7	148.5	65.	150.	5.	24.3	150.5	70.	306.	10.	0.0	0.0	0.	-0.	0.
1104002	21.2	146.5	55	21.3	146.8	55.	18.	0.	25.5	148.8	65.	38.	5.	30.0	152.6	70.	47.	10.	0.0	0.0	0.	-0.	0.
1104062	22.1	146.9	55	22.0	147.0	55.	56.	0.	26.1	148.9	65.	42.	5.	30.6	153.2	70.	96.	10.	0.0	0.0	0.	-0.	0.
1104122	23.1	147.3	60	23.0	147.0	55.	18.	-5.	27.1	149.6	65.	62.	5.	31.6	154.3	70.	166.	15.	0.0	0.0	0.	-0.	0.
1104182	24.2	147.7	60	24.2	147.7	60.	0.	0.	28.6	150.9	60.	61.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1105002	25.4	148.1	60	25.4	148.4	60.	16.	0.	29.3	151.7	60.	88.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1105062	26.8	148.8	60	26.7	148.7	60.	8.	0.	31.0	151.8	55.	120.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1105122	28.1	149.9	60	27.9	149.2	60.	39.	0.	31.7	153.0	55.	214.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1105182	29.6	151.1	60	28.8	150.7	60.	41.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1106002	30.7	152.2	60	30.3	152.5	55.	28.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1106062	31.9	153.9	60	32.3	154.4	55.	35.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1106122	33.1	156.9	55	33.5	157.1	50.	26.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	29.	108.	194.	347.
AVG RIGHT ANGLE ERROR	21.	53.	127.	237.
AVG INTENSITY MAGNITUDE ERROR	2.	4.	8.	4.
AVG INTENSITY BIAS	-2.	-1.	1.	3.
NUMBER OF FORECASTS	20	16	12	8

TROPICAL DEPRESSION 32

(November)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
1115182	15.3	130.1	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1116002	15.3	129.8	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1116062	15.3	129.5	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1116122	15.3	129.2	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1116182	15.3	128.9	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1117002	15.3	128.5	25	16.0	130.0	25.	96.	0.	17.1	130.2	30.	210.	5.	19.5	132.9	35.	330.	10.	21.4	138.2	35.	973.	20.
1117062	15.3	128.2	25	16.3	130.0	25.	119.	0.	17.3	130.2	30.	249.	5.	19.5	132.8	35.	350.	15.	0.0	0.0	0.	-0.	0.
1117122	15.2	128.0	25	17.0	128.9	25.	119.	0.	18.5	127.2	30.	260.	5.	20.0	125.2	35.	390.	15.	0.0	0.0	0.	-0.	0.
1117182	15.1	127.6	25	17.4	128.4	25.	149.	0.	19.1	126.9	30.	290.	5.	21.1	120.9	35.	491.	15.	0.0	0.0	0.	-0.	0.
1118002	15.0	127.3	25	14.8	126.8	25.	37.	0.	14.5	125.5	40.	38.	-5.	14.0	123.5	15.	38.	0.	0.0	0.0	0.	-0.	0.
1118062	14.7	126.8	25	14.6	126.8	25.	6.	0.	14.4	125.2	40.	46.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1118122	14.4	126.5	25	14.6	126.8	25.	21.	0.	14.3	126.0	40.	48.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1118182	14.2	126.1	25	14.4	126.4	25.	21.	0.	14.0	126.2	40.	40.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1119002	13.9	125.7	25	14.3	125.8	25.	25.	0.	13.8	123.4	40.	25.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1119062	13.7	125.2	20	13.8	125.2	25.	6.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1119122	13.5	124.6	20	13.5	124.6	25.	0.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1119182	13.4	123.9	20	13.5	123.9	20.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1120002	13.4	123.3	15	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	50.	133.	401.	973.
AVG RIGHT ANGLE ERROR	33.	108.	349.	871.
AVG INTENSITY MAGNITUDE ERROR	1.	3.	11.	20.
AVG INTENSITY BIAS	1.	2.	11.	20.
NUMBER OF FORECASTS	12	9	5	1

TYPHOON VIOLA

(November)

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
1110Z04	3.0	155.0	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1116Z04	4.9	154.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1122Z04	5.0	153.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1200Z04	5.0	152.0	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1206Z04	5.0	151.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1212Z04	8.0	149.9	30	8.1	149.9	30.	0.	0.	10.7	149.9	90.	0.	-5.	12.3	149.3	90.	0.	0.	12.8	148.1	90.	10.	-15.
1218Z04	8.7	148.5	35	8.5	148.4	30.	2.	-5.	10.8	148.5	95.	0.	-5.	12.1	147.9	90.	2.	-5.	12.5	146.1	90.	15.	-25.
1300Z04	9.1	147.1	40	9.1	147.1	35.	0.	-5.	11.5	146.9	95.	1.	-5.	12.5	147.2	95.	0.	-5.	14.3	143.7	95.	7.	-35.
1306Z04	9.9	145.6	40	9.5	145.7	40.	0.	0.	11.7	144.2	90.	1.	-5.	13.2	143.2	95.	0.	-10.	16.6	141.8	95.	10.	-50.
1312Z04	10.0	144.5	45	9.5	144.0	45.	4.	0.	11.2	138.2	90.	7.	10.	13.0	132.5	95.	1.	-10.	13.9	126.9	90.	35.	-50.
1318Z04	10.9	143.1	45	10.7	143.0	45.	1.	0.	12.8	137.9	90.	3.	-5.	14.2	131.7	95.	1.	-20.	15.1	126.0	90.	45.	-55.
1318Z04	11.3	141.8	50	11.5	141.9	50.	2.	0.	13.1	135.0	90.	10.	0.	14.5	129.7	95.	2.	-35.	15.9	123.7	90.	45.	-55.
1400Z04	11.7	140.4	50	11.7	140.4	50.	0.	0.	13.3	135.0	90.	9.	-5.	14.7	129.0	90.	3.	-45.	15.8	122.8	75.	45.	-45.
1406Z04	12.2	138.9	50	12.2	139.0	50.	0.	0.	13.8	134.1	90.	10.	-15.	15.0	127.2	90.	3.	-50.	16.1	121.2	90.	45.	-55.
1412Z04	12.9	138.0	55	12.5	137.9	50.	2.	-5.	14.4	132.3	90.	15.	-25.	15.3	126.1	90.	3.	-55.	16.2	120.5	90.	50.	-50.
1418Z04	13.5	137.3	60	13.7	136.8	60.	3.	0.	16.0	131.9	75.	15.	-25.	16.3	126.5	90.	4.	-45.	16.3	120.0	90.	55.	-40.
1500Z04	13.8	136.5	65	14.5	135.9	60.	5.	-5.	16.7	131.2	75.	13.	-30.	17.1	125.4	90.	2.	-40.	17.6	119.3	90.	60.	-35.
1506Z04	14.5	135.5	75	14.6	135.6	70.	8.	-5.	16.1	132.7	90.	13.	-30.	16.9	129.5	100.	12.	-15.	17.2	125.4	100.	45.	20.
1512Z04	15.1	134.8	85	15.2	134.8	70.	13.	-15.	16.8	131.5	90.	11.	-35.	17.5	128.4	100.	155.	-10.	17.6	124.2	100.	50.	30.
1518Z04	15.5	134.0	100	15.5	134.0	85.	8.	-15.	17.1	130.7	95.	17.	-30.	17.5	127.6	105.	218.	5.	17.5	123.3	105.	60.	45.
1600Z04	15.9	133.4	115	16.1	133.1	100.	21.	-15.	17.8	129.9	100.	30.	0.	18.0	126.6	105.	262.	30.	18.7	122.4	130.	70.	80.
1606Z04	16.3	132.6	120	16.4	132.4	115.	13.	-5.	18.0	129.1	130.	60.	15.	18.5	125.8	135.	304.	55.	18.8	121.6	135.	80.	95.
1612Z04	16.8	131.7	125	16.8	131.8	120.	13.	-5.	17.9	127.8	130.	139.	20.	18.8	123.9	135.	499.	65.	0.0	0.0	0.	-0.	0.
1618Z04	17.4	130.8	125	17.2	130.7	120.	13.	-5.	18.3	126.7	130.	190.	30.	19.8	122.8	135.	612.	75.	0.0	0.0	0.	-0.	0.
1700Z04	18.3	129.9	120	18.3	129.7	105.	11.	5.	19.5	125.8	130.	227.	35.	19.7	122.5	135.	705.	85.	0.0	0.0	0.	-0.	0.
1706Z04	19.0	129.1	115	19.1	129.1	115.	13.	0.	21.4	127.8	95.	199.	15.	23.3	130.4	75.	329.	35.	0.0	0.0	0.	-0.	0.
1712Z04	20.1	128.3	110	19.9	128.2	110.	13.	0.	22.8	128.2	90.	167.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1718Z04	21.0	128.5	100	21.2	128.4	105.	13.	5.	23.8	131.1	90.	58.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1800Z04	21.7	129.1	95	21.7	128.9	100.	11.	5.	24.3	131.5	90.	130.	40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1806Z04	22.7	130.0	80	22.3	129.7	95.	29.	15.	24.8	132.8	80.	186.	40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1812Z04	23.7	131.0	70	23.9	131.1	90.	20.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1818Z04	24.6	131.9	60	24.7	132.7	75.	44.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1900Z04	25.2	133.8	50	25.5	133.5	50.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1906Z04	25.9	135.9	40	25.4	135.0	40.	49.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS				TYPHOONS WHILE OVER 35 KTS			
	WRNG	24-HR	48-HR	72-HR	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	98.	269.	438.	19.	98.	269.	438.
AVG RIGHT ANGLE ERROR	10.	51.	172.	338.	10.	51.	172.	338.
AVG INTENSITY MAGNITUDE ERROR	5.	19.	33.	48.	5.	19.	33.	48.
AVG INTENSITY BIAS	-1.	2.	0.	-14.	0.	2.	0.	-14.
NUMBER OF FORECASTS	29	25	21	17	28	25	21	17

TROPICAL STORM WINNIE

(November)

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
1112Z12	9.4	147.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1118Z12	9.7	147.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1200Z04	10.0	147.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1206Z04	10.4	147.9	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1212Z12	10.6	148.3	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1218Z12	10.8	148.7	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1300Z04	10.9	149.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1306Z04	11.0	149.5	30	11.7	149.5	30.	6.	0.	12.5	147.2	95.	210.	10.	13.9	144.9	95.	362.	0.	0.0	0.0	0.	-0.	0.
1312Z12	12.0	149.0	30	12.0	149.1	30.	36.	0.	12.9	146.9	95.	287.	5.	13.8	144.5	95.	448.	0.	0.0	0.0	0.	-0.	0.
1318Z12	13.7	148.4	30	12.8	148.7	30.	68.	0.	13.4	146.4	95.	304.	0.	14.1	144.0	95.	451.	5.	0.0	0.0	0.	-0.	0.
1400Z04	14.7	147.8	35	14.9	147.7	35.	13.	0.	20.2	147.3	90.	80.	55.	24.8	150.5	90.	355.	20.	0.0	0.0	0.	-0.	0.
1406Z04	15.0	147.5	35	15.7	147.4	35.	19.	0.	19.4	147.1	90.	180.	55.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1412Z12	17.7	146.8	40	18.8	147.1	40.	61.	0.	20.5	147.4	90.	249.	55.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1418Z12	19.5	146.4	45	19.1	145.9	45.	37.	0.	24.7	147.5	90.	260.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1500Z04	20.7	146.2	55	21.2	146.1	55.	30.	0.	27.8	150.1	95.	299.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1506Z04	22.5	147.4	55	22.4	146.8	55.	45.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1512Z12	24.3	149.0	55	24.0	148.2	50.	47.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1518Z12	26.4	151.7	50	26.5	151.5	50.	12.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
1300Z04	28.4	155.8	40	28.2	155.1	45.	29.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	14.	238.	614.	0.
AVG RIGHT ANGLE ERROR	16.	81.	274.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	4.	8.	0.
AVG INTENSITY BIAS	0.	1.	6.	0.
NUMBER OF FORECASTS	12	8	4	0

2. NORTH INDIAN OCEAN CYCLONE TRACK DATA

TC18-78

(MAY)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT		WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND
513024	10.5	88.9	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
513082	10.0	89.1	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
513142	11.1	89.2	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
513202	11.4	89.4	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
514022	11.6	89.5	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
514082	12.0	89.6	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
514144	12.3	89.6	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
514202	12.5	89.7	30	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
515022	12.7	89.8	30	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
515082	13.2	90.1	30	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
515142	14.1	90.1	35	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
515202	14.9	90.0	35	15.7	92.8	35.	157. 0.	17.7	93.4	40.	120. -5.	19.2	94.4	25.	78. 5.	0.0	0.0	0.	-0. 0.
516022	16.9	89.8	35	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
516082	16.8	90.2	40	16.5	90.0	35.	21. -5.	18.7	91.1	40.	100. +20.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
516142	17.7	90.6	40	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
516202	18.4	91.1	45	18.4	91.4	35.	6. -10.	21.0	90.4	30.	30. 10.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
517022	18.5	92.1	50	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
517082	18.9	93.0	60	19.5	92.8	35.	38. -25.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
517142	19.7	93.8	45	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
517202	20.5	94.5	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	55.	88.	78.	0.
AVG RIGHT ANGLE ERROR	51.	41.	45.	0.
AVG INTENSITY MAGNITUDE ERROR	10.	12.	5.	0.
AVG INTENSITY BIAS	-10.	-5.	5.	0.
NUMBER OF FORECASTS	4	3	1	0

TC19-78

(OCTOBER)

	BEST TRACK			WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
						ERRORS				ERRORS				ERRORS				ERRORS	
	POSIT		WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND	POSIT		WIND	DST WIND
1020022	8.5	96.9	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1020082	9.0	95.4	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1020142	10.7	93.8	20	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1020202	11.8	92.2	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1021022	12.8	91.0	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1021082	13.5	90.0	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1021142	14.2	89.1	30	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1021202	15.0	88.5	30	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1022022	15.6	87.9	35	15.7	87.3	35.	35. 0.	18.4	86.0	35.	193. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1022082	16.5	87.6	35	16.7	87.2	35.	17. 0.	19.7	83.9	40.	237. -15.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1022142	17.2	87.1	35	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1022202	17.9	87.0	35	17.8	86.6	35.	57. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1023022	18.6	87.4	35	18.5	86.9	35.	29. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1023082	19.4	88.1	35	19.4	88.7	35.	34. 0.	21.1	93.4	40.	178. -5.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1023142	20.0	89.0	40	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1023202	20.8	89.8	40	21.0	90.6	40.	46. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1024022	21.8	90.3	35	22.2	90.4	25.	25. -10.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.
1024082	22.7	90.7	25	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.	0.0	0.0	0.	-0. 0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35.	203.	0.	0.
AVG RIGHT ANGLE ERROR	25.	183.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	7.	0.	0.
AVG INTENSITY BIAS	-1.	-7.	0.	0.
NUMBER OF FORECASTS	7	3	0	0

TC20-78

(NOVEMBER)

	BEST TRACK			WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST		ERRORS	
	POSIT		WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
110308Z	9.5	80.8	15	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110314Z	9.8	79.9	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110320Z	10.1	78.8	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110400Z	10.2	77.9	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110408Z	10.4	76.9	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110414Z	10.5	76.0	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110420Z	10.6	75.0	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110500Z	10.6	74.3	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110508Z	10.6	73.5	20	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110514Z	10.7	72.9	25	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110520Z	10.9	72.3	30	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110600Z	11.3	71.9	30	0.0	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.	0.0	0.	-0.	0.
110608Z	11.9	71.3	35	11.0	72.0	35.	68.	0.	11.6	69.6	45.	213.	-5.	12.4	67.2	95.	334.	-20.	0.
110614Z	12.5	70.3	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110620Z	13.0	69.3	40	12.1	70.3	40.	79.	0.	13.4	67.4	50.	183.	-10.	14.5	64.8	90.	249.	-20.	0.
110700Z	13.6	68.3	45	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110708Z	14.2	67.1	50	13.5	67.1	50.	43.	0.	15.3	64.2	70.	93.	-5.	16.0	62.1	70.	221.	-10.	0.
110714Z	14.7	66.1	55	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110720Z	15.4	65.0	60	15.2	65.5	60.	31.	0.	16.2	62.8	70.	130.	-10.	20.9	60.9	70.	100.	-5.	0.
110800Z	16.0	64.2	70	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110808Z	16.7	63.5	75	16.9	62.8	75.	42.	0.	19.0	57.7	70.	263.	-10.	0.0	0.0	0.	-0.	0.	0.
110814Z	17.4	62.9	75	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110820Z	18.1	62.6	80	17.5	61.5	90.	72.	10.	19.0	57.5	70.	313.	-5.	0.0	0.0	0.	-0.	0.	0.
110900Z	18.9	62.4	80	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110908Z	19.7	62.3	80	19.2	62.0	90.	34.	10.	21.8	62.4	80.	67.	20.	23.9	65.6	75.	120.	35.	0.
110914Z	20.3	62.4	75	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
110920Z	20.9	62.7	75	21.7	63.2	85.	55.	10.	24.2	67.7	80.	175.	10.	0.0	0.0	0.	-0.	0.	0.
111000Z	21.5	63.1	65	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
111008Z	21.9	63.6	60	22.3	64.1	75.	37.	15.	24.9	69.5	30.	166.	+10.	0.0	0.0	0.	-0.	0.	0.
111014Z	22.3	64.4	55	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
111020Z	22.5	65.1	50	23.5	66.8	65.	78.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0	0.
111100Z	22.7	66.3	45	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
111108Z	22.9	67.5	40	22.6	66.5	40.	58.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
111114Z	23.0	68.4	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.
111120Z	23.0	69.3	20	23.1	70.2	45.	50.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	54.	165.	205.	0.
AVG RIGHT ANGLE ERROR	25.	101.	102.	0.
AVG INTENSITY MAGNITUDE ERROR	5.	9.	18.	0.
AVG INTENSITY BIAS	5.	-3.	-4.	0.
NUMBER OF FORECASTS	12	9	5	0

	BEST TRACK			WARNING		ERRORS			24 HOUR FORECAST		ERRORS			48 HOUR FORECAST		ERRORS			72 HOUR FORECAST				
	POSIT		WIND	POSIT	WIND	DST	WIND		POSIT	WIND	DST	WIND		POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
111/20Z	8.0	90.9	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112/00Z	7.9	90.3	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112/06Z	7.8	89.8	40	8.0	90.5	40.	43.	0.	8.2	88.5	00.	67.	10.	8.9	85.3	70.	120.	0.	0.0	0.0	0.	-0.	0.
112/12Z	7.8	89.4	40	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112/18Z	7.5	88.9	40	8.5	88.8	40.	60.	0.	9.3	85.5	00.	150.	5.	9.8	81.5	75.	232.	-5.	0.0	0.0	0.	-0.	0.
113/00Z	7.5	88.4	45	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
113/06Z	7.4	87.7	50	7.7	88.0	50.	25.	0.	7.6	84.7	00.	91.	-10.	7.2	79.9	90.	160.	-40.	0.0	0.0	0.	-0.	0.
113/12Z	7.2	87.1	50	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
113/18Z	7.0	86.5	55	7.3	86.7	55.	21.	0.	7.0	83.5	05.	30.	-15.	6.7	78.7	50.	158.	-20.	0.0	0.0	0.	-0.	0.
114/00Z	7.0	85.9	60	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
114/06Z	6.9	85.2	70	6.7	85.0	60.	17.	-10.	6.2	81.8	10.	76.	-20.	5.5	77.1	95.	251.	15.	0.0	0.0	0.	-0.	0.
114/12Z	6.8	84.7	75	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
114/18Z	6.9	84.1	80	6.7	84.1	65.	12.	-15.	6.4	81.4	10.	112.	0.	6.0	76.6	95.	253.	35.	0.0	0.0	0.	-0.	0.
115/00Z	7.0	83.5	85	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
115/06Z	7.2	82.6	90	7.0	83.0	75.	27.	-15.	6.3	80.4	05.	179.	15.	6.0	76.6	80.	344.	50.	0.0	0.0	0.	-0.	0.
115/12Z	7.5	81.8	80	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
115/18Z	8.2	80.9	70	7.8	81.1	70.	38.	0.	7.9	78.3	00.	152.	30.	8.6	75.5	90.	283.	25.	0.0	0.0	0.	-0.	0.
116/00Z	8.8	80.2	55	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
116/06Z	9.1	79.3	50	8.5	79.9	65.	50.	15.	8.8	77.1	00.	222.	30.	9.0	74.0	70.	300.	35.	0.0	0.0	0.	-0.	0.
116/12Z	9.4	78.3	40	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
116/18Z	10.2	77.2	30	9.4	77.8	35.	59.	5.	10.7	74.4	25.	147.	-10.	13.0	71.3	35.	105.	10.	0.0	0.0	0.	-0.	0.
117/00Z	10.8	75.6	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
117/06Z	11.3	74.3	30	11.7	74.5	40.	27.	10.	14.2	71.4	50.	61.	15.	16.5	69.9	90.	133.	40.	0.0	0.0	0.	-0.	0.
117/12Z	11.8	73.4	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
117/18Z	12.3	72.5	35	11.7	72.3	45.	38.	10.	13.4	69.2	00.	58.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
118/00Z	12.7	71.8	35	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
118/06Z	13.2	71.2	35	13.0	70.7	55.	31.	20.	15.5	68.1	00.	43.	40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
118/12Z	13.6	70.5	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
118/18Z	14.1	69.9	25	14.1	70.2	55.	17.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
119/00Z	14.5	69.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
119/06Z	14.8	68.4	20	14.6	68.6	35.	17.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
119/12Z	15.0	67.8	20	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	31.	104.	213.	0.
AVG MIGHT ANGLE ERROR	18.	62.	147.	0.
AVG INTENSITY MAGNITUDE ERROR	10.	18.	25.	0.
AVG INTENSITY BIAS	5.	10.	13.	0.
NUMBER OF FORECASTS	16	13	11	0

ANNEX B – TROPICAL CYCLONE FIX DATA

1. WESTERN NORTH PACIFIC CYCLONE FIX DATA

NOTE 1: FIXES PRECEDED BY AN ASTERISK (*) WERE NOT CONSIDERED REPRESENTATIVE AND WERE NOT USED IN DETERMINING BEST TRACK.

NOTE 2: UNDER "SITE" COLUMN, ICAO IDENTIFIER IS INDICATED WITH THE EXCEPTION OF FLEET WEATHER FACILITY, SUITLAND WHICH IS ENCODED "FWFS".

TROPICAL STORM NADINE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
* 1	052019	5.0N 170.0E		T1.0	GOES2	INITIAL OBS	PHNL
2	061254	7.7N 164.9E	PCN 6		DMSP13		PGTW
3	062043	6.5N 165.4E	PCN 6	T2.0/2.0-	DMSP13	INITIAL OBS	PGTW
4	062133	6.6N 165.3E	PCN 5		NOAA9		PGTW
5	071004	8.5N 163.4E	PCN 6		NOAA9	POORLY DEFINED	PGTW
6	071221	9.5N 163.2E	PCN 6		DMSP13		PGTW
7	071221	9.3N 163.5E	PCN 6		DMSP13		KGWC
8	072026	10.2N 162.0E	PCN 6	T1.0/1.0 /W1.0/24HRS	DMSP13		PGTW
9	072243	9.9N 160.5E	PCN 5		NOAA9		PGTW
10	080103	10.1N 158.6E	PCN 6		DMSP13		PGTW
11	080408	9.8N 161.7E	PCN 6		DMSP13	CI SAME	PGTW
12	080925	9.8N 161.0E	PCN 6		NOAA9		PGTW
13	081206	9.5N 161.3E	PCN 6		DMSP13		KGWC
14	082008	9.3N 161.1E	PCN 6	T1.0/1.0 /S0.0/24HRS	DMSP13		PGTW
15	090157	10.1N 160.9E	CONF 1	T1.5/1.5 /01.5/24HRS	NOAA9	INITIAL OBS	FWFS
16	090201	10.1N 161.0E	PCN 5		NOAA9		PGTW
17	090948	11.1N 160.7E	PCN 5		DMSP13		PGTW
18	090945	11.4N 161.1E	CONF 2		NOAA9		FWFS
19	090950	11.1N 161.5E	PCN 6		DMSP13		KGWC
20	090851	10.4N 161.7E	PCN 6		DMSP13	CI SAME	PGTW
21	091038	10.3N 161.5E	PCN 5		NOAA9		PGTW
22	091328	10.6N 161.5E	PCN 6		DMSP13		PGTW
23	091951	11.0N 161.3E	PCN 6	T1.5/1.5	DMSP13	INITIAL OBS	KGWC
24	091951	11.6N 161.9E	PCN 6		DMSP13	EDGE OF DATA	PGTW
25	092117	10.9N 161.0E	PCN 5	T1.0/1.0 /S0.0/25HRS	NOAA9	INITIAL OBS	PGTW
26	092309	11.1N 161.4E	CONF 1	T2.5/2.5 /01.0/21HRS	NOAA9		FWFS
27	100028	11.2N 161.6E	PCN 6		DMSP13		PGTW
28	100933	12.6N 160.7E	PCN 6		DMSP13		KGWC
29	100836	12.2N 160.8E	PCN 6		DMSP13	CI UP	PGTW
30	100956	12.5N 160.9E	PCN 5		NOAA9		PGTW
31	101310	13.2N 160.5E	PCN 4		DMSP13		PGTW
32	102115	13.4N 160.1E	PCN 6	T1.0/1.0	DMSP13	INITIAL OBS	KGWC
33	102115	13.4N 160.2E	PCN 5		DMSP13		PGTW
34	102225	14.0N 160.9E	CONF 1	T3.5/3.5 /01.0/24HRS	NOAA9		FWFS
35	102230	14.0N 160.2E	PCN 5	T2.0/2.0 /01.0/25HRS	NOAA9		PGTW
36	110010	14.6N 160.4E	PCN 5		DMSP13		PGTW
37	110816	15.5N 160.8E	PCN 6		DMSP13		KGWC
38	110817	15.6N 160.9E	PCN 6		DMSP13	CI UP	PGTW
39	110910	15.9N 161.7E	PCN 4		NOAA9		PHNX
40	110910	15.6N 161.0E	PCN 6		NOAA9		PGTW
41	110915	15.8N 161.0E	CONF 1	T4.0/4.0 /01.0/24HRS	NOAA9		FWFS
42	111252	16.4N 160.9E	PCN 6		DMSP13		PGTW
43	112145	16.6N 163.8E	PCN 4	T4.0/4.0	NOAA9	INITIAL OBS	PHNX
44	112146	17.1N 163.7E	PCN 2	T3.5/3.5-/01.5/23HRS	NOAA9		PGTW
45	112336	16.9N 164.9E	CONF 3	T4.5/4.5 /01.0/24HRS	NOAA9		FWFS
46	112353	17.0N 164.2E	PCN 2		DMSP13		PGTW
47	120756	18.1N 167.0E	PCN 4	T3.5/3.5	DMSP13		KGWC
48	120759	17.9N 166.8E	PCN 6		DMSP13		PHNX
49	120926	17.9N 167.1E	PCN 6		NOAA9		PGTW
50	120926	17.9N 167.3E	PCN 4		NOAA9	POORLY DEFINED	PHNX
51	121016	19.9N 168.9E	PCN 6		DMSP13		PGTW
52	122056	20.0N 170.9E	CONF 1	T3.0/3.0 /S0.0/12HRS	NOAA9		FWFS
53	122102	20.0N 171.8E	PCN 4	T2.0/3.0-/W1.5/24HRS	NOAA9		PGTW
54	122102	20.0N 171.3E	PCN 6	T3.0/4.0-/W1.0/24HRS	NOAA9		PHNX
55	122249	21.1N 171.8E		T3.0	GOES2	INITIAL OBS	PHNL
56	130349	22.5N 173.5E			GOES2		PHNL

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/QRG/RWG	MAX-FLT-LVL-WND DIR/VEL/QRD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TIAN/TATION	EYE TEMP (C) UHF/ INF/ DP/ESI	MSN NO.
1	080248	9.1N 161.9E	15001	0381	996	035 290 030	330 033 290 140	10 15			+24 +24 +24 24	03
2	090615	10.3N 161.9E	700MB	3056	996	030 180 042	260 036 180 042	04 07			+11 +12 +10	04
3	091536	10.0N 161.1E	700MB	3026	995		140 030 270 060	15 45			+12 +12 +12	05
4	100315	11.2N 161.3E	700MB	3031		030 230 130		04 08			+11 +10 +10	05
5	101506	13.2N 160.2E	700MB	2955	985		310 038 220 015	10 05			+11 +13 +12	07
6	110325	14.4N 160.7E	700MB	2961	981	040 290 050	150 060 290 050	05 05			+12 +14 +11	08
7	111447	16.1N 162.1E	700MB	2882	976		150 063 270 021	10 10	ELLIPTICAL	20 50 150	+13 +15 +11 25	09
8	120306	17.6N 165.3E	700MB	2870	973	050 160 012	320 070 270 040	04 10			+11 +20 +08	10
9	121013	19.4N 170.1E	700MB	2852	972		030 058 280 020	10 03	CIRCULAR	20	+13 +14 +11	11

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	JUDGMENT CODE	SAT	COMMENTS	SITE
1	162305	5.6N 140.3E	PCN 5	T0.0/0.0	NOAA5		PGTW
2	161905	5.1N 147.0E	PCN 5		NOAA5		PGTW
3	162241	5.1N 143.8E	PCN 5	T1.0/1.0 /D1.0/24HRS	NOAA5		PGTW
4	160401	5.5N 141.3E	PCN 5		DMSP3A	CI SAME	PGTW
5	161117	5.6N 141.1E	PCN 5		NOAA5		PGTW
6	161340	5.7N 140.8E	PCN 5		DMSP3S		PGTW
* 7	162234	7.3N 139.6E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP3A		PGTW
* 8	162353	7.3N 139.4E	PCN 5		NOAA5		PGTW
9	170222	6.4N 139.6E	PCN 5		DMSP4S		PGTW
10	171033	7.2N 137.1E	PCN 5		NOAA5	CI SAME	PGTW
11	171115	7.3N 137.3E	PCN 5		DMSP3A		PGTW
12	172215	8.3N 135.0E	PCN 5	T0.0/0.0	DMSP3A		RPMK
13	172217	8.5N 135.7E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP3A		PGTW
14	172304	8.5N 135.4E	PCN 5		NOAA5		PGTW
15	140204	8.3N 134.8E	PCN 5		DMSP3S		PGTW
16	140234	8.3N 134.8E	PCN 5		DMSP3S		RPMK
17	141033	8.1N 133.1E	PCN 5		DMSP3A	CI UP	PGTW
18	141033	8.1N 133.1E	PCN 5		DMSP3A		RPMK
19	141145	8.1N 132.9E	PCN 5		NOAA5		PGTW
20	141345	8.3N 132.3E	PCN 5		DMSP3S		PGTW
21	142154	8.6N 130.2E	PCN 5		DMSP3A		PGTW
22	142154	8.6N 130.0E	PCN 5	T2.0/2.0 /D2.0/24HRS	DMSP3A		RPMK
23	142154	8.7N 130.0E	PCN 5		DMSP3A		RODN
24	190022	9.8N 129.3E	PCN 5	T3.0/3.0-/D2.0/24HRS	NOAA5		PGTW
25	140304	9.4N 129.8E	CONF 2	T3.5/3.5 /D0.5/24HRS	DMSP		FWFS
26	191329	9.6N 128.8E	PCN 5		DMSP3S	GOOD OUTFLOW	RPMK
27	191041	10.3N 127.7E	PCN 3		DMSP3A	CI UP	RPMK
28	191041	10.3N 127.6E	PCN 1		DMSP3A	CI UP	PGTW
29	191102	10.3N 127.7E	PCN 4		NOAA5		PGTW
30	191429	10.7N 126.9E	PCN 4		DMSP3A		PGTW
31	192326	11.5N 126.6E	PCN 5	T4.0/4.0-/D1.0/23HRS	DMSP3A		PGTW
32	192326	11.3N 126.7E	PCN 5	T4.0/4.0-	DMSP3A		RODN
33	192339	11.5N 126.6E	PCN 5		NOAA5		PGTW
34	200136	11.5N 126.4E	PCN 5		NOAA5		PGTW
35	200315	11.4N 126.0E	CONF 1	T4.5/4.5 /D1.0/24HRS	DMSP		FWFS
36	201205	12.5N 122.1E	PCN 1		DMSP3A		RPMK
37	201214	12.5N 122.0E	PCN 1		NOAA5	CI UP	PGTW
38	202305	13.0N 119.6E	PCN 3	T3.5/3.5+/W0.5/24HRS	DMSP3A		PGTW
39	202305	13.0N 119.5E	PCN 3	T3.5/3.5	DMSP3A		RKSO
40	210030	13.2N 119.5E	PCN 4		NOAA5		PGTW
41	210252	13.1N 119.2E	PCN 3		DMSP3S		PGTW
42	210252	13.0N 119.3E	PCN 3		DMSP4S		RKSO
43	211148	13.3N 117.4E	PCN 1		DMSP3A	CI UUNN	PGTW
44	212259	13.3N 116.6E	PCN 5		DMSP3A		PGTW
45	212344	13.3N 116.6E	PCN 5	T4.0/4.0	DMSP3A		RODN
46	220006	13.3N 116.4E	PCN 5		NOAA5		PGTW
47	220031	14.0N 116.4E	PCN 3		DMSP3A		RPMK
48	220235	14.0N 116.0E	PCN 3		DMSP3S		RPMK
49	220235	13.9N 116.0E	PCN 5		DMSP3S		PGTW
50	221131	14.6N 115.3E	PCN 3		DMSP3A		RPMK
51	221131	14.4N 116.8E	PCN 1		DMSP3A		PGTW
52	221242	14.7N 114.8E	PCN 1		NOAA5		PGTW
53	221517	15.6N 114.6E	PCN 1		DMSP3S		PGTW
54	230013	15.3N 113.7E	PCN 2	T3.0/5.0	DMSP3A		KGWC
55	230014	14.0N 113.5E	PCN 1	T3.0/5.0	DMSP3A		RPMK
56	230119	16.0N 113.4E	PCN 1	T3.0/5.0	NOAA5		PGTW
57	230359	16.3N 113.4E	PCN 1		DMSP3S		RODN
58	230359	16.6N 113.2E	PCN 1		DMSP3S		RPMK
59	231158	16.4N 112.8E	PCN 3		NOAA5	CI UP WELL DEFINED EYE	PGTW
60	231256	17.3N 112.9E	PCN 4		DMSP3A		RODN
61	231540	17.2N 113.3E	PCN 4		DMSP3S		RODN
62	231540	17.3N 113.3E	PCN 5		DMSP3S		RPMK
63	232356	18.6N 113.9E	PCN 1	T5.0/5.0	DMSP3A		RODN
64	232356	18.5N 113.9E	PCN 1	T5.0/5.0-/S0.0/24HRS	DMSP3A		RPMK
65	240035	18.6N 113.5E	PCN 1	T5.0/5.0-/S0.0/23HRS	NOAA5		PGTW
66	240304	18.3N 114.2E	PCN 1		DMSP3S		RODN
67	240341	19.0N 114.1E	PCN 1		DMSP3S		RPMK
68	240345	18.3N 114.5E	CONF 1		DMSP		FWFS
69	241238	19.6N 115.4E	PCN 1		DMSP3A		RODN
70	241523	19.3N 117.8E	PCN 5		DMSP3S		RODN
71	241523	20.0N 117.4E	PCN 5		DMSP3S	CI UUNN	RPMK
72	242339	21.0N 118.7E	PCN 3	T4.0/4.0	DMSP3A		RKSO
73	242339	20.9N 118.4E	PCN 3	T3.0/4.0 /W2.0/24HRS	DMSP3A		RPMK
74	250323	21.0N 119.7E	PCN 3		DMSP3S		RPMK
75	250329	21.0N 119.4E	CONF 2		DMSP		FWFS
76	251221	21.5N 124.5E	PCN 5		DMSP3A		RKSO
77	251221	21.5N 123.4E	PCN 5		DMSP3A		RPMK
78	251227	21.5N 124.0E	PCN 5		NOAA5		PGTW
79	251505	22.3N 126.0E	PCN 5		DMSP3A		RKSO
80	252322	22.1N 127.2E	PCN 3	T3.0/3.0-/S0.0/24HRS	DMSP3A		RPMK
81	252322	22.6N 129.3E	PCN 5		DMSP3A		RODN
82	260103	23.1N 127.5E	PCN 3	T3.0/4.0 /W2.0/25HRS	NOAA5		PGTW
83	260305	22.6N 128.3E	PCN 3	T3.0/4.0 /W1.0/27HRS	DMSP3S		RKSO
84	261022	22.7N 131.5E	PCN 5		DMSP3A		RKSO
85	261022	22.9N 131.0E	PCN 5		DMSP3A		PGTW
86	261143	22.3N 131.3E	PCN 5		NOAA5		PGTW
87	261406	22.9N 132.2E	PCN 5		DMSP3S		PGTW
88	262305	23.6N 135.0E	PCN 4		DMSP3A		PGTW
89	270019	23.3N 135.0E	PCN 4		NOAA5		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE DIAM/ORIENTATION	EYE TEMP (C) OHT/ INV/ DP/SST	MSG NO.
1	170023	6.3N 141.1E	1500FT		1005	025 030 050	090 021 020 050	05 10			+22 +22 28	01
2	180212	8.5N 134.9E	1500FT		1003	035 030 030	060 038 030 030	04 02			+27 +23	02
3	180252	8.5N 134.6E	700MB	3093	1003			06 05			+11 +11	02
4	181553	9.2N 131.8E	700MB	3057	997		110 038 060 120	05 05	ELLIPTICAL	20 10 110	+12 +11	03
5	190114	10.0N 129.9E	700MB									04
6	190322	9.9N 129.1E	700MB	3009	992	030 020 010	150 060 030 020	05 05	CIRCULAR	12	+12 +15 +10	04
7	191635	10.7N 127.4E	700MB	2986	989		030 055 030 040	15 20			+18 +14 +11	05
8	192030	11.1N 125.5E	700MB	2881			160 077 060 040	03 10	CIRCULAR	25	+14 +14 +11	05
9	200915	12.1N 122.8E	619MB		982		210 065 120 025	05 05	CIRCULAR	25	+04 +07	06
10	202104	13.0N 120.0E	700MB	3013	995		260 049 240 012	05 05	CIRCULAR	06	+10 +13 +12	07
11	202315	13.0N 119.7E	700MB									07
12	210233	13.0N 119.3E	700MB	3013	995		300 065 050 050	05 05	ELLIPTICAL	30 10 090	+12 +13 +11	07
13	210345	13.3N 118.4E	700MB	2945	985	080 290 020	030 040 290 030	05 08			+13 +16 +10	08
14	220155	13.9N 116.2E	700MB									09
15	220442	14.1N 115.8E	700MB	2834		050 230 012	240 077 240 025	04 03	ELLIPTICAL	35 30 160	+10 +18 +12	09
16	221235	14.8N 115.0E	700MB									10
17	221530	15.2N 114.4E	700MB	2740	958			05 05	CIRCULAR	30	+13 +18	10
18	240330	18.8N 114.2E	700MB	2692	956	090 150 018	240 090 170 043	04 08	CIRCULAR	20	+13 +20	12
19	240537	19.3N 115.1E	700MB	2682		090 200 019	200 090 120 022	04 04	CIRCULAR	30	+11 +16	12
20	242103	20.6N 118.0E	700MB	2823	970		230 110 150 035	05 05	ELLIPTICAL	60 20 200	+12 +17 +12	13
21	250233	21.2N 119.4E	700MB	2849	974		210 110 120 030	05 05			+12 +15 +13	13
22	250330	21.2N 119.4E	700MB									13
23	251530	21.6N 124.6E	700MB	2920	983		300 065 210 040	03 08			+13 +15 +14	14
24	251749	21.7N 125.1E	700MB									14
25	260350	21.9N 128.3E	700MB	2926	979	090 260 012	260 085 090 040	15 03			+15 +17	15

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	192220	11.2N 124.3E	LAND						11.0N 125.7E	98558
2	192300	11.2N 124.2E	LAND	GOOD		011			11.0N 125.7E	98558
3	200000	11.0N 123.8E	LAND	GOOD		017			11.0N 125.7E	98558
4	200100	11.2N 123.8E	LAND	GOOD		012			11.0N 125.7E	98558
5	200200	11.2N 123.5E	LAND	GOOD		012			11.0N 125.7E	98558
6	240400	19.4N 114.0E	LAND				20902 /////		22.3N 114.2E	45005
7	240500	19.0N 114.4E	LAND				20912 /////		22.3N 114.2E	45005
8	240900	19.2N 114.8E	LAND				20912 /////		22.3N 114.2E	45005
9	241200	19.4N 115.4E	LAND				30912 /////		22.3N 114.2E	45005
10	241500	19.8N 116.3E	LAND				35/// 70719		22.3N 114.2E	45005
11	250000	20.7N 118.9E	LAND				25/// 50523		22.6N 120.3E	46744
12	250100	20.7N 119.0E	LAND				25/// 50907		22.6N 120.3E	46744
13	250200	20.7N 119.2E	LAND				25/// 50808		22.6N 120.3E	46744
14	250300	20.8N 119.4E	LAND				25/// 08016		22.6N 120.3E	46744
15	250400	20.8N 119.6E	LAND				25/// /0809		22.6N 120.3E	46744
16	250500	20.8N 120.1E	LAND				25/// /0926		22.6N 120.3E	46744
17	250500	21.1N 120.6E	LAND				25/// /0626		22.6N 120.3E	46744

TROPICAL STORM POLLY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
* 1	151345	20.4N 139.1E	CONF 2		DMSP		FWFS
2	152259	21.4N 136.9E	PCN 3	T1.5/1.0	DMSP1A	INIT JHS	PGTW
3	160005	22.1N 136.4E	PCN 4		NOAA5		PGTW
4	160200	22.5N 136.0E	PCN 3		DMSP1A	SECONDARY AT 19.2N 136.0E	PGTW
* 5	160214	20.0N 139.7E	CONF 2	T1.5/1.5 /00.5/12HRS	DMSP		FWFS
6	161042	23.6N 134.0E	PCN 4		NOAA5	CI SAME EXPOSED LOW LVL CIRC	PGTW
7	161130	23.7N 135.0E	PCN 3		DMSP1A		RKSO
8	161130	23.6N 134.8E	PCN 4		DMSP1A	CI SAME EXPOSED LOW LVL CIRC	PGTW
* 9	161444	19.3N 139.0E	CONF 2	T1.5/1.5 /00.5/24HRS	DMSP		FWFS
10	161450	24.1N 134.9E	PCN 3		DMSP1A	CI SAME	PGTW
11	162251	24.1N 133.3E	PCN 3	T1.0/1.0	DMSP1A	INIT JHS	RKSO
12	162251	24.6N 133.3E	PCN 3	T1.0/1.0 /50.0/24HRS	DMSP1A		PGTW
13	162314	24.1N 133.4E	PCN 4		NOAA5		PGTW
14	170151	24.4N 133.0E	PCN 3		DMSP1A		RKSO
* 15	170157	20.3N 139.0E	CONF 2	T1.5/1.5 /50.0/24HRS	DMSP		FWFS
* 16	170400	19.8N 139.5E			DMSP		FWFS
17	172214	23.4N 137.4E	PCN 5	T1.5/1.5 /00.5/24HRS	DMSP1A		PGTW
18	180031	23.6N 137.5E	PCN 5		NOAA5		PGTW
19	180131	23.6N 137.1E	PCN 5		DMSP1A		PGTW
* 20	180344	20.2N 139.5E	CONF 1		DMSP		FWFS
* 21	181007	24.7N 137.2E	PCN 6		DMSP17		RODN
22	181055	24.1N 137.1E	PCN 6		DMSP1A		PGTW
23	181111	24.6N 137.0E	PCN 6		NOAA5		PGTW
24	181414	23.7N 131.4E	PCN 6		DMSP1A		PGTW
25	182335	24.1N 139.0E	CONF 2		DMSP		FWFS
26	182125	24.1N 139.0E	PCN 4	T2.0/2.0-/00.5/24HRS	DMSP17		PGTW
27	182347	24.1N 139.2E	PCN 4		NOAA5		PGTW
28	170115	25.4N 139.0E	CONF 2	T2.0/2.0 /50.0/24HRS	DMSP		FWFS
29	171007	25.4N 137.1E	PCN 6		DMSP17	CI 00ev	PGTW
30	171245	25.4N 137.0E	PCN 5		NOAA5		PGTW
31	171536	25.4N 137.1E	PCN 4		DMSP1A		PGTW
32	172105	25.8N 136.1E	PCN 5	T2.0/2.0	DMSP17	INIT JHS	RPMA
33	172105	26.2N 136.1E	PCN 4	T2.0/2.0 /50.0/24HRS	DMSP17		PGTW
34	172321	26.4N 136.1E	PCN 3	T2.0/2.0	DMSP1A	INIT JHS	RKSO
35	172321	26.1N 136.1E	PCN 4		DMSP1A		PGTW
36	180100	26.4N 136.4E	PCN 5		NOAA5		PGTW
* 37	181234	26.1N 136.1E	PCN 5		DMSP1A		PGTW
38	181134	26.5N 136.1E	PCN 4		NOAA5		PGTW
39	181203	26.6N 136.0E	PCN 3		DMSP1A	CI UP	PGTW
40	181203	26.6N 135.9E	PCN 3		DMSP1A		RKSO
41	181435	26.5N 136.0E	CONF 2		DMSP		FWFS
42	181521	26.6N 136.2E	PCN 4		DMSP1A		PGTW
43	182225	27.2N 136.0E	PCN 6		DMSP17		RODN
44	182224	27.1N 136.0E	PCN 4		DMSP17		RPMA
45	182303	27.5N 135.7E	PCN 3	T3.0/3.0-/01.0/24HRS	DMSP1A		RKSO
46	182304	27.3N 136.1E	PCN 3	T3.0/3.0-/01.0/24HRS	DMSP1A		RPMA
47	182304	27.4N 136.1E	PCN 5	T2.0/2.0	DMSP1A	INIT JHS	RODN
48	182304	27.3N 136.0E	PCN 3	T3.0/3.0 /01.0/24HRS	DMSP1A		PGTW
49	190010	27.6N 135.8E	PCN 3		NOAA5		PGTW
50	190221	27.7N 136.0E	PCN 1		DMSP17		RODN
51	190221	27.6N 136.0E	PCN 1		DMSP1A		RKSO
52	190221	27.7N 136.0E	PCN 1		DMSP17		RPMA
53	190221	27.6N 136.0E	PCN 1		DMSP1A		PGTW
54	190234	27.3N 136.1E	CONF 1		DMSP		FWFS
55	191035	24.9N 136.3E	PCN 2		NOAA5		PGTW
56	191109	29.9N 136.5E	PCN 2		DMSP17		RODN
57	191145	29.3N 136.3E	PCN 2		DMSP1A		RODN
58	191145	29.3N 136.4E	PCN 1		DMSP1A	CI SAME	PGTW
59	191145	29.6N 136.4E	PCN 3		DMSP1A		RKSO
60	191503	29.6N 136.5E	PCN 5		DMSP1A		PGTW
61	191521	27.7N 136.0E	CONF 1	T4.0/4.5 /01.0/12HRS	DMSP		FWFS
62	192209	31.2N 137.5E	PCN 5	T3.0/3.0-/50.0/24HRS	DMSP17		RPMA
63	192245	31.1N 136.5E	PCN 3	T3.0/3.0-/50.0/24HRS	DMSP1A	APPRNT LOW LVL CIRC	RKSO
64	192245	31.5N 137.1E	PCN 5		DMSP1A		PGTW
65	200126	31.7N 137.3E	PCN 5		NOAA5		PGTW
66	200203	32.2N 136.0E	PCN 3		DMSP1A		RKSO
67	200203	32.2N 137.6E	PCN 6		DMSP1A		PGTW
68	201126	32.6N 139.8E	PCN 5		DMSP1A		RKSO
69	201129	33.1N 139.7E	PCN 5		DMSP1A		PGTW
70	201445	33.4N 132.3E	PCN 6		DMSP1A		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN SEA HGT	SRS MSLP	MAX-SFC-WND VEL/SRG/RNG	MAX-FLT-LVL-WND DIR/VEL/SRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) UNIT/ IN/ OB/EST	MSW NO.
1	160516	23.1N 132.4E	150DFI		999	035 130 075	160 065 130 075	05 05				+26 +28	06
2	161558	23.7N 129.9E	700MH	1085	1000		190 040 120 140	04 10				+09 +11 +10	05
3	161720	23.7N 129.9E	700MH										05
4	161935	23.9N 129.5E	700MH										05
5	170235	24.4N 128.9E	700MH	1071	997	030 110 120	260 020 180 020	03 10				+12 +13 +10	06
6	170936	24.7N 128.0E	700MH	1063	997	020 350 025	100 032 350 020	02 04				+13 +13 +12	07
7	171047	24.7N 127.8E	700MH	1064	997		060 025 270 030	02 04				+12 +13 +13	07
8	180322	25.9N 125.7E	700MH	1026	993	035 070 060	130 034 060 060	04 07				+13 +12	08
9	181457	26.7N 126.1E	700MH	1005	988		100 035 230 070	02 10				+12 +14 +11	09
10	190241	27.4N 128.1E	700MH	1955	984	060 170 030	270 050 170 030	04 01	CIRCULAR	30		+10 +13	10
11	191305	29.0N 128.3E	700MH										11
12	191521	29.4N 128.5E	700MH	1976	987		210 062 120 090	04 04				+14 +16 +11	11
13	191535	29.4N 128.5E	700MH										11
* 14	200330	32.4N 128.4E	700MH	1007	992		250 030 190 030	02 10				+18 +13 +13	12
15	200636	32.2N 128.5E	1500FI		989		000 000 0	02 10				+23 +23	12

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCUR	EYE SHAPE	EYE DIAM	RADOM-CODE ASWAN TOUFF	COMMENTS	RADAR POSITION	SITE WHO NO.
1	170400	26.4N 127.8E	LAND	GOOD	CIRCULAR	010			26.4N 127.8E	47091
2	170830	26.4N 127.8E	LAND	GOOD	CIRCULAR	009		MAX TOP 200	26.4N 127.8E	47091
3	171000	26.4N 126.8E	LAND	POOR	CIRCULAR	008			26.4N 127.8E	47091
4	171030	27.4N 127.8E	LAND	POOR	CIRCULAR	019		MAX TOP 320	26.4N 127.8E	47091
5	171100	26.4N 127.8E	LAND	GOOD	CIRCULAR	027			26.4N 127.8E	47091
6	171200	26.4N 127.3E	LAND	POOR	ELLIPTICAL	006			26.4N 127.8E	47091
7	171535	26.4N 127.8E	LAND	POOR	CIRCULAR	015		MAX TOP 150	26.4N 127.8E	47091
8	171500	26.4N 127.8E	LAND	POOR	CIRCULAR	015			26.4N 127.8E	47091
9	171500	26.4N 126.7E	LAND				A//// /////		26.2N 127.8E	47097
10	171530	26.1N 127.8E	LAND	POOR	CIRCULAR	012		MAX TOP 200	26.4N 127.8E	47091
11	171700	26.4N 127.8E	LAND	POOR	CIRCULAR	007			26.4N 127.8E	47091
12	171700	26.2N 127.3E	LAND				35/// 53216		26.2N 127.8E	47097
13	171730	26.4N 127.1E	LAND	POOR	CIRCULAR	007		MAX TOP 200	26.4N 127.8E	47091
14	171810	26.4N 127.9E	LAND	POOR	CIRCULAR	030			26.4N 127.8E	47091
15	171935	26.4N 127.1E	LAND	POOR	CIRCULAR	015		MAX TOP 200	26.4N 127.8E	47091
16	171400	26.4N 127.1E	LAND				A//// 73212		26.2N 127.8E	47097
17	171430	26.4N 126.8E	LAND	POOR	CIRCULAR	015		MAX TOP 280	26.4N 127.8E	47091
18	172000	26.4N 126.9E	LAND				A//// 73211		26.2N 127.8E	47097
19	172010	26.2N 126.8E	LAND	POOR	CIRCULAR	015			26.4N 127.8E	47091
20	172030	26.2N 126.9E	LAND	POOR	CIRCULAR	015		MAX TOP 340	26.4N 127.8E	47091
21	172100	26.4N 126.7E	LAND				A//// 73111		26.2N 127.8E	47090
22	172110	26.3N 126.8E	LAND	FAIR	CIRCULAR	010			26.4N 127.8E	47091
23	172200	26.2N 126.5E	LAND				A//// 73113		26.2N 127.8E	47097
24	172210	26.3N 126.4E	LAND	POOR	CIRCULAR	018			26.4N 127.8E	47091
25	172235	26.3N 126.2E	LAND	POOR	CIRCULAR	010			26.4N 127.8E	47091
26	172300	26.4N 126.2E	LAND				35/// 5////		26.8N 125.3E	47097
27	172300	26.3N 126.3E	LAND				A//// 73012		26.2N 127.8E	47097
28	172310	26.4N 126.1E	LAND	POOR	CIRCULAR	012			26.4N 127.8E	47091
29	172330	26.3N 126.1E	LAND	POOR	CIRCULAR	015		MAX TOP 300	26.4N 127.8E	47091
30	180005	26.3N 126.0E	LAND	POOR				SYSTEM APPEARS LESS ORGANIZED	26.4N 127.8E	47091
31	180035	26.1N 126.0E	LAND	POOR	CIRCULAR	015		SYSTEM APPEARS LESS ORGANIZED	26.4N 127.8E	47091
32	180100	26.4N 125.9E	LAND				A5/// 52608		26.8N 125.3E	47097
33	180110	26.2N 125.8E	LAND	POOR	CIRCULAR	019			26.4N 127.8E	47091
34	180200	26.2N 125.8E	LAND				22873 52308		26.8N 125.3E	47097
35	180200	26.4N 125.9E	LAND				A//// 72212		26.2N 127.8E	47097
36	180300	26.4N 125.8E	LAND				22413 51904		26.8N 125.3E	47097
37	180300	26.4N 125.9E	LAND				A//// 72008		26.2N 127.8E	47097
38	180400	26.2N 125.9E	LAND				A5/42 50708		26.8N 125.3E	47097
39	180400	26.4N 125.8E	LAND				///// 72405		26.2N 127.8E	47097
40	180500	26.2N 126.1E	LAND				A//// 50812		26.8N 125.3E	47097
41	180500	26.4N 126.0E	LAND				///// 70000		26.2N 127.8E	47097
42	180545	26.3N 125.8E	LAND	FAIR	CIRCULAR	017			26.4N 127.8E	47091
43	180700	26.3N 126.2E	LAND				A//// 53619		26.8N 125.3E	47097
44	180700	26.4N 126.3E	LAND				35/11 70514		26.2N 127.8E	47097
45	180900	26.1N 126.2E	LAND				A5/// 70107		26.8N 125.3E	47097
46	180900	26.3N 126.2E	LAND				///// 70208		26.2N 127.8E	47097
47	180930	25.4N 125.8E	LAND	GOOD	CIRCULAR	012			26.4N 127.8E	47091
48	180900	26.3N 126.1E	LAND				A5/// 53211		26.8N 125.3E	47097
49	180900	26.3N 125.7E	LAND	GOOD	CIRCULAR	012			26.4N 127.8E	47091
50	180930	26.3N 125.8E	LAND	GOOD	CIRCULAR	019			26.4N 127.8E	47091
51	181000	26.3N 126.1E	LAND				A5/// 50211		26.8N 125.3E	47097
52	181000	26.2N 125.5E	LAND	FAIR	CIRCULAR	016			26.4N 127.8E	47091
53	181300	26.3N 126.2E	LAND				A//// 73507		26.2N 127.8E	47097
54	181030	26.1N 125.5E	LAND	GOOD	CIRCULAR	020			26.4N 127.8E	47091
55	181100	26.1N 125.5E	LAND	FAIR	CIRCULAR	020			26.4N 127.8E	47091
56	181100	26.4N 126.0E	LAND				35/// 73622		26.8N 125.3E	47097
57	181100	26.3N 126.1E	LAND				A//// 73605		26.2N 127.8E	47097
58	181133	26.2N 125.1E	LAND	POOR	CIRCULAR	024		MAX TOP 400	26.4N 127.8E	47091
59	181200	26.4N 126.0E	LAND				35/// 73236		26.8N 125.3E	47097
60	181200	26.4N 125.2E	LAND	POOR	CIRCULAR	008			26.4N 127.8E	47091
61	181200	26.4N 126.1E	LAND				A//// 70000		26.2N 127.8E	47097
62	181300	26.4N 125.9E	LAND				35/// 73322		26.8N 125.3E	47097
63	181300	26.4N 126.1E	LAND				///// 73503		26.2N 127.8E	47097
64	181400	26.4N 125.9E	LAND				A//// 73307		26.2N 127.8E	47097
65	181435	26.4N 125.9E	LAND	POOR	CIRCULAR	015		MAX TOP 410	26.4N 127.8E	47091
66	181500	26.7N 125.8E	LAND				A5/// 73316		26.8N 125.3E	47097
67	181500	26.7N 125.9E	LAND				A//// 73307		26.2N 127.8E	47097
68	181505	26.7N 125.9E	LAND	POOR	CIRCULAR	020			26.4N 127.8E	47091
69	181530	26.7N 125.9E	LAND	GOOD	CIRCULAR	015		MAX TOP 340	26.4N 127.8E	47091
70	181500	26.4N 125.9E	LAND				A5/// 73412		26.8N 125.3E	47097
71	181500	26.4N 125.8E	LAND				A//// 73208		26.2N 127.8E	47097
72	181505	26.4N 125.8E	LAND	GOOD	CIRCULAR	015			26.4N 127.8E	47091
73	181530	27.0N 125.9E	LAND	FAIR		020		NOV 1620	26.2N 127.8E	47097
74	181532	26.9N 126.0E	LAND	GOOD	CIRCULAR	015		MAX TOP 330	26.4N 127.8E	47091
75	181700	27.1N 125.8E	LAND				A5/// 63624		26.8N 125.3E	47097
76	181700	26.9N 125.8E	LAND				A//// 73611		26.2N 127.8E	47097
77	181705	27.1N 125.9E	LAND	FAIR	CIRCULAR	020			26.4N 127.8E	47091
78	181730	27.2N 125.8E	LAND	FAIR	CIRCULAR	025		MAX TOP 400	26.4N 127.8E	47091
79	181400	27.1N 125.8E	LAND				35/// 73532		26.8N 125.3E	47097
80	181900	27.1N 125.8E	LAND	FAIR		020		NOV 3620	26.2N 127.8E	47097
81	181900	27.2N 125.9E	LAND				A//// 73611		26.2N 127.8E	47097
82	181910	27.2N 125.8E	LAND	FAIR	CIRCULAR	020			26.4N 127.8E	47091
83	181930	27.2N 125.6E	LAND	FAIR	CIRCULAR	020		MAX TOP 310	26.4N 127.8E	47091
84	181900	27.1N 125.8E	LAND				A5/// 50000		26.8N 125.3E	47097
85	181900	27.1N 125.7E	LAND				A//// 73506		26.2N 127.8E	47097
86	181910	27.2N 125.7E	LAND	FAIR	CIRCULAR	020			26.4N 127.8E	47091
87	181930	27.2N 125.6E	LAND	FAIR	CIRCULAR	015		MAX TO 300	26.4N 127.8E	47091
88	182000	27.2N 125.7E	LAND				35/// 52208		26.8N 125.3E	47097
89	182000	27.1N 125.7E	LAND				A//// 73504		26.2N 127.8E	47097
90	182010	27.2N 125.8E	LAND	GOOD	CIRCULAR	015			26.4N 127.8E	47091
91	182030	27.2N 125.8E	LAND	GOOD	CIRCULAR	020		MAX TOP 310	26.4N 127.8E	47091
92	182100	27.1N 125.9E	LAND				35/// 71504		26.8N 125.3E	47097
93	182100	27.1N 125.9E	LAND				A//// 70000		26.2N 127.8E	47097
94	182110	27.1N 126.0E	LAND	FAIR	CIRCULAR	020			26.4N 127.8E	47091
95	182130	27.2N 126.0E	LAND	FAIR	CIRCULAR	020		MAX TOP 270	26.4N 127.8E	47091
96	182200	27.1N 125.9E	LAND				A//// 70000		26.2N 127.8E	47097
97	182210	27.2N 126.0E	LAND	POOR	CIRCULAR	020			26.4N 127.8E	47091

98	182230	27.3N 126.0E	LAND	PGUM	CIRCULAR	020					26.4N	127.8E	47991
99	182230	27.4N 126.0E	LAND	PGUM					MAX TOP 280		26.4N	127.8E	47991
100	182300	27.5N 126.2E	LAND				62777	70616			26.2N	127.8E	47997
101	182330	27.3N 126.2E	LAND	PGUM	CIRCULAR	015			EYE VERY DFUS APPRS TO BE FILNG		26.4N	127.8E	47991
102	190000	27.5N 126.3E	LAND				62777	70516			26.2N	127.8E	47997
103	190010	27.6N 126.1E	LAND	PGUM					SMRL FEATURES BCMG ILL DEFINED		26.4N	127.8E	47991
104	190030	27.5N 126.2E	LAND	PGUM					MAX TOP 280		26.4N	127.8E	47991
105	190100	27.5N 126.2E	LAND				62777	73508			26.2N	127.8E	47997
106	190130	27.4N 126.0E	LAND	PGUM					MAX TOP 360		26.4N	127.8E	47991
107	190200	27.7N 126.3E	LAND				62777	70119			26.2N	127.8E	47997
108	190210	27.4N 126.0E	LAND	PGUM							26.4N	127.8E	47991
109	190230	27.7N 126.1E	LAND						MAX TOP 270		26.4N	127.8E	47991
110	190300	27.4N 126.2E	LAND				62777	70119			26.2N	127.8E	47997
111	190400	27.8N 126.1E	LAND				62777	73509			26.2N	127.8E	47997
112	190500	28.1N 126.1E	LAND				62773	57777			28.4N	129.5E	47909
113	190500	28.1N 126.1E	LAND				62777	73409			26.2N	127.8E	47997
114	190500	28.2N 126.2E	LAND				65773	50211			28.4N	129.5E	47909
115	190500	28.4N 126.1E	LAND				62777	73511			26.2N	127.8E	47997
116	190700	28.3N 126.9E	LAND				65772	50316			28.4N	129.5E	47909
117	190500	28.7N 126.9E	LAND				65773	53514			28.4N	129.5E	47909
118	190900	28.4N 126.9E	LAND				65773	53614			28.4N	129.5E	47909
119	191000	28.3N 126.9E	LAND				65773	53605			28.4N	129.5E	47909
120	191300	29.1N 126.9E	LAND				62773	53605			28.4N	129.5E	47909
121	191400	29.2N 126.9E	LAND				62773	53611			28.4N	129.5E	47909
122	191500	29.4N 126.9E	LAND				62773	53311			28.4N	129.5E	47909
123	191700	29.4N 126.9E	LAND				62773	60108			28.4N	129.5E	47909
124	192050	30.1N 126.8E	LAND	PGUM					NOV 0230	SHIMONOSHIKI			47762

TROPICAL STORM ROSE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	201445	17.9N 132.0E	PCN 6		DMSP34		PGTW
2	202229	16.6N 130.7E	PCN 5	T1.0/1.0	DMSP34	INIT OBS	RPMK
3	210044	16.3N 130.2E	PCN 5	T1.0/1.0	NOAA5	INIT OBS	PGTW
4	210145	16.3N 129.8E	PCN 6		DMSP34		PGTW
5	210146	16.4N 129.8E	PCN 5		DMSP34		RPMK
6	211124	17.1N 129.2E	PCN 6		NOAA5	CI OBSV	PGTW
7	220000	18.7N 128.2E	PCN 5	T1.0/1.0 /S0.0/23HRS	NOAA5		PGTW
8	220309	19.6N 126.8E	PCN 3		DMSP34	DUAL LOW LVL CIRCULATION EXPOSED	PGTW
9	220309	17.9N 128.1E	PCN 5	T1.0/1.0 /S0.0/29HRS	DMSP34	NO LOW LVL CIRCULATION	RPMK
10	221236	19.5N 126.9E	PCN 6		NOAA5		PGTW
11	221551	16.9N 125.1E	PCN 5		DMSP34		RODN
12	222335	18.6N 124.8E	PCN 5	T2.0/2.0 /D1.0/21HRS	DMSP34		RPMK
13	222336	18.8N 124.8E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP34	SECONDARY 20.5N 125.3E	PGTW
14	230112	18.7N 124.6E	PCN 5		NOAA5		PGTW
15	230252	18.7N 124.5E	PCN 5		DMSP35		PGTW
16	230252	19.4N 123.9E	PCN 5	T2.0/2.0	DMSP34	INIT OBS	RODN
17	230252	18.5N 124.7E	PCN 5		DMSP34		RPMK
18	231133	18.5N 124.1E	PCN 6		DMSP37		RODN
19	231133	19.0N 124.5E	PCN 5		DMSP37		RPMK
20	231152	18.5N 123.7E	PCN 6		NOAA5		PGTW
21	231218	18.5N 124.3E	PCN 6		DMSP34		RODN
22	231218	18.8N 124.2E	PCN 5		DMSP34		RPMK
23	231533	18.7N 123.1E	PCN 5		DMSP35		PGTW
24	232233	21.0N 122.6E	PCN 3		DMSP37		RPMK
25	232319	21.3N 122.6E	PCN 3	T2.5/2.5-/D0.5/24HRS	DMSP34		PGTW
26	232319	21.2N 122.5E	PCN 3	T2.0/2.0	DMSP34	INIT OBS	RKSO
27	232319	21.2N 122.5E	PCN 3	T2.0/2.0 /S0.0/24HRS	DMSP34		RPMK
28	240028	21.4N 122.5E	PCN 3		NOAA5		PGTW
29	241114	22.5N 122.0E	PCN 5		DMSP37	NO LOW LVL CIRCULATION	RODN
30	241201	22.7N 121.5E	PCN 6		DMSP34		PGTW
31	241515	24.6N 121.8E	PCN 5		DMSP35	NO APPRNT LOW LVL CIRCULATION	PGTW
32	241516	24.6N 121.9E	PCN 5		DMSP34	NO APPRNT LOW LVL CIRCULATION	RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND DIR/VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) UNIT/ IN/ OD/SST	MSN NO.
1	220154	18.6N 127.2E	1500FT		1003	30 070 070	140 032 080 080	04 02				+25 +26 +24	01
2	210112	18.7N 124.6E	1500FT		989	65 070 50	150 55 070 30					+26	02
3	230305	18.8N 124.5E	700MB	1039	993	030 090 010	080 045 350 020	05 05	CIRCULAR	10		+18 +15	02
* 4	231000	18.7N 123.5E	700MB	1096	1004		250 035 190 040	20 20				+10 +10	03
5	232142	20.9N 122.6E	700MB	1069	995	035 310 015	230 030 170 410	02 03				+14 +16 29	04
6	240959	22.6N 121.8E	700MB	1082	1002	030 160 040	210 040 210 040	02 10				+14 +14 +13	05
7	241140	22.5N 121.8E	700MB	1082			260 31 150 31					+13 +13	05

TROPICAL STORM SHIRLEY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	271240	11.3N 122.6E	PCN 5		NOAA5	UPPER LVL	PGTW
2	272256	11.2N 117.8E	PCN 5		DMSP37		RPMK
3	272351	10.9N 118.0E	PCN 5	T1.0/1.0	DMSP3A	INIT DBS	RPMK
4	280125	9.6N 119.5E	PCN 5	T1.0/1.0	NOAA5	INIT DBS	PGTW
5	280304	10.1N 119.3E	PCN 5		DMSP35		RPMK
6	241137	10.4N 116.8E	PCN 6		DMSP37	CI DOWN	RPMK
7	281205	10.4N 117.1E	PCN 6		NOAA5	CI DOWN UPPER LVL	PGTW
8	281546	10.6N 116.0E	PCN 6		DMSP35		RPMK
9	282237	10.3N 118.4E	PCN 5	T1.0/1.0	DMSP37	INIT DBS SECONDARY 12.2N 115.0E	RODN
10	282333	10.9N 117.7E	PCN 5	T1.0/1.0 /S0.0/22HRS	DMSP3A		PGTW
11	282334	10.2N 117.4E	PCN 5		DMSP3A		RODN
12	290041	10.9N 117.6E	PCN 5		NOAA5		PGTW
13	291118	11.3N 115.3E	PCN 6		DMSP37		RODN
14	291216	11.2N 115.6E	PCN 5		DMSP35	CI SAME	RPMK
15	291528	12.1N 113.6E	PCN 5		DMSP35		PGTW
16	292217	13.2N 111.8E	PCN 3	T2.0/2.0	DMSP37	INIT DBS	RPMK
17	252218	13.2N 112.5E	PCN 5	T2.0/2.0 /D1.0/23HRS	DMSP37		PGTW
18	300410	13.2N 111.6E	PCN 3		DMSP35	BANDING TYPE EYE EST T3.0	RPMK
19	301058	13.6N 109.6E	PCN 3		DMSP37	CI UP	RPMK
20	301059	13.7N 109.4E	PCN 6		DMSP37		RODN
21	301158	13.7N 109.6E	PCN 3		DMSP3A		RPMK
22	301159	13.6N 109.5E	PCN 3		DMSP3A	CI UP	PGTW
23	301233	13.6N 109.2E	PCN 4		NOAA5		PGTW
24	301552	13.7N 108.4E	PCN 5		DMSP35		RPMK
25	302340	14.6N 107.0E	PCN 5	T1.0/2.0-/W1.0/25HRS	DMSP37		RPMK
26	010110	14.6N 106.4E	PCN 5	T1.0/2.0-/W1.0/26HRS	NOAA5		PGTW
27	010353	14.6N 106.2E	PCN 5		DMSP35	EST T1.0/2.0 LOST IN DROP-OUT	RODN

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN	RADOB-CODE TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	300050	12.3N 112.2E	ACFT						54 WRS		

TYPHOON TRIX

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	110055	19.0N 153.6E	PCN 6	T0.0/0.0	DMSP35	INIT DHS	PGTW
2	111018	17.9N 154.3E	PCN 6		NOAA5		PGTW
3	112130	19.4N 151.7E	PCN 5	T1.0/1.0 /D1.0/21HRS	DMSP36		PGTW
4	112255	19.5N 151.3E	PCN 6		NOAA5		PGTW
5	120936	20.4N 149.5E	PCN 6		NOAA5		PGTW
6	121012	21.4N 149.7E	PCN 5		DMSP36		PGTW
• 7	121318	22.3N 149.8E	PCN 6		DMSP35		PGTW
8	122113	23.6N 148.2E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP36		PGTW
9	130008	23.3N 147.8E	PCN 5		NOAA5		PGTW
10	130201	23.6N 147.8E	PCN 6		DMSP35		PGTW
• 11	130955	22.4N 150.9E	PCN 6		DMSP36		PGTW
• 12	131047	21.4N 150.0E	PCN 6		NOAA5	SECONDARY 23.0N 146.9E	PGTW
13	131442	24.0N 145.4E	PCN 6		DMSP35	NO APPRNT CC PRML SECONDARY CC	PGTW
14	132109	24.2N 143.9E	PCN 5		DMSP37		RKSO
• 15	132109	23.9N 146.5E	PCN 5		DMSP37		PGTW
16	132237	24.2N 143.9E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP36		PGTW
17	132237	24.0N 143.5E	PCN 5	T2.0/2.0	DMSP36		RKSO
18	132324	23.9N 143.4E	PCN 5		NOAA5		PGTW
19	140143	24.0N 143.2E	PCN 5		DMSP35		PGTW
20	140143	24.5N 143.2E	PCN 5		DMSP35		RKSO
21	140950	24.6N 142.2E	PCN 6		DMSP37		RODN
22	140950	23.7N 142.3E	PCN 6		DMSP37	CI UP	PGTW
23	141003	23.4N 142.2E	PCN 6		NOAA5		PGTW
24	141119	23.9N 142.2E	PCN 5		DMSP36		PGTW
25	141119	24.0N 142.2E	PCN 5		DMSP36		RKSO
26	141425	23.9N 141.2E	PCN 5		DMSP35		PGTW
27	142049	24.1N 140.5E	PCN 3	T3.0/3.0 /D1.0/23HRS	DMSP37		PGTW
28	142049	24.1N 140.4E	PCN 3	T3.0/3.0 /D1.0/23HRS	DMSP37		RKSO
29	142220	24.0N 139.8E	PCN 3		DMSP36		RKSO
30	142222	24.1N 140.0E	PCN 3		DMSP36		PGTW
31	150125	24.0N 139.0E	PCN 3		DMSP35		PGTW
32	150930	23.6N 138.3E	PCN 6		DMSP37	CI UP	PGTW
33	150930	23.6N 138.2E	PCN 4		DMSP37		RKSO
34	151102	23.5N 138.2E	PCN 3		DMSP36		PGTW
35	151407	23.4N 138.0E	PCN 5		DMSP35		PGTW
36	152030	22.7N 137.2E	PCN 3		DMSP37		RODN
37	152030	22.9N 137.3E	PCN 1	T4.0/4.0 /D1.0/24HRS	DMSP37		PGTW
38	152203	22.5N 137.2E	PCN 3	T4.0/4.0	DMSP36	INIT DHS	RODN
39	160107	22.9N 137.7E	PCN 3	T4.0/4.0 /D1.0/24HRS	DMSP37		RKSO
40	161044	22.4N 137.8E	PCN 4		DMSP36		RODN
41	162145	22.2N 138.7E	PCN 3		DMSP36		PGTW
42	162152	22.2N 138.4E	PCN 1	T4.0/4.0	DMSP37	INIT DHS	RPMK
43	162152	22.0N 138.5E	PCN 3	T4.0/4.0 /S0.0/25HRS	DMSP37		PGTW
44	162307	22.0N 138.8E	PCN 4		NOAA5		PGTW
45	171027	22.7N 139.9E	PCN 6		DMSP37		RODN
46	171027	23.2N 140.2E	PCN 6		DMSP36		PGTW
47	171144	23.2N 140.7E	PCN 6		NOAA5		PGTW
48	172128	23.5N 142.2E	PCN 3	T4.5/4.5 /D0.5/24HRS	DMSP36		PGTW
49	172128	23.2N 142.0E	PCN 5	T4.0/4.0	DMSP36	INIT DHS	RODN
50	172132	23.4N 142.2E	PCN 1	T5.0/5.0	DMSP37	INIT OBS RAGGED EYE	RKSO
51	180213	24.4N 143.3E	PCN 3		DMSP35	CI DOWN	RKSO
52	180213	24.5N 143.5E	PCN 3		DMSP35		PGTW
53	180213	24.5N 143.4E	PCN 5		DMSP35		RODN
54	181010	25.4N 143.9E	PCN 6		DMSP36		RODN
55	181013	25.3N 144.6E	PCN 5		DMSP37		RPMK
56	181013	25.3N 144.8E	PCN 5		DMSP37	CI DOWN	PGTW
57	181100	25.7N 141.5E	PCN 5		NOAA5		PGTW
58	181314	25.6N 145.2E	PCN 5		DMSP35		PGTW
59	181455	25.5N 145.7E	PCN 5		DMSP35		RPMK
60	182110	25.2N 145.5E	PCN 3	T5.0/5.0 /D0.5/24HRS	DMSP36		PGTW
61	182111	25.7N 145.9E	PCN 6	T5.0/5.0 /D1.0/24HRS	DMSP36		RODN
62	182112	25.6N 145.7E	PCN 3	T5.0/5.0 /S0.0/24HRS	DMSP37		RKSO
63	182336	25.6N 146.2E	PCN 3		NOAA5		PGTW
64	190156	26.0N 145.6E	PCN 3		DMSP35		RKSO
65	190159	26.5N 146.1E	PCN 3		DMSP35		PGTW
• 66	190954	27.5N 144.8E	PCN 6		DMSP37		RODN
67	190954	27.0N 145.0E	PCN 3		DMSP37		RKSO
68	191016	27.0N 145.5E	PCN 5		NOAA5		PGTW
69	191437	27.7N 145.2E	PCN 3		DMSP35	CI UP	PGTW
70	192053	29.9N 144.0E	PCN 3	T3.5/4.5 /W1.5/24HRS	DMSP37		PGTW
71	192053	29.0N 143.8E	PCN 3	T4.0/4.0 /W1.5/24HRS	DMSP37		RKSO
72	192235	29.0N 143.8E	PCN 3		DMSP36	UPR LVL 29.5N 143.3E	RKSO
73	192252	29.2N 143.6E	PCN 6		NOAA5		PGTW
74	200138	29.2N 143.2E	PCN 3		DMSP35		PGTW
75	200934	29.9N 141.0E	PCN 6		DMSP37		PGTW
• 76	200934	30.6N 140.9E	PCN 6		DMSP37	LOW LVL CIRC ON CU LINE	RODN
77	201117	30.1N 139.8E	PCN 5		DMSP36		PGTW
78	201128	29.5N 140.0E	PCN 6		NOAA5		PGTW
79	201619	29.5N 139.2E	PCN 6		DMSP35		PGTW
80	202034	29.7N 138.0E	PCN 5		DMSP37		PGTW
81	202218	29.9N 136.7E	PCN 5	T2.5/2.5	DMSP36	INIT OBS	RODN
82	202218	30.2N 137.9E	PCN 5	T3.0/4.0 /W1.0/24HRS	DMSP36		RKSO
83	202218	30.1N 137.9E	PCN 5	T2.0/3.0 /W1.5/24HRS	DMSP36		PGTW
84	210005	30.5N 137.6E	PCN 3		NOAA5		PGTW
• 85	210120	30.4N 137.2E	PCN 5		DMSP35	EXPOSED LOW LVL CIRC	RKSO

86	211054	30.2N 134.1E	PCN 5			DMSP3A			PGTW
87	211100	30.4N 134.7E	PCN 5			DMSP3A			RKSO
88	211401	24.7N 132.9E	PCN 5			DMSP3A			PGTW
89	211534	24.4N 133.2E	PCN 5			DMSP3A			RODN
90	212136	29.1N 130.5E	PCN 5	T2.0/2.0 /S0.0/24HRS		DMSP3A			PGTW
91	212201	29.2N 130.8E	PCN 5	T2.0/3.0 /W1.0/24HRS		DMSP3A			RKSO
92	220117	24.9N 130.4E	PCN 5			NOAA9			PGTW
93	220244	24.9N 130.5E	PCN 5	T2.0/2.5 /W0.5/24HRS		DMSP3A			RODN
94	220244	24.9N 127.2E	PCN 5			DMSP3A			RKSO
95	221035	24.9N 125.6E	PCN 5			DMSP3A			PGTW
96	221037	24.9N 125.6E	PCN 5			DMSP3A			RKSO
97	221156	24.1N 124.7E	PCN 5			NOAA9			PGTW
98	221226	27.4N 124.8E	PCN 5			DMSP3A	BASED ON CI BANDING		RODN
99	221525	28.6N 124.1E	PCN 5			DMSP3A			PGTW
100	222137	29.2N 121.8E	PCN 3	T1.0/2.0-/W1.0/24HRS		DMSP3A			PGTW
101	222137	28.6N 121.8E	PCN 5	T1.0/2.0 /W1.0/18HRS		DMSP3A			RODN
102	230033	29.2N 121.3E	PCN 5			NOAA9			PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN SLP	OBS MSLP	MAX-SFC-WND VEL/QRD/RNG	MAX-FLT-LVL-WND DIR/VEL/RNG/QNE	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE DIAM	EYE TEMP (C) UNIT/ IN/ OP/SST	MSG NO.
1	131500	23.9N 144.8E	700MB	1000	1003		090 029 360 090	04 05				+10 +10	2
2	140105	23.6N 143.1E	700MB			35 330 50	070 27 330 90						3
3	140338	23.9N 142.8E	700MB	1001	995	035 340 045	070 027 340 045	04 02				+14 +15	3
4	141003	23.9N 141.2E	700MB	1000	992		200 038 100 010	02 05				+11 +13 +12	4
5	150309	23.8N 139.6E	700MB	>996		100 050 10	230 65 050 30					+17	5
6	150345	23.9N 139.3E	700MB	>992	980	080 140 010	090 064 360 040	10 05	CIRCULAR	15		+10 +17	5
* 7	150940	23.9N 139.3E	700MB	>992		80 140 10	230 57 140 15					+17	5
8	151130	23.6N 138.1E	700MB	>993			060 58 360 30					+20	6
9	151506	23.2N 138.0E	700MB	>996	980		040 045 290 075	05 05				+13 +20	6
10	160030	22.9N 137.8E	700MB	>967	973	090 120 010	230 071 140 010	01 03	CIRCULAR	15		+12 +17 08	7
11	160326	22.7N 137.7E	700MB	>952	970	090 120 020	040 065 360 025	03 03	CIRCULAR	10		+10 +16 09	7
12	161221	22.1N 138.1E	700MB	>981			200 75 100 10					+18	8
13	161505	22.0N 138.1E	700MB	>976	974		200 070 110 020	05 02	CIRCULAR	20		+12 +18	8
14	170132	22.0N 139.3E	700MB	>934		70 180 25	270 75 180 25					+17 +17	9
15	170435	22.4N 139.6E	700MB	>929	967	065 170 025	270 072 170 025	03 00	CIRCULAR	25		+15 +21 +13	9
16	171410	22.6N 140.8E	700MB	>962			200 50 090 30					+20	10
17	171530	22.9N 141.3E	700MB	>939	980		200 050 120 025	04 04				+11 +17 +17	10
18	180317	24.1N 143.7E	700MB	>911								+16 +11	11
19	180436	24.2N 143.9E	700MB	>909	980	065 180 030	250 050 180 030	02 10				+14 +16 +10	11
20	190330	24.4N 144.1E	700MB	1001	988	050 270 030	240 040 100 045	03 05				+11 +17	12
21	190506	24.6N 144.4E	700MB		984	055 250 010	180 060 080 030	02 01				+21 +25 27	12
22	191305	27.4N 145.3E	700MB	1012			140 53 090 50					+14 +13	13
23	191342	24.0N 144.8E	700MB	>974			110 050 020 040	03 04				+16 +17 +15	13
24	200256	29.1N 141.0E	700MB	1004	996	035 070 040	140 040 070 035	03 05				+14 +14 26	14
25	201520	29.6N 139.3E	700MB	1070	1000		050 039 290 042	10 05				+16 +16 +11	15
26	210305	29.9N 136.5E	700MB		1000	025 360 025	100 025 360 025	03 10				+24 +25 +24 29	16
* 27	211529	27.1N 131.9E	700MB	1108	1003		140 025 280 010	02 15					17
28	220000	24.0N 129.1E	1500FT		1000								18
29	220350	24.7N 127.7E	1500FT		997	055 100 015	140 035 080 080	05 05	CIRCULAR	08		+26 +26 27	18

TYPHOON VIRGINIA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	222237	14.3N 151.0E	PCN 5	T0.0/0.0	NOAA5	INIT OBS	PGTW
2	230044	16.2N 151.3E	PCN 5		DMSP35		PGTW
3	231025	16.1N 150.7E	PCN 5		DMSP36	CI UP	PGTW
* 4	231025	14.4N 148.5E	PCN 4		DMSP36		RODN
5	231326	16.1N 151.1E	PCN 6		DMSP35		PGTW
* 6	231326	13.3N 150.2E	PCN 6		DMSP35	SECONDARY 15.4N 152.1E	RODN
7	232126	14.3N 151.9E	PCN 5	T2.0/2.0 /D2.0/23HRS	DMSP36		PGTW
8	240027	16.3N 151.5E	PCN 5		DMSP35		PGTW
9	241008	17.3N 151.2E	PCN 6		DMSP36	CI SAME	PGTW
10	241308	18.1N 151.2E	PCN 6		DMSP35		PGTW
11	242109	18.5N 150.5E	PCN 5	T3.0/3.0 /D1.0/24HRS	DMSP36		PGTW
12	242305	18.7N 150.4E	PCN 5		NOAA5		PGTW
13	250150	19.3N 150.3E	PCN 5		DMSP35		PGTW
14	250940	20.0N 149.6E	PCN 5		DMSP37		PGTW
15	250940	19.5N 150.7E	PCN 5		DMSP37		RODN
16	251251	20.4N 149.5E	PCN 6		DMSP35		PGTW
17	252038	20.4N 149.2E	PCN 5	T4.0/4.0 /D1.0/24HRS	DMSP37		PGTW
18	252038	20.3N 149.4E	PCN 5	T4.0/4.0	DMSP37	INIT OBS	RODN
19	260132	21.2N 148.9E	PCN 6		DMSP35		PGTW
20	260919	21.8N 147.9E	PCN 5		DMSP37		PGTW
21	260919	21.3N 148.9E	PCN 6		DMSP37	UPR LVL CDO	RODN
22	261616	21.8N 147.8E	PCN 5		DMSP35	CI DOWN	PGTW
23	262018	21.5N 148.1E	PCN 5		DMSP37		PGTW
24	262215	21.3N 148.0E	PCN 3		DMSP36		RPMK
25	270114	21.5N 147.0E	PCN 5		DMSP35		PGTW
26	270115	21.5N 147.8E	PCN 5	T3.0/4.0	DMSP35		RODN
27	270900	21.8N 147.4E	PCN 4		DMSP35		RODN
28	270900	21.5N 147.4E	PCN 4		DMSP37		PGTW
29	271057	21.8N 146.9E	PCN 4		DMSP36		PGTW
30	271357	21.7N 147.2E	PCN 5		DMSP35		PGTW
31	271959	21.2N 147.2E	PCN 5	T5.0/5.0 /D1.0/24HRS	DMSP37		PGTW
32	272138	21.7N 147.4E	PCN 5	T3.5/3.5	DMSP36	INIT OBS	RKSO
33	272158	21.3N 147.5E	PCN 5		DMSP36		PGTW
34	280056	21.4N 147.7E	PCN 5		DMSP35		PGTW
35	280940	22.2N 147.4E	PCN 6		DMSP37	CI DOWN	PGTW
36	281040	22.2N 147.2E	PCN 4		DMSP36		RODN
37	281040	22.1N 147.2E	PCN 5		DMSP36	UPR LVL	PGTW
38	281339	22.0N 146.6E	PCN 6		DMSP35		PGTW
39	281357	21.7N 147.9E	PCN 5		DMSP35		RODN
40	282121	22.3N 146.9E	PCN 3		DMSP37		RPMK
41	282121	22.7N 147.0E	PCN 3		DMSP37		RKSO
42	282141	22.2N 146.7E	PCN 3	T4.0/4.0	DMSP36	INIT OBS	RODN
43	282141	22.3N 147.2E	PCN 3	T4.5/5.0-/W0.5/26HRS	DMSP36		PGTW
44	290039	22.3N 147.3E	PCN 4		DMSP35		PGTW
45	291002	24.0N 147.3E	PCN 4		DMSP37		RKSO
46	291002	23.8N 146.8E	PCN 4		DMSP37		PGTW
47	291022	23.3N 146.6E	PCN 4		DMSP36		PGTW
48	291023	24.1N 146.6E	PCN 6		DMSP36		RODN
49	291320	24.0N 146.5E	PCN 4		DMSP35		PGTW
50	292102	25.0N 145.0E	PCN 3		DMSP37		RKSO
51	292102	25.3N 145.6E	PCN 5	T4.0/4.0 /S0.0/24HRS	DMSP37		RODN
52	292126	25.0N 145.1E	PCN 3	T4.5/4.5 /S0.0/24HRS	DMSP36		PGTW
53	300203	25.4N 145.0E	PCN 3		DMSP35		RPMK
54	300203	25.3N 144.7E	PCN 3	T4.0/4.0	DMSP35		RKSO
55	300203	25.8N 144.9E	PCN 4		DMSP35		PGTW
56	300943	27.3N 143.9E	PCN 6		DMSP37		RODN
57	300943	27.3N 143.9E	PCN 4		DMSP37		PGTW
58	301005	27.3N 143.7E	PCN 4		DMSP36		PGTW
59	301446	27.6N 143.6E	PCN 4		DMSP35		PGTW
60	301445	27.5N 143.6E	PCN 5		DMSP35		RKSO
61	302043	28.7N 143.0E	PCN 3	T3.0/4.0 /W1.0/24HRS	DMSP37		RODN
62	302043	28.8N 142.8E	PCN 1	T3.5/4.5 /W1.0/24HRS	DMSP37		PGTW
63	302106	28.8N 142.9E	PCN 3		DMSP36		PGTW
64	310145	30.2N 142.8E	PCN 3	T3.5/4.0 /W0.5/24HRS	DMSP35		RKSO
65	310145	30.3N 142.8E	PCN 3		DMSP35		PGTW
66	310923	31.3N 141.9E	PCN 6		DMSP37		RODN
67	310923	31.5N 141.8E	PCN 4		DMSP37		PGTW
68	311129	31.3N 141.8E	PCN 4		DMSP36		PGTW
69	311426	32.3N 141.6E	PCN 3		DMSP35		PGTW
70	311427	32.5N 141.7E	PCN 3		DMSP35		RPMK
71	311427	32.6N 142.0E	PCN 3		DMSP35		RKSO
72	312023	33.3N 141.5E	PCN 1	T3.0/4.0-/W0.5/24HRS	DMSP37		PGTW
73	312231	33.3N 141.5E	PCN 3		DMSP36		PGTW
74	312346	33.6N 141.1E	PCN 3		NOAA5		PGTW
75	010127	34.1N 141.6E	PCN 3	T3.0/3.5-/W0.5/24HRS	DMSP35		RKSO
76	010127	34.1N 141.6E	PCN 3		DMSP35		PGTW
77	010906	35.6N 142.0E	PCN 6		DMSP37		RODN
78	010906	35.2N 141.8E	PCN 3		DMSP37	CI SAME	PGTW
* 79	011045	30.5N 142.3E	PCN 4		DMSP37		RKSO
80	011112	35.8N 142.5E	PCN 3		DMSP36		PGTW
81	011140	36.4N 143.0E	PCN 3		DMSP35		PGTW
82	012004	34.6N 144.0E	PCN 5	T2.0/2.0	DMSP37		RODN
83	012004	37.7N 143.9E	PCN 5		DMSP37		PGTW
84	012213	38.7N 144.1E	PCN 5	T3.0/4.0-/S0.0/24HRS	DMSP36		PGTW
85	012213	38.9N 144.3E	PCN 5	T2.0/3.0-/W1.0/24HRS	DMSP36		RKSO
86	012302	38.9N 144.3E	PCN 5		NOAA5		PGTW
87	020942	40.1N 147.9E	PCN 6		NOAA5	CI DOWN	PGTW
88	021026	40.5N 148.2E	PCN 5		DMSP37		RKSO
89	021026	40.6N 148.6E	PCN 6		DMSP37		RODN
90	021055	40.6N 148.6E	PCN 5		DMSP36		RKSO
91	030015	43.5N 150.4E	PCN 5		NOAA5		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN ALT	OBS MSLP	MAX-SFC-WND DIR/VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	230315	15.4N 151.0E	150OFT		984	55 290 65	350 65 290 65	3 5	CIRCULAR	60		+26 +26 +26 26	1
2	232205	14.5N 151.1E	700MB	1027	993	75 240 5	310 65 340 20	4 5				+13 +21 +11	2
3	240135	14.7N 151.0E	700MB	1024		100 050 20	140 50 050 20					+18 + 8	2
4	240333	14.3N 151.0E	700MB	1025	987	55 280 10	140 70 120 15	4 4				+15 +15 + 8	2
5	241333	14.7N 151.0E	700MB										3
6	241550	14.3N 150.8E	700MB	2964	982		140 50 050 30	7 2				+ 9 +19	3
7	250130	14.9N 150.2E	700MB	2935		30 700 30	160 63 700 60					+18 +11	4
8	250425	14.4N 150.2E	700MB	2880	974	70 130 10	220 60 130 10	5 5	CIRCULAR	60		+15 +21 +12	4
9	251345	20.1N 140.9E	700MB	2894			120 65 400 30					+19	5
10	251500	20.4N 140.3E	700MB	2894	977		200 30 180 24	4 4	ELLIPTICAL	60 25 140		+12 +16	5
11	260307	21.1N 144.6E	700MB	2913	981	35 210 22	300 55 250 60	7 5				+10 +17 +13	5
12	260345	21.4N 144.3E	700MB	2921		30 340 65	060 75 340 50					+17 +13	6
13	261250	21.4N 147.7E	700MB	2968			090 65 050 30					+19 +10	7
14	261512	21.7N 147.6E	700MB	2963	982		360 70 270 30	3 5				+15 +18 +11	7
15	270340	21.5N 147.1E	700MB	2997		30 020 70	110 65 060 30					+16 +12	8
16	270535	21.4N 147.3E	700MB	2996	987	100 340 30	060 55 340 30	4 4				+13 +17 +13	8
17	280221	21.3N 147.6E	700MB	2913		40 030 120	090 30 030 120					+16 +13	9
18	281434	21.6N 147.9E	700MB	2911	979	30 280 120	010 40 260 60	3 5				+15 +17 +11	9
19	281550	21.4N 147.1E	700MB	2905	980		270 60 210 36	5 3				+12 +15 +13	10
20	281902	22.2N 147.1E	700MB	2884	977		020 52 110 95	5 3				+13 +14 +13	10
21	290215	22.7N 147.1E	700MB	2923		50 320 40	060 50 320 70					+15 +13	11
22	290411	22.4N 146.9E	700MB	2915	982	40 090 50	350 65 090 60	4 10				+13 +15 +12 21	11
23	291413	24.3N 145.8E	700MB	2934			130 55 030 80					+14 +12	12
24	291550	24.5N 145.9E	700MB	2930	983		090 50 360 100	3 5				+13 +14 +12	12
25	300114	25.5N 144.8E	700MB	2944		50 140 58	200 55 140 68	6 4				+13 +12 +12	13
26	300342	25.4N 144.7E	700MB	2934	985	65 100 58	340 40 100 68	5 5				+12 +13 +12	13
27	301715	24.4N 143.3E	700MB	2958	984		260 48 180 60	25 5				+12 +12	14
28	310230	30.0N 142.2E	700MB	2930	978	55 210 60	320 40 220 72	3 1				+13 +14 +13	15
29	310324	30.5N 142.0E	700MB	2925		55 060 120	180 63 060 77					+13 +12	15
30	311314	32.4N 141.5E	700MB	2944	983		180 57 100 66	5 5				+13 +13 +12	16
31	311423	32.3N 141.6E	700MB	2932			160 75 090 80					+12 +12	16
32	312042	33.1N 141.2E	700MB	2936	982	65 170 35	260 47 170 65	5 5				+12 +13 +11	15
33	010030	33.4N 141.2E	700MB	2900	978	50 200 25	280 50 190 70	5 2				+14 +15 +12	17
34	010235	34.0N 141.4E	700MB	2904	978		160 55 060 60	5 3				+13 +15 +11	17
35	011315	36.3N 142.9E	700MB	2930	981		320 60 240 60	2 5	ELLIPTICAL	65 20 030		+13 +14	18
36	011731	37.0N 143.3E	700MB	2926			240 55 200 120					+14	19

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	312130	33.4N 141.3E	LAND	GOOD		25		NOV 3620 MINEOKA	35.2N 140.1E	
2	312230	33.5N 141.4E	LAND	GOOD		25		NOV 3620 MINEOKA	35.2N 140.1E	
3	312300	33.4N 141.5E	LAND	GOOD		25		NOV 3615 MINEOKA	35.2N 140.1E	
4	010000	33.6N 141.6E	LAND	GOOD		25		NOV 3620 MINEOKA	35.2N 140.1E	
5	010100	33.3N 141.5E	LAND	GOOD		25		NOV 3615 MINEOKA	35.2N 140.1E	
6	010230	34.0N 141.5E	LAND	GOOD		30		NOV 3615 MINEOKA	35.2N 140.1E	
7	010300	34.2N 141.6E	LAND	GOOD		25		NOV 0310 MINEOKA	35.2N 140.1E	
8	010300	34.1N 141.6E	LAND				21901 /////		35.8N 139.8E	47582
9	010335	34.1N 141.4E	LAND	POOR					35.7N 139.3E	47582
10	010400	34.3N 141.6E	LAND	GOOD		25		NOV 3615 MINEOKA	35.2N 140.1E	
11	010410	34.1N 141.4E	LAND	POOR					35.7N 139.3E	47582
12	010445	34.2N 141.5E	LAND	POOR					35.7N 139.3E	47582
13	010500	34.5N 141.8E	LAND	GOOD		25		NOV 0430 MINEOKA	35.2N 140.1E	
14	010510	34.2N 141.5E	LAND	POOR					35.7N 139.3E	47582
15	010535	34.3N 141.6E	LAND	POOR					35.7N 139.3E	47582
16	010500	34.4N 141.9E	LAND	GOOD		30		NOV 0440 MINEOKA	35.2N 140.1E	
17	010510	34.5N 141.8E	LAND	POOR					35.7N 139.3E	47582
18	010535	34.6N 141.0E	LAND	POOR					35.7N 139.3E	47582
19	010700	34.3N 141.9E	LAND	GOOD		45		NOV 3620 MINEOKA	35.2N 140.1E	
20	010700	35.0N 141.8E	LAND				21942 70120		35.8N 139.8E	47582
21	010710	34.7N 141.8E	LAND	POOR					35.7N 139.3E	47582
22	010735	34.8N 141.8E	LAND	POOR					35.7N 139.3E	47582
23	010835	35.2N 142.1E	LAND	POOR					35.7N 139.3E	47582
24	010900	35.5N 142.2E	LAND				21922 70319		35.8N 139.8E	47582
25	010910	35.4N 142.3E	LAND	POOR					35.7N 139.3E	47582
26	010935	35.3N 142.4E	LAND	POOR					35.7N 139.3E	47582
27	011000	35.4N 142.3E	LAND				21922 70314		35.8N 139.8E	47582
28	011010	35.4N 142.6E	LAND	POOR					35.7N 139.3E	47582
29	011030	36.0N 142.6E	LAND	POOR					35.7N 139.3E	47582
30	011100	35.3N 142.4E	LAND				21912 70216		35.8N 139.8E	47582
31	011110	34.6N 142.3E	LAND	POOR					35.7N 139.3E	47582
32	011200	34.1N 142.4E	LAND				21912 70214		35.8N 139.8E	47582
33	011210	36.4N 142.5E	LAND	POOR					35.7N 139.3E	47582
34	011230	36.4N 142.5E	LAND	POOR					35.7N 139.3E	47582
35	011300	36.1N 142.6E	LAND				22912 70315		35.8N 139.8E	47582
36	011500	36.4N 142.6E	LAND				55/61 70110		35.8N 139.8E	47582
37	011500	36.7N 142.5E	LAND				55/71 50111		38.3N 140.9E	47590
38	011500	37.0N 142.7E	LAND				55/// 50216		38.3N 140.9E	47590
39	011700	37.4N 143.2E	LAND				55/// 50432		38.3N 140.9E	47590
40	011800	37.7N 143.3E	LAND				55/// 50322		38.3N 140.9E	47590
41	011900	39.1N 143.7E	LAND				5//// 50327		38.3N 140.9E	47590
42	012000	38.4N 144.1E	LAND				5//// 50327		38.3N 140.9E	47590

SATELLITE FIXES

FIX NO.	FIX TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	232137	21.1N 137.4E	PCN 3	T1.0/1.0	DMSP17		PGTW
2	231018	21.4N 137.1E	PCN 5		DMSP17	CI UP	PGTW
3	231508	22.0N 137.0E	PCN 6		DMSP15		PGTW
4	231508	21.4N 136.6E	PCN 3		DMSP15		RODN
5	232117	21.4N 136.1E	PCN 5	T3.0/3.0 /D2.0/24HRS	DMSP17		PGTW
6	232308	21.4N 136.5E	PCN 5		DMSP18		PGTW
7	232349	21.3N 136.1E	PCN 5		NOAA9		PGTW
8	240208	21.1N 136.0E	PCN 3		DMSP15		PGTW
9	240958	21.1N 133.9E	PCN 5		DMSP17	CI UP	PGTW
10	240958	20.5N 136.0E	PCN 5		DMSP17		RKSO
11	241149	20.9N 133.6E	PCN 5		DMSP18		PGTW
12	241149	20.5N 136.6E	PCN 5		DMSP18		RKSO
13	241450	20.7N 136.0E	PCN 5		DMSP15		PGTW
14	241450	20.0N 136.5E	PCN 5		DMSP15		RKSO
15	242056	21.7N 136.8E	PCN 1	T5.0/5.0	DMSP17	INIT JOS	RODN
16	242058	21.7N 133.8E	PCN 1	T4.5/4.5 /D1.5/24HRS	DMSP17		PGTW
17	242250	20.9N 133.9E	PCN 3	T4.0/4.0	DMSP18	INIT JOS	RPMK
18	242250	21.9N 136.4E	PCN 5	T4.5/4.5	DMSP18	INIT JOS	RKSO
19	242305	20.4N 133.8E	PCN 3		NOAA9		PGTW
20	250150	20.9N 133.7E	PCN 5		DMSP15		PGTW
21	250150	20.6N 136.2E	PCN 5		DMSP15		RKSO
22	250938	21.1N 133.3E	PCN 5		DMSP17		RKSO
23	250939	21.3N 133.3E	PCN 3		DMSP17	CI SAME	RODN
24	250939	21.1N 133.3E	PCN 5		DMSP17	CI SAME	PGTW
25	251132	21.0N 133.4E	PCN 4		DMSP18		PGTW
26	251132	21.1N 136.0E	PCN 3		DMSP18		RKSO
27	251632	21.0N 133.4E	PCN 5		DMSP15		PGTW
28	252232	21.5N 136.0E	PCN 5	T5.0/5.0 /D0.5/24HRS	DMSP18		PGTW
29	252232	21.5N 136.0E	PCN 5	T5.0/5.0 /D0.5/24HRS	DMSP18		PGTW
30	252233	21.6N 136.1E	PCN 3	T5.0/5.0 /D0.5/24HRS	DMSP18		RKSO
31	252233	21.0N 136.2E	PCN 3	T4.0/4.0 /S0.0/24HRS	DMSP18		RPMK
32	260017	21.6N 133.8E	PCN 5		NOAA9	BASED ON EXTRAP CB BAND	PGTW
33	260132	21.7N 133.3E	PCN 5		DMSP15	BANDING TYPE EYE	RKSO
34	260132	21.5N 133.4E	PCN 5		DMSP15		PGTW
35	260919	22.2N 133.0E	PCN 6		DMSP17		RODN
36	260919	22.3N 132.9E	PCN 4		DMSP17		PGTW
37	261101	22.3N 132.9E	PCN 4		DMSP17		PGTW
38	261101	22.4N 133.2E	PCN 2		DMSP17		RKSO
39	261115	22.6N 132.9E	PCN 2		DMSP18		RODN
40	261115	22.3N 132.8E	PCN 4		DMSP18		PGTW
41	261616	22.6N 132.6E	PCN 3		DMSP15		PGTW
42	262200	23.1N 132.9E	PCN 1	T5.0/5.0+/S0.0/24HRS	DMSP17		RKSO
43	262200	23.2N 132.5E	PCN 1	T5.0/5.0+/S0.0/24HRS	DMSP17		PGTW
44	262215	23.3N 132.4E	PCN 1		DMSP18		PGTW
45	262215	23.2N 132.4E	PCN 1	T4.0/4.0+/S0.0/24HRS	DMSP18		RPMK
46	270115	23.2N 132.0E	PCN 5		DMSP15		RKSO
47	270115	23.0N 132.4E	PCN 5		DMSP15		RODN
48	271041	24.3N 131.8E	PCN 2		DMSP17		PGTW
49	271041	24.4N 131.9E	PCN 1		DMSP17		RPMK
50	271057	24.4N 131.8E	PCN 4		DMSP18		RODN
51	271057	24.3N 131.6E	PCN 2		DMSP18		PGTW
52	271530	24.6N 131.1E	PCN 4		DMSP15		PGTW
53	271538	24.7N 131.1E	PCN 4		DMSP15		RPMK
54	272140	25.7N 130.3E	PCN 3	T5.0/5.0 /S0.0/24HRS	DMSP17		PGTW
55	272158	25.7N 130.6E	PCN 3	T5.0/5.0+/S0.0/24HRS	DMSP18		RKSO
56	272340	26.2N 129.9E	PCN 3		DMSP18		RKSO
57	280045	26.7N 129.8E	PCN 3		NOAA9		PGTW
58	280238	26.9N 128.9E	PCN 4		DMSP15		PGTW
59	280239	26.9N 129.4E	PCN 1		DMSP15		RKSO
60	280239	26.8N 129.3E	PCN 3	T5.5/5.5	DMSP15	INIT JOS	RODN
61	280239	26.9N 129.1E	PCN 3	T3.0/4.0 /W1.0/28HRS	DMSP15		RPMK
62	281022	27.1N 127.6E	PCN 4		DMSP17	CI SAME	PGTW
63	281022	27.4N 127.7E	PCN 2		DMSP17	CI SAME	RKSO
64	281222	27.7N 127.3E	PCN 4		DMSP18		RODN
65	281222	28.0N 127.2E	PCN 2		DMSP18		RKSO
66	281222	27.8N 127.8E	PCN 4		DMSP18		RPMK
67	281520	27.9N 126.7E	PCN 4		DMSP15		PGTW
68	282121	28.2N 126.2E	PCN 1	T4.0/5.0-/W1.0/24HRS	DMSP17		PGTW
69	282121	28.1N 126.2E	PCN 1	T4.0/5.0-/W1.0/24HRS	DMSP17		RKSO
70	282121	28.1N 126.2E	PCN 1	T3.5/3.5 /D0.5/10HRS	DMSP17		RPMK
71	282323	28.3N 126.1E	PCN 1		DMSP18		PGTW
72	282323	28.1N 126.0E	PCN 1		DMSP18		RPMK
73	291002	29.7N 126.0E	PCN 4		DMSP17		PGTW
74	291002	29.1N 125.8E	PCN 3		DMSP17		RKSO
75	291144	29.3N 125.5E	PCN 6		DMSP17		RPMK
76	291206	29.2N 125.6E	PCN 2		DMSP18		RKSO
77	291206	29.2N 125.7E	PCN 4		DMSP18		PGTW
78	291502	29.5N 125.4E	PCN 4		DMSP15		PGTW
79	292102	29.9N 125.0E	PCN 5		DMSP17		PGTW
80	292102	29.9N 125.3E	PCN 2	T4.0/4.0-/S0.0/24HRS	DMSP17		RKSO
81	292102	29.9N 125.1E	PCN 3		DMSP17		RODN
82	292243	29.9N 125.3E	PCN 3		DMSP17		RKSO
83	292243	29.9N 125.2E	PCN 3		DMSP17		RPMK
84	292305	29.9N 125.3E	PCN 3	T4.5/4.5-/D0.5/24HRS	DMSP18		PGTW
85	292305	29.9N 125.1E	PCN 3	T4.5/4.5-/D1.0/24HRS	DMSP18		RPMK
86	300202	29.9N 125.1E	PCN 3		DMSP15		RPMK
87	300203	30.0N 125.3E	PCN 1		DMSP15		RKSO
88	300203	30.1N 125.0E	PCN 2		DMSP15		PGTW
89	301124	30.9N 125.5E	PCN 4		DMSP17		RODN
90	301147	30.5N 124.8E	PCN 4		DMSP18		PGTW
91	301147	30.6N 125.0E	PCN 3		DMSP18		RKSO
92	301446	30.4N 124.7E	PCN 3		DMSP15		PGTW
93	301445	30.3N 124.5E	PCN 3		DMSP15		RKSO
94	301626	30.1N 124.9E	PCN 3		DMSP15		RKSO

95	301626	30.3N 125.1E	PCN 3			DMSP 15			RPMK
96	302226	30.4N 125.0E	PCN 4			DMSP 14			RPMK
97	302248	30.3N 124.7E	PCN 3	T3.0/4.0 /W1.5/24HRS		DMSP 14			PGTd
98	302248	30.1N 124.9E	PCN 3	T3.0/3.0		DMSP 14	INIT JAS		RODN
99	310145	30.5N 124.6E	PCN 3	T3.0/4.0 /W1.0/24HRS		DMSP 15			RKSD
100	310145	30.3N 124.5E	PCN 4			DMSP 15			PGTd
101	310327	30.5N 124.6E	PCN 3			DMSP 14			RKSD
102	311105	30.4N 124.9E	PCN 4			DMSP 17			RKSD
103	311105	30.6N 124.8E	PCN 4			DMSP 17			RODN
104	311105	30.7N 124.9E	PCN 3			DMSP 17			RPMK
105	311129	30.6N 124.7E	PCN 4			DMSP 14			PGTd
106	311205	30.2N 125.0E	PCN 3	T3.5/3.5		DMSP 17	INIT JAS		RPMK
107	311504	30.6N 125.0E	PCN 3			DMSP 14			RPMK
108	311504	30.3N 124.7E	PCN 5			DMSP 14	CI 0.0+		RKSD
109	312205	30.6N 125.2E	PCN 3	T2.0/3.0 /W1.0/24HRS		DMSP 17			RODN
110	312231	30.5N 125.2E	PCN 3	T2.5/3.5 /W0.5/24HRS		DMSP 14			PGTd
111	312346	30.5N 125.0E	PCN 5			NOAA 9			PGTd
112	011045	30.3N 125.8E	PCN 3			DMSP 17			RPMK
113	011045	30.6N 126.5E	PCN 6			DMSP 17			RKSD
114	011046	30.7N 126.4E	PCN 6			DMSP 17			RODN
115	011112	30.9N 126.5E	PCN 5			DMSP 14	CI 0.0+		PGTd
116	011550	30.3N 127.7E	PCN 3			DMSP 15			RPMK
117	011551	30.9N 127.2E	PCN 6			DMSP 15			RKSD
118	012145	31.1N 128.6E	PCN 3	T1.0/2.0 /W1.0/24HRS		DMSP 17			RODN
119	012145	31.1N 128.4E	PCN 3	T2.5/3.5 /W1.0/24HRS		DMSP 17			RPMK
120	012145	31.0N 128.4E	PCN 4	T2.0/2.5 /W0.5/24HRS		DMSP 17			PGTd
121	012213	31.1N 128.6E	PCN 3			DMSP 14			PGTd
122	012213	31.3N 128.7E	PCN 3	T2.0/2.0-		DMSP 14	INIT JAS		RKSD
123	020058	31.2N 128.9E	PCN 3			NOAA 9			PGTd
124	021026	31.1N 130.8E	PCN 6			DMSP 17			RODN
125	021026	32.4N 130.2E	PCN 6			DMSP 17	CI 0.0+		PGTd
126	021026	32.4N 131.4E	PCN 6			DMSP 17			RKSD
127	021055	32.6N 130.3E	PCN 5			DMSP 14			PGTd
128	021237	31.3N 131.1E	PCN 5			DMSP 14			RODN
129	021532	31.3N 130.0E	PCN 5			DMSP 14			RPMK
130	021533	32.4N 131.7E	PCN 5			DMSP 14			RODN
131	022126	35.4N 131.6E	PCN 5	T1.0/2.0 /W1.0/24HRS		DMSP 17			PGTd
*132	022126	36.4N 131.4E	PCN 5			DMSP 17			RODN
133	022126	37.0N 131.7E	PCN 5	T1.0/2.0-/W1.5/24HRS		DMSP 17			RPMK
134	032155	35.4N 131.5E	PCN 5			DMSP 14			PGTd
135	030015	34.5N 132.2E	PCN 5			NOAA 9			PGTd
136	030233	37.7N 133.3E	PCN 5			DMSP 15	SECONDARY CENTER 36.7N 133.1E		RODN
137	030233	36.7N 133.2E	PCN 5			DMSP 15			RKSD

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MBT	OBS MSLP	MAX-SFC-WND VEL/RAD/RWB	MAX-FLT-LVL-WND DIR/VEL/RAD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	260545	20.9N 134.1E	1500FT		994	40 350 130	060 35 350 130	5 1			+25 +26 29	2
2	262130	20.9N 133.8E	700MB	2984	988	55 030 25	040 45 310 120	5 5			+12 +12	3
3	250106	20.9N 133.7E	700MB	2983		60 350 120	070 40 350 120				+14	3
4	250345	20.8N 133.5E	700MB	2954	983	55 320 35	040 50 320 65	5 2			+14 +15	3
5	251335	20.9N 133.8E	700MB	2872			270 62 170 90				+15	4
6	251553	21.0N 133.8E	700MB	2866	978		360 55 200 120	20 10			+13 +15	4
7	260334	21.4N 133.7E	700MB	2836	968	50 120 70	050 50 320 50	3 5			+13 +15	5
8	261540	22.2N 132.5E	700MB	2768	963		040 57 310 140	5 5			+14 +17	6
9	261920	22.7N 132.8E	700MB	2761			050 46 300 120				+16	6
10	270340	21.9N 132.3E	700MB	2786	963	50 250 50		10 10			+14 +15	7
11	271543	25.2N 131.1E	700MB	2767	961		500 58 310 100	5 5			+16 +18 +14	8
12	271946	25.3N 130.8E	700MB	2762			320 56 350 100				+17 +14	8
13	272141	24.8N 130.4E	700MB	2760	962		240 55 190 25	2 10	CIRCULAR	40	+15 +17 +14	9
14	280330	26.9N 129.1E	700MB	2774	963	50 170 150	250 50 170 130	5 10			+15 +16	9
15	280630	27.2N 128.6E	700MB	2771			310 41 200 120				+16	9
16	281333	27.4N 127.0E	700MB	2836			150 66 180 90				+14	10
17	281538	27.4N 126.5E	700MB	2837	971		050 55 320 75	5 5	ELLIPTICAL	30 20 120	+12 +13	10
18	290035	28.2N 126.2E	700MB	2793	966	55 150 120	290 54 150 120				+16 +14	11
19	290240	24.6N 126.0E	700MB	2767	961	55 300 20	140 68 060 85	3 1	CIRCULAR	20	+14 +16 +16	11
20	291335	29.3N 125.4E	700MB	2774			190 64 090 90				+16 + 0	12
21	291534	29.5N 125.7E	700MB	2767	961		140 57 030 90	10 5	CIRCULAR	30	+15 +16 +10	12
22	310658	30.6N 125.1E	700MB	2829	970		240 50 150 45	5 8			+13 +15 +15	14
23	310859	30.9N 125.0E	700MB	2837		35 060 30	100 40 060 90				+14 +14	14
24	010250	30.6N 125.9E	700MB	2897		35 080 120	240 45 140 120				+13 +17	15
25	010444	30.7N 125.8E	700MB	2897	980		240 44 140 90	10 10			+12 +13 +17	15
26	020336	31.9N 128.8E	700MB	2926	983	35 180 24	310 28 220 40	0 10			+13 +14 +17	15

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	271630	25.3N 131.1E	LAND	POOR	CIRCULAR			EYE	27.6N 128.7E	47962
2	271800	25.2N 131.2E	LAND	POOR	CIRCULAR			EYE	27.6N 128.7E	47962
3	271700	25.3N 131.1E	LAND	POOR	CIRCULAR			EYE	27.6N 128.7E	47962
4	271900	25.2N 131.0E	LAND	GOOD	CIRCULAR	60		EYE	27.6N 128.7E	47962
5	280000	26.5N 130.0E	LAND				4//// 53016		28.6N 129.5E	47909
6	280100	26.7N 129.8E	LAND				4//// 53216		28.6N 129.5E	47909
7	280100	26.6N 129.9E	LAND				3//// 57///		26.2N 127.8E	47937
8	280200	26.7N 129.5E	LAND				4//// 52716		28.6N 129.5E	47909
9	280200	26.5N 129.5E	LAND	POOR	CIRCULAR	90		EYE	27.6N 128.7E	47962
10	280200	26.7N 129.6E	LAND				4//11 52919		26.2N 127.8E	47937
11	280300	26.7N 129.2E	LAND	FAIR	CIRCULAR	80		EYE	27.6N 128.7E	47962
12	280300	26.8N 129.3E	LAND				4//// 52813		28.6N 129.5E	47909
13	280300	26.8N 129.2E	LAND				4//12 52922		26.2N 127.8E	47937
14	280400	26.9N 129.2E	LAND				4//// 53111		28.6N 129.5E	47909
15	280400	26.9N 129.1E	LAND	FAIR	CIRCULAR	80		EYE	26.2N 127.8E	47937
16	280400	26.9N 129.1E	LAND				4//// 72916		26.2N 127.8E	47937

17	280632	27.1N	128.9E	LAND	POOR	CIRCULAR	70			PSHL CNTN	26.4N	127.8E	47991
18	280500	24.9N	129.0E	LAND				6////	53112		28.4N	129.5E	47909
19	240500	27.0N	128.9E	LAND				6////	72913		26.2N	127.8E	47997
20	280501	27.0N	124.9E	LAND	POOR	CIRCULAR	77			PSHL CNTN	26.4N	127.8E	47991
21	280506	27.0N	128.8E	LAND	POOR	CIRCULAR	69			PSHL CNTR	26.4N	127.8E	47991
22	280500	27.0N	128.9E	LAND	FAIR	CIRCULAR	120			EYE	26.2N	127.8E	47997
23	280700	27.3N	128.6E	LAND				5////	73011		26.2N	127.8E	47997
24	280700	27.3N	128.7E	LAND				6////	53413		28.4N	129.5E	47909
25	280701	27.4N	128.6E	LAND	FAIR	CIRCULAR	65			CNTR	26.4N	127.8E	47991
26	280900	27.4N	128.4E	LAND				6////	52916		28.4N	129.5E	47909
27	280901	27.4N	128.5E	LAND	FAIR	CIRCULAR	76			CNTR	26.4N	127.8E	47991
28	280925	27.4N	128.1E	LAND	FAIR	CIRCULAR	75			CNTR	26.4N	127.8E	47991
29	280900	27.7N	128.2E	LAND	FAIR	CIRCULAR	70			EYE	26.2N	127.8E	47997
30	280900	27.6N	128.1E	LAND				5////	73117		26.2N	127.8E	47997
31	280900	27.7N	128.2E	LAND				6////	53318		28.4N	129.5E	47909
32	280930	27.6N	127.8E	LAND	GOOD	CIRCULAR	75			CNTR	26.4N	127.8E	47991
33	281000	27.6N	127.8E	LAND				5////	73015		26.2N	127.8E	47997
34	281000	27.7N	127.9E	LAND				6////	52817		28.4N	129.5E	47909
35	281001	27.7N	127.7E	LAND	GOOD	CIRCULAR	71			EYE	26.4N	127.8E	47991
36	281030	27.9N	127.7E	LAND	GOOD	CIRCULAR	73			EYE	26.4N	127.8E	47991
37	281100	27.6N	127.4E	LAND	GOOD	CIRCULAR	78			EYE	26.4N	127.8E	47991
38	281100	27.6N	127.4E	LAND				21911	72816		26.2N	127.8E	47997
39	281100	27.7N	127.7E	LAND				6////	52712		28.4N	129.5E	47909
40	281130	27.5N	127.4E	LAND	GOOD	ELLIPTICAL	78			EYE	26.4N	127.8E	47991
41	281200	27.5N	127.3E	LAND	GOOD	ELLIPTICAL				EYE	26.4N	127.8E	47991
42	241200	27.7N	127.3E	LAND	GOOD	CIRCULAR	60			EYE	26.2N	127.8E	47997
43	241200	27.5N	127.4E	LAND				5////	72614		26.2N	127.8E	47997
44	241200	27.7N	127.5E	LAND				6////	52711		28.4N	129.5E	47909
45	241230	27.6N	127.3E	LAND	GOOD	ELLIPTICAL				EYE	26.4N	127.8E	47991
46	281300	27.7N	127.2E	LAND	FAIR	ELLIPTICAL				EYE	26.4N	127.8E	47991
47	281300	27.6N	127.3E	LAND				5////	73208		26.2N	127.8E	47997
48	281300	27.7N	127.1E	LAND				6////	52720		28.4N	129.5E	47909
49	281330	27.5N	127.3E	LAND	FAIR	CIRCULAR	60			CNTR	26.4N	127.8E	47991
50	281400	27.7N	126.9E	LAND				6////	52714		28.4N	129.5E	47909
51	281400	27.7N	127.0E	LAND				32942	52916		26.2N	127.8E	47997
52	281400	27.7N	127.0E	LAND	FAIR	CIRCULAR	60			EYE	26.2N	127.8E	47997
53	281430	27.5N	127.0E	LAND	GOOD	CIRCULAR	75			EYE	26.4N	127.8E	47991
54	281500	27.5N	127.0E	LAND	GOOD	CIRCULAR	60			EYE	26.4N	127.8E	47991
55	281500	27.5N	126.8E	LAND				22917	72711		26.2N	127.8E	47997
56	281500	27.7N	126.7E	LAND				6////	52811		28.4N	129.5E	47909
57	281530	27.5N	126.8E	LAND	FAIR	CIRCULAR	60			EYE	26.4N	127.8E	47991
58	281600	27.7N	126.6E	LAND				6////	52508		28.4N	129.5E	47909
59	241600	27.6N	126.8E	LAND				22913	72708		26.2N	127.8E	47997
60	281600	27.5N	126.8E	LAND	FAIR	CIRCULAR	60			EYE	26.4N	127.8E	47991
61	241535	27.6N	126.8E	LAND	FAIR	CIRCULAR	75			EYE	26.4N	127.8E	47991
62	281700	27.7N	126.4E	LAND	FAIR	CIRCULAR	75			EYE	26.4N	127.8E	47991
63	281700	27.7N	126.5E	LAND				21963	72709		26.2N	127.8E	47997
64	281700	27.3N	126.6E	LAND				6////	50000		28.4N	129.5E	47909
65	241730	27.4N	126.5E	LAND	FAIR	CIRCULAR	75			EYE	26.4N	127.8E	47991
66	281800	27.7N	126.5E	LAND				21913	72905		26.2N	127.8E	47997
67	281830	28.0N	126.3E	LAND	FAIR	CIRCULAR	70			EYE	26.4N	127.8E	47991
68	281900	27.9N	126.4E	LAND				5////	73208		26.2N	127.8E	47997
69	281900	27.9N	126.3E	LAND	FAIR	CIRCULAR	70			EYE	26.4N	127.8E	47991
70	282000	27.9N	126.3E	LAND				5////	73105		26.2N	127.8E	47997
71	282000	27.3N	126.4E	LAND	FAIR	CIRCULAR	60			EYE	26.2N	127.8E	47997
72	282100	27.9N	126.4E	LAND				5////	73406		26.2N	127.8E	47997
73	282200	28.1N	126.4E	LAND				5////	73505		26.2N	127.8E	47997
74	282200	28.1N	126.3E	LAND	FAIR	CIRCULAR	60			EYE	26.2N	127.8E	47997
75	282300	28.1N	126.1E	LAND	FAIR	CIRCULAR	60			EYE	26.2N	127.8E	47997
76	282300	28.1N	126.3E	LAND				5////	73609		26.2N	127.8E	47997
77	282300	28.2N	126.3E	LAND				6////	53605		28.4N	129.5E	47909
78	290100	28.4N	126.3E	LAND				6////	53408		28.4N	128.5E	47909
79	290100	28.3N	126.0E	LAND				5////	73008		26.2N	127.8E	47997
80	290100	28.4N	126.1E	LAND	FAIR	CIRCULAR	60			EYE	26.2N	127.8E	47997
81	290200	28.5N	126.0E	LAND	GOOD	CIRCULAR	60			EYE	26.3N	126.8E	47999
82	290200	28.5N	125.9E	LAND				5////	73209		26.2N	127.8E	47997
83	290200	28.5N	126.2E	LAND				6////	53208		28.4N	128.5E	47909
84	290300	28.7N	125.9E	LAND				6////	53108		26.2N	127.8E	47997
85	290300	28.5N	126.1E	LAND				6////	53009		28.4N	129.5E	47909
86	290400	28.7N	125.8E	LAND				6////	73408		26.2N	127.8E	47997
87	290400	28.6N	125.8E	LAND				6////	53008		28.4N	129.5E	47909
88	290500	28.9N	125.8E	LAND				6////	73406		26.2N	127.8E	47997
89	290500	28.6N	125.7E	LAND				6////	52708		28.4N	129.5E	47909
90	290700	28.5N	125.7E	LAND				5////	73000		26.2N	127.8E	47997
91	290700	28.9N	125.8E	LAND				6////	50000		28.4N	129.5E	47909
92	290800	28.7N	125.8E	LAND				5////	73000		26.2N	127.8E	47997
93	290800	28.9N	125.9E	LAND				6////	50404		28.4N	129.5E	47909
94	290900	28.7N	125.9E	LAND				5////	73000		26.2N	127.8E	47997
95	290900	28.9N	125.9E	LAND				6////	50305		28.4N	129.5E	47909
96	291000	29.1N	126.0E	LAND				6////	70311		26.2N	127.8E	47997
97	291000	29.0N	126.0E	LAND				6////	50408		28.4N	128.5E	47909
98	291100	29.1N	126.0E	LAND				6////	53408		28.4N	129.5E	47909
99	291200	29.2N	125.9E	LAND				6////	53308		28.4N	129.5E	47909
100	291300	29.3N	125.8E	LAND				6////	53105		28.4N	129.5E	47909

TROPICAL STORM AGNES

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	240049	15.9N 114.0E	PCN 5	T1.0/1.0	DMSP36	INIT JHS	RPMK
2	240349	16.6N 115.6E	PCN 5		DMSP35		RPMK
3	241139	18.5N 115.8E	PCN 6		DMSP37	CI UP	RPMK
4	241149	17.9N 115.4E	PCN 5		DMSP36		PGTW
5	241149	18.4N 115.5E	PCN 5		DMSP36		RKSO
6	241225	14.1N 115.7E	PCN 5		NOAA5		PGTW
7	241631	19.0N 115.2E	PCN 4		DMSP35		RPMK
8	242239	19.4N 116.1E	PCN 5	T2.0/2.0	DMSP37	INIT JHS	RODN
9	250031	19.2N 115.8E	PCN 5	T3.0/3.0 /D2.0/24HRS	DMSP36		RPMK
10	250102	19.7N 115.9E	PCN 5	T3.0/3.0	NOAA5	INIT JHS	PGTW
11	250332	20.0N 115.8E	PCN 3		DMSP35	EXPOSED LOW LVL	RODN
12	250332	20.1N 115.8E	PCN 3		DMSP35	EXPOSED LOW LVL	RPMK
13	250332	20.2N 116.0E	PCN 3	T2.5/2.5	DMSP35	INIT JHS	RKSO
14	251120	20.3N 115.5E	PCN 4		DMSP37		RODN
15	251141	21.0N 115.6E	PCN 5		NOAA5		PGTW
16	251313	20.5N 115.7E	PCN 4		DMSP36		RODN
17	251513	21.1N 115.4E	PCN 3		DMSP35		RODN
18	251514	21.0N 115.9E	PCN 4		DMSP35		RPMK
19	252219	21.5N 115.0E	PCN 5	T4.0/4.0 /D1.0/27HRS	DMSP37		PGTW
20	252220	20.9N 115.1E	PCN 5	T3.0/3.0 /D1.0/24HRS	DMSP37	BASED ON U/L GRAVITY WAVES	RODN
21	260014	21.3N 115.1E	PCN 5	T3.0/3.0-/S0.0/24HRS	DMSP36		RPMK
22	260015	21.2N 115.6E	PCN 5	T3.0/3.0 /D1.0/24HRS	DMSP36		RODN
23	260314	21.9N 115.0E	PCN 3		DMSP35		RODN
24	260314	21.5N 114.6E	PCN 3		DMSP35		RPMK
25	261101	21.5N 114.1E	PCN 2		DMSP37		RKSO
26	261101	21.3N 114.0E	PCN 2		DMSP37		PGTW
27	261234	20.3N 114.0E	PCN 4		NOAA5		PGTW
28	261256	21.1N 114.0E	PCN 3		DMSP36		RPMK
29	261555	21.1N 113.3E	PCN 6		DMSP35		RPMK
30	261556	21.1N 113.9E	PCN 3		DMSP35		RODN
31	262200	21.2N 113.5E	PCN 1	T4.0/4.0	DMSP37	INIT JHS	RKSO
32	262200	21.3N 113.3E	PCN 1	T4.5/4.5 /D0.5/24HRS	DMSP37		PGTW
33	262357	21.4N 112.9E	PCN 1	T4.0/4.0 /D0.5/24HRS	DMSP36		RPMK
34	262357	21.3N 113.0E	PCN 1	T3.5/ /D0.5/25HRS	DMSP36		RODN
35	271041	21.2N 112.6E	PCN 1		DMSP37		RPMK
36	271041	21.0N 112.4E	PCN 2		DMSP37		PGTW
37	271239	21.1N 112.3E	PCN 1		DMSP36		RKSO
38	271538	20.9N 112.1E	PCN 4	T4.0/4.0+/S0.0/24HRS	DMSP35		RPMK
39	271538	21.1N 111.9E	PCN 1		DMSP35	BANDING EYE	PGTW
40	272322	20.9N 111.6E	PCN 2		DMSP37		RODN
41	272339	20.9N 112.0E	PCN 1	T3.0/3.5 /W0.5/24HRS	DMSP36		RODN
42	272340	20.3N 111.7E	PCN 1	T3.0/4.0 /W1.0/24HRS	DMSP36		RKSO
43	272340	20.5N 111.8E	PCN 1	T4.0/4.0-/S0.0/24HRS	DMSP36		RPMK
44	280239	21.0N 111.8E	PCN 5		DMSP35	CI SAME	RODN
45	280420	20.5N 112.0E	PCN 1		DMSP35		RPMK
46	281203	20.4N 111.8E	PCN 4		DMSP37		RODN
47	281203	20.3N 112.2E	PCN 6		DMSP37		RPMK
48	281222	20.4N 111.6E	PCN 4		DMSP36	CI UNKN	RODN
49	281222	20.4N 111.8E	PCN 4		DMSP36	CI UNKN	RKSO
50	281222	20.5N 112.3E	PCN 4		DMSP36		RPMK
51	281520	20.3N 112.2E	PCN 6		DMSP35		PGTW
52	282323	20.5N 112.5E	PCN 3		DMSP36		PGTW
53	282323	20.6N 112.7E	PCN 3	T2.5/3.5 /W1.5/24HRS	DMSP36		RPMK
54	290602	20.9N 113.7E	PCN 1	T3.0/3.0 /S0.0/28HRS	DMSP35		RODN
55	290602	20.6N 113.4E	PCN 1		DMSP35		RPMK
56	291144	21.3N 114.7E	PCN 2		DMSP37		RODN
57	291144	21.5N 114.4E	PCN 6		DMSP37		RPMK
58	291204	21.9N 114.4E	PCN 4		DMSP36		PGTW
59	291204	21.5N 114.3E	PCN 6		DMSP36		RKSO
60	291644	21.5N 114.7E	PCN 6		DMSP35	APPEARS WEAKER	RODN
61	291644	22.0N 114.6E	PCN 4		DMSP35	CI UNKN	RPMK
62	292243	22.4N 115.0E	PCN 3	T3.0/3.0-	DMSP37	INIT JHS	RKSO
63	292243	22.7N 114.5E	PCN 3	T2.5/2.5-/S0.0/23HRS	DMSP37		RPMK
64	300114	22.5N 114.9E	PCN 5	T2.5/2.5	NOAA5	INIT JHS	PGTW
65	300344	22.4N 115.2E	PCN 3		DMSP35	CENTRAL CLOUD MASS 23.2N 114.4E	RPMK
66	300345	22.7N 115.3E	PCN 3		DMSP35		RKSO
67	300345	23.0N 114.4E	PCN 5	T2.0/2.0	DMSP35	INIT JHS	RODN
68	301124	23.9N 114.6E	PCN 6		DMSP37		RODN
69	310030	24.3N 119.1E	PCN 3	T1.0/2.0 /W1.5/23HRS	NOAA5		PGTW

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	250010	19.7N 115.8E	LAND				55A11 50107		22.3N 114.2E	45005
2	250400	20.1N 115.7E	LAND				55711 5////		22.3N 114.2E	45005
3	250700	20.3N 115.7E	LAND				5566/ /////		22.3N 114.2E	45005
4	250900	20.9N 115.7E	LAND				3567/ /////		22.3N 114.2E	45005
5	251200	21.2N 115.7E	LAND				3566/ /////		22.3N 114.2E	45005
6	251500	21.3N 115.5E	LAND				3566/ 11111		22.3N 114.2E	45005
7	251758	21.4N 115.5E	LAND				2134/ 73403		22.3N 114.2E	45005
8	252100	21.4N 115.2E	LAND				3576/ /////		22.3N 114.2E	45005
9	260000	21.5N 114.8E	LAND				3576/ 72806		22.3N 114.2E	45005

10	260300	21.4N	114.6E	LAND		21977	72906	22.3N	114.2E 45005
11	260600	21.5N	114.4E	LAND		22977	52705	22.3N	114.2E 45005
12	260900	21.4N	114.1E	LAND		21947	52205	22.3N	114.2E 45005
13	261200	21.3N	114.0E	LAND		10811	52704	22.3N	114.2E 45005
14	261400	21.3N	113.9E	LAND		10811	52704	22.3N	114.2E 45005
15	261500	21.3N	113.8E	LAND		10811	52704	22.3N	114.2E 45005
16	261500	21.3N	113.8E	LAND		10811	52703	22.3N	114.2E 45005
17	261700	21.3N	113.8E	LAND		10811	52703	22.3N	114.2E 45005
18	261800	21.3N	113.7E	LAND		10811	52804	22.3N	114.2E 45005
19	261900	21.3N	113.6E	LAND		10811	52805	22.3N	114.2E 45005
20	262130	21.3N	113.5E	LAND		10812	52704	22.3N	114.2E 45005
21	270000	21.3N	113.3E	LAND		10812	52705	22.3N	114.2E 45005
22	270300	21.3N	113.0E	LAND		10812	52704	22.3N	114.2E 45005
23	270500	21.3N	112.7E	LAND		10812	82705	22.3N	114.2E 45005
24	270900	21.3N	112.5E	LAND		10813	92705	22.3N	114.2E 45005
25	271200	21.2N	112.3E	LAND		21863	52905	22.3N	114.2E 45005
26	271300	21.1N	112.2E	LAND		10863	52306	22.3N	114.2E 45005
27	271400	21.1N	112.1E	LAND		10163	52706	22.3N	114.2E 45005
28	271500	21.1N	112.0E	LAND		10813	52506	22.3N	114.2E 45005
29	271500	21.0N	111.9E	LAND		20863	52905	22.3N	114.2E 45005
30	271900	20.9N	111.8E	LAND		21777	52204	22.3N	114.2E 45005
31	272100	20.9N	112.0E	LAND		35777	77777	22.3N	114.2E 45005
32	272200	20.9N	112.0E	LAND		20973	53002	22.3N	114.2E 45005
33	272300	20.9N	112.0E	LAND		25763	50000	22.3N	114.2E 45005
34	240000	20.9N	111.9E	LAND		25763	57777	22.3N	114.2E 45005
35	240200	20.9N	111.9E	LAND		25962	72103	22.3N	114.2E 45005
36	240500	20.9N	111.8E	LAND		25913	73002	22.3N	114.2E 45005
37	241200	20.6N	112.0E	LAND		25983	61205	22.3N	114.2E 45005
38	241500	20.3N	112.2E	LAND		28587	71306	22.3N	114.2E 45005
39	241800	20.6N	112.4E	LAND		25857	70404	22.3N	114.2E 45005
40	242100	20.5N	112.6E	LAND		10857	50704	22.3N	114.2E 45005
41	242200	20.5N	112.7E	LAND		20863	51107	22.3N	114.2E 45005
42	290000	20.5N	112.9E	LAND		25963	50810	22.3N	114.2E 45005
43	290200	20.5N	113.1E	LAND		10723	50907	22.3N	114.2E 45004
44	290300	20.6N	113.3E	LAND		10813	50415	22.3N	114.2E 45005
45	290400	20.7N	113.4E	LAND		10783	50705	22.3N	114.2E 45005
46	290500	20.8N	113.7E	LAND		10536	50708	22.3N	114.2E 45005
47	290900	21.2N	114.2E	LAND		10722	60710	22.3N	114.2E 45005
48	291200	21.5N	114.4E	LAND		25772	50611	22.3N	114.2E 45005
49	292140	22.5N	114.8E	LAND		50577	77777	22.3N	114.2E 45005
50	300000	22.9N	114.7E	LAND		65777	77777	22.3N	114.2E 45005

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TROPICAL STORM BONNIE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	090140	18.9N 114.5E	PCN 5	T0.0/0.0	NOAA5	INIT DHS	PGTW
2	091219	20.0N 114.5E	PCN 6		NOAA5		PGTW
3	092318	18.5N 114.3E	PCN 3	T1.0/1.0	DMSP36	INIT DHS	RPMK
4	100056	19.0N 113.9E	PCN 3	T1.0/1.0 /01.0/24HRS	NOAA5		PGTW
5	100352	19.3N 113.8E	PCN 5		DMSP35		RPMK
6	101113	19.3N 112.2E	PCN 6		DMSP37		RPMK
* 7	101113	16.9N 110.7E	PCN 5		DMSP37		RODN
8	101200	19.4N 112.4E	PCN 5		DMSP36	CI SAME	PGTW
9	101536	18.1N 111.6E	PCN 6		DMSP35		RPMK
* 10	102213	17.4N 110.4E	PCN 5		DMSP37		PGTW
* 11	102213	17.5N 110.7E	PCN 5		DMSP37		RPMK
12	110042	17.5N 110.4E	PCN 3	T2.5/2.5 /01.5/25HRS	DMSP36		RPMK
13	110336	17.9N 109.4E	PCN 5		DMSP35	MID AND LOW LVL	RPMK
14	111054	17.9N 107.9E	PCN 6		DMSP37		PGTW
* 15	111324	16.7N 108.2E	PCN 6		DMSP36	UPR LVL	RPMK
* 16	111516	16.6N 108.5E	PCN 6		DMSP35	UPR LVL	RPMK
17	120021	17.4N 105.0E	PCN 3	T2.5/2.5-/50.0/24HRS	DMSP36		RPMK
18	120125	17.5N 104.7E	PCN 6		NOAA5		PGTW
19	120316	17.7N 104.6E	PCN 5		DMSP35		RPMK

TYPHOON CARMEN

SATELLITE FIXES

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FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	080104	16.3N 145.8E	PCN 6	T0.0/0.0	DMSP43	INIT JTS	PGTW
2	091023	16.5N 145.7E	PCN 6		NOAA5		PGTW
3	092300	16.9N 145.5E	PCN 5	T1.0/1.0	NOAA5	INIT JTS	PGTW
4	100210	17.1N 143.9E	PCN 5		DMSP43		PGTW
• 5	100932	16.0N 145.6E	PCN 6		DMSP47	CI UP	PGTW
6	101016	16.2N 145.7E	PCN 6		DMSP43		PGTW
7	101311	16.5N 145.0E	PCN 6		DMSP43		PGTW
• 8	102032	15.2N 144.6E	PCN 5	T2.0/2.0 /D1.0/22HRS	DMSP37		PGTW
• 9	102119	15.2N 144.5E	PCN 5		DMSP38		PGTW
10	110012	16.1N 144.8E	PCN 5		NOAA5		PGTW
11	110912	16.0N 144.0E			DMSP47		RODN
12	110913	15.7N 144.2E	PCN 6		DMSP37	CI SAME	PGTW
13	111434	15.7N 144.3E	PCN 4		DMSP35		PGTW
14	112012	15.7N 144.4E	PCN 3	T2.5/2.5 /D0.5/24HRS	DMSP37		PGTW
15	112243	15.9N 144.4E	PCN 3	T4.0/4.0	DMSP43	INIT JTS	RPMK
16	112243	15.9N 144.4E	PCN 3		DMSP38		PGTW
17	120135	16.1N 144.5E	PCN 3		DMSP43		PGTW
18	120953	17.9N 144.2E	PCN 6		DMSP47	CI SAME	PGTW
19	120953	19.9N 145.4E	PCN 6		DMSP47	UPR LVL	RODN
20	121125	18.0N 143.9E	PCN 5		DMSP38		PGTW
21	121417	19.1N 143.3E	PCN 6		DMSP35		PGTW
22	122134	19.5N 141.6E	PCN 6	T3.5/3.5 /D1.0/25HRS	DMSP47		PGTW
23	122134	19.9N 141.6E	PCN 4		DMSP47		RODN
24	122225	19.6N 141.8E	PCN 5		DMSP38		PGTW
25	122226	19.6N 141.3E	PCN 3	T3.0/3.0	DMSP38	INIT JTS	RODN
26	130116	20.3N 140.8E	PCN 3		DMSP35		PGTW
27	131015	21.3N 138.2E	PCN 2		DMSP37		RODN
28	131015	21.8N 138.5E	PCN 1		DMSP37	INIT JTS	RKSO
29	131015	21.5N 138.7E	PCN 2		DMSP47	CI UP	PGTW
30	131108	21.5N 138.5E	PCN 2		DMSP38		PGTW
31	131359	21.7N 137.2E	PCN 2		DMSP35		PGTW
32	132114	22.9N 136.4E	PCN 3	T3.5/3.5 /S0.0/24HRS	DMSP35		PGTW
33	132115	23.0N 135.5E	PCN 3	T4.5/4.5	DMSP47	INIT JTS	RKSO
34	132208	23.1N 135.4E	PCN 1		DMSP35		PGTW
35	132356	23.2N 134.9E	PCN 3		NOAA5		PGTW
36	140240	23.9N 134.0E	PCN 1		DMSP35		PGTW
37	140241	24.0N 134.3E	PCN 1	T4.0/4.0	DMSP35	INIT JTS	RPMK
38	140241	23.9N 134.4E	PCN 1	T4.5/4.5	DMSP43		RODN
39	140241	24.0N 134.5E	PCN 1	T4.5/4.5 24HRS	DMSP35		RKSO
• 40	140355	25.3N 130.5E	PCN 2		DMSP37		RPMK
41	141036	24.7N 132.2E	PCN 1		NOAA5		PGTW
42	141523	25.0N 130.0E	PCN 2		DMSP35		PGTW
43	142055	26.2N 129.6E	PCN 2	T4.5/4.5 /D1.0/24HRS	DMSP37		PGTW
44	142237	26.1N 129.4E	PCN 3		DMSP37	EDGE OF DATA	RPMK
45	142323	26.6N 128.7E	PCN 1	T5.0/5.0 /D0.5/24HRS	DMSP38		RKSO
46	142332	26.6N 128.9E	PCN 2		DMSP38		PGTW
47	142333	26.3N 128.8E	PCN 1	T5.0/5.0 /D0.5/21HRS	DMSP38		RODN
48	150108	26.6N 128.5E	PCN 1		NOAA5		PGTW
49	150222	26.7N 128.1E	PCN 1		DMSP35		PGTW
50	150223	26.7N 127.9E	PCN 1	T4.5/4.5 /D0.5/24HRS	DMSP35		RPMK
51	150223	26.7N 127.9E	PCN 1		DMSP35		RKSO
52	150223	26.7N 128.0E	PCN 1		DMSP35		RODN
53	151117	27.2N 126.9E	PCN 2		DMSP47		RPMK
54	151118	27.6N 126.6E	PCN 2		DMSP37		RKSO
55	151149	27.5N 126.9E	PCN 1		NOAA5		PGTW
56	151215	27.6N 126.8E	PCN 2		DMSP38		PGTW
57	151505	27.8N 125.1E	PCN 1		DMSP35		PGTW
58	152217	27.9N 124.0E	PCN 3	T5.0/5.0 /S0.0/23HRS	DMSP37		RODN
59	152217	28.0N 124.1E	PCN 1	T4.0/5.0-/W1.0/24HRS	DMSP37		RKSO
60	152315	28.1N 124.1E	PCN 1	T5.0/5.0-/D0.5/21HRS	DMSP38		RPMK
61	152315	28.3N 123.8E	PCN 1	T5.0/5.0-/D0.5/25HRS	DMSP38		PGTW
62	160205	28.1N 123.8E	PCN 1		DMSP35		RKSO
63	160205	28.3N 123.5E	PCN 1		DMSP35		PGTW
64	160205	28.3N 123.6E	PCN 5		DMSP35		RODN
• 65	161058	27.9N 123.0E	PCN 2		DMSP37		RPMK
66	161058	28.4N 123.2E	PCN 1		DMSP37	CTR IN EYE	RKSO
67	161157	28.6N 123.3E	PCN 3		DMSP38		PGTW
68	161446	28.9N 123.0E	PCN 3		DMSP35		PGTW
69	161528	28.2N 122.4E	PCN 3		DMSP35		RPMK
70	161529	28.7N 122.9E	PCN 6		DMSP35		RODN
71	162158	28.7N 122.7E	PCN 5	T3.5/4.0-/W0.5/24HRS	DMSP37		RKSO
72	162158	28.5N 122.2E	PCN 5	T3.5/4.5 /W1.5/23HRS	DMSP47		PGTW
73	162158	28.6N 122.4E	PCN 5	T3.5/4.5 /W1.5/22HRS	DMSP37		RPMK
74	162258	28.6N 122.4E	PCN 5		DMSP38		PGTW
75	170147	28.1N 122.7E	PCN 5		DMSP35		PGTW
76	170329	28.3N 122.4E	PCN 5		DMSP35		RKSO
77	170329	28.5N 122.0E	PCN 6	T3.5/4.5-/W1.5/29HRS	DMSP35		RODN
78	171038	28.5N 123.0E	PCN 6		DMSP37		PGTW
79	171039	28.3N 122.6E	PCN 6		DMSP37	UPR LVL CTR	RODN
80	171139	28.7N 123.1E	PCN 5		DMSP35		PGTW
81	171511	28.2N 123.1E	PCN 5		DMSP35		RKSO
82	171511	28.4N 123.1E	PCN 3		DMSP35		RPMK
83	172138	28.7N 123.1E	PCN 6	T2.0/3.0 /W1.5/18HRS	DMSP37		RODN
84	172138	28.6N 123.4E	PCN 5	T2.0/3.0 /W1.5/24HRS	DMSP37		PGTW
85	172241	28.9N 123.5E	PCN 5		DMSP38		RODN
86	172241	28.5N 123.3E	PCN 5		DMSP38		PGTW
87	172241	29.1N 123.4E	PCN 5		DMSP38		RKSO
88	180053	28.9N 123.3E	PCN 3		NOAA5		PGTW
89	180311	28.6N 123.6E	PCN 3	T3.0/3.5+/W0.5/29HRS	DMSP35		RPMK
90	180311	28.6N 123.9E	PCN 5		DMSP38		RODN
91	180311	28.5N 123.6E	PCN 5	T2.0/3.0-/W1.5/24HRS	DMSP35		RKSO
92	181019	28.3N 124.0E	PCN 5		DMSP47		RKSO
93	181019	27.9N 124.1E	PCN 4		DMSP37		PGTW

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94	181122	27.4N 124.0E	PCN 4			DMSP3A				PGT#	
95	181133	27.4N 124.1E	PCN 6			NOAA5				PGT#	
96	181304	29.4N 124.1E	PCN 6			DMSP3A	UPR LVL			RODN	
97	181353	29.3N 124.0E	PCN 3			DMSP4S				RKSO	
98	181553	29.5N 123.9E	PCN 3			DMSP4S				RPMK	
99	182119	29.1N 123.5E	PCN 6			DMSP47				RODN	
100	182119	29.0N 124.0E	PCN 5			DMSP47				PGT#	
101	182223	28.2N 124.2E	PCN 6			DMSP3A				PGT#	
102	190004	24.4N 124.0E	PCN 5	TE.0/3.0-/W1.0/21HRS		DMSP3A				RPMK	
103	190004	24.2N 124.5E	PCN 5	TE.0/2.0 /S0.0/22HRS		NOAA5				PGT#	
104	191000	30.6N 125.2E	PCN 5			DMSP47				RKSO	
105	191000	30.6N 125.2E	PCN 5			DMSP47	CI SAME			PGT#	
106	191044	30.7N 125.5E	PCN 5			NOAA5				PGT#	
107	191247	31.1N 125.7E	PCN 5			DMSP3A				RODN	
108	191535	32.5N 125.6E	PCN 3			DMSP4S				RPMK	
109	191535	31.5N 125.7E	PCN 5			DMSP4S				RODN	
110	192059	33.3N 126.3E	PCN 5			DMSP47				RODN	
111	192059	34.0N 126.0E	PCN 3			DMSP47				PGT#	
112	192059	33.9N 126.3E	PCN 5			DMSP47				RKSO	
113	192205	34.2N 126.2E	PCN 5			DMSP3A				PGT#	
114	200122	35.0N 126.2E	PCN 5	T1.0/2.0 /W1.0/25HRS		NOAA5				PGT#	
115	200235	35.9N 127.4E	PCN 5			DMSP4S				RKSO	
116	200235	35.8N 127.7E	PCN 5	T0.0/1.0 /W2.0/22HRS		DMSP3S				RPMK	

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MGT	OBS MSLP	MAX-SFC-WND VEL/RAD/PRG	MAX-FLT-LVL-WND DIR/VEL/RAD/PRG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
* 1	180128	17.3N 144.0E	1500FT		1004	15 010 10		4 20			+24 24	1
* 2	180705	17.0N 143.6E	1500FT		1007	25 170 130	280 15 170 75	15 5			+26 +26 +25 24	2
3	181020	16.7N 143.7E	700MB				310 20 270 240	5 15			+12 +11	2
4	181030	16.1N 144.8E	700MB	3085		40 010 30	120 40 010 30				+10 + 9	3
5	181309	15.5N 144.5E	700MB	3014	992	70 220 15	040 40 350 60	4 5			+12 +12 +11	3
6	181100	15.5N 144.5E	700MB	3005			200 45 070 17				+14 + 8	4
7	181433	15.9N 144.3E	700MB	2989	989		320 58 190 22	4 2	ELLIPTICAL	35 22 120	+10 +14 +07	4
8	182228	15.9N 144.3E	700MB	2952	983	30 170 15	230 80 170 8	1 5	CIRCULAR	25	+13 +15 +11	5
9	190100	16.9N 144.3E	700MB	2942		100 310 10	030 65 310 15				+16	5
10	190315	16.3N 144.1E	700MB	2926	980	90 240 10	260 65 240 10	2 5	CIRCULAR	20	+12 +19	5
11	191235	17.5N 143.3E	700MB	2972			150 61 030 40				+17 + 9	5
12	191531	18.3N 142.9E	700MB	2949	983		150 61 110 40	10 10			+13 +16 +11	5
13	192338	20.4N 140.2E	700MB	2898	976	90 090 15	150 80 090 15	5 5	CIRCULAR	25	+10 +19 +11	7
14	201510	22.3N 137.1E	700MB	2864	974		180 70 120 45	5 5	ELLIPTICAL	35 20 50	+09 +16 +10	8
15	201735	22.4N 136.3E	700MB	2851			290 52 350 25				+15 +11	8
16	200150	21.5N 134.4E	700MB	2811	969	90 140 15	260 65 140 15	3 1	CIRCULAR	28	+15 +19 +13	9
17	200613	23.4N 133.8E	700MB	2816	969	90 180 20	260 70 180 20	3 3	CIRCULAR	25	+12 +18 +13	9
18	201349	25.7N 130.8E	700MB	2781	965		300 58 190 35	5 3	ELLIPTICAL	25 20 30	+11 +16 +13	10
19	201915	25.3N 129.9E	700MB	2752			110 118 300 15				+14 +14	10
20	202037	26.1N 129.5E	700MB	2765	963		030 68 320 20	5 3	CIRCULAR	28	+12 +16 +11	10
21	151231	27.5N 125.8E	700MB	2752			080 89 300 24				+18 +23	11
22	151634	27.9N 125.1E	700MB	2744			080 85 350 14	5 2	CIRCULAR	15	+16 +18 +16	11

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN TOOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	110845	15.8N 144.7E	LAND		ELLIPTICAL	12		OPEN SW	13.6N 144.9E	91218
2	110745	16.0N 144.6E	LAND	FAIR	ELLIPTICAL	14		OPEN W THRU S	13.6N 144.9E	91218
3	110845	15.9N 144.4E	LAND	GOOD	CIRCULAR	35		OPEN NW AND SE	13.6N 144.9E	91218
4	110945	15.9N 144.2E	LAND	FAIR	ELLIPTICAL	33		OPEN NW AND E THRU S	13.6N 144.9E	91218
5	111045	15.7N 144.3E	LAND	GOOD	CIRCULAR	25		OPEN E	13.6N 144.9E	91218
6	111145	15.7N 144.4E	LAND	GOOD	CIRCULAR	23		OPEN NW AND E	13.6N 144.9E	91218
7	111245	15.7N 144.5E	LAND	POOR				OPEN W THRU E	13.6N 144.9E	91218
8	111345	15.9N 144.5E	LAND	GOOD	CIRCULAR	35		OPEN NE THRU S	13.6N 144.9E	91218
9	111445	15.9N 144.4E	LAND	GOOD	CIRCULAR	40		OPEN NE	13.6N 144.9E	91218
10	111545	15.9N 144.3E	LAND	GOOD	CIRCULAR	45		OPEN NW	13.6N 144.9E	91218
11	111845	15.9N 144.4E	LAND	GOOD	CIRCULAR	30		OPEN SW	13.6N 144.9E	91218
12	111745	15.9N 144.5E	LAND	GOOD	CIRCULAR	40		OPEN NW	13.6N 144.9E	91218
13	111845	16.0N 144.1E	LAND	POOR	ELLIPTICAL	40		OPEN W THRU N THRU E	13.6N 144.9E	91218
14	111945	15.9N 144.3E	LAND	GOOD	CIRCULAR	32		OPEN NW AND SE	13.6N 144.9E	91218
15	112045	16.0N 144.3E	LAND	GOOD	CIRCULAR	30		OPEN N	13.6N 144.9E	91218
16	141400	25.1N 131.4E	LAND				47777 77777		26.1N 127.8E	47937
17	141500	25.2N 131.2E	LAND				47777 53014		26.1N 127.8E	47937
18	141500	25.2N 131.2E	LAND				47777 52812		28.4N 129.5E	47909
19	141600	25.5N 131.0E	LAND	GOOD		20		MOV 3125	26.1N 127.7E	47937
20	141600	25.5N 130.9E	LAND				47777 53122		28.4N 129.5E	47909
21	141600	25.4N 130.8E	LAND				21401 63019		26.1N 127.8E	47937
22	141700	25.6N 130.7E	LAND	GOOD		20		MOV 2930	26.1N 127.7E	47937
23	141700	25.7N 130.6E	LAND				20702 53123		28.4N 129.5E	47909
24	141700	25.6N 130.6E	LAND				11771 73019		26.1N 127.8E	47937
25	141800	25.7N 130.5E	LAND	GOOD		20		MOV 3130	26.1N 127.7E	47937
26	141800	25.8N 130.4E	LAND				10712 53010		28.4N 129.5E	47909
27	141800	25.9N 130.2E	LAND				10811 73020		26.1N 127.8E	47937
28	141900	26.0N 130.1E	LAND	GOOD		20		MOV 3130	26.1N 127.7E	47937
29	141900	26.0N 130.0E	LAND				10692 53019		28.4N 129.5E	47909
30	141900	25.9N 130.0E	LAND				10811 73018		26.1N 127.8E	47937
31	141930	25.6N 129.8E	LAND	POOR					26.3N 127.8E	47931
32	142000	26.1N 129.9E	LAND	GOOD		20		MOV 3130	26.1N 127.7E	47937
33	142000	26.0N 129.8E	LAND				10811 73018		26.1N 127.8E	47937
34	142000	26.1N 129.8E	LAND				10812 53013		28.4N 129.5E	47909
35	142005	25.7N 129.5E	LAND	POOR					26.3N 127.8E	47931
36	142030	26.0N 129.6E	LAND	GOOD					26.3N 127.8E	47931
37	142100	26.2N 129.6E	LAND	GOOD		20		MOV 3130	26.1N 127.7E	47937
38	142100	26.2N 129.5E	LAND				10812 52919		28.4N 129.5E	47909
39	142100	26.1N 129.4E	LAND				10711 72824		26.1N 127.8E	47937

40	142100	28.1N	129.4E	LAND	GOOD							28.3N	127.8E	47931
41	142130	28.1N	129.4E	LAND	GOOD							28.3N	127.8E	47931
42	142200	28.1N	129.2E	LAND	GOOD	CIRCULAR	25					28.3N	127.8E	47931
43	142200	28.2N	129.2E	LAND				10811	72913			28.1N	127.8E	47937
44	142200	28.3N	129.3E	LAND				10812	53113			28.4N	129.5E	47909
45	142200	28.3N	129.3E	LAND	GOOD		18				MOV 3230	28.1N	127.7E	47937
46	142230	28.2N	129.1E	LAND	GOOD	CIRCULAR	25					28.3N	127.8E	47931
47	142300	28.3N	128.9E	LAND				10811	72917			28.1N	127.8E	47937
48	142300	28.3N	128.9E	LAND	GOOD	ELLIPTICAL	20					28.3N	127.8E	47931
49	142300	28.4N	129.0E	LAND	GOOD		20				MOV 3130	28.1N	127.7E	47937
50	142300	28.6N	129.8E	LAND	POOR							28.2N	127.6E	47930
51	142300	28.6N	128.9E	LAND				10812	52920			28.4N	129.5E	47909
52	142330	28.3	128.3E	LAND	GOOD	ELLIPTICAL	17					28.3N	127.8E	47931
53	150000	28.5N	128.7E	LAND	GOOD		20				MOV 3130	28.1N	127.7E	47937
54	150000	28.6N	128.6E	LAND	GOOD	ELLIPTICAL	17					28.3N	127.8E	47931
55	150000	28.6N	128.7E	LAND				10812	52913			28.4N	129.5E	47909
56	150000	28.5N	129.4E	LAND	GOOD		20					28.2N	127.6E	47930
57	150030	28.6N	128.5E	LAND	GOOD	ELLIPTICAL	22					28.3N	127.8E	47931
58	150100	28.5N	128.4E	LAND				10711	72916			28.1N	129.5E	47937
59	150100	28.6N	128.4E	LAND	GOOD		18					28.2N	127.6E	47930
60	150100	28.5N	128.4E	LAND	GOOD	ELLIPTICAL	19					28.3N	127.8E	47931
61	150100	28.6N	128.5E	LAND	GOOD		20				MOV 3130	28.1N	127.7E	47937
62	150100	28.5N	128.5E	LAND				57742	52915			28.4N	129.5R	47909
63	150135	28.6N	128.3E	LAND	GOOD	ELLIPTICAL	16					28.3N	127.8E	47931
64	150200	28.7N	128.2E	LAND	GOOD		18					28.2N	127.6E	47930
65	150200	28.6N	128.2E	LAND	GOOD	ELLIPTICAL	17					28.3N	127.8E	47931
66	150200	28.7N	128.3E	LAND	GOOD		20				MOV 3030	28.1N	127.7E	47937
67	150200	28.6N	128.2E	LAND				57742	52919			28.4N	129.5E	47909
68	150200	28.5	128.2E	LAND				11711	72915			28.1N	127.8E	47937
69	150300	28.8N	128.0E	LAND	GOOD	ELLIPTICAL	20					28.1N	127.8E	47931
70	150300	28.9N	127.9E	LAND				11701	73010			28.1N	127.8E	47937
71	150300	28.7N	128.0E	LAND				57712	53113			28.4N	129.5E	47909
72	150300	28.8N	128.0E	LAND	GOOD		15				MOV 3030	28.1N	127.7E	47937
73	150300	28.8N	127.9E	LAND	POOR		20					28.2N	127.6E	47930
74	150330	28.9N	127.8E	LAND	GOOD	ELLIPTICAL	20					28.1N	127.8E	47931
75	150400	27.0N	127.6E	LAND	POOR							28.2N	127.6E	47930
76	150400	28.9N	127.8E	LAND				11811	72910			28.1N	127.8E	47937
77	150400	28.9N	127.8E	LAND				57742	53213			28.4N	129.5E	47909
78	150400	28.9N	127.7E	LAND	GOOD	ELLIPTICAL	21					28.1N	127.8E	47931
79	150400	28.9N	127.7E	LAND	GOOD		15				MOV 3030	28.1N	127.7E	47937
80	150500	27.0N	127.6E	LAND				57742	53013			28.4N	129.5E	47909
81	150500	27.1N	127.5E	LAND	GOOD		18				MOV 3130	28.1N	127.7E	47937
82	150500	27.0N	127.5E	LAND	GOOD	CIRCULAR	23					28.1N	127.8E	47931
83	150500	27.0N	127.4E	LAND				10711	72915			28.1N	127.8E	47937
84	150600	27.1N	127.2E	LAND				10811	73014			28.1N	127.8E	47937
85	150600	27.2N	127.6E	LAND				57741	53015			28.4N	129.5E	47909
86	150600	27.1N	127.3E	LAND	GOOD		18				MOV 2920	28.1N	127.7E	47937
87	150700	27.1N	127.0E	LAND				57713	53011			24.8N	125.3E	47927
88	150700	27.2N	127.0E	LAND				10812	73012			28.1N	127.8E	47937
89	150700	27.3N	127.0E	LAND	GOOD		28				MOV 3025	28.1N	127.7E	47937
90	150700	27.2N	127.2E	LAND				17741	53015			28.4N	129.5E	47909
91	150800	27.3N	126.8E	LAND	GOOD	CIRCULAR	16					28.1N	127.8E	47931
92	150800	27.3N	126.8E	LAND				10712	72912			28.1N	127.8E	47937
93	150800	27.2N	126.9E	LAND				67741	52710			28.4N	129.5E	47909
94	150800	27.3N	126.8E	LAND				37712	53110			24.8N	125.3E	47927
95	150800	27.3N	126.8E	LAND	GOOD		23				MOV 3025	28.1N	127.7E	47937
96	150900	27.3N	126.5E	LAND				10731	72912			28.1N	127.8E	47937
97	150900	27.4N	126.6E	LAND				37712	53011			24.8N	125.3E	47927
98	150900	27.3	126.5E	LAND	GOOD		25				MOV 2930	28.1N	127.7E	47937
99	150900	27.2N	126.5E	LAND				67741	52820			28.4N	129.5E	47909
100	151000	27.5N	126.3E	LAND				37712	52910			24.8N	125.3E	47927
101	151000	27.3N	126.3E	LAND	GOOD		18				MOV 2930	28.3N	126.8E	47929
102	151000	27.4N	126.4E	LAND	FAIR	CIRCULAR	17					28.1N	127.8E	47931
103	151000	27.4N	126.3E	LAND				20842	72914			28.1N	127.8E	47937
104	151030	27.5N	126.2E	LAND	FAIR	CIRCULAR	16					28.1N	127.8E	47931
105	151100	27.5N	126.0E	LAND				20711	72914			28.1N	127.8E	47937
106	151100	27.5N	126.1E	LAND	POOR	CIRCULAR	16					28.1N	127.8E	47931
107	151100	27.5N	126.1E	LAND	GOOD		18				MOV 3030	28.3N	126.8E	47929
108	151100	27.5N	126.0E	LAND				37712	52714			24.8N	125.3E	47927
109	151200	27.6N	125.9E	LAND				57772	52908			24.8N	125.3E	47927
110	151200	27.5N	125.8E	LAND				67777	72912			28.1N	127.8E	47937
111	151200	27.6N	125.9E	LAND	GOOD		15				MOV 3020	28.3N	126.8E	47929
112	151300	27.6N	125.7E	LAND				67777	72910			28.1N	127.8E	47937
113	151300	27.7N	125.6E	LAND				57772	53012			24.8N	125.3E	47927
114	151300	27.6N	125.7E	LAND	GOOD		13				MOV 3030	28.3N	126.8E	47929
115	151400	27.6N	125.4E	LAND				67777	72811			28.1N	127.8E	47937
116	151400	27.9N	125.3E	LAND				37772	52915			24.8N	125.3E	47927
117	151400	27.7N	125.6E	LAND	FAIR		15				MOV 3020	28.3N	126.8E	47929
118	151500	27.8N	125.2E	LAND				37772	52911			24.8N	125.3E	47927
119	151500	27.7N	125.2E	LAND				67777	73012			28.1N	127.8E	47937
120	151500	27.9N	125.0E	LAND	FAIR		15				MOV 3030	28.3N	126.8E	47929
121	151600	27.9N	124.9E	LAND				57772	52715			24.8N	125.3E	47927
122	151700	27.9N	124.8E	LAND				57771	53108			24.8N	125.3E	47927
123	151800	28.0N	124.6E	LAND				57772	53013			24.8N	125.3E	47927
124	151900	28.0N	124.4E	LAND				57772	52711			24.8N	125.3E	47927
125	152000	28.1N	124.3E	LAND				57772	53308			24.8N	125.3E	47927

TROPICAL STORM DELLA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	100210	13.9N 124.7E	PCN 5	T0.0/0.0	DMSP 15	INIT J4S	PGTW
2	101200	14.4N 124.5E	PCN 5		DMSP 14	CI UP	PGTW
3	102213	15.5N 124.4E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP 17		PGTW
4	111056	14.4N 126.9E	PCN 6		DMSP 17	CI UP	PGTW
5	111142	14.6N 127.0E	PCN 5		DMSP 14		PGTW
6	111436	14.9N 126.6E	PCN 5		DMSP 15		PGTW
7	111436	14.3N 127.0E	PCN 5		DMSP 15		RODN
8	112154	20.0N 125.0E	PCN 5	T1.0/1.0 /01.0/24HRS	DMSP 17		PGTW
9	112243	20.7N 124.7E	PCN 5		DMSP 14		PGTW
10	112243	20.1N 125.8E	PCN 5	T1.0/1.0	DMSP 14	INIT J4S	RPMK
11	120125	20.9N 124.6E	PCN 5		NOAA 9		PGTW
* 12	120315	22.1N 125.2E	PCN 5	T1.0/1.0	DMSP 15	INIT J4S	RODN
13	120316	21.5N 125.0E	PCN 5		DMSP 15		RPMK
* 14	121035	23.2N 124.2E	PCN 6		DMSP 17	CI UP	PGTW
* 15	121125	23.4N 123.9E	PCN 5		DMSP 14		PGTW
16	121558	24.2N 123.4E	PCN 5		DMSP 15		RPMK
17	122134	23.9N 122.0E	PCN 5	T2.5/2.5+/01.5/24HRS	DMSP 17		PGTW
* 18	130007	24.6N 121.6E	PCN 5	T3.5/3.5	DMSP 14	INIT J4S	RKSO
19	130258	25.0N 121.1E	PCN 3	T3.0/3.0-/02.0/24HRS	DMSP 15		RPMK
20	130258	24.4N 120.8E	PCN 5		DMSP 15		PGTW
21	130259	25.2N 121.0E	PCN 3	T2.5/2.5+/01.5/24HRS	DMSP 15		RODN
22	131120	26.5N 120.3E	PCN 6		NOAA 9		PGTW
23	131249	26.5N 120.1E	PCN 6		DMSP 14		RODN
24	131540	26.7N 119.5E	PCN 6		DMSP 15		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN SLP	OBS MSLP	MAX-SFC-WND DIR/VEL/RAD/RNG	MAX-FLT-LVL-WND DIR/VEL/RAD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) IN/ DP/SST	MSN NO.
1	110424	14.9N 128.1E	1500FT		999	40 090 15 240	40 130 10	2 2					01
2	120403	21.5N 124.9E	700MB	3031									02
3	120424	21.5N 124.8E	700MB	3031		30 050 25 180	58 050 25	5 5				+12 +16 +11	02
4	120651	21.9N 124.5E	700MB	3035								+14 +10	02
5	121505	22.6N 122.9E	700MB	3009	987		250 40 180 15	2 2				+18 +18 +08	03
6	121920	23.1N 122.1E	700MB	2990	984		210 35 110 20	5 5				+18 +20 +06	03

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	121700	22.9N 122.8E	LAND				25/// 51314		24.0N 121.6E	46699
2	121900	23.1N 122.6E	LAND				25/// 53114		24.0N 121.6E	46699
3	121900	23.2N 122.4E	LAND				25/// 53312		24.0N 121.6E	46699
4	122000	23.5N 122.4E	LAND				24/// 53413		24.0N 121.6E	46699
5	122100	23.6N 122.2E	LAND				25/// 52312		24.0N 121.6E	46699
6	122200	23.6N 122.4E	LAND				24/// 53413		24.0N 121.6E	46699
7	122300	23.5N 122.1E	LAND				25/// 53313		24.0N 121.6E	46699
8	130000	23.8N 122.2E	LAND				///// 50217		24.0N 121.6E	46699
9	130100	24.1N 122.1E	LAND				10572 50515		24.0N 121.6E	46699

TROPICAL DEPRESSION 14

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	132200	9.4N 160.0E	PCN 6	T0.0/0.0	NOAA5	INIT J+S	PGTW
2	141391	11.4N 150.0E	PCN 6		DMSP15	CI 0.0+W	PGTW
3	150091	12.4N 156.4E	PCN 5	T0.0/0.0 /S0.0/27HRS	DMSP15		PGTW
4	151952	13.5N 156.8E	PCN 5		NOAA5	CI UP	PGTW
5	151363	13.4N 156.9E	PCN 6		DMSP15		PGTW
6	160023	16.0N 154.9E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP15		PGTW
7	171197	19.5N 150.8E	PCN 3	T1.0/1.0 /D1.0/24HRS	DMSP15		PGTW
8	171955	20.4N 148.9E	PCN 6		DMSP18		PGTW
9	172034	21.0N 149.0E	PCN 5	T1.0/1.0 /S0.0/13HRS	DMSP18		PGTW
10	181124	22.2N 148.9E	PCN 6		DMSP15		PGTW
* 11	181122	24.5N 145.7E	PCN 6		DMSP18		PGTW
12	181133	24.5N 144.5E	PCN 6		NOAA5		PGTW
13	181911	24.1N 144.4E	PCN 4		DMSP15	PARTIALLY EXPOSED LLCC	PGTW
* 14	182119	25.1N 141.4E	oCN 5	T2.0/2.0+/D1.0/24HRS	DMSP17		PGTW
15	182223	25.7N 141.2E	PCN 3		DMSP18		PGTW
16	190304	26.0N 141.0E	PCN 3		NOAA5		PGTW
17	191300	27.4N 138.2E	PCN 3		DMSP17	CI 0.0+W	PGTW
18	191000	27.5N 138.1E	PCN 3		DMSP17		RKSO
19	191094	27.4N 137.9E	PCN 4		NOAA5		PGTW
20	191304	28.2N 137.0E	PCN 3		DMSP15		PGTW
21	192004	30.1N 136.5E	oCN 3	T2.5/2.5-/D0.5/24HRS	DMSP17		PGTW
22	192004	30.0N 136.0E	PCN 3	T2.0/2.0	DMSP17	INIT J+S	RKSO
23	192204	30.1N 136.5E	PCN 3	T1.0/1.0	DMSP17	INIT J+S	RODN
24	192205	30.4N 135.9E	PCN 3		DMSP18		PGTW
25	192303	30.4N 135.2E			NOAA5		PGTW
26	200004	31.2N 135.1E	PCN 3		DMSP15		PGTW
27	200235	31.7N 134.9E	PCN 3		DMSP15		PGTW
28	200235	31.7N 134.8E	PCN 3		DMSP15		RKSO
29	200490	33.0N 134.9E	PCN 5		DMSP17		PGTW
30	200490	33.4N 133.8E	PCN 6		DMSP17		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/RAD/RNG	MAX-FLT-LVL-WND DIR/VEL/RNG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	141350	26.1N 144.3E	700MB	3103	1002		100 48 080 95	5 3			+11 +10 + R	2
2	191135	29.9N 140.5E	700MB									3
3	191329	28.3N 139.9E	700MB	3004	998	50 360 15	080 50 300 15	2 3			+24 +26 +26 28	3
* 4	191922	27.9N 135.5E	700MB	3116			090 38 090 40	13 4			+10 +10 +10	4
5	200298	31.3N 134.5E	1500FT		1006	20 130 60	250 35 130 40	5 20			+26 +17	5

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	200700	33.2N 134.4E	LAND				51627 /999/		33.3N 134.2E	47899
2	200500	33.4N 134.5E	LAND				5//// 50127		33.3N 134.2E	47899

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TYPHOON ELAINE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	142305	18.3N 133.2E	PCN 5	T0.0/0.0	NOAA5	INIT J4S	PGTW
2	210034	14.2N 130.4E	PCN 5	T0.0/0.0 /S0.0/25HRS	NOAA5		PGTW
3	211114	15.4N 129.3E	PCN 6		NOAA5	CI UP	PGTW
4	212354	17.3N 126.2E	PCN 5	T0.0/0.0 /S0.0/23HRS	NOAA5		PGTW
5	221230	17.6N 125.2E	PCN 6		NOAA5		PGTW
6	222253	17.3N 124.0E	PCN 3	T2.0/2.0	DMSP3A	INIT J4S PENETRATING CBS	RPMK
7	230105	17.8N 124.9E	PCN 6	T1.0/1.0 /01.0/25HRS	NOAA5		PGTW
8	230323	18.1N 123.5E	PCN 3		DMSP3S	PENETRATING CBS AT 18.2N 123.8E	RPMK
9	231024	18.6N 122.8E	PCN 5		DMSP37	CI UP	PGTW
10	231024	18.6N 122.8E	PCN 5		DMSP37		RODN
11	231145	18.6N 122.3E	PCN 5		NOAA5		PGTW
12	231503	17.7N 121.8E	PCN 5		DMSP3S		RPMK
13	231505	17.7N 120.8E	PCN 5		DMSP3S		RODN
14	232305	18.6N 120.7E	PCN 5	T2.0/2.0	DMSP37	INIT J4S SECONDARY 17.5N 121.4E	RODN
15	240020	17.7N 120.4E	PCN 3		DMSP3A	PSBL SECONDARY CC 17.6N 120.7E	RPMK
16	240020	17.5N 120.8E	PCN 5		DMSP33		RODN
17	240322	17.5N 121.4E	PCN 5	T2.0/2.0 /01.0/25HRS	NOAA5		PGTW
18	240305	17.3N 120.4E	PCN 3		DMSP3S		PGTW
19	241145	17.1N 120.2E	PCN 6		DMSP37		RODN
20	241145	17.1N 119.5E	PCN 3		DMSP37		RPMK
21	241238	17.1N 119.4E	PCN 5		NOAA5		PGTW
22	241302	17.0N 119.5E	PCN 3		DMSP3A	SECONDARY CC 17.8N 119.1E	RPMK
23	241547	17.4N 119.4E	PCN 5		DMSP3S	SECONDARY CC 18.9N 118.9E	RODN
24	242245	17.6N 118.9E	PCN 3	T3.0/3.0+/01.0/23HRS	DMSP37		RODN
25	250002	17.4N 118.5E	PCN 5	T3.0/3.0	DMSP3A	INIT J4S	RPMK
26	250003	17.6N 118.4E			DMSP3A		RODN
27	250134	17.8N 119.5E	PCN 5	T2.5/2.5 /00.5/25HRS	NOAA5		PGTW
28	251120	17.1N 117.9E	PCN 5		DMSP37		RPMK
29	251214	16.9N 117.9E	PCN 6		NOAA5		PGTW
30	251244	17.3N 117.6E	PCN 3		DMSP3A	LOW LVL CIRCULATION	RPMK
31	251324	17.6N 117.3E	PCN 3		DMSP3S		PGTW
32	252226	18.0N 117.2E	PCN 3	T3.5/3.5 /01.0/21HRS	DMSP37		PGTW
* 33	252256	17.3N 117.6E	PCN 5	T3.0/3.0 /S0.0/22HRS	DMSP37		RPMK
* 34	252345	17.6N 117.9E	PCN 5	T3.0/3.0 /S0.0/25HRS	DMSP3A		RODN
35	252345	17.3N 117.2E	PCN 5		DMSP3A		PGTW
36	260051	17.5N 117.0E	PCN 4		NOAA5		PGTW
37	260230	17.5N 116.3E	PCN 3		DMSP3S		PGTW
38	260230	17.7N 116.3E	PCN 3		DMSP3S		RPMK
39	261107	19.6N 115.6E	PCN 3		DMSP37		RODN
40	261130	19.2N 115.3E	PCN 6		NOAA5		PGTW
41	261227	19.6N 114.9E	PCN 5		DMSP3A		RPMK
42	261512	20.0N 114.6E	PCN 3		DMSP3S		PGTW
43	261512	19.3N 114.6E	PCN 3		DMSP3S		RPMK
44	261554	20.0N 114.6E	PCN 4		DMSP3S	BASED ON CONTINUITY	RPMK
45	262205	20.1N 113.3E	PCN 5		DMSP37		PGTW
46	262328	20.2N 113.0E	PCN 3	T4.0/4.0 /00.5/25HRS	DMSP3A		PGTW
47	270354	20.6N 112.3E	PCN 1	T5.0/5.0 /02.0/29HRS	DMSP3S		RPMK
48	271047	21.6N 110.8E	PCN 4		DMSP37		PGTW
49	271047	21.6N 110.6E	PCN 4		DMSP37		RPMK
50	271209	21.6N 110.4E	PCN 4		DMSP3A		PGTW
51	271535	21.6N 108.7E	PCN 5		DMSP37	EYE GONE	RPMK
52	280119	21.7N 106.8E	PCN 5		NOAA5		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND DIR/VEL/RNG/ANG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	240034	17.6N 120.3E	700MB	2993		50 010 50	080 61 010 120				+12 +12	1
2	240230	17.0N 120.2E	700MB	2995		40 330 50	080 50 320 130	2 5			+12 +12 +12	1
3	241253	16.8N 119.1E	700MB									2
4	241545	16.6N 119.1E	700MB	2976			020 62 300 155	2 7			+11 +13 +11	2
5	250355	17.6N 118.1E	700MB	2961	981	30 160 120	260 48 160 120	5 10			+28 +25	3
6	250532	17.3N 117.9E	700MB									3
7	250835	17.0N 117.8E	700MB	2926	981	40 200 35	270 45 200 45	5 10			+14 +14 +11	3
8	251504	17.2N 118.1E	700MB	2897	977		220 43 150 75	20 8			+12 +14 +10	4
9	251938	17.6N 117.8E	700MB	2885	977		310 40 240 120	25 5			+12 +14 +10	4
10	252225	18.2N 117.0E	700MB	2882	975		360 40 230 60	15 3			+12 +14 +12	4
11	261028	19.2N 115.5E	700MB	2867	970	45 120 135	180 55 110 60	2 5			+12 +15 +14 27	5
12	261330	19.6N 114.8E	700MB	2867			170 68 270 105				+13 +13	5

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RAJAH FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCMY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM	TDUFF	COMMENTS	RADAR POSITION	SITE WMO NO.
* 1	231200	14.6N 121.5E	LAND				2221/	427//		16.3N 120.6E	98321
* 2	231300	18.4N 121.3E	LAND				2212/	427//		16.3N 120.6E	98321
* 3	231740	19.4N 120.6E	LAND				29///	/////		16.3N 120.6E	98321
4	240001	17.6N 120.3E	LAND				1060/	/////		16.3N 120.6E	98321
5	240200	17.3N 120.2E	LAND				1152/	62115		16.3N 120.6E	98321
6	240605	17.3N 119.7E	LAND						PSBL CNTH	16.6N 120.3E	
7	240630	17.3N 120.0E	LAND				1012J	73608		16.3N 120.6E	98321
8	240800	17.5N 119.7E	LAND				11197	10413		16.3N 120.6E	98321
9	241700	17.2N 118.7E	LAND				45///	9////		16.3N 120.6E	98321
10	250015	16.5N 119.4E	LAND		CIRCULAR	21			EYE	16.6N 120.3E	
11	250230	17.5N 118.2E	LAND				4////	/////		16.3N 120.6E	98321
* 12	250355	16.3N 119.5E	LAND							16.6N 120.3E	
13	250730	17.2N 117.6E	LAND				4////	6////		16.3N 120.6E	98321
14	250930	17.2N 117.6E	LAND				4////	6////		16.3N 120.6E	98321
15	251330	17.1N 117.4E	LAND				4////	6////	10DEG SPHL OVERLAY	16.3N 120.6E	98321
16	262240	19.9N 113.1E	LAND				30902	52710		22.3N 114.2E	45005
17	262350	20.0N 112.9E	LAND				30912	53110		22.3N 114.2E	45005
18	270003	20.1N 112.7E	LAND				2091/	52914		22.3N 114.2E	45005
19	270130	20.1N 112.6E	LAND				2091C	52907		22.3N 114.2E	45005
20	270300	20.3N 112.4E	LAND				2091C	53210		22.3N 114.2E	45005
21	270400	20.6N 112.0E	LAND				2091C	63117		22.3N 114.2E	45005
22	270600	20.9N 111.8E	LAND				2091C	63211		22.3N 114.2E	45005
23	270800	21.3N 111.5E	LAND				2091C	63215		22.3N 114.2E	45005
24	270900	21.6N 111.3E	LAND				2094C	63213		22.3N 114.2E	45005

TYPHOON FAYE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	240240	6.6N 160.8E	PCN 6	T0.0/0.0	NOAA5	INIT JTS	PGTW
2	251017	7.4N 157.8E	PCN 6		NOAA5		PGTW
3	252256	6.5N 155.8E	PCN 6	T0.0/0.0 /S0.0/25HRS	NOAA5		PGTW
4	260936	7.3N 152.9E	PCN 6		NOAA5		PGTW
5	271028	10.5N 148.9E	PCN 6		DMSP36		PGTW
6	272129	12.7N 144.0E	PCN 3	T1.0/1.0	DMSP36	INIT JTS	PGTW
7	272323	12.7N 145.8E	PCN 3		NOAA5		PGTW
8	280155	13.6N 144.0E	PCN 5		DMSP35		PGTW
9	280346	14.6N 145.0E	PCN 6		DMSP37	CI UP	PGTW
10	281011	14.8N 145.0E	PCN 5		DMSP36		PGTW
11	281637	15.1N 144.7E	PCN 6		DMSP35		PGTW
12	282127	16.3N 145.9E	PCN 5	T3.5/3.5 /D2.5/24HRS	DMSP37		PGTW
13	282253	16.6N 145.8E	PCN 5		DMSP36		PGTW
14	290137	17.0N 145.2E	PCN 5		DMSP35		PGTW
15	290827	17.3N 145.6E	PCN 6		DMSP37	CI SAME	PGTW
16	290953	18.0N 145.2E	PCN 6		DMSP36		PGTW
17	291619	18.4N 145.7E	PCN 6		DMSP35		PGTW
18	292108	19.3N 146.3E	PCN 5	T3.5/3.5 /S0.0/24HRS	DMSP37		PGTW
19	292108	19.3N 146.5E	PCN 3	T3.5/3.5	DMSP37	INIT JTS	RPMK
20	292236	19.4N 146.6E	PCN 5		DMSP36		PGTW
21	300948	14.5N 147.6E	PCN 6		DMSP37		RKSO
22	300949	19.4N 147.6E	PCN 5		DMSP37	CI SAME	PGTW
23	301118	19.3N 148.1E	PCN 5		DMSP36		PGTW
24	301401	19.0N 148.3E	PCN 6		DMSP35		PGTW
25	302048	17.9N 148.5E	PCN 5	T3.5/3.5 /S0.0/24HRS	DMSP37		PGTW
26	302048	18.2N 149.1E	PCN 3	T3.0/3.0	DMSP37	INIT JTS	RODN
27	302218	17.9N 148.9E	PCN 4		DMSP36		PGTW
28	310929	17.4N 149.0E	PCN 5		DMSP37		RKSO
29	310929	17.3N 148.6E	PCN 6		DMSP37		PGTW
30	310929	17.5N 148.6E	PCN 6		DMSP37		RODN
31	311100	17.3N 148.9E	PCN 5		DMSP36		PGTW
32	311343	17.1N 147.9E	PCN 3		DMSP35	EXPOSED LOW LVL	PGTW
33	312028	16.9N 147.5E	PCN 3	T4.0/4.0 /D0.5/24HRS	DMSP37		PGTW
34	312201	17.4N 147.5E	PCN 3		DMSP36		PGTW
35	010043	16.7N 147.2E	PCN 3		DMSP35		PGTW
36	010910	17.4N 146.4E	PCN 5		DMSP37	CI UP	PGTW
37	010910	17.3N 146.0E	PCN 6		DMSP37		RODN
38	011043	17.5N 146.1E	PCN 5		DMSP36		PGTW
39	011325	17.3N 145.6E	PCN 5		DMSP35		PGTW
40	012009	19.5N 145.0E	PCN 2	T4.5/4.5 /D0.5/24HRS	DMSP37		PGTW
41	012143	14.9N 144.9E	PCN 1		DMSP36		PGTW
42	020207	19.3N 144.6E	PCN 1		DMSP35		PGTW
43	020850	20.2N 143.7E	PCN 2		DMSP37	CI UP	PGTW
44	020850	19.8N 143.2E	PCN 6		DMSP37		RODN
45	021026	20.4N 143.6E	PCN 1		DMSP36		PGTW
46	021449	20.8N 143.6E	PCN 5		DMSP35		PGTW
47	022126	21.8N 141.6E	PCN 2		DMSP36		PGTW
48	022308	22.0N 141.4E	PCN 4		DMSP36		PGTW
49	030149	22.4N 140.7E	PCN 4	T5.0/5.0-/D0.5/30HRS	DMSP35		PGTW
50	031012	23.5N 139.4E	PCN 6		DMSP37		PGTW
51	031012	23.4N 139.2E	PCN 6		DMSP37		RKSO
52	031150	24.0N 138.9E	PCN 6		DMSP36		PGTW
53	031150	24.0N 139.2E	PCN 5		DMSP36		RODN
54	031431	24.4N 138.2E	PCN 5		DMSP35		PGTW
55	032112	25.2N 137.3E	PCN 5	T3.5/4.5 /W1.5/19HRS	DMSP37		PGTW
56	032251	25.4N 137.7E	PCN 5	T4.0/4.0	DMSP36	INIT JTS	RKSO
57	032251	25.6N 137.0E	PCN 5		DMSP36		PGTW
58	040131	26.2N 136.4E	PCN 3		DMSP35		RKSO
59	040131	26.1N 136.6E	PCN 3		DMSP35		PGTW
60	040953	27.4N 135.4E	PCN 4		DMSP37		RKSO
61	040953	27.5N 135.5E	PCN 4		DMSP37	CENTER OF CDO	PGTW
62	041133	27.9N 135.4E	PCN 5		DMSP36		PGTW
63	041413	28.3N 134.8E	PCN 5		DMSP35		PGTW
64	042053	28.7N 134.8E	PCN 5	T3.0/3.5 /W0.5/24HRS	DMSP37		PGTW
65	042233	28.9N 134.8E	PCN 3	T3.5/4.0 /W0.5/24HRS	DMSP36		RKSO
66	042233	28.9N 134.7E	PCN 5		DMSP36		PGTW
67	050934	30.4N 135.4E	PCN 6		DMSP37		RKSO
68	050934	29.8N 135.5E	PCN 6		DMSP37		PGTW
69	051115	30.2N 134.0E	PCN 5		DMSP36		PGTW
70	051356	30.0N 134.5E	PCN 5		DMSP35	CI UP	PGTW
71	051356	29.9N 134.5E	PCN 5		DMSP35		RODN
72	052033	30.1N 137.9E	PCN 4	T3.0/3.0 /S0.0/24HRS	DMSP37		PGTW
73	052033	33.0N 137.9E	PCN 3	T3.5/3.5-/S0.0/22HRS	DMSP37		RKSO
74	052216	30.1N 138.4E	PCN 5		DMSP36		PGTW
75	060056	30.3N 138.3E	PCN 5		DMSP35		RKSO
76	060056	30.0N 138.0E	PCN 3		DMSP35		PGTW
77	060914	30.1N 139.4E	PCN 5		DMSP37	CI DOWN	PGTW
78	060914	30.0N 139.3E	PCN 6		DMSP37		RODN
79	061058	30.0N 139.5E	PCN 5		DMSP36		PGTW
80	061338	29.9N 139.9E	PCN 5		DMSP35		PGTW
81	061519	29.3N 141.3E	PCN 6		DMSP35		RODN
82	062014	30.6N 140.1E	PCN 3	T2.5/3.0 /W0.5/24HRS	DMSP37		PGTW
83	062014	30.6N 140.3E	PCN 3	T2.5/3.5 /W1.0/24HRS	DMSP37		RKSO
84	062158	30.7N 140.3E	PCN 3		DMSP36		PGTW
85	070038	30.7N 140.8E	PCN 3		DMSP35		PGTW
86	070219	30.6N 140.6E	PCN 4		DMSP37		KGWC
87	070219	30.6N 140.6E	PCN 4		DMSP37		KGWC
88	071028	30.5N 141.2E	PCN 4		NOAA5	CI DOWN	PGTW
89	071036	30.2N 140.9E	PCN 6		DMSP37		RODN
90	071502	30.5N 141.8E	PCN 4		DMSP35		PGTW
91	071502	30.1N 141.6E	PCN 5		DMSP35		RODN
92	072136	30.3N 142.5E	PCN 3		DMSP37		PGTW
93	072141	30.4N 142.4E	PCN 3		DMSP36		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) UNIT/ IN/ OP/SST	MSV NO.
1	272253	12.4N 144.3E	1500FT		1000	65 110 55	150 68 110 55	5 3			+23 +26 30	1
2	280158	13.2N 144.0E	1500FT		997	25 180 65	260 30 180 65	5 3			+24 +26 30	1
3	281535	15.4N 144.9E	700MB	1095	1001		290 30 250 30	3 5			+11 +15 + 7	2
4	281927	15.1N 145.0E	700MB	1091			000 38 300 30				+ 13+ 6	2
5	282102	14.2N 145.1E	700MB	1094	1001	50 180 15	030 29 300 60	3 5			+14 +15 + 7	2
6	290100	14.4N 145.0E	700MB	1125		50 050 60	140 43 050 60				+ 15+ 12	3
7	290324	17.3N 145.1E	700MB	1100	1002	35 310 45	030 20 310 30	4 2			+14 +20 +11	3
8	291503	14.2N 145.8E	700MB	1053	996		350 35 270 30	5 2			+13 +20 + 9	4
9	300034	14.2N 146.4E	700MB			50 360 20	170 65 030 15					5
10	300332	19.2N 147.0E	700MB	1055	984	60 020 15	140 65 020 15	2 2	CIRCULAR	15	+14 +16 + 9	28 5
11	301205	14.0N 147.9E	700MB	1053			330 49 210 30				+16 + 6	6
12	301652	14.4N 144.3E	700MB	1100	1002		010 38 270 40	10 10	ELLIPTICAL	50 20 090	+12 +12 +11	6
13	302340	14.0N 148.6E	700MB	1069	997	35 120 35	320 45 120 35				+16 + 7	7
14	310340	17.4N 144.8E	700MB	2974	987	50 240 20	350 50 270 15	3 1			+11 +19 + 7	7
15	311202	17.4N 144.7E	700MB	2994			340 45 300 20				+19 + 8	8
16	311442	17.3N 144.3E	700MB	2974	986		350 45 280 20	3 5	CIRCULAR	30	+11 +17 +13	8
17	312052	17.0N 147.7E	700MB	2994	987	50 090 10	240 38 180 15	3 5			+18 +15 +11 29	9
18	010035	14.9N 147.3E	700MB	2982		80 010 10	110 52 010 20				+ 15+ 11	9
19	010333	17.0N 147.0E	700MB	2919	981	85 300 10	260 62 290 10	3 5	CIRCULAR	30	+12 +15 +11	9
20	011521	14.0N 145.6E	700MB	2821	969		290 77 170 15	5 2	CIRCULAR	15	+12 +16 +13	10
21	011830	14.5N 145.3E	700MB	2770			170 95 140 12				+ 15+ 13	10
22	012031	14.7N 144.2E	700MB	2969	981	40 180 50	010 75 280 10	5 2	CIRCULAR	12	+10 +15 +13	10
23	020044	19.1N 144.8E	700MB	2866	949	40 230 50	310 80 230 15	3 2	ELLIPTICAL	15 12 040	+13 +17 +12	11
24	020339	19.5N 144.5E	700MB	2957	939	130 270 7	310 100 270 10	2 1	CIRCULAR	15	+12 +19 +14	11
25	021503	21.3N 143.1E	700MB	2929	936		270 94 180 15	20 2	CIRCULAR	12	+12 +19 +15	12
26	021833	21.4N 142.4E	700MB	2928			000 103 350 5				+ 19+ 15	12
27	022042	21.4N 141.8E	700MB	2942	937		290 93 210 8	5 2	CIRCULAR	15	+12 +19 +15	12
28	010053	22.2N 141.1E	700MB	2853	950							13
29	010340	22.6N 140.6E	700MB	2746	961	100 360 10	110 122 300 10	5 5	CIRCULAR	15	+13 +15 +15	13
30	031513	24.7N 138.2E	700MB	3000	990		190 61 110 55	5 5	ELLIPTICAL	30 20 150	+12 +20 + 8	14
31	012118	25.5N 137.3E	700MB	3009	991	60 090 20	120 58 090 20	5 10			+15 +11 +11	14
32	040108	26.1N 136.9E	700MB	2956		80 050 20	190 55 120 60				+16	15
33	040339	26.7N 136.1E	700MB	2974	987	55 310 45	070 35 310 45	3 3			+15 +19	15
34	041455	28.2N 134.7E	700MB	3014	989		200 52 140 30	2 5			+12 +18 +13	16
35	041901	28.2N 134.0E	700MB	2978			160 45 060 60				+ 18+ 9	16
36	042057	28.4N 134.7E	700MB	2977	985	35 360 15	010 35 300 25	4 2			+15 +18 +11	16
37	050030	29.2N 134.5E	700MB	2922		40 090 20	180 54 090 30				+16	17
38	050315	29.5N 135.1E	700MB	2903	979	30 330 30	030 49 330 20	4 3	CIRCULAR	25	+12 +16	17
39	051236	30.0N 136.6E	700MB	2899			180 70 120 25				+17 +11	18
40	051541	30.2N 136.9E	700MB	2877	972		010 80 280 15	3 3	CIRCULAR	17	+19 +20 +16	18
41	060040	30.3N 138.3E	700MB	2886	975	90 270 5	74				+25 + 9	19
42	060330	30.2N 138.6E	700MB	2870	975	100 040 25	140 65 040 30	2 2			+16 +21 + 8	19
43	062356	30.7N 140.6E	700 MB			30 0	31					20
44	070036	30.8N 140.5E	700MB	3104	1002	25 240 30	320 61 240 90	4 2			+17 +18 + 9	20
45	070302	30.7N 140.7E	700MB	3084	1000	35 010 120	090 20 010 40	5 3			+17 +18 + 8	20

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE RADAR TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	272330	12.7N 144.1E	LAND					1 HAND SONM		
2	280125	13.2N 145.7E	LAND					POORLY DEFINED SPIRAL BAND	13.6N 144.9E	91218
3	280235	13.3N 145.5E	LAND					FREQUENT BANDS APPEAR WEAKER	13.6N 144.9E	91218
4	280310	13.6N 145.7E	LAND	POOR				PRBL CNTR	13.6N 144.9E	91218
5	280335	13.6N 145.7E	LAND	GOOD	CIRCULAR	20		PRBL CNTR WALL CLD OPEN S-W	13.6N 144.9E	91218
6	280410	13.7N 145.6E	LAND	POOR	CIRCULAR	15		PRBL CNTR WALL CLD OPEN SE-N	13.6N 144.9E	91218
7	280435	13.9N 145.5E	LAND	GOOD	ELLIPTICAL			PRBL CNTR WALL CLD OPEN SW-NE	13.6N 144.9E	91218
8	280510	13.9N 145.5E	LAND	POOR				PRBL CNTR	13.6N 144.9E	91218
9	281310	14.9N 145.2E	LAND	FAIR	CIRCULAR	25		PRBL EYE	13.6N 144.9E	91218

TROPICAL STORM GLORIA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	281512	20.2N 132.4E	PCN 5		DMSP35		PGTW
* 2	272310	17.5N 129.4E	PCN 5	T1.0/1.0	DMSP36	INIT DTG	RODN
3	280152	21.1N 130.6E	PCN 3	T1.0/1.0	DMSP35	INIT DTG	PGTW
* 4	281028	19.6N 128.4E	PCN 5		DMSP37	CI UP	PGTW
* 5	281152	19.6N 128.7E	PCN 5		DMSP36	SECONDARY 22.3N 128.0E	PGTW
* 6	281637	19.6N 128.0E	PCN 5		DMSP35		PGTW
7	282127	20.1N 126.0E	PCN 3		DMSP37	SECONDARY 22.2N 129.7E	PGTW
8	282253	22.2N 129.0E	PCN 3	T1.0/1.0	DMSP36	INIT DTG	RKSO
9	282253	22.2N 129.1E	PCN 3	T1.0/1.0	DMSP36	INIT DTG	RPMK
10	282253	22.2N 129.0E	PCN 3	T2.0/2.0 /01.0/21HRS	DMSP36	SECONDARY 20.0N 126.6E	PGTW
11	290035	22.0N 128.9E	PCN 3		NOAA5	SECONDARY 22.3N 130.8E	PGTW
12	290137	21.8N 128.5E	PCN 3		DMSP35	SECONDARY 22.5N 130.1E	RPMK
13	290137	21.9N 128.3E	PCN 3		DMSP35	SECONDARY 22.6N 129.9E	PGTW
14	291005	22.3N 128.0E	PCN 6		DMSP37		RKSO
* 15	291008	20.2N 126.5E	PCN 6		DMSP37		RPMK
16	291008	23.1N 127.9E	PCN 5		DMSP37	CI SAME	PGTW
17	291135	22.0N 127.9E	PCN 5		DMSP36		PGTW
18	291619	22.0N 127.8E	PCN 5		DMSP35		PGTW
19	291500	23.0N 130.0E			DMSP35		RPMK
20	292108	23.3N 129.0E	PCN 3	T2.0/2.0 /01.0/22HRS	DMSP37		RKSO
21	292105	23.9N 128.7E	PCN 3	T2.5/2.5 /01.5/23HRS	DMSP37		RPMK
22	292105	24.0N 128.7E	PCN 3	T2.5/2.5 /00.5/22HRS	DMSP37		PGTW
23	292236	24.1N 128.7E	PCN 3		DMSP36		PGTW
* 24	300944	24.9N 127.4E	PCN 4		DMSP37		RKSO
25	300944	24.0N 128.9E	PCN 5		DMSP37	CI SAME	PGTW
26	301118	25.1N 129.1E	PCN 5		DMSP36		PGTW
27	301542	25.3N 128.9E	PCN 4		DMSP35		RPMK
28	302218	27.5N 130.3E	PCN 3		DMSP36		PGTW
29	302236	27.6N 130.5E	PCN 3	T2.0/2.5-/W0.5/25HRS	DMSP37		RPMK
30	302230	27.4N 130.3E	PCN 3		DMSP37		RKSO
31	310242	27.4N 130.0E	PCN 3		DMSP35	SECONDARY 31.3N 134.7E	RPMK
32	310242	27.7N 129.9E	PCN 3		DMSP35		PGTW
33	310243	27.5N 130.0E	PCN 5		DMSP35		RKSO
34	311100	28.6N 130.7E	PCN 5		DMSP36		PGTW
35	311242	28.0N 130.6E	PCN 6		DMSP36		RPMK
* 36	312201	27.6N 131.9E	PCN 5		DMSP36		PGTW
* 37	312210	27.2N 131.9E	PCN 5		DMSP37		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/RAD/RNG	MAX-FLT-LVL-WND DIR/VEL/RNG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE TEMP (C) DRT/ IN/ DP/SST	MSN NO.
1	290117	21.1N 129.2E	150FL		998	25 360 70	040 24 360 70	5 20			+26 +26 +26	1
2	290231	21.3N 128.9E	700MB	3057	996	25 020 50	040 24 020 50	5 10			+11 +10	1
3	291437	22.5N 127.9E	700MB	3034	994		030 20 300 40	4 10			+11 +13 +10	2
4	300640	24.7N 128.5E	700MB	3000	990	25 180 35	200 29 210 60	4 2			+13 +14 + 9	3
5	301400	25.5N 128.4E	700MB	3013			210 27 120 90				+14 + 9	4
6	301630	24.2N 128.6E	700MB	3046	995		230 36 120 150	5 15			+15 +14 + 5	6
7	310408	27.7N 130.1E	700MB	3039	993	15 270 35	200 15 110 30	1 4			+13 +13 +13	5

TROPICAL STORM HESTER

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	281011	27.2N 150.4E	PCN 5		DMSP1A	UPPER LVL POSITION	PGTW
2	281637	28.0N 150.3E	PCN 6		DMSP1A	UPPER LVL POSITION	PGTW
3	290137	29.4N 149.3E	PCN 6	T1.0/1.0	DMSP1A	INIT DBS	PGTW
4	290827	29.8N 148.5E	PCN 6		DMSP17	CI UP	PGTW
5	290953	29.9N 148.4E	PCN 6		DMSP1A		PGTW
6	291619	30.3N 149.0E	PCN 6		DMSP1A	UPPER LVL	PGTW
7	291926	30.4N 149.6E	PCN 6		DMSP17		PGTW
8	292056	31.1N 150.1E	PCN 5	T2.0/2.0 /D1.0/12HRS	DMSP1A		PGTW
9	292108	31.1N 150.1E	PCN 6		DMSP17		PGTW
10	300908	32.4N 150.3E	PCN 4		DMSP17		RKSO
11	300909	32.4N 150.5E	PCN 3		DMSP17	CI UP	PGTW
12	301118	33.1N 150.5E	PCN 2		DMSP1A		RODN
13	301119	32.9N 150.7E	PCN 1		DMSP1A		PGTW
14	301601	33.2N 150.4E	PCN 2		DMSP1A		PGTW
15	301602	32.9N 150.4E	PCN 4		DMSP1A		RKSO
16	301906	33.4N 151.1E	PCN 4		DMSP17		KGWC
17	302048	34.2N 151.9E	PCN 1	T3.0/3.0	DMSP17	INIT DBS	RODN
18	302049	34.0N 151.8E	PCN 2	T3.5/3.5-/D1.5/24HRS	DMSP17		PGTW
19	310101	35.2N 152.5E	PCN 1		DMSP1A		RKSO
20	310101	34.9N 152.4E	PCN 2		DMSP1A		RODN
21	310101	35.0N 152.2E	PCN 1		DMSP1A		PGTW
22	310920	36.1N 155.0E	PCN 2		DMSP17		RKSO
23	311100	36.4N 155.7E	PCN 2		DMSP1A		PGTW
24	311343	37.2N 156.6E	PCN 2		DMSP1A		PGTW
25	311343	37.7N 156.6E	PCN 2		DMSP1A		KGWC
26	311847	38.9N 160.6E	PCN 4	T3.0/3.0	DMSP17	INIT DBS	KGWC
* 27	312029	39.7N 164.0E	PCN 5		DMSP17	LOW/MID LVL FEATURE	RKSO
28	312301	41.1N 161.5E	PCN 4		DMSP1A		KGWC
29	010843	48.5N 166.1E	PCN 6		DMSP1A		PGTW
* 30	010910	51.5N 174.5E			DMSP17		KGWC
31	010910	47.0N 168.0E			DMSP		KGWC

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MSLP	OBS MSLP	MAX-SFC-WND DIR/VEL/RAD/RMW	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSG NO.
1	291909	39.9N 169.8E	700MB	1000	999	060	36 320	21	S	S		+14 / 8	1

TYPHOON IRMA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	091147	19.5N 124.7E	PCN 5		DMSP3A		PGTW
2	092248	21.4N 121.4E	PCN 5	T1.0/1.0	DMSP3A	INIT JHS	PGTW
3	101130	21.2N 121.2E	PCN 5		DMSP3A		PGTW
4	102214	21.7N 121.4E	PCN 5	T1.5/1.5	DMSP37	INIT JHS	RPMK
5	110012	22.0N 121.4E	PCN 5		DMSP3A		RPMK
6	110250	22.3N 121.5E	PCN 5		DMSP35		PGTW
7	111054	23.0N 122.3E	PCN 6		DMSP37		PGTW
8	112154	23.4N 122.7E	PCN 3	T2.5/2.5	DMSP37	INIT JHS	RODN
9	112154	24.4N 122.9E	PCN 5	T2.5/2.5	DMSP37	INIT JHS	PGTW
10	121040	25.5N 123.4E	PCN 6		DMSP37		PGTW
11	121237	25.8N 123.6E	PCN 5		DMSP3A		RPMK
12	121514	26.2N 123.5E	PCN 2		DMSP35		RKSO
13	121514	26.1N 123.6E	PCN 4		DMSP35	PSBL EYE FORMING	PGTW
14	122134	27.3N 123.7E	PCN 3	T3.0/3.0	DMSP37	INIT JHS	RPMK
15	122140	27.0N 123.2E	PCN 3	T3.0/3.0 /00.5/24HRS	DMSP37		PGTW
16	122338	27.4N 123.1E	PCN 3	T3.0/3.0 /00.5/24HRS	DMSP3A		RODN
17	130214	27.5N 123.2E	PCN 4		DMSP35		PGTW
18	131020	28.2N 123.9E	PCN 4		DMSP37		PGTW
19	131021	28.3N 124.3E	PCN 4		DMSP37		RKSO
20	131220	28.5N 124.2E	PCN 5		DMSP3A		RODN
21	131456	28.7N 124.3E	PCN 3		DMSP35		PGTW
22	132120	29.4N 124.5E	PCN 6		DMSP37		PGTW
23	132120	29.6N 124.6E	PCN 4	T3.0/3.0-/50.0/24HRS	DMSP37		RPMK
24	132220	29.8N 124.9E	PCN 3	T3.5/3.5-/00.5/24HRS	DMSP3A		PGTW
25	141001	31.5N 125.8E	PCN 4		DMSP3A		PGTW
26	141001	31.6N 125.8E	PCN 4		DMSP37		RKSO
27	141001	31.8N 125.8E	PCN 6		DMSP37		RODN
28	141202	31.7N 124.2E	PCN 2		DMSP3A		RKSO
29	141202	31.7N 124.0E	PCN 1		DMSP3A		PGTW
30	141438	32.0N 124.5E	PCN 4		DMSP35		RKSO
31	141438	31.9N 124.4E	PCN 3		DMSP35		PGTW
32	142101	32.6N 124.1E	PCN 1		DMSP37		PGTW
33	142101	32.8N 124.0E	PCN 2		DMSP37		RODN
34	142303	32.9N 124.8E	PCN 1		DMSP3A		PGTW
35	150134	33.2N 125.2E	PCN 3	T3.0/3.5-/W0.5/24HRS	DMSP35		PGTW
36	150942	34.6N 127.5E	PCN 4		DMSP37	CI 00KM	PGTW
37	151123	34.3N 133.1E	PCN 5		DMSP37		RKSO
38	151145	34.6N 133.2E	PCN 5		DMSP3A		PGTW
39	151421	35.2N 134.5E	PCN 6		DMSP35		PGTW
40	151421	35.1N 134.5E	PCN 5		DMSP35		RKSO
41	151421	35.5N 134.0E	PCN 6		DMSP35		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MSL	OBS MSLP	MAX-SFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND DIR/VEL/ARG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	12:727	25.5N 123.1E	700MB	2957	985	30 030 30	140 60 080 60				+15 +13	1
2	120935	25.7N 123.6E	700MB	2987	988	50 220 10	170 57 090 20	1 2	CIRCULAR	15	+12 +15 +13	1
3	131225	28.4N 124.1E	700MB				140 58 010 30					3
4	140100	30.3N 124.7E	700MB	2908	979	55 110 75	140 70 110 20				+14 +13	4
5	140333	30.5N 124.1E	700MB	2904	978		130 74 080 25	5 5	CIRCULAR	30	+11 +13 +13	4
6	141248	31.4N 124.2E	700MB	2882	976		170 53 050 20				+15 +13	5
7	141546	32.0N 124.8E	700MB	2875	972		240 80 150 50	2 3	CIRCULAR	25	+13 +14 +13	5

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM TOUFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	111938	24.3N 122.8E	LAND				21571 /////		24.3N 124.2E	47918
2	112000	24.4N 122.9E	LAND				65771 60217		24.3N 124.2E	47918
3	112100	24.7N 122.8E	LAND				67771 53514		24.3N 124.2E	47918
4	112100	24.5N 122.7E	LAND				65778 57///		24.4N 123.3E	47927
5	112200	24.7N 122.8E	LAND				67771 53305		24.3N 124.2E	47918
6	112200	24.7N 122.6E	LAND				65778 53314		24.4N 123.3E	47927
7	112300	25.0N 122.7E	LAND				67772 53514		24.3N 124.2E	47918
8	112300	24.9N 122.6E	LAND				67773 50208		24.4N 123.3E	47927
9	120000	25.1N 122.6E	LAND				65773 53210		24.3N 124.2E	47918
10	120000	25.2N 122.6E	LAND				67773 50119		24.4N 123.3E	47927
11	120100	25.1N 122.6E	LAND				67773 53506		24.3N 124.2E	47918
12	120100	25.2N 122.5E	LAND				67773 52705		24.4N 123.3E	47927
13	120200	25.3N 122.6E	LAND				67773 50108		24.3N 124.2E	47918
14	120200	25.2N 122.6E	LAND				67774 50000		24.4N 123.3E	47927
15	120300	25.2N 122.7E	LAND				67774 50707		24.4N 123.3E	47927
16	120400	25.3N 122.9E	LAND				67773 50515		24.4N 123.3E	47927
17	120400	25.5N 122.8E	LAND				67772 50608		24.3N 124.2E	47918
18	120500	25.3N 122.9E	LAND				67774 50000		24.4N 123.3E	47927
19	120700	25.4N 123.1E	LAND				60504 50500		24.4N 123.3E	47927
20	120700	25.4N 123.2E	LAND				65704 71007		24.3N 124.2E	47918
21	122000	27.0N 123.3E	LAND				37774 53406		24.4N 123.3E	47927
22	130100	27.4N 123.5E	LAND				67715 50214		24.4N 123.3E	47927
23	130200	27.5N 123.3E	LAND				67776 53011		24.4N 123.3E	47927
24	130237	27.6N 123.8E	ACFT	GOOD	CIRCULAR	35		EYE 10NM THICK 54 WRS	26.5N 123.9E	
25	131319	28.6N 124.1E	ACFT	GOOD				54 WRS	29.4N 125.6E	

26	141900	32.5N	127.3E	LAND			55770	60410				33.4N	130.3E 47906
27	141900	32.5N	127.3E	LAND			55770	60605				33.4N	130.3E 47906
28	142100	32.6N	127.9E	LAND			55771	50716				33.4N	130.3E 47906
29	142200	32.7N	128.3E	LAND			55771	50719				33.4N	130.3E 47906
30	142300	31.0N	128.5E	LAND			55771	50319				33.4N	130.3E 47906
31	142300	31.0N	128.5E	LAND	FAIR	40			EVE	MOV 0625	SEBURI		
32	150000	31.2N	128.4E	LAND			20911	50616				33.4N	130.3E 47906
33	150000	31.2N	128.7E	LAND	FAIR	40			EVE	MOV 0625	SEBURI		
34	150100	31.3N	128.9E	LAND			10881	50311				33.4N	130.3E 47906
35	150100	31.3N	128.9E	LAND	GOOD	45			EVE	MOV 0625	SEBURI		
36	150200	31.5N	129.1E	LAND			10811	50516				33.4N	130.3E 47906
37	150200	31.4N	129.2E	LAND	FAIR	45			EVE	MOV 0625	SEBURI		
38	150230	32.5N	129.4E	LAND			20001	47777				36.3N	132.6E 47792
39	150300	33.7N	129.5E	LAND			19931	50622				33.4N	130.3E 47906
40	150300	33.5N	129.7E	LAND			20911	40914				36.3N	132.6E 47792
41	150300	33.5N	129.7E	LAND	POOR	40			EVE	MOV 0620	SEBURI		
42	150400	33.4N	130.8E	LAND			30951	50522				36.3N	132.6E 47792
43	150400	33.4N	129.7E	LAND			14851	50616				33.4N	130.3E 47906
44	150400	33.4N	129.9E	LAND	POOR	20			EVE	MOV 0520	WISHIMA		
45	150500	34.0N	130.4E	LAND			35851	50516				36.3N	132.6E 47792
46	150500	34.1N	130.7E	LAND			45777	50622				35.5N	133.1E 47791
47	150500	34.1N	130.2E	LAND			25861	50625				33.4N	130.3E 47906
48	150500	33.9N	130.2E	LAND	POOR	10			EVE	MOV 0630	WISHIMA		
49	150500	34.3N	130.6E	LAND	POOR	25			EVE	MOV 0625	TAKAO	35.6N	133.2E
50	150600	34.2N	130.8E	LAND			45772	57777				35.5N	133.1E 47791
51	150600	34.1N	130.6E	LAND			25861	50722				33.4N	130.3E 47906
52	150700	34.3N	130.9E	LAND	POOR	20			EVE	MOV 0720	TAKAO	35.6N	133.2E
53	150700	34.2N	131.0E	LAND			21971	60816				33.4N	130.3E 47906
54	150700	34.2N	131.1E	LAND			30771	50816				35.5N	133.1E 47791
55	150800	34.4N	131.4E	LAND			30821	50722				36.3N	132.6E 47792
56	150800	34.3N	131.3E	LAND			21961	50616				33.4N	130.3E 47906
57	150800	34.3N	131.5E	LAND			35771	50716				35.5N	133.1E 47791
58	140400	34.4N	131.6E	LAND			20811	50814				36.3N	132.6E 47792
59	150900	34.5N	131.9E	LAND	POOR	30			EVE	MOV 0920	TAKAO	35.6N	133.2E
60	150900	34.6N	131.9E	LAND			35771	50722				35.5N	133.1E 47791
61	140900	34.6N	131.8E	LAND			21911	60719				33.4N	130.3E 47906
62	151000	34.7N	132.0E	LAND			31941	60622				33.4N	130.3E 47906
63	151000	34.5N	132.2E	LAND			25771	50716				35.5N	133.1E 47791
64	151000	34.3N	132.1E	LAND			35771	50922				36.3N	132.6E 47792
65	141100	34.6N	132.7E	LAND			25777	50716				35.5N	133.1E 47791
66	151100	34.7N	132.4E	LAND			36770	60519				33.4N	130.3E 47906
67	141100	34.6N	132.6E	LAND			37771	50722				36.3N	132.6E 47792
68	151200	34.9N	133.0E	LAND			25770	50532				33.4N	130.3E 47906
69	151200	34.6N	132.8E	LAND			77777	50916				35.5N	133.1E 47791
70	141200	34.7N	133.1E	LAND			37771	50827				36.3N	132.6E 47792
71	151300	34.7N	133.4E	LAND			77777	50819				35.5N	133.1E 47791
72	151300	34.4N	133.4E	LAND			37771	50619				36.3N	132.6E 47792
73	151400	34.6N	133.8E	LAND			77777	51026				35.5N	133.1E 47791
74	151400	34.3N	133.9E	LAND			37771	50824				36.3N	132.6E 47792

TYPHOON JUDY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	091006	19.3N 145.3E	PCN 6		DMSP3A	APPARENT LOW LVL	PGTW
2	092106	19.9N 146.5E	PCN 6	T0.0/0.0	DMSP3A	INIT DBS	PGTW
3	100948	20.9N 148.8E	PCN 4		DMSP3A	EXPOSED LLCC	PGTW
4	102049	22.3N 147.0E	PCN 4	T1.0/1.0 /01.0/24HRS	DMSP3A		PGTW
5	110931	23.3N 143.3E	PCN 6		DMSP3A	EXTRAP TO ILL DEFINED LLCC	PGTW
6	112018	22.9N 150.2E	PCN 5	T2.0/2.0 /01.0/24HRS	DMSP37		PGTW
7	121055	23.5N 148.0E	PCN 3		DMSP		PGTW
8	121332	23.4N 147.9E	PCN 3		DMSP3A		PGTW
9	121956	24.2N 147.2E	PCN 5		DMSP37		PGTW
10	122156	24.5N 147.0E	PCN 5	T3.5/3.5 /01.5/24HRS	DMSP3A		PGTW
11	130033	24.6N 146.7E			DMSP3A		PGTW
12	130939	25.5N 146.5E	PCN 6		DMSP37		PGTW
13	131038	24.4N 144.1E	PCN 4		DMSP3A		PGTW
14	131038	24.5N 144.3E	PCN 6		DMSP3A		RODN
15	131314	26.9N 146.1E	PCN 5		DMSP3A		PGTW
16	132120	27.5N 145.4E	PCN 6		DMSP37		PGTW
17	132139	27.4N 145.5E	PCN 5	T4.0/4.0 /00.5/24HRS	DMSP3A		PGTW
18	132139	27.5N 144.1E	PCN 6		DMSP3A		RODN
19	141001	28.3N 145.0E	PCN 3		DMSP37		PGTW
20	141001	28.5N 144.4E	PCN 6		DMSP37		RKSO
21	141001	28.5N 145.0E	PCN 6		DMSP37		RODN
22	141020	28.6N 145.0E	PCN 3		DMSP3A		PGTW
23	141438	28.5N 144.4E	PCN 6		DMSP3A		RKSO
24	141438	28.9N 144.6E	PCN 6		DMSP3A		PGTW
25	142101	29.3N 144.2E	PCN 1	T4.0/4.0 /S0.0/23HRS	DMSP37		PGTW
26	142101	29.5N 144.0E	PCN 2	T5.0/5.0	DMSP37	INIT DBS	RODN
27	142101	29.2N 144.4E	PCN 2	T5.0/5.0	DMSP37	INIT DBS	RPMK
28	142121	29.4N 144.1E	PCN 3		DMSP3A		PGTW
29	150139	29.9N 144.1E	PCN 1		DMSP3A		PGTW
30	150942	31.0N 144.6E	PCN 2		DMSP37	RAGGED EYE	RODN
31	150942	30.9N 144.6E	PCN 2		DMSP37	CI SAME	PGTW
32	151003	30.9N 144.5E	PCN 2		DMSP3A		PGTW
33	151145	31.1N 144.8E	PCN 1		DMSP3A		PGTW
34	151421	31.6N 144.8E	PCN 2		DMSP3A		PGTW
35	151421	31.6N 145.0E	PCN 2		DMSP3A		RODN
36	151421	31.6N 144.7E	PCN 1		DMSP3A		RKSO
37	152041	33.0N 145.5E	PCN 2	T5.0/5.0 /S0.0/24HRS	DMSP37		RODN
38	152041	32.9N 145.5E	PCN 1	T4.5/4.5-/D0.5/24HRS	DMSP37		PGTW
39	152104	32.9N 145.6E	PCN 1		DMSP3A		PGTW
40	152245	33.2N 146.0E	PCN 1		DMSP3A		PGTW
41	160121	34.0N 146.1E	PCN 1		DMSP3A		PGTW
42	160922	36.0N 148.5E	PCN 2		DMSP37		RODN
43	160922	35.9N 148.4E	PCN 1		DMSP37	CI SAME	PGTW
44	161148	34.6N 149.2E	PCN 1		DMSP3A		PGTW
45	161403	37.0N 149.7E	PCN 3		DMSP3A		PGTW
46	162022	39.2N 152.5E	PCN 5		DMSP37		RKSO
47	162022	39.1N 152.3E	PCN 3	T3.0/4.0 /W1.5/24HRS	DMSP37		PGTW
48	170103	40.5N 154.1E	PCN 5	T3.5/3.5	DMSP3A	INIT DBS	KGWC
49	170902	43.0N 158.9E	PCN 6		DMSP		KGWC
50	171345	44.1N 160.8E	PCN 6		DMSP		KGWC

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND DIR/VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	130000	24.6N 146.6E	700MB	3015	991	90 070 75	150 56 080 75	4 2			+14 +10	1
2	130340	25.0N 146.4E	700MB	3007	990	40 270 50	360 30 270 60	4 10			+13 +13 + 9	1
3	131410	24.9N 145.8E	700MB	>936			140 51 100 51				+18 +10	2
4	131652	24.9N 145.6E	700MB	>917	980		110 55 300 90	5 5	CIRCULAR	35	+11 +14 +11	2
5	140330	27.9N 145.7E	700MB	>917	979	55 270 30	350 45 270 35	2 3			+12 +16 +13	3
6	140345	29.1N 145.1E	700MB	>899	977	40 140 90	210 50 140 30				+16 +13	3
7	141335	29.9N 144.5E	700MB	>888	977		140 80 060 25			30	+15 +11	4
8	141618	29.1N 144.4E	700MB	>867	972		200 50 250 25	4 2	ELLIPTICAL	30 20 090	+14 +17 +13	4
9	150030	29.9N 144.1E	700MB	>779	964	80 010 15	070 78 010 23				+15 +11	5
10	150317	30.2N 144.2E	700MB	>754	962	70 250 20	330 72 250 20	5 5	ELLIPTICAL	35 38 020	+15 +14 +10	5
11	151330	31.5N 144.7E	700MB	>713	957		270 105 210 20				+17 +14	5
12	151940	31.9N 144.8E	700MB	>680	953		270 120 180 14	2 3	CIRCULAR	25	+16 +19 +13	6
13	160032	33.9N 146.1E	700MB	>656	950	90 250 15	090 92 020 14				+19 +13	7
14	160318	34.5N 146.7E	700MB	>661	950	90 260 10	360 106 270 12	4 2	CIRCULAR	38	+13 +18 +15	7

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SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	192318	13.6N 133.6E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
* 2	200946	16.3N 128.2E	PCN 6		DMSP37		PGTW
* 3	202227	13.7N 127.2E	PCN 5	T1.0/1.0 /D1.0/23HRS	DMSP37		PGTW
* 4	202227	13.2N 128.0E	PCN 5	T1.5/1.5	DMSP37	INIT OBS	RPMK
5	210315	13.6N 128.0E	PCN 5		DMSP35		RPMK
* 6	211048	12.6N 125.6E	PCN 5		DMSP37		RODN
7	211108	13.6N 126.5E	PCN 5		DMSP37		RPMK
8	211142	13.5N 127.2E	PCN 6		DMSP36		PGTW
9	211415	13.0N 128.6E	PCN 6		DMSP35		RODN
10	211556	14.0N 125.7E	PCN 5		DMSP35	BASED ON CB W EDGE OUTFLOW	RODN
* 11	212208	13.7N 123.8E	PCN 5	T2.0/2.0 /D0.5/24HRS	DMSP37		RPMK
* 12	212208	14.9N 123.2E	PCN 5	T1.5/1.5-/D0.5/24HRS	DMSP37		PGTW
13	220257	14.0N 120.7E	PCN 5		DMSP35	2ND 15.0N 120.7E 15.0N 122.7E	RPMK
14	220257	15.0N 123.3E	PCN 5		DMSP35		PGTW
15	221048	15.2N 120.8E	PCN 5		DMSP37		RPMK
16	221048	15.5N 121.0E	PCN 5		DMSP37		PGTW
17	221539	14.4N 118.1E	PCN 5		DMSP35		RPMK
18	221539	14.4N 118.6E	PCN 5		DMSP35		PGTW
19	222148	17.4N 117.8E	PCN 5		DMSP37	CI UP	PGTW
20	222148	18.1N 117.7E	PCN 5		DMSP37		RPMK
21	222330	15.5N 115.7E	PCN 5		DMSP37		RPMK
22	230239	15.5N 115.8E	PCN 5	T2.0/2.0 /D0.5/28HRS	DMSP35	APPARENT LOW LVL CIRCULATION	PGTW
23	230239	15.5N 115.4E	PCN 5	T2.0/2.0+/S0.0/28HRS	DMSP35		RPMK
24	230421	15.5N 115.0E	PCN 5		DMSP35		RPMK
25	231029	14.8N 114.0E	PCN 6		DMSP37		RPMK
26	231029	15.2N 115.4E	PCN 6		DMSP37		PGTW
27	231210	15.0N 112.7E	PCN 6		DMSP37		RPMK
28	231249	14.5N 114.3E	PCN 6		DMSP36		RODN
29	232310	15.7N 113.4E	PCN 5	T2.5/2.5 /D0.5/21HRS	DMSP37		RPMK
30	232350	16.3N 112.9E	PCN 6	T2.5/2.5-/D0.5/21HRS	DMSP36	2ND 17.6N 123.7E 17.9N 112.9E	PGTW
31	232350	16.3N 113.0E	PCN 6	T3.0/3.0	DMSP36	INIT OBS	RODN
32	240403	16.0N 113.3E	PCN 5		DMSP35	BETTER ORGANIZED	RPMK
33	241151	16.9N 112.2E	PCN 5		DMSP37	CI DOWN	RPMK
34	241151	17.1N 112.4E	PCN 6		DMSP37		RODN
35	241645	17.6N 111.7E	PCN 5		DMSP35		RPMK
36	242251	17.9N 111.2E	PCN 3	T3.0/3.0-/D0.5/24HRS	DMSP37		RPMK
37	242251	17.9N 111.2E	PCN 6		DMSP37	SECONDARY AT 16.8N 110.1E	RODN
38	242332	18.2N 111.0E	PCN 6		DMSP36		PGTW
39	250345	17.9N 110.4E	PCN 5		DMSP35		RPMK
40	250345	18.5N 109.5E	PCN 5		DMSP35		RODN
41	251132	18.9N 109.0E	PCN 5		DMSP37		RPMK
42	251132	17.8N 108.7E	PCN 6		DMSP37	CI UP	RODN
43	251215	18.3N 109.1E	PCN 5		DMSP36		PGTW
44	251527	18.9N 108.3E	PCN 5		DMSP35		RPMK
45	252231	18.2N 107.6E	PCN 5	T2.0/2.5-/W0.5/23HRS	DMSP37		PGTW
46	260058	17.9N 107.2E	PCN 1	T3.5/3.5-/D0.5/26HRS	DMSP36	RAGGED EYE	RPMK
47	260327	17.9N 107.0E	PCN 3		DMSP35		RPMK
48	261112	17.5N 106.4E	PCN 5		DMSP37		RPMK
49	261112	17.6N 105.3E	PCN 5		DMSP37		RODN
50	261509	17.7N 104.4E	PCN 6		DMSP35		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSG NO.
1	210122	13.5N 128.8E	1500FT		1001	15 040 50	190 18 070 20	5 20	ELLIPTICAL	360	+25 +23 +23 27	1
2	210152	13.2N 128.0E	1500FT				070 12 310 120				+10 + 9	1
3	212258	14.7N 125.2E	1500FT		995	20 090 245	180 26 100 260	5 2			+25 +25 +23 27	2
4	220251	14.9N 124.2E	1500FT		995	25 100 165	180 23 170 145	4 6			+25 +24 +23 28	2
5	221542	15.4N 121.9E	700MB	3099	1001		080 20 350 10	2 5	CIRCULAR	15	+10 +10 +10	3
6	230200	15.3N 115.7E	700MB	3056		25 080 210	150 33 080 210				+11 + 9	4
7	230337	14.6N 115.2E	700MB	3049	996	10 120 100	210 25 120 100	4 5			+10 +10 + 9	4
8	230958	14.9N 115.8E	700MB	3031	994	40 090 20	180 37 090 25	3 4			+13 +15 + 7	5
9	231658	15.3N 115.3E	700MB	3019	992		350 19 270 15	10 3			+12 +15 +12	5
10	232137	15.4N 114.2E	700MB	3046	995		210 53 110 50	5 4	ELLIPTICAL	20 15 150	+10 +13 +10	6
11	232137	15.4N 114.2E	700MB	3044		35 050 65	210 53 110 50				+13 +10	6
12	240040	16.0N 113.7E	700MB									6

TYPHOON LOLA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	200045	9.1N 146.0E	PCN 5	TU.0/0.0	DMSP37	INIT J&S	PGTW
2	210925	10.2N 146.1E	PCN 6		DMSP37	BASED ON POSN FLCC	PGTW
3	211615	9.8N 146.1E	PCN 6		DMSP35		PGTW
4	212243	11.3N 142.4E	PCN 6	TU.0/0.0 /S0.0/24HRS	DMSP36		PGTW
5	221357	9.6N 141.4E	PCN 5		DMSP35		PGTW
6	231107	11.0N 139.3E	PCN 5		DMSP36		PGTW
7	232208	12.7N 137.6E	PCN 5	T1.0/1.0	DMSP36	INIT J&S SECONDARY 11.4N 136.5E	PGTW
8	240222	12.1N 135.3E	PCN 5		DMSP35		PGTW
9	241010	12.2N 134.2E	PCN 6		DMSP37	CI UP	PGTW
10	241010	12.4N 134.6E	PCN 5		DMSP37		RPMK
11	241050	12.4N 133.9E	PCN 5		DMSP36		PGTW
12	241503	12.5N 133.1E	PCN 5		DMSP35		PGTW
13	241503	12.4N 134.1E	PCN 5		DMSP35		RPMK
14	242109	13.7N 131.7E	PCN 5	T2.5/2.5 /D1.5/23HRS	DMSP37		PGTW
15	242332	13.1N 131.7E	PCN 5		DMSP36	BASED ON CH HANDS	PGTW
16	250204	13.0N 130.5E	PCN 5		DMSP35		PGTW
17	250204	12.4N 130.8E	PCN 3	T2.0/2.0	DMSP35	INIT J&S	RPMK
18	250950	12.0N 129.6E	PCN 5		DMSP37	CI UP	PGTW
19	250950	11.7N 129.5E	PCN 6		DMSP37	MULTI CB LINES	RPMK
20	251215	12.1N 129.6E	PCN 5		DMSP36		PGTW
21	251215	11.9N 129.8E	PCN 5		DMSP36		RPMK
22	251446	12.2N 129.0E	PCN 5		DMSP35		PGTW
23	252231	12.2N 126.9E	PCN 5	T2.5/2.5+/S0.0/23HRS	DMSP37		PGTW
24	252231	12.7N 126.9E	PCN 5	T2.5/2.5 /D0.5/20HRS	DMSP37		RPMK
25	252315	12.3N 126.6E	PCN 5		DMSP36		PGTW
26	260327	12.9N 125.9E	PCN 5		DMSP35		RPMK
27	261112	13.0N 124.7E	PCN 5		DMSP37		RPMK
28	261112	12.1N 124.7E	PCN 5		DMSP37		RODN
29	261157	12.9N 124.5E	PCN 5		DMSP36	CI UP	PGTW
30	261428	13.0N 124.5E	PCN 6		DMSP35		RPMK
31	261428	13.3N 124.0E	PCN 5		DMSP35		PGTW
32	262211	13.5N 122.1E	PCN 3	T3.0/3.0	DMSP37	INIT J&S	RKSO
33	262212	13.3N 122.4E	PCN 3	T3.5/3.5 /D1.0/24HRS	DMSP37		RPMK
34	262212	13.4N 122.5E	PCN 5	T3.5/3.5 /D1.0/24HRS	DMSP37		PGTW
35	262258	13.4N 122.4E	PCN 5		DMSP36		PGTW
36	270310	13.8N 121.7E	PCN 3	T4.0/4.0+/D1.0/24HRS	DMSP35		RPMK
37	270310	13.7N 121.7E	PCN 3		DMSP35		PGTW
38	270310	13.9N 121.7E	PCN 5	T2.0/2.0	DMSP35	INIT J&S	RODN
39	271053	14.3N 120.2E	PCN 3		DMSP37		PGTW
40	271053	14.1N 120.4E	PCN 3		DMSP37		RPMK
41	271140	14.4N 119.9E	PCN 4		DMSP36		PGTW
42	271140	14.5N 120.2E	PCN 5		DMSP36		RPMK
43	271551	14.9N 119.2E	PCN 5		DMSP35	CI UP	RPMK
44	272152	14.4N 117.9E	PCN 5		DMSP37		PGTW
45	272152	15.0N 118.9E	PCN 6		DMSP37		RPMK
46	272152	14.5N 118.8E	PCN 5		DMSP36		RODN
47	280022	14.1N 118.2E	PCN 6		DMSP36		RPMK
48	280252	15.4N 117.1E	PCN 3	T3.5/3.5+/S0.0/20HRS	DMSP35		RPMK
49	280252	15.5N 117.3E	PCN 3	T3.5/3.5 /S0.0/20HRS	DMSP35		PGTW
50	281033	15.7N 116.6E	PCN 3		DMSP37	INDISTINCT EYE	PGTW
51	281033	15.6N 116.5E	PCN 3		DMSP37		RODN
52	281304	16.2N 116.6E	PCN 5		DMSP36		RPMK
53	281534	16.2N 116.0E	PCN 3		DMSP35		PGTW
54	282314	16.7N 115.0E	PCN 1	T4.5/4.5 /D1.0/20HRS	DMSP37		RPMK
55	290004	16.7N 114.9E	PCN 1		DMSP36		RPMK
56	290004	16.5N 114.7E	PCN 1	T4.5/4.5	DMSP36	INIT J&S	RODN
57	290234	16.3N 114.6E	PCN 3		DMSP35		PGTW
58	290416	16.5N 114.6E	PCN 1		DMSP35	EYE EXPANDING 3/4 DEG CIRCULAR	RPMK
59	291246	17.0N 113.5E	PCN 1		DMSP36		RPMK
60	291516	17.1N 113.1E	PCN 1		DMSP35		PGTW
61	291516	16.9N 113.0E	PCN 1		DMSP35		RODN
62	292255	17.1N 113.2E	PCN 1	T5.5/5.5 /D1.0/24HRS	DMSP37		RPMK
63	292255	17.2N 113.0E	PCN 1	T5.0/5.0 /D0.5/22HRS	DMSP37		RODN
64	292347	17.1N 113.1E	PCN 1	T4.5/4.5	DMSP36	INIT J&S	PGTW
65	300358	17.6N 112.7E	PCN 1		DMSP35		RPMK
66	301136	18.1N 112.4E	PCN 1		DMSP37		RPMK
67	301136	18.0N 112.6E	PCN 4		DMSP37		RODN
68	301640	18.6N 112.2E	PCN 1		DMSP35		RPMK
69	302235	18.7N 111.7E	PCN 1	T4.5/4.5	DMSP37	INIT J&S	RKSO
70	302235	18.8N 111.7E	PCN 3	T4.0/5.0-/W1.0/24HRS	DMSP37		RODN
71	302329	18.5N 112.0E	PCN 3		DMSP36	EDGE OF DATA	PGTW
72	010110	18.7N 112.0E	PCN 1	T5.5/5.5-/S0.0/26HRS	DMSP36		RPMK
73	010340	19.1N 111.4E	PCN 1		DMSP35	RAGGED EYE	RKSO
74	010340	19.0N 111.3E	PCN 6		DMSP35		RODN
75	011116	19.4N 110.5E	PCN 5		DMSP37		RODN
76	011116	19.6N 110.5E	PCN 1		DMSP37		RPMK
77	011212	19.5N 110.7E	PCN 1		DMSP36	EXTREME EDGE OF DATA	PGTW
78	011622	19.8N 110.6E	PCN 6		DMSP35		RODN
79	011622	20.0N 110.3E	PCN 1		DMSP35		RPMK
80	012215	20.0N 110.0E	PCN 2		DMSP37		PGTW
81	012216	20.1N 109.9E	PCN 1		DMSP37		RKSO
82	020322	20.7N 109.6E	PCN 1		DMSP35		RODN
83	020322	20.6N 109.5E	PCN 1	T5.0/5.0-/W0.5/22HRS	DMSP35		RPMK
84	021057	21.5N 108.6E	PCN 1		DMSP37		RKSO
85	021057	21.4N 108.5E	PCN 1		DMSP37		PGTW
86	021336	21.2N 108.0E	PCN 2		DMSP36		RPMK
87	021604	21.3N 107.7E	PCN 1		DMSP35		RKSO
88	021604	21.5N 107.6E	PCN 1		DMSP35		RPMK
89	022338	21.4N 106.9E	PCN 1	T3.0/4.0-/W2.0/20HRS	DMSP37	EYE ALMOST GONE	RPMK
90	030034	21.6N 106.4E	PCN 6	T1.0/1.0	DMSP36	INIT J&S	RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MSLP	OBS MSLP	MAX-SFC-WND DIR/VEL/RAD/RNG	MAX-FLT-LVL-WND DIR/VEL/RAD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	242200	12.1N 131.3E	700MB	3104	1005	25 340 50	050 30 340 60	5 10				+12 +12 + A	1
2	250135	12.2N 130.5E	700MB	3105		25 340 50	040 37 340 60					+11 +11	1
3	250315	12.2N 130.3E	700MB	3097	1002	10 130 35	210 20 130 15	3 5				+11 +13 + 9	1
4	251551	12.4N 128.1E	700MB	3070			130 50 060 180	5 10				+12 + 7	2
5	251950	12.3N 127.7E	700MB	3045			330 33 230 60					+12 + 7	2
6	252110	12.0N 127.3E	700MB	3044		35 290 30	070 38 290 120	5 10				+12 + A	2
7	260200	12.2N 126.6E	700MB	3041		30 120 30	210 40 130 60					+12 +11	3
8	260356	12.3N 126.2E	700MB	3013	992	45 100 90	180 45 090 40	2 3				+10 +13 +10	3
9	271100	14.2N 120.4E	700MB	2965			040 72 310 60					+14 +12	6
10	271510	14.5N 119.5E	700MB	2964	985		300 62 190 10	5 5				+13 +15 +11	6
11	280306	15.2N 117.7E	700MB			50 0							5
12	280415	15.3N 117.4E	700MB	2935	983	50 120 60	190 57 120 60	3 2				+12 +15 + 9	5
13	281955	14.3N 115.7E	700MB	2825	969		130 74 020 45	10 5	ELLIPTICAL	50 20 360		+14 +15 +12	6
14	282120	14.4N 115.1E	700MB	2815	969		140 62 100 50	7 5	ELLIPTICAL	50 20 360		+14 +15 +11	6
15	290351	16.8N 114.6E	700MB	2812	968	65 090 30	170 74 090 30	3 4	CIRCULAR	50		+12 +15 + 9	7
16	290535	16.8N 114.3E	700MB	2773		70 350 50	080 82 350 60	5 4				+16 + 9	7
17	290948	17.0N 114.0E	700MB	2764	963		180 87 090 30	15 3	ELLIPTICAL	50 40 340		+12 +17 + A	7

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM TUOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	261900	13.4N 123.4E	LAND					PROBABLE EYE NOT WELL DEFINED	14.1N 123.0E	98440
2	262330	13.4N 122.5E	LAND					PSBL CENTER	15.2N 120.6E	98327
3	270035	13.5N 122.4E	LAND				25877 53212		14.1N 123.0E	98440
4	270130	13.6N 122.4E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
5	270210	13.6N 122.2E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
6	270230	13.6N 122.1E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
7	270310	13.6N 122.0E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
8	270330	13.4N 121.9E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
9	270430	13.4N 121.7E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
10	270510	13.4N 121.8E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
11	270535	13.7N 121.6E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
12	270630	14.1N 121.3E	LAND	POOR				PSBL CENTER	15.2N 120.6E	98327
13	270710	14.0N 121.1E	LAND					EYE NEG WALL CLD	15.2N 120.6E	98327
14	270730	14.0N 121.0E	LAND	FAIR	CIRCULAR	32		EYE NEG WALL CLD	15.2N 120.6E	98327
15	270810	14.0N 121.1E	LAND	FAIR	CIRCULAR	26		EYE APRNT WALL CLD FRMG E QUAD	15.2N 120.6E	98327
16	270830	14.0N 121.1E	LAND	FAIR	CIRCULAR	29		EYE NEG WALL CLD	15.2N 120.6E	98327
17	270910	13.9N 121.1E	LAND	FAIR	CIRCULAR	23		EYE NEG WALL CLD	15.2N 120.6E	98327
18	271010	14.0N 120.8E	LAND	FAIR	CIRCULAR	29		EYE NEG WALL CLD	15.2N 120.6E	98327
19	271030	13.9N 120.7E	LAND	FAIR	CIRCULAR	30		EYE NEG WALL CLD	15.2N 120.6E	98327
20	271100	14.7N 119.8E	LAND				10207 /////		16.3N 120.6E	98321
21	271210	14.3N 120.3E	LAND	POOR	CIRCULAR	12		EYE APPEARS TO BE REORGANIZING	15.2N 120.6E	98327
22	271235	14.3N 120.4E	LAND	POOR	CIRCULAR	36		EYE APPEARS TO BE REORGANIZING	15.2N 120.6E	98327
23	271310	14.3N 120.3E	LAND	POOR	CIRCULAR	38		EYE BCMG INDISTINCT DUE TO MTNS	15.2N 120.6E	98327
24	271410	14.3N 120.1E	LAND	POOR	CIRCULAR	36		PSBL EYE NEG WALL CLD	15.2N 120.6E	98327
25	271500	15.0N 119.5E	LAND				45/// /////		16.3N 120.6E	98321
26	271800	14.9N 119.7E	LAND				4//// /////	10 DEG SMRL OVERLAY	16.3N 120.6E	98321
27	272100	15.0N 118.8E	LAND				4//// /////		16.3N 120.6E	98321
28	272300	15.0N 118.3E	LAND				45/// 62712	10 DEG SMRL OVERLAY	16.3N 120.6E	98321
29	280300	15.3N 117.4E	LAND				45/// 52709	15 DEG SMRL OVERLAY	16.3N 120.6E	98321

TYPHOON NAME

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	282223	19.3N 154.0E	PCN 5	T0.0/0.0	DMSP1A	INIT DBS	PGTW
2	290924	19.7N 153.3E	PCN 6		DMSP1A	CI UP	PGTW
3	291105	20.0N 153.3E	PCN 5		DMSP1A	CI UP	PGTW
4	292205	19.6N 153.2E	PCN 5	T1.5/1.5 /D1.5/24HRS	DMSP1A		PGTW
5	300035	19.4N 152.9E	PCN 5		DMSP1S		PGTW
6	300813	19.5N 153.2E	PCN 6		DMSP17		PGTW
7	301048	19.4N 152.9E	PCN 5		DMSP1A		PGTW
8	301316	20.1N 153.0E	PCN 5		DMSP1S		PGTW
9	302053	21.5N 153.3E	PCN 6		DMSP17		PGTW
10	302054	21.5N 153.3E	PCN 6		DMSP17	BASED ON CENTER COD	RODN
11	302148	21.3N 153.6E	PCN 6	T2.5/2.5 /D1.0/23HRS	DMSP1A		PGTW
12	010016	21.4N 152.3E	PCN 4		DMSP1S	BASED ON EXTRAP CU/TCU LINES	PGTW
13	010935	23.2N 152.0E	PCN 5		DMSP17	CI UP	PGTW
14	011030	23.5N 151.9E	PCN 5		DMSP1A		PGTW
15	011259	23.9N 151.8E	PCN 5		DMSP1S		PGTW
16	012034	24.0N 150.3E	PCN 4	T3.5/3.5 /D1.0/24HRS	DMSP17		PGTW
17	012036	24.9N 150.4E	PCN 6	T1.0/1.0	DMSP17	INIT DBS	RODN
18	012130	24.3N 150.7E	PCN 4		DMSP1A		PGTW
19	020140	25.2N 149.8E	PCN 5		DMSP1S		PGTW
20	020315	26.1N 150.1E	PCN 5		DMSP17	CI SAME	PGTW
21	020315	26.5N 150.4E	PCN 6		DMSP17		RODN
22	021013	26.6N 150.2E	PCN 5		DMSP1A		PGTW
23	021422	27.4N 150.5E	PCN 5		DMSP1S		PGTW
24	022014	24.1N 150.4E	PCN 4	T3.0/3.0+/D2.0/24HRS	DMSP17		RODN
25	022015	24.2N 150.4E	PCN 4	T3.0/3.5 /W0.5/24HRS	DMSP17		PGTW
26	022113	24.2N 150.6E	PCN 4		DMSP1A		PGTW
27	030122	29.5N 151.1E	PCN 4		DMSP1S		PGTW
28	030856	31.2N 152.7E	PCN 5		DMSP17	CI DOWN	PGTW
29	030956	31.5N 152.6E	PCN 6		DMSP1A		PGTW
30	031404	32.4N 153.4E	PCN 6		DMSP1S		PGTW
31	031955	35.0N 155.9E	PCN 3	T2.0/3.0 /W1.0/24HRS	DMSP17		PGTW
32	031955	34.9N 155.9E	PCN 4	T2.5/2.5	DMSP17	INIT DBS	KGWC
33	032056	35.6N 156.8E	PCN 3		DMSP1A		PGTW
34	040105	36.4N 158.2E	PCN 3		DMSP1S		PGTW
35	040836	39.4N 161.6E	PCN 4		DMSP	NO CONVECTION	KGWC
36	041348	41.5N 164.3E	PCN 6		DMSP1S	CONVECTION NORTH OF STORM	KGWC
37	041935	42.1N 168.5E	PCN 4		DMSP17	WELL DEFINED SC BANDING	KGWC
38	042305	42.2N 170.5E	PCN 4		DMSP1S	WELL DEFINED SC BANDING	KGWC

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND DIR/VEL/ARG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C) DRT/ IN/ OP/SST	MSG NO.
1	300213	19.3N 152.5E	1500FT		996	30 150 40	240 27 100 35	3 1			+23 +25 +25 23	1
2	300358	19.3N 152.6E	700MB	1056	996	35 150 40	220 22 150 20	5 2			+10 +13 +10	1
3	010156	21.6N 152.5E	700MB	1030		35 050 30	190 43 050 30				+15 + 7	2
4	010350	22.1N 152.5E	700MB	1001	990	35 260 30	330 30 260 30	4 2			+13 +16 + 9	2
5	011455	23.4N 150.9E	700MB	>967	986		260 38 100 25	5 2			+12 +18 +12	3
6	020357	25.5N 150.0E	700MB	>983	985	45 060 15	040 54 330 25	3 7			+14 +15 +12	4
7	021928	24.1N 150.3E	700MB	>858	973		240 50 100 25	4 3	CIRCULAR	10	+13 +15 +15	5
8	030050	24.1N 150.9E	700MB	>797		65 130 45	220 70 130 20				+20 +10	6
9	030317	24.4N 151.3E	700MB	>774	965	50 060 55	160 65 060 30	3 3			+12 +18 +11	6
10	031243	32.5N 153.1E	700MB	>811	969		200 87 090 62				+18 +12	7
11	031405	31.1N 153.5E	700MB	>824	969		170 75 080 120				+15 +12	7
12	031503	33.6N 154.0E	700MB	>795	963		300 58 310 M	4 4	ELLIPTICAL	40 30 150	+13 +17 +12	7

TROPICAL STORM NINA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	052203	15.6N 140.6E	PCN 5	T0.0/0.0	DMSP3A	INIT DBS	PGTW
2	061045	17.7N 137.3E	PCN 6		DMSP3A		PGTW
3	062327	16.8N 134.2E	PCN 5	T1.5/1.5 /01.5/24HRS	DMSP3A		PGTW
4	071209	14.5N 131.1E	PCN 5		DMSP3A		PGTW
5	071435	14.4N 130.0E	PCN 5		DMSP3S		PGTW
6	072200	15.7N 128.3E	PCN 5	T2.5/2.5 /01.0/23HRS	DMSP3J		PGTW
7	072310	15.6N 128.2E	PCN 5		DMSP3A		PGTW
8	081041	14.9N 126.8E	PCN 5		DMSP3J	CI UP	PGTW
9	041041	13.9N 126.8E	PCN 5		DMSP3J		RPMK
10	081152	15.1N 127.1E	PCN 3		DMSP3A		PGTW
11	081558	15.6N 126.1E	PCN 5		DMSP3S		RODN
12	082141	14.5N 126.8E	PCN 6		DMSP3J		PGTW
13	082252	14.9N 126.6E	PCN 6		DMSP3A		PGTW
14	090259	15.1N 123.5E	PCN 5	T2.0/2.0	DMSP3S	INIT DBS	RPMK
15	090259	15.0N 126.3E	PCN 5	T3.0/3.0-/00.5/29HRS	DMSP3S		PGTW
16	091022	15.5N 124.0E	PCN 3		DMSP3J		PGTW
17	091135	15.3N 123.1E	PCN 5		DMSP3A		PGTW
18	091341	15.0N 122.0E	PCN 5		DMSP3S		RPMK
19	091341	15.7N 122.6E	PCN 5		DMSP3S		RODN
20	092303	14.9N 121.0E	PCN 5	T2.0/2.0+/S0.0/20HRS	DMSP3J		RPMK
21	092303	14.5N 120.4E	PCN 6		DMSP3J	SE QUAD CDO	RODN
22	100016	14.6N 120.0E	PCN 3	T2.5/2.5+/00.5/22HRS	DMSP3A		RPMK
23	100949	14.5N 120.3E	PCN 5	T3.5/3.5 /00.5/22HRS	NOAA9		PGTW
24	101522	15.4N 118.0E	PCN 5		DMSP3S		RPMK
25	101523	14.5N 119.0E	PCN 5		DMSP3S		PGTW
26	102243	14.9N 117.3E	PCN 5	T3.0/3.0 /00.5/23HRS	DMSP3J		RPMK
27	102243	12.7N 117.5E	PCN 6		DMSP3J	POSSIBLE 2ND 14.7N 116.3E	RODN
28	102359	14.6N 117.8E	PCN 3	T4.0/4.0-/00.5/24HRS	DMSP3A		PGTW
29	102359	15.0N 117.3E	PCN 3		DMSP3A		RPMK
30	110223	15.1N 117.6E	PCN 3		DMSP3S	PARTIALLY EXPOSED LLCC	PGTW
31	110223	15.0N 118.2E	PCN 5		DMSP3S	BASED ON EXPOSED LLCC	RPMK
32	110405	15.2N 118.3E	PCN 3		DMSP3S	BASED ON EXPOSED LLCC	RPMK
33	111124	15.6N 117.9E	PCN 3		DMSP3J		RPMK
34	111241	15.6N 117.8E	PCN 3		DMSP3A		RPMK
35	111505	15.5N 117.1E	PCN 3		DMSP3S	PARTIALLY EXPOSED LLCC	PGTW
36	111505	15.5N 117.5E	PCN 3		DMSP3S		RPMK
37	112223	15.6N 116.6E	PCN 3		DMSP3J	PARTIALLY EXPOSED LLCC	PGTW
38	112223	15.6N 116.1E	PCN 5	T3.0/3.0 /S0.0/24HRS	DMSP3J	POSS 2ND EXPOSED 16.2N 117.0E	RPMK
39	112223	15.2N 116.8E	PCN 5		DMSP3J		RKSO
40	120347	15.2N 115.7E	PCN 1		DMSP3S		RPMK
41	121105	15.5N 115.8E	PCN 5		DMSP3J		RODN
42	121105	15.5N 116.3E	PCN 1		DMSP3J		RPMK
43	121529	15.6N 116.1E	PCN 3		DMSP3S		RPMK
44	122204	15.6N 115.6E	PCN 4		DMSP3J		PGTW
45	122324	15.5N 116.0E	PCN 3		DMSP3A		PGTW
46	122324	15.2N 116.5E	PCN 3		DMSP3A		RPMK
47	130329	15.2N 116.2E	PCN 3	T4.0/4.0	DMSP3S	INIT DBS	RODN
48	130329	15.2N 115.8E	PCN 3	T3.0/3.0 /S0.0/29HRS	DMSP3S	LLCC	RPMK
49	131045	15.5N 115.2E	PCN 6		DMSP3J		RPMK
50	131045	15.3N 114.4E	PCN 5		DMSP3J	CI DOWN	PGTW
51	131207	15.7N 116.4E	PCN 3		DMSP3J		PGTW
52	131611	15.6N 115.2E	PCN 5		DMSP3S	PARTIALLY EXPOSED LLCC NW	RPMK
53	132326	17.1N 115.7E	PCN 5	T1.5/2.5 /W1.5/20HRS	DMSP3J	BASED ON CENTER OF FEATURES	RPMK
54	140311	14.7N 114.9E	PCN 5	T3.5/4.0 /W0.5/24HRS	DMSP3S		RODN
55	140311	14.7N 115.2E	PCN 3	T2.5/2.5	DMSP3S	INIT DBS PARTIALLY EXPOSED LLCC	PGTW
56	140311	16.2N 115.1E	PCN 3	T3.0/3.0	DMSP3S	INIT DBS	RKSO
57	141207	17.7N 115.3E	PCN 3		DMSP3J	EXPOSED LLCC	RPMK
58	141553	17.9N 114.9E	PCN 3		DMSP3S		RPMK
59	141553	17.9N 114.8E	PCN 3		DMSP3S		RODN
60	141553	18.1N 114.7E	PCN 5		DMSP3S	NE OF CDO	RKSO
61	142307	18.4N 113.6E	PCN 4		DMSP3J		RODN
62	151148	18.8N 111.9E	PCN 3		DMSP3J		RPMK
63	151316	19.2N 111.9E	PCN 3		DMSP3S		RPMK
64	151535	19.0N 112.2E	PCN 3		DMSP3S		RODN
65	151535	20.0N 111.7E	PCN 5		DMSP3S		PGTW
66	160014	20.9N 112.1E	PCN 5	T2.0/2.0	DMSP3A	INIT DBS	RPMK
67	160417	21.3N 112.0E	PCN 5		DMSP3S		RPMK
68	161128	21.6N 113.1E	PCN 3		DMSP3J		RODN
69	161128	21.6N 114.2E	PCN 5		DMSP3J		RPMK
70	161256	22.7N 112.6E	PCN 5		DMSP3A		RODN
71	161317	21.6N 114.4E	PCN 5		DMSP3S		RPMK
72	161517	22.6N 114.2E	PCN 5		DMSP3S	CI DOWN	PGTW
73	162356	21.9N 114.2E	PCN 5		DMSP3A	2ND 21.7N 110.9E	RODN
74	162359	21.6N 111.3E	PCN 3		DMSP3A		RPMK

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN MSLP	OBS MSLP	MAX-SFC-WND VEL/QRG/RNG	MAX-FLT-LVL-WND DIR/VEL/QRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	072334	15.2N 129.3E	1500FT		993	30 080 55	110 36 050 160	3 2				+26 +26 +23 29	3
2	080230	15.2N 128.7E	1500FT		992	30 060 30	120 33 060 90	4 2				+26 +27 +23 27	3
3	081555	14.5N 126.1E	700MB	3973	986		100 53 010 40	4 4				+14 +14 +11	4
4	081900	14.6N 125.6E	700MB	3974			090 53 320 120					+13 +13	4
5	082040	14.7N 125.3E	700MB	3964	986		240 39 120 120	4 8				+14 +14 +12	4

6	090346	15.2N	123.4E	TROPHB	2945	984	65	350	50	080	45	350	50	5	5			+17	+18	+11	5
7	100521	13.9N	119.7E	TROPHB	3012		65	350	100	240	42	150	25	4	10				+10	+10	6
8	100844	14.5N	119.7E	TROPHB	3009	994	65	200	30	240	52	200	20	3	10				+10	+10	6
9	110253	15.3N	117.8E	TROPHB	2939	984	65	040	100	150	44	040	125	4	6			+12	+12	+10	7
10	110533	15.4N	117.5E	TROPHB	2923	981	40	230	55	200	30	100	55	6	5				+13	+09	7
11	111329	15.5N	117.6E	TROPHB	2991	989				100	46	200	80						+12	+11	8
12	111328	15.4N	117.3E	TROPHB	2979	987				220	46	140	90	5	2			+13	+13		8
13	120927	15.5N	116.2E	TROPHB			67	100	140	190	57	110	60	4	5				+08		9
14	121503	14.5N	115.7E	TROPHB	2956	985				190	61	070	125	5	4			+11	+15	+09	10
15	140201	14.1N	113.6E	TROPHB	2954	984				190	55	100	35	7	2						10
16	150235	14.5N	112.4E	TROPHB	2970	987	65	090	50	180	50	090	40	7	5						10

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION		RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAN	TDUFF	COMMENTS	RADAR POSITION		SITE WMO NO.
1	081845	14.0N	125.0E	LAND		CIRCULAR				EYE OPEN S MOVG 270? PARADES	14.2N	122.7E	
2	090730	15.2N	122.8E	LAND				25///	/////	QNT 40 KTS	16.3N	120.6E	98321
* 3	090900	15.2N	120.8E	LAND				1261/	5////	QNT 30 KTS	16.3N	120.6E	98321
4	091100	15.2N	122.8E	LAND				1151/	/////	EYE ELLIPTICAL OPEN NE	16.3N	120.6E	98321
5	091230	15.3N	122.4E	LAND				1199/	52927	EYE ELLIPTICAL OPEN N 36 KTS	16.3N	120.6E	98321
6	091330	14.9N	122.5E	LAND				1038/	4////	EYE CIRCULAR OPEN NW 42 KTS	16.3N	120.6E	98321
7	091330	14.9N	122.2E	LAND	FAIR	CIRCULAR	11				15.2N	120.6E	98327
8	091400	14.9N	122.5E	LAND				1031/	4////	QNT 40 KTS	16.3N	120.6E	98321
9	091403	14.9N	122.2E	LAND	GOOD	CIRCULAR	9				15.2N	120.6E	98327
10	091430	14.9N	122.1E	LAND	FAIR	CIRCULAR	9			EYE PASSING OVER PULILLO IS	15.2N	120.6E	98327
11	091500	14.9N	122.3E	LAND				1031/	42706	QNT 40 KTS	16.3N	120.6E	98321
12	091510	14.9N	122.0E	LAND	FAIR	CIRCULAR	8			EYE	15.2N	120.6E	98327
13	091530	15.0N	122.1E	LAND				1031/	42710	QNT 40 KTS	16.3N	120.6E	98321
14	091605	15.0N	121.8E	LAND	GOOD	CIRCULAR	10			EYE	15.2N	120.6E	98327
15	091630	15.0N	121.8E	LAND				1134/	52715	QNT 32 KTS	16.3N	120.6E	98321
16	091630	14.9N	121.7E	LAND	FAIR	CIRCULAR	10			EYE	15.2N	120.6E	98327
17	091710	15.0N	121.6E	LAND						NEG WALL CLD MOVED ONSHR	15.2N	120.6E	98327
18	091730	15.0N	121.5E	LAND	FAIR					NEG WALL CLD CNTR OVR LAND	15.2N	120.6E	98327
19	091810	15.0N	121.4E	LAND	POOR					PSBL CNTR NEG WALL CLD OVR MTNS	15.2N	120.6E	98327
20	091830	15.0N	121.3E	LAND	POOR					PSBL CNTR NEG WALL CLD	15.2N	120.6E	98327
21	091910	15.0N	121.2E	LAND	POOR					PSBL CNTR NEG WALL CLD	15.2N	120.6E	98327
22	091930	15.1N	121.1E	LAND	FAIR					CNTR LEAVING MTNS	15.2N	120.6E	98327
23	092000	14.7N	120.7E	LAND	POOR	CIRCULAR	14			PSBL EYE WALLACE	16.6N	120.3E	
24	092010	15.0N	121.0E	LAND	POOR					NEG WALL CLD MVY ATTENUATION	15.2N	120.6E	98327
25	092050	15.0N	120.9E	LAND	POOR					PSBL CNTR NEG WALL CLD ATTEN	15.2N	120.6E	98327
26	092100	15.0N	120.6E	LAND		CIRCULAR	19			PSBL EYE WALLACE	16.6N	120.3E	
27	092110	15.0N	120.8E	LAND	POOR					PSBL CNTR NEG WALL CLD	15.2N	120.6E	98327
28	100503	14.9N	120.5E	LAND	POOR					LOCATED 190/21 FROM CLARK	15.2N	120.6E	98327
29	151150	19.4N	112.3E	LAND				2511/	53108		22.3N	114.2E	45005
30	151510	19.2N	112.2E	LAND				45//9	/3107		22.3N	114.2E	45005
31	151820	19.6N	112.1E	LAND				65//9	/3106		22.3N	114.2E	45005
32	152120	19.8N	112.2E	LAND				6///9	83606		22.3N	114.2E	45005
33	152350	20.3N	112.2E	LAND				6///9	93605		22.3N	114.2E	45005
34	160300	20.9N	112.5E	LAND				6///3	90104		22.3N	114.2E	45005

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TYPHOON ORA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	072310	11.2N 137.4E	PCN 5	T0.0/0.0	DMSP 4A	INIT JTS	PGTW
2	081417	11.2N 138.4E	PCN 6		DMSP 4A	SECONDARY 11.0N 142.4E	PGTW
3	092141	14.5N 138.5E	PCN 6	T1.0/1.0 /01.0/23HRS	DMSP 4A		PGTW
4	092252	14.4N 138.4E	PCN 6		DMSP 4A		PGTW
5	090117	14.3N 138.2E	PCN 5		DMSP 4A		PGTW
6	091022	14.4N 138.7E	PCN 5		DMSP 4A		PGTW
7	091133	14.4N 138.5E	PCN 5		DMSP 4A		PGTW
8	091354	14.5N 138.4E	PCN 5		DMSP 4A		PGTW
9	092121	17.0N 133.3E	PCN 6	T1.0/1.0 /50.0/24HRS	DMSP 4A		PGTW
10	092236	17.1N 133.2E	PCN 6		DMSP 4A		PGTW
11	101002	14.7N 132.2E	PCN 6		DMSP 4A	CI UP PARTIALLY EXPOSED LLCC	PGTW
12	101002	14.6N 133.1E	PCN 5		DMSP 4A		RPMK
13	101117	14.9N 132.1E	PCN 5		DMSP 4A		PGTW
14	101523	14.0N 131.1E	PCN 6		DMSP 4A		PGTW
15	102101	14.9N 128.9E	PCN 6		DMSP 4A		PGTW
16	102102	14.0N 130.9E	PCN 6		DMSP 4A		RODN
17	102359	14.3N 129.3E	PCN 6		DMSP 4A		PGTW
18	110223	20.1N 129.5E	PCN 5	T3.0/3.0	DMSP 4A	INIT JTS EXPOSED LLCC	RODN
19	110223	20.0N 129.5E	PCN 5	T2.5/2.5	DMSP 4A	INIT JTS	RPMK
20	110223	13.9N 129.3E	PCN 5	T2.0/2.0-/01.0/27HRS	DMSP 4A		PGTW
21	110943	20.9N 129.2E	PCN 5		DMSP 4A	CI UP	PGTW
22	111241	21.1N 127.3E	PCN 5		DMSP 4A	CI UP	RPMK
23	111241	20.5N 126.1E	PCN 5		DMSP 4A		RKSO
24	111505	21.0N 126.3E	PCN 5		DMSP 4A		PGTW
25	111505	21.1N 126.5E	PCN 5		DMSP 4A		RPMK
26	112223	21.4N 125.1E	PCN 5	T3.5/3.5-/01.0/20HRS	DMSP 4A		RPMK
27	112223	21.4N 126.7E	PCN 6	T3.0/3.0 /01.0/20HRS	DMSP 4A		PGTW
28	112223	21.4N 126.4E	PCN 5	T3.0/3.0	DMSP 4A	INIT JTS	RKSO
29	120205	22.0N 123.9E	PCN 5		DMSP 4A	BEGINNING OF HANDING TYPE EYE	PGTW
30	120205	22.0N 126.1E	PCN 5	T3.0/3.0 /50.0/24HRS	DMSP 4A		RODN
31	121105	22.1N 122.8E	PCN 1		DMSP 4A		RODN
32	121105	22.0N 123.1E	PCN 1		DMSP 4A		RPMK
33	121447	22.0N 123.1E	PCN 1		DMSP 4A		RODN
34	121447	22.1N 122.5E	PCN 2		DMSP 4A	CI UP	PGTW
35	122206	22.4N 122.7E	PCN 2	T4.0/4.0 /01.0/24HRS	DMSP 4A		PGTW
36	122206	22.4N 122.4E	PCN 1	T4.5/4.0-/01.0/24HRS	DMSP 4A		RKSO
37	122324	21.1N 122.8E	PCN 1	T4.5/4.5-/01.0/25HRS	DMSP 4A		RPMK
38	122324	21.0N 122.9E	PCN 1		DMSP 4A		PGTW
39	130324	21.7N 122.9E	PCN 1		DMSP 4A		RPMK
40	130324	21.7N 122.9E	PCN 1	T4.0/4.0 /01.0/25HRS	DMSP 4A		RODN
41	131045	24.6N 124.3E	PCN 3		DMSP 4A		PGTW
42	131045	24.7N 124.2E	PCN 3		DMSP 4A		RKSO
43	131044	24.3N 124.3E	PCN 3		DMSP 4A		RPMK
44	131207	24.7N 124.2E	PCN 3		DMSP 4A		PGTW
45	131511	25.0N 124.7E	PCN 1		DMSP 4A		RODN
46	132144	25.5N 124.5E	PCN 4	T3.0/4.0 /+1.0/23HRS	DMSP 4A		PGTW
47	132306	25.9N 124.4E	PCN 3		DMSP 4A	EXPOSED LLCC	PGTW
48	140311	26.5N 123.9E	PCN 5	T3.0/4.0-/+1.-/24HRS	DMSP 4A		RODN
49	140311	26.6N 123.9E	PCN 3	T3.0/3.0 /+1.0/24HRS	DMSP 4A	PARTIALLY EXPOSED LLCC	RKSO
50	141026	27.2N 125.7E	PCN 5		DMSP 4A		RODN
51	141026	27.3N 126.4E	PCN 5		DMSP 4A	CI OOZY	PGTW
52	141144	27.2N 126.3E	PCN 5		DMSP 4A		PGTW
53	141553	27.2N 127.2E	PCN 5		DMSP 4A		RPMK
54	141553	24.0N 127.9E	PCN 5		DMSP 4A		RODN
55	141553	27.2N 126.7E	PCN 3		DMSP 4A		RKSO
56	142125	24.3N 126.8E	PCN 4		DMSP 4A	PART EXP LLCC E EDGE MAJ CONV	PGTW
57	142125	27.4N 129.5E	PCN 5	T2.0/2.5-/+1.4/05HRS	DMSP 4A		RODN
58	142249	29.0N 129.1E	PCN 5	T2.0/3.0-/+1.1/25HRS	DMSP 4A		PGTW
59	151006	31.5N 134.3E	PCN 5		DMSP 4A		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN-TATION	EYE DIAM	EYE TEMP (C) UNIT/ IN/ OB/EST	MSN NO.
1	092254	17.1N 134.0E	700MB	3080	997	50 150 10	200 38 080 20	5 2				+23 +25 +22	1
2	100238	17.4N 133.5E	700MB	3073	998	50 150 10	270 40 210 30	5 2				+ 9 +13 + 7	1
3	101230	17.7N 131.3E	700MB	3057			160 35 050 60					+13 + 7	2
4	101456	14.3N 131.0E	700MB	3031	996		040 40 240 60	5 15				+12 +11 +11	2
5	110321	19.9N 129.2E	700MB			50 110 65	110 65 210 65	4 M				+12 +14 +16	3
6	110530	20.3N 128.5E	700MB			30 310 30	060 36 310 120					+13 +11	3
7	110939	20.7N 128.1E	700MB		987		240 33 190 75	4 M				+11 +14 +11	3
8	111326	21.9N 126.9E	700MB	2987	989		050 62 310 90					+15 +12	4
9	111530	21.2N 126.4E	700MB	2965	982		190 55 090 20	5 2				+12 +14 +14	4
10	120304	22.1N 123.9E	700MB	2923	970		130 65 040 5	4 7	CIRCULAR	15		+14 +16 +13	5
11	120710	22.4N 123.4E	700MB	2763	962	75 180 15	240 70 130 10	5 5	CIRCULAR	15		+14 +16 +12	5
12	130430	23.7N 122.7E	700MB	2800	944	100 080 5	210 80 120 10	2 2	CIRCULAR	7		+14 +15 +14	5
13	130559	24.0N 122.8E	700MB	2840	949	100 180 15	240 70 180 20					+15 +13	5
14	132122	25.9N 123.4E	700MB	2980	988		220 62 130 20	2 1				+17 +19 +11	7
15	140040	26.0N 123.8E	700MB	2967	986	60 160 10	250 54 160 10					+18 +10	7
16	140252	26.2N 124.0E	700MB	3025	991	35 180 75	210 48 180 10	2 4				+14 +19 + 9	7
17	141315	27.4N 124.6E	700MB	3040	995		240 47 180 90					+14 +13	8
18	141430	27.4N 124.6E	700MB	3034	998		240 65 200 30	2 4				+11 +12 +12	8

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TOOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	112300	21.7N 124.8E	LAND				35/// /////		24.3N 124.2E	47918
2	120000	21.4N 124.5E	LAND				21613 52916		24.3N 124.2E	47918
3	120100	21.9N 124.3E	LAND				10613 52919		24.3N 124.2E	47918
4	120100	22.0N 124.4E	LAND				27/05 5////		24.8N 125.3E	47927
5	120200	21.9N 124.2E	LAND				10623 62710		24.3N 124.2E	47918
6	120200	22.0N 124.2E	LAND				25/75 52711		24.8N 125.3E	47927
7	120300	22.0N 123.9E	LAND				10613 72809		24.3N 124.2E	47918
8	120300	22.0N 124.1E	LAND				25/73 52911		24.8N 125.3E	47927
9	120400	22.1N 123.8E	LAND				10732 72911		24.3N 124.2E	47918
10	120400	22.1N 123.9E	LAND				20675 53014		24.8N 125.3E	47927
11	120500	22.1N 123.7E	LAND				20823 73611		24.3N 124.2E	47918
12	120500	22.1N 123.7E	LAND				35/65 52710		24.8N 125.3E	47927
13	120600	22.2N 123.5E	LAND				45/62 72911		24.3N 124.2E	47918
14	120600	22.1N 123.4E	LAND				35/75 52715		24.8N 125.3E	47927
15	120700	22.2N 123.4E	LAND				20822 72709		24.3N 124.2E	47918
16	120700	22.2N 123.3E	LAND				35/70 53305		24.8N 125.3E	47927
17	120700	22.3N 123.3E	LAND	GOOD		25		EYE	24.8N 125.3E	47927
18	120800	22.2N 123.1E	LAND				35/70 52711		24.8N 125.3E	47927
19	120800	22.3N 123.2E	LAND				10849 53329		24.0N 121.6E	46599
20	120800	22.2N 123.2E	LAND				10512 72911		24.3N 124.2E	47918
21	120900	22.2N 123.1E	LAND				21633 72708		24.3N 124.2E	47918
22	120900	22.2N 123.1E	LAND				10549 52907		24.0N 121.6E	46599
23	120900	22.2N 123.1E	LAND				21633 72708		24.8N 125.3E	47927
24	121100	22.2N 122.8E	LAND				35/70 52708		24.8N 125.3E	47927
25	121100	22.1N 122.9E	LAND				11323 52709		24.0N 121.6E	46599
26	121100	22.2N 122.8E	LAND				31562 72506		24.3N 124.2E	47918
27	121200	22.1N 122.7E	LAND				3144/ 72608		24.3N 124.2E	47918
28	121300	22.1N 122.6E	LAND				12424 52607		24.0N 121.6E	46599
29	121300	22.1N 122.6E	LAND				3154/ 72708		24.3N 124.2E	47918
30	121400	22.0N 122.5E	LAND				11324 52105		24.0N 121.6E	46599
31	121400	22.0N 122.5E	LAND				31511 72506		24.3N 124.2E	47918
32	121500	21.9N 122.5E	LAND				10314 50000		24.0N 121.6E	46599
33	121500	21.9N 122.5E	LAND				31541 50000		24.3N 124.2E	47918
34	121500	22.1N 122.6E	LAND				12424 52607		24.0N 121.6E	46599
35	121500	21.9N 122.5E	LAND				31511 50000		24.3N 124.2E	47918
36	121700	22.0N 122.7E	LAND				12513 50708		24.0N 121.6E	46599
37	121700	22.0N 122.5E	LAND				3141/ 50106		24.3N 124.2E	47918
38	121800	22.1N 122.7E	LAND				12424 50308		24.0N 121.6E	46599
39	121800	22.1N 122.7E	LAND				10342 50311		24.3N 124.2E	47918
40	121900	22.3N 122.7E	LAND				20312 53615		24.3N 124.2E	47918
41	122000	22.5N 122.8E	LAND				12322 53609		24.0N 121.6E	46599
42	122000	22.5N 122.8E	LAND				21322 50310		24.3N 124.2E	47918
43	122100	22.7N 122.6E	LAND				35/70 43613		24.8N 125.3E	47927
44	122100	22.4N 122.8E	LAND				21312 73612		24.3N 124.2E	47918
45	122200	22.8N 122.6E	LAND				20470 53613		24.8N 125.3E	47927
46	122200	22.8N 122.8E	LAND				11312 73611		24.3N 124.2E	47918
47	122300	23.0N 122.7E	LAND				20416 50112		24.8N 125.3E	47927
48	122300	23.0N 122.8E	LAND				12243 53513		24.0N 121.6E	46599
49	122300	23.0N 122.7E	LAND				21313 73511		24.3N 124.2E	47918
50	130000	23.1N 122.7E	LAND				10313 73511		24.3N 124.2E	47918
51	130000	23.1N 122.7E	LAND				22416 53505		24.8N 125.3E	47927
52	130100	23.3N 122.7E	LAND				10224 73509		24.3N 124.2E	47918
53	130100	23.3N 122.7E	LAND				11213 53509		24.0N 121.6E	46599
54	130100	23.2N 122.8E	LAND				22326 53306		24.8N 125.3E	47927
55	130200	23.4N 122.7E	LAND				22375 50212		24.8N 125.3E	47927
56	130200	23.3N 122.6E	LAND				12213 53506		24.0N 121.6E	46599
57	130200	23.4N 122.7E	LAND				10214 53508		24.3N 124.2E	47918
58	130300	23.5N 122.7E	LAND				10122 73607		24.3N 124.2E	47918
59	130300	23.5N 122.6E	LAND				11212 53510		24.0N 121.6E	46599
60	130300	23.4N 122.7E	LAND				22285 53404		24.8N 125.3E	47927
61	130300	23.4N 122.8E	LAND	GOOD		55		EYE MOV 0120	24.8N 125.3E	47927
62	130400	23.4N 122.7E	LAND				10212 50308		24.0N 121.6E	46599
63	130400	23.7N 122.7E	LAND				11212 73608		24.3N 124.2E	47918
64	130400	23.6N 122.7E	LAND				12285 50213		24.8N 125.3E	47927
65	130500	23.8N 122.8E	LAND				12212 50211		24.0N 121.6E	46599
66	130500	23.8N 122.8E	LAND				12335 50110		24.8N 125.3E	47927
67	130500	23.8N 122.7E	LAND				12313 70109		24.3N 124.2E	47918
* 68	130500	24.0N 122.0E	LAND				11213 53610		24.0N 121.6E	46599
69	130600	23.9N 122.7E	LAND				10212 70209		24.3N 124.2E	47918
70	130500	23.9N 122.9E	LAND				12314 54011		24.8N 125.3E	47927
71	130700	24.0N 122.9E	LAND				12415 53605		24.8N 125.3E	47927
72	130700	24.1N 122.9E	LAND				10213 70209		24.3N 124.2E	47918
73	130800	24.2N 123.0E	LAND				12463 50309		24.0N 121.6E	46599
74	130800	24.1N 123.0E	LAND				20354 50408		24.8N 125.3E	47927
75	130800	24.2N 123.0E	LAND				10213 70309		24.3N 124.2E	47918
76	130900	24.3N 123.1E	LAND				12323 50309		24.0N 121.6E	46599
77	130900	24.3N 123.1E	LAND				10212 70309		24.3N 124.2E	47918
78	130900	24.3N 123.1E	LAND				10474 52012		24.8N 125.3E	47927
79	130900	24.3N 123.1E	LAND	GOOD		10		EYE MOV 0115	24.8N 125.3E	47927
80	131000	24.5N 123.1E	LAND				11312 70309		24.3N 124.2E	47918
81	131000	24.5N 123.1E	LAND				10314 53612		24.8N 125.3E	47927
82	131000	24.5N 123.1E	LAND	GOOD		10		EYE MOV 3615	24.8N 125.3E	47927
83	131100	24.6N 123.1E	LAND				10314 51008		24.8N 125.3E	47927
84	131100	24.7N 123.1E	LAND				11311 70210		24.3N 124.2E	47918
85	131100	24.7N 123.1E	LAND	GOOD		10		EYE MOV 3620	24.8N 125.3E	47927
86	131200	24.9N 123.1E	LAND				35/// 50211		24.0N 121.6E	46599
87	131200	24.9N 123.1E	LAND				47/71 73611		24.8N 125.3E	47927
88	131200	24.9N 123.1E	LAND				47/71 73611		24.3N 124.2E	47918
89	131200	24.9N 123.1E	LAND	GOOD		10		EYE MOV 3615	24.8N 125.3E	47927
90	131300	25.0N 123.1E	LAND				47/71 73609		24.3N 124.2E	47918
91	131300	24.9N 123.1E	LAND				47/74 501[illegible]		24.8N 125.3E	47927
92	131400	25.1N 123.1E	LAND				37/74 53[illegible]		24.8N 125.3E	47927
93	131500	25.3N 123.1E	LAND				47/74 5[illegible]		24.8N 125.3E	47927
94	131700	25.4N 123.0E	LAND				35/// 52[illegible]		24.0N 121.6E	46599
95	140700	26.7N 124.9E	LAND	GOOD		55		EYE	24.8N 125.3E	47927
96	140900	26.8N 125.3E	LAND	GOOD				EYE MOV 0740	24.8N 125.3E	47927

TROPICAL DEPRESSION 26

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	040111	19.5N 143.3E	PCN 5	T0.0/0.0	DMSP18	INIT JHS	PGTW
2	091939	21.4N 141.7E	PCN 6	T0.0/0.0 /S0.0/22HRS	DMSP17		PGTW
3	092053	22.0N 142.0E	PCN 6		DMSP18		PGTW
4	100336	22.2N 140.4E	PCN 6		DMSP18	CI SAME	PGTW
5	100935	22.1N 139.0E	PCN 6	T1.0/1.0 /01.0/25HRS	DMSP18		PGTW
6	110041	22.0N 140.5E	PCN 6		DMSP18	PSBL 2ND EXPOSED LLCC	PGTW
7	110501	22.0N 138.1E	PCN 5		DMSP17	CI SAME	PGTW
8	111918	21.9N 138.1E	PCN 6		DMSP18		PGTW
9	111323	22.1N 136.0E	PCN 6		DMSP18		PGTW
10	112042	21.0N 133.4E	PCN 4		DMSP17	PSN BY EXPOSED LLCC NW QUAD	PGTW
11	112042	21.2N 133.3E	PCN 4		DMSP17	BASED ON APPARENT LLCC	RODN
12	112200	21.2N 133.0E	PCN 3	T1.0/1.0 /S0.0/25HRS	DMSP18	EXPOSED LLCC	PGTW
13	120023	21.4N 132.5E	PCN 4		DMSP15	CI DOWN EXPOSED LLCC	PGTW
14	120423	21.9N 130.5E	PCN 3		DMSP17	CI DOWN EXPOSED LLCC	PGTW
15	120923	24.2N 130.6E	PCN 6		DMSP17		RODN
16	121042	24.0N 130.0E	PCN 4		DMSP18		PGTW
17	122022	25.0N 129.4E	PCN 4	T0.0/1.0 /W1.0/22HRS	DMSP17	EXPOSED LLCC	PGTW

TROPICAL DEPRESSION 27

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	040111	7.3N 153.5E	PCN 5	T0.0/0.0	DMSP18	INIT JHS	PGTW
2	090340	5.3N 152.5E	PCN 6		DMSP17		PGTW
3	100335	7.5N 152.3E	PCN 6		DMSP18		PGTW
4	102101	6.3N 151.4E	PCN 6		DMSP17		PGTW
5	102217	6.5N 151.2E	PCN 6	T1.0/1.0	DMSP18	INIT JHS	PGTW
6	111323	6.5N 147.5E	PCN 6		DMSP15		PGTW
7	112042	6.5N 145.6E	PCN 6	T1.5/1.5-/00.5/22HRS	DMSP17		PGTW
8	112200	9.0N 145.4E	PCN 6		DMSP18		PGTW
9	120205	10.6N 145.0E	PCN 6		DMSP15		PGTW
10	120923	10.7N 143.1E	PCN 6		DMSP17	CI SAME	PGTW
11	121042	11.0N 142.9E	PCN 6		DMSP18		PGTW
12	121447	11.1N 142.1E	PCN 6		DMSP15		PGTW
13	122324	11.6N 139.0E	PCN 6	T1.0/1.5 /W0.5/27HRS	DMSP18		PGTW
14	130147	11.6N 138.6E	PCN 3		DMSP15	BASED ON APPARENT LLCC	PGTW
15	130906	12.7N 137.1E	PCN 6		DMSP17		PGTW
16	131207	13.7N 135.2E	PCN 5		DMSP18		PGTW
17	131629	13.7N 134.6E	PCN 5		DMSP15		PGTW
18	132144	14.5N 133.2E	PCN 6	T2.0/2.0 /01.0/22HRS	DMSP17		PGTW
19	132305	14.8N 133.1E	PCN 5		DMSP18		PGTW
20	140129	17.5N 133.4E	PCN 5		DMSP15		PGTW
21	141325	19.1N 132.0E	PCN 5		DMSP17	CI DOWN 2ND 19.1N 132.0E	PGTW
22	141149	19.3N 131.6E	PCN 5		DMSP18	2ND 19.1N 131.7E	PGTW
23	141411	20.0N 131.5E	PCN 6		DMSP15	2ND 19.6N 130.7E	PGTW
24	142125	14.5N 131.4E	PCN 6		DMSP17		RODN
25	142249	16.5N 130.3E	PCN 6	T2.0/2.0 /S0.0/25HRS	DMSP18		PGTW
26	151132	15.5N 129.2E	PCN 5		DMSP18		PGTW
27	152105	16.2N 129.9E	PCN 5		DMSP17		PGTW
28	152105	17.4N 130.3E	PCN 6		DMSP17		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	120538	8.3N 144.7E	1500FT		1005	15 090 40	200 17 090 40	5 4			+25 +26 +23 29	3
2	130353	10.1N 138.6E	1500FT		1003	15 120 35	170 24 030 70	10 5			+26 29	4

TYPHOON PHYLLIS

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OBJECTIVE CODE	SAT	COMMENTS	SITE
1	131200	4.0N 145.5E	PCN 6		DMSP35		PGTW
2	132003	4.9N 144.9E	PCN 6	T0.0/0.0	DMSP37		PGTW
3	132125	5.1N 144.7E	PCN 6		DMSP38		PGTW
4	132348	10.9N 143.3E	PCN 6	T1.5/1.5	DMSP35	INIT DHS	KGWC
5	141005	11.3N 144.2E	PCN 6		DMSP38		PGTW
6	141230	11.9N 143.9E	PCN 6		DMSP35	CI UP	PGTW
7	141943	13.6N 142.9E	PCN 4	T0.0/0.0 /S0.0/24HRS	DMSP37		PGTW
8	142107	13.6N 143.1E	PCN 4		DMSP38		PGTW
9	150325	14.4N 142.0E	PCN 6		DMSP37		PGTW
10	150350	14.6N 141.8E	PCN 6		DMSP38	CI UP	PGTW
11	150951	14.7N 142.9E	PCN 6		DMSP38		NNUL
12	151212	14.5N 141.7E	PCN 5		DMSP35		PGTW
13	151212	14.6N 141.6E	PCN 6		DMSP35		NNUL
14	151924	15.2N 141.1E	PCN 5	T2.0/2.0 /D2.0/24HRS	DMSP37		PGTW
15	151924	15.0N 141.5E	PCN 4		DMSP37		KGWC
16	152050	15.3N 141.2E	PCN 5		DMSP38		PGTW
17	160054	15.3N 141.0E	PCN 5		DMSP35		PGTW
18	160505	15.5N 140.3E	PCN 6		DMSP37		PGTW
19	160905	16.1N 139.7E	PCN 6		DMSP37		KGWC
20	160908	15.5N 139.5E	PCN 4		DMSP37		NNUL
21	160933	15.5N 139.8E	PCN 5		DMSP38	CI UP	PGTW
22	161336	15.7N 139.6E	PCN 5		DMSP35		PGTW
23	161336	15.6N 139.4E	PCN 4		DMSP35	MDT INFLOW SW-S QUADS	NNUL
24	162033	16.6N 138.6E	PCN 6		DMSP38		PGTW
25	170036	16.8N 138.5E	PCN 1	T0.0/0.0+/D2.0/24HRS	DMSP35		PGTW
26	170038	16.9N 138.5E	PCN 1	T0.5/4.5	DMSP35	INIT DHS WELL DFND CC SML EYE	NNUL
27	170915	17.6N 137.0E	PCN 6		DMSP38		PGTW
28	171318	18.4N 137.2E	PCN 1		DMSP35		PGTW
29	171318	18.0N 137.0E	PCN 2		DMSP35	WELL DFND CC SML EYE VSBL	NNUL
30	172157	19.4N 136.9E	PCN 1	T4.5/4.5 /D0.5/22HRS	DMSP38		PGTW
31	172157	19.4N 136.0E	PCN 1	T5.0/5.0 /D0.5/21HRS	DMSP38	WELL DFND CC EYE VSBL	NNUL
32	181040	20.9N 135.3E	PCN 1		DMSP38		PGTW
33	181040	21.0N 135.6E	PCN 2		DMSP38	SML EYE VSBL	NNUL
34	181040	20.9N 135.5E	PCN 0		DMSP38		RODN
35	181300	20.9N 135.1E	PCN 3		DMSP35		PGTW
36	141300	20.9N 135.2E	PCN 2		DMSP35	SML EYE VSBL	NNUL
37	182139	21.9N 135.5E	PCN 2	T4.5/4.5 /S0.0/24HRS	DMSP38		PGTW
38	182140	21.9N 135.5E	PCN 3	T5.5/5.5 /D0.5/24HRS	DMSP38	1 DEG CDO STRNG LL INFLOW ALQDS	NNUL
39	190000	22.1N 135.5E	PCN 1		DMSP35	RAGGED EYE	PGTW
40	190000	22.1N 135.6E	PCN 2		DMSP	MDT LL INFLOW ALQDS	NNUL
41	191022	22.3N 135.6E	PCN 2		DMSP38		PGTW
42	191242	23.2N 135.7E	PCN 2		DMSP35		PGTW
43	192122	23.9N 135.1E	PCN 2	T5.0/5.0 /D0.5/24HRS	DMSP38		PGTW
44	200126	24.1N 134.7E	PCN 3		DMSP35		PGTW
45	201005	25.2N 134.3E	PCN 2		DMSP38		PGTW
46	201406	25.5N 134.2E	PCN 2		DMSP35		PGTW
47	201406	25.4N 134.2E	PCN 2		DMSP35		RKSO
48	202105	26.5N 133.5E	PCN 3	T4.5/5.0-/W0.5/24HRS	DMSP38		PGTW
49	210106	27.2N 133.6E	PCN 4	T4.0/4.0	DMSP35	INIT DHS	KGWC
50	210106	27.3N 133.1E	PCN 4		DMSP35		PGTW
51	210106	27.6N 133.5E	PCN 4	T4.5/4.5	DMSP35	INIT DHS	RODN
52	210947	28.4N 133.8E	PCN 4		DMSP38	CI UOWN	PGTW
53	211348	29.2N 135.0E	PCN 1		DMSP35		RODN
54	211348	28.3N 134.9E	PCN 4		DMSP35		PGTW
55	212048	31.5N 138.5E	PCN 5		DMSP38		PGTW
56	220048	33.2N 140.8E	PCN 5	T3.0/4.0 /W1.5/27HRS	DMSP35		PGTW
57	220749	36.5N 145.6E	PCN 6		DMSP		KGWC
58	221324	40.3N 171.3E	PCN 6		DMSP35		KGWC

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE DIAM	EYE TEMP (C) UNIT/ IN/ OP/SST	MSN NO.
1	140330	15.9N 140.6E	700MB	3015	992	55 030 20	130 60 030	15 10 5	CIRCULAR	20		+14 +17 + 9	1
2	161447	16.3N 139.5E	700MB	2984	986		060 52 360	20 5 5	CIRCULAR	15		+16 +16 +11	2
3	170355	17.3N 138.1E	700MB	2907	980	40 220 30	320 55 220	15 4 2	CIRCULAR	25		+ 9 +13 +13	3
4	171451	18.7N 136.8E	700MB	2820	968		360 80 270	10 3 5	ELLIPTICAL	20	12 350	+11 +16	4
5	171557	18.9N 136.7E	700MB				320 85 260	10				+17	4
6	180245	20.0N 135.3E	700MB	2707	953	90 140 10	230 83 140	10 4 2	CIRCULAR	20		+19 +19 + 8	5
7	180515	20.3N 135.3E	700MB	2709		50 060 70	120 105 060					+19 + 9	5
8	182321	22.0N 135.3E	700MB	2740	957	100 160 15	220 90 120	15 2 3	CIRCULAR	22		+12 +20 +12	6

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAM TOOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	182042	21.9N 135.4E	ACFT					54 WRS		

SUPER TYPHOON RITA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCUR	REMARK CODE	SAT	COMMENTS	SITE
1	142315	10.0N 174.5W			GOES4		PHNL
2	150215	9.5N 177.0W			GOES4		PHNL
3	150312	9.0N 178.1W		T1.5/0.5	DMSP43	UPR LVL ANTICYCLONE	KGWC
4	161156	9.1N 179.2E			DMSP43		KGWC
5	161156	9.5N 179.5E	PCN 6		DMSP43		NNUL
6	162033	9.3N 178.4E		T1.5/1.5	DMSP43	INIT DBS	KGWC
7	162033	9.4N 179.2E	PCN 4	T1.5	DMSP43	WELL DEFINED LLCC	NNUL
8	162315	9.0N 178.5E			GOES4	WELL DEFINED MOOKING BANDS	PHNL
9	171344	9.8N 177.7E			GOES4		PHNL
10	170915	10.1N 177.2E	PCN 6		DMSP43		PGTW
11	170915	9.5N 177.4E	PCN 6		DMSP43		KGWC
12	170915	9.7N 176.7E	PCN 4		DMSP43	MDT LOW LVL INFLOW ALGDS	NNUL
13	171126	10.3N 176.6E	PCN 4		DMSP43	MDT LOW LVL INFLOW ALGDS	NNUL
14	171136	9.6N 176.5E	PCN 6		DMSP43		PHIK
15	171345	10.3N 175.2E	PCN 4		DMSP47	MDT LOW LVL INFLOW ALGDS	NNUL
16	172015	10.0N 174.5E	PCN 6	T1.5/1.5 /S0.0/24HRS	DMSP43		KGWC
17	180344	10.7N 173.8E			GOES4	1.5 DES CDO	PHNL
18	180726	10.0N 173.5E	PCN 4		DMSP47		NNUL
19	180957	10.5N 172.9E	PCN 6	T1.5/1.5 / S.0/24HRS	DMSP43		KGWC
20	180959	10.3N 171.4E	PCN 4		DMSP43	MDT LOW LVL INFLOW ALGDS	NNUL
21	181115	11.2N 172.8E	PCN 6		DMSP43		PHIK
22	181118	10.6N 171.9E	PCN 6	T2.5/2.5 /01.5/16HRS	DMSP43		KGWC
23	190000	11.2N 170.0E	PCN 3	T3.0/3.0	DMSP43	INIT DBS	PGTW
24	190000	11.4N 169.5E	PCN 2	T2.5	DMSP43	EYE BARELY DISCERNIBLE INIT OBS	NNUL
25	190946	11.3N 168.3E	PCN 6		NIMAS		PHIK
26	191242	11.2N 167.3E	PCN 4		DMSP43		NNUL
27	191242	11.3N 167.4E	PCN 6		DMSP43		PGTW
28	191948	11.3N 167.2E	PCN 4	T3.0/3.0 /00.5/20HRS	DMSP47	STRONG LOW LVL INFLOW ALGDS	NNUL
29	192122	11.6N 165.1E	PCN 2	T4.0/4.0 /01.0/24HRS	DMSP43		PGTW
30	192122	11.6N 165.4E	PCN 2	T5.0/5.0	NIMAS	INIT DBS NO GEOGRAPHY	PHIK
31	192342	12.1N 164.0E	PCN 2	T4.5/4.5	DMSP43	INIT DBS	KGWC
32	200005	11.7N 161.7E	PCN 6		DMSP43		PGTW
33	201224	11.8N 161.0E	PCN 2		DMSP43		PGTW
34	201224	11.9N 161.2E			DMSP43	STRONG LOW LVL INFLOW ALGDS	NNUL
35	202105	11.6N 158.8E	PCN 1	T3.5/3.5 /01.5/24HRS	DMSP43		PGTW
36	210105	11.5N 157.4E	PCN 2		DMSP43		PGTW
37	210105	11.8N 156.6E	PCN 1	T3.5/3.5 /02.5/24HRS	DMSP43	EYE VAIL STRONG LOW LVL INFLOW	NNUL
38	210947	11.1N 155.0E	PCN 6		DMSP43	UPR LVL ANTICYCLONE	PGTW
39	211348	10.9N 155.4E	PCN 6		DMSP43	UPR LVL ANTICYCLONE	PGTW
40	212050	11.2N 154.4E	PCN 1	T3.0/3.0 /00.5/19HRS	DMSP47	EYE OBSCURED BY THIN OVC	NNUL
41	212224	11.1N 153.9E	PCN 1	T3.5/3.5 /01.0/25HRS	DMSP43		PGTW
42	220048	11.4N 153.7E	PCN 1		DMSP43	WELL DEFINED EYE	NNUL
43	220048	11.4N 153.2E	PCN 1		DMSP43		PGTW
44	220929	11.5N 151.5E	PCN 2		DMSP43		PGTW
45	220932	11.2N 152.4E			DMSP47		NNUL
46	221330	11.4N 151.0E	PCN 2		DMSP43		PGTW
47	221330	11.4N 151.0E	PCN 2		DMSP43		RODN
48	221330	11.4N 151.0E	PCN 2		DMSP43		NNUL
49	222211	11.3N 149.0E	PCN 1	T3.0/3.0 /01.0/26HRS	DMSP	STRONG LOW LVL INFLOW ALGDS	NNUL
50	222212	11.5N 148.9E	PCN 1	T3.0/3.0 /00.5/24HRS	DMSP43		PGTW
51	230912	12.0N 146.2E	PCN 2		DMSP47		NNUL
52	231054	11.9N 145.8E	PCN 2		DMSP43		PGTW
53	231312	12.1N 145.2E	PCN 1		DMSP43		PGTW
54	232011	11.9N 142.7E	PCN 2		DMSP47		PGTW
55	232154	12.2N 142.0E	PCN 1	T3.0/3.0 /S0.0/24HRS	DMSP43		PGTW
56	240154	12.1N 141.1E	PCN 1		DMSP43		PGTW
57	240154	12.2N 141.4E	PCN 1	T3.0/3.0	DMSP43	INIT DBS	RPMK
58	240952	12.5N 138.7E	PCN 2		DMSP47		RODN
59	240952	12.5N 138.7E	PCN 2		DMSP47		PGTW
60	241035	12.6N 138.0E	PCN 2		DMSP43		PGTW
61	241635	12.6N 134.7E	PCN 2		DMSP43		PGTW
62	241635	12.6N 137.0E	PCN 2		DMSP43	EYE DIA 20NM	NNUL
* 63	242133	12.2N 140.1E		T3.0/3.0	DMSP47	EYE DIA 25NM INIT OBS	NNUL
64	242133	12.4N 134.1E	PCN 1	T3.5/3.5 /00.5/20HRS	DMSP47		RPMK
65	242319	12.7N 133.3E	PCN 1	T3.5/3.5 /00.5/25HRS	DMSP43		PGTW
66	250136	12.7N 132.6E	PCN 1		DMSP43		RPMK
67	250135	12.7N 132.4E	PCN 1		DMSP43		PGTW
68	251014	13.3N 129.7E	PCN 1		DMSP47		RPMK
69	251014	13.2N 129.7E	PCN 1		DMSP47		PGTW
70	251014	13.0N 129.5E	PCN 2		DMSP47	EYE DIA 20NM	NNUL
71	251201	13.2N 128.9E	PCN 1		DMSP43		PGTW
72	251201	13.3N 129.0E	PCN 2		DMSP43		RPMK
73	251201	13.1N 129.0E	PCN 2		DMSP43	EYE DIA 20NM	NNUL
74	251618	13.3N 128.2E	PCN 1		DMSP43		PGTW
75	251618	13.5N 128.5E	PCN 2		DMSP43	EYE DIA 20NM	NNUL
76	252113	13.4N 126.1E	PCN 1		DMSP47		RPMK
77	252255	13.6N 125.6E	PCN 1	T3.0/3.0 /S0.0/25HRS	DMSP47	EYE DIA 20NM	NNUL
78	252301	14.0N 125.5E	PCN 1	T3.0/3.5-/W0.5/24HRS	DMSP43		PGTW
79	260258	14.6N 124.3E	PCN 1	T3.0/3.0-/W1.5/30HRS	DMSP43		RPMK
80	260300	14.6N 124.3E	PCN 1		DMSP43		PGTW
81	260955	14.5N 122.5E	PCN 1		DMSP47		PGTW
82	260955	14.7N 122.4E	PCN 1		DMSP47		RODN
83	260955	14.6N 122.5E	PCN 2		DMSP47		RPMK
84	261000	14.9N 122.5E	PCN 2		DMSP47	EYE DIA 25NM	NNUL
85	261143	14.7N 122.5E	PCN 1		DMSP43		PGTW
86	261342	15.2N 121.7E	PCN 2		DMSP43		RPMK
87	261342	15.2N 122.0E	PCN 1		DMSP43		RODN
88	261342	15.1N 121.9E	PCN 2		DMSP43	EYE DIA 15NM	NNUL
89	262236	15.2N 120.1E	PCN 5		DMSP47		RKSO
90	262236	15.0N 120.2E	PCN 5	T3.0/6.0 /W1.0/20HRS	DMSP47		RPMK

91	262335	14.4N 120.6E	PCN 4	T4.5/4.5+		DMSP47	INIT JAS		RDDN
92	271065	14.7N 119.6E	PCN 5	T5.0/6.0 /W2.0/22HRS		DMSP36			RPMK
93	271692	14.4N 118.9E	PCN 3	T4.5/5.5+/W2.5/24HRS		NOAA9			PGTW
94	271117	14.4N 117.8E	PCN 4			DMSP47			RDDN
95	271308	14.3N 117.3E	PCN 2			DMSP36	SMALL EYE VSBL		NNJL
96	271308	14.3N 117.1E	PCN 1			DMSP36			RPMK
97	271524	17.1N 116.9E	PCN 4			DMSP45	EYE NOT VSBL		NNJL
98	271524	17.3N 116.9E	PCN 4			DMSP45	CI 00#W		PGTW
99	272215	17.2N 115.8E	PCN 4	T4.0/4.5 /W0.5/20HRS		DMSP47			PGTW
100	272217	14.4N 115.4E	PCN 4			DMSP47	NO VSBL EYE		NNJL
101	240008	14.7N 115.5E	PCN 5	T5.5/5.5 /W1.5/24HRS		DMSP36			RPMK
102	240008	14.2N 115.5E	PCN 5	T5.+		DMSP36	NO VSBL EYE		NNJL
103	240805	17.0N 114.3E	PCN 5			DMSP36	EYE NOT VSBL		NNJL
104	240805	17.5N 115.5E	PCN 5			DMSP36			RPMK
105	240806	17.2N 115.0E	PCN 5	T5.0/5.0 /W1.5/24HRS		DMSP36	PARTIALLY EXPOSED LLCC		RDDN
106	241057	14.4N 115.2E	PCN 4			DMSP47			NNJL
107	651057	14.5N 115.0E	PCN 5			DMSP47	CI 00#W UPR LVL		PGTW
108	241057	14.4N 115.1E	PCN 5			DMSP47	UPR LVL		RKSO
109	241650	14.3N 115.0E	PCN 5			DMSP36			RDDN
110	241505	14.2N 114.5E	PCN 5			DMSP45			RPMK
111	241505	14.6N 114.6E	PCN 6			DMSP45	UPR LVL		PGTW
112	242350	14.5N 112.6E	PCN 5	T5.0/5.0-/W2.0/22HRS		DMSP36	PARTIALLY EXPOSED LLCC		PGTW
113	242351	14.2N 113.6E	PCN 5	T3.0/4.0 /W1.0/20HRS		DMSP36	APPARENT LLCC		RDDN
114	242351	14.4N 113.5E	PCN 5	T5.5/5.5		DMSP36	INIT JAS		RKSO
115	241037	14.3N 113.6E	PCN 5			DMSP47	CI DOWN		PGTW
*116	241232	14.2N 110.4E	PCN 5			DMSP36			RDDN
*117	241530	14.3N 109.2E	PCN 6			DMSP45			RDDN
*118	241530	14.2N 109.0E	PCN 5			DMSP36	POSSIBLE SECONDARY 12.8N 109.0E		RPMK

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	DRS MSLP	MAX-SFC-WND VEL/ARC/RNG	MAX-FLT-LVL-WND WIND/VEL/ARC/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	180015	14.5N 174.2E	700MB	3095	1002	40 070 15	120 40 300 10	1 1	CIRCULAR		250	+11 +13 + 9	1
2	182230	11.1N 170.2E	700MB	3103		50 140 30	030 48 140 30					+14 + 9	2
3	190245	11.3N 169.4E	700MB	3035	995	35 100 20	090 50 300 10	1 1	ELLIPTICAL	10 05	100	+12 +14 + 8	2
4	191014	11.2N 167.8E	700MB	3032	995		090 65 340 15	7 3	CIRCULAR		120	+12 +13 + 9	3
5	191205	11.6N 167.3E	700MB	3024			180 70 060 15						3
6	192100	11.7N 165.1E	700MB	2813	968	100 300 3	060 100 310 10	2 1	CIRCULAR		80	+12 +16 +12	4
7	192340	11.6N 164.8E	700MB	2805		90 360 4	090 85 010 12					+15 +12	4
8	200355	11.7N 163.3E	700MB	2791	967	80 240 10	140 71 100 8	5 5	CIRCULAR		40	+10 +11 +11	4
9	200538	11.7N 162.6E	700MB	2830	970	75 290 10	080 80 290 10					+11 +11	4
10	201545	11.6N 159.9E	700MB	2732	959		200 40 120 8	1 1	CIRCULAR		40	+10 +16 + 9	5
11	202030	11.4N 159.0E	700MB	2963	938	130 180 10	110 95 220 15	1 1	CIRCULAR		50	+13 +20 +10	5
12	210320	11.4N 155.9E	700MB	2925	935	130 230 10	140 75 230 12	4 2	CIRCULAR		100	+12 +15 +14	7
13	210922	11.2N 156.3E	700MB		945		030 95 300 10	5 1	CIRCULAR		60	+11 +21 +16	7
14	211515	11.1N 155.0E	700MB	2946	937		020 105 290 12	4 2	CIRCULAR		120	+12 +17 +14	8
15	211920	11.2N 154.4E	700MB	2976	930		030 110 310 24					+17 +14	8
16	212009	11.2N 154.2E	700MB	2932	925	110 360 5	270 95 180 12	4 2	CIRCULAR		100	+15 +17 +14	8
17	220054	11.3N 153.3E	700MB	2970		130 030 10	110 110 030 10					+16 +16	9
18	220307	11.3N 152.8E	700MB	2920	911	130 320 8	080 113 320 8	2 2	CIRCULAR		120	+13 +23 +17	9
19	220545	11.5N 152.2E	700MB	2920		120 250 10	120 110 250 7					+19 +13	10
20	220949	11.5N 151.8E	700MB	2919	913		080 112 320 12	3 2	CIRCULAR		130	+11 +19 +14	10
21	221222	11.4N 151.1E	700MB	2913			140 98 160 12					+21 +12	11
22	221630	11.6N 150.9E	700MB	2974	897		070 122 310 8	4 2	CIRCULAR		100	+11 +20 +12	11
23	222222	11.6N 148.8E	700MB	2911	888	130 330 5	020 110 300 12	4 4	CIRCULAR		100	+12 +29 +14	12
24	230202	11.7N 148.2E	700MB	2960	882	150 100 5	120 105 030 12	4 2	CIRCULAR		120	+12 +31 + 8	12
25	230835	11.9N 146.4E	700MB	2955	884		140 115 270 8	0 0	CIRCULAR		80	+12 +27 +19	13
26	231423	12.1N 144.7E	700MB	2988	899		080 127 330 15	3 3	CIRCULAR		120	+11 +21 +13	14
27	232035	11.3N 142.9E	700MB	2965	897	115 020 20	290 120 190 10	5 2	CIRCULAR		130	+13 +20 +18	15
28	240217	12.2N 141.2E	700MB	2905	900		300 120 250 9	5 5	CIRCULAR		180	+16 +17 +17	15
29	240515	12.4N 140.2E	700MB	2968	897	140 0	141					+24 +13	15
30	241408	12.5N 136.7E	700MB	2951	895		320 109 230 14	4 1	CIRCULAR		160	+12 +19 +13	17
31	241905	12.6N 135.2E	700MB	2939			091 15 12					+19 +14	17
32	242027	12.9N 134.3E	700MB	2973	886	90 080 38	140 135 060 10	4 1	CIRCULAR		130	+12 +24 +16	18
33	250015	12.7N 133.2E	700MB	2964	882	130 230 10	130 115 040 10					+25 +18	18
34	250317	12.9N 132.1E	700MB	2987	878	130 010 12	130 110 010 10	1 1	CIRCULAR		100	+12 +27 +10	19
35	251415	13.6N 128.0E	700MB	2981	886		130 110 220 10	5 5	CIRCULAR		150	+12 +18 +16	19
36	251902	13.7N 126.9E	700MB	2926	889		080 114 330 30					+17 +14	19
37	252001	13.8N 126.5E	700MB	2928	892		300 116 190 20	5 1	CIRCULAR		200	+10 +18 +17	19
38	270857	14.8N 117.8E	700MB	2980	884	55 360 17	130 56 060 120	2 1	CIRCULAR		220	+13 + 8	21
39	271205	14.3N 117.4E	700MB	2956	884		080 44 300 8					+13 +10	21
*0	271411	17.0N 117.0E	700MB	2970	887		170 44 080 25	2 2	CIRCULAR		250	+12 +13 +12	21
*1	272030	17.2N 115.9E	700MB	2939	890		170 54 090 130	0 0	CIRCULAR		200	+11 +14 +11	22
42	290321	16.9N 115.8E	700MB	2984	888	35 050 30	080 57 310 90	5 2				+ 9 +13 + 8	23
*3	290521	14.9N 115.2E	700MB	2979	888	35 060 30	150 49 060 120					+12 + 8	23

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RAINOB-CODE ASHAR TDUFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	230320	11.7N 147.7E	LAND	GOOD	CIRCULAR	10		EYE	13.6N 144.9E	91218
2	230410	11.8N 147.5E	LAND	GOOD	CIRCULAR	10		EYE	13.6N 144.9E	91218
3	230435	11.8N 147.3E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
4	230510	11.8N 147.3E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
5	230535	11.8N 147.3E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
6	230610	11.9N 147.1E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
7	230635	11.8N 147.0E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
8	230710	11.9N 146.7E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
9	230735	12.0N 146.7E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
10	230835	12.0N 146.4E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
11	230910	12.0N 146.3E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
12	230935	12.0N 146.3E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
13	231010	12.1N 146.0E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
14	231035	12.2N 145.7E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218
15	231110	12.2N 145.7E	LAND	GOOD	CIRCULAR	15		EYE	13.6N 144.9E	91218

16	231135	12.2N	145.5E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
17	231210	12.2N	145.3E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
18	231235	12.2N	145.2E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
19	231310	12.2N	145.0E	LAND	GOOD	CIRCULAR	16			EYE			13.0N	144.9E	91218
20	231335	12.3N	144.8E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
21	231410	12.3N	144.7E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
22	231435	12.3N	144.7E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
23	231510	12.3N	144.5E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
24	231535	12.3N	144.3E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
25	231610	12.3N	144.2E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
26	231635	12.2N	144.1E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
27	231710	12.2N	143.8E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
28	231735	12.2N	143.7E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
29	231810	12.1N	143.6E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
30	231835	12.0N	143.4E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
31	231910	12.0N	143.2E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
32	231935	11.9N	143.0E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
33	232010	11.9N	143.0E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
34	232035	11.9N	142.8E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
35	232100	11.9N	142.6E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
36	232135	11.9N	142.5E	LAND	GOOD	CIRCULAR	15			EYE			13.0N	144.9E	91218
37	260300	14.0N	125.5E	LAND		CIRCULAR	33			EYE OPEN E		PARADES	14.2N	122.7E	
38	260000	14.5N	125.4E	LAND				10410	52935				14.0N	124.3E	98447
39	260001	14.0N	125.0E	LAND		CIRCULAR	25			EYE MOVG NNW 10KTS		PARADES	14.2N	122.7E	
40	260100	14.0N	124.8E	LAND		CIRCULAR	22			EYE MOVG WNW 20KTS		PARADES	14.2N	122.7E	
41	260100	14.5N	125.2E	LAND				10447	52735	EYE BECOMING LARGER			14.0N	124.3E	98447
42	260200	14.2N	124.9E	LAND			23			EYE		PARADES	14.2N	122.7E	
43	260200	14.5N	124.7E	LAND				10410	52740				14.0N	124.3E	98447
44	260200	14.5N	124.6E	LAND				11240	30877				14.1N	123.0E	98440
45	260300	14.5N	124.3E	LAND				30N40	52935				14.0N	124.3E	98447
46	260300	14.2N	124.2E	LAND			23			MOVG 2710 AVG SPD 19KTS		PARADES	14.2N	122.7E	
47	260300	14.4N	124.3E	LAND				20N11	52918				14.1N	123.0E	98440
48	260400	14.4N	124.0E	LAND			21			EYE MOVG WNW 15KTS		PARADES	14.2N	122.7E	
49	260500	14.5N	123.7E	LAND						EYE MOVG W 10KTS		PARADES	14.2N	122.7E	
50	260500	14.5N	123.6E	LAND				20N40	61035				14.1N	123.0E	98440
51	260530	14.7N	123.9E	LAND				4////	4////				16.3N	120.6E	98321
52	260500	14.8N	123.7E	LAND				10707	4////	EYE CIRCULAR OPEN SE			16.3N	120.6E	98321
53	260500	14.5N	123.5E	LAND						EYE MOVG WNW 15KTS		PARADES	14.2N	122.7E	
54	260700	14.4N	123.0E	LAND				10717	52916	EYE CIRCULAR OPEN SE			16.3N	120.6E	98321
55	260700	14.6N	123.3E	LAND		CIRCULAR	17			EYE MOVG W 17KTS		PARADES	14.2N	122.7E	
56	260730	14.9N	123.4E	LAND				10717	42712	EYE CIRCULAR			16.3N	120.6E	98321
57	260900	14.9N	123.3E	LAND				10777	42710	EYE CIRCULAR OPEN S			16.3N	120.6E	98321
58	260900	14.7N	122.9E	LAND		CIRCULAR	22			EYE MOVG W 15KTS		PARADES	14.2N	122.7E	
59	260920	14.7N	123.1E	LAND	POOR	CIRCULAR	22			WALL CLD			15.2N	120.6E	98327
60	260930	14.7N	123.2E	LAND				10827	4////	EYE CIRCULAR OPEN			16.3N	120.6E	98321
61	260900	14.7N	122.7E	LAND						EYE MOVG WSW 13KTS		PARADES	14.2N	122.7E	
62	260910	14.9N	122.9E	LAND	POOR	CIRCULAR	24			WALL CLD			15.2N	120.6E	98327
63	260930	14.7N	122.9E	LAND	FAIR	CIRCULAR	24			WALL CLD			15.2N	120.6E	98327
64	260930	14.7N	123.1E	LAND				10777	4////	EYE CIRCULAR OPEN S			16.3N	120.6E	98321
65	261000	14.7N	122.8E	LAND		CIRCULAR				EYE MOVG W 8KTS		PARADES	14.2N	122.7E	
66	261030	14.7N	122.7E	LAND	GOOD	CIRCULAR	29			EYE			15.2N	120.6E	98327
67	261100	14.7N	122.5E	LAND						CTNR MOVG W 9KTS		GOZAR			
68	261100	14.5N	122.6E	LAND				21750	52708				14.1N	123.0E	98440
69	261110	14.7N	122.6E	LAND	GOOD	CIRCULAR	26			EYE OPEN SW			15.2N	120.6E	98327
70	261200	14.5N	122.5E	LAND				35750	52900				14.1N	123.0E	98440
71	261200	14.3N	122.4E	LAND		CIRCULAR	25			EYE MOVG W 8KTS		GOZAR			
72	261200	14.7	122.6E	LAND				10877	4////	EYE CIRCULAR 100 PERCENT			16.3N	120.6E	98321
73	261210	14.8N	122.5E	LAND	GOOD	CIRCULAR	23			EYE OPEN S			15.2N	120.6E	98327
74	261300	14.8N	122.2E	LAND		CIRCULAR				EYE MOVG NW 9KTS		GOZAR			
75	261300	14.9N	122.4E	LAND				10727	4////	EYE CIRCULAR			16.3N	120.6E	98321
76	261310	14.9N	122.2E	LAND	GOOD	CIRCULAR	24			EYE OPEN SW-S			15.2N	120.6E	98327
77	261330	14.9N	122.2E	LAND	GOOD	CIRCULAR	20			EYE OPEN SW-S			15.2N	120.6E	98327
78	261330	14.9N	122.3E	LAND				11747	42700	EYE ELLIPTICAL			16.3N	120.6E	98321
79	261400	14.9N	122.0E	LAND		CIRCULAR	25			EYE MOVG W 8KTS		GOZAR			
80	261400	14.9N	122.1E	LAND	GOOD	CIRCULAR	25			EYE OPEN SE-S			15.2N	120.6E	98327
81	261430	15.1N	122.1E	LAND				10737	4////	EYE CIRCULAR			16.3N	120.6E	98321
82	261430	15.0N	122.0E	LAND	GOOD	CIRCULAR	20			EYE OPEN S-W			15.2N	120.6E	98327
83	261500	14.9N	122.9E	LAND						EYE MOVG W 10KTS		PARADES	14.2N	122.7E	
84	261500	14.9	122.1E	LAND				47770	52800				14.1N	123.0E	98440
85	261510	15.0N	121.9E	LAND	GOOD	CIRCULAR	22			EYE OPEN SW			15.2N	120.6E	98327
86	261530	15.1N	121.8E	LAND	GOOD	CIRCULAR	15			EYE OPEN NW			15.2N	120.6E	98327
87	261600	15.2N	121.9E	LAND				10877	43000	EYE CIRCULAR			16.3N	120.6E	98321
88	261700	15.3N	121.6E	LAND			15			EYE MOVG NW 12KTS		GOZAR			
89	261700	15.4N	121.7E	LAND				10487	53210	EYE CIRCULAR			16.3N	120.6E	98321
90	261730	15.2N	121.5E	LAND	FAIR					CNTR FILLED AND OVR LAND			15.2N	120.6E	98327
91	261818	15.4N	121.6E	LAND				10447	52707	EYE CIRCULAR OPEN SE			16.3N	120.6E	98321
92	261930	15.5N	121.2E	LAND	FAIR					CNTR REFORMING # OF WINS			15.2N	120.6E	98327
93	261915	15.6N	121.1E	LAND	FAIR					CNTR NFG WALL CLD			15.2N	120.6E	98327
94	261930	15.5N	120.9E	LAND	FAIR					CNTR NFG WALL CLD			15.2N	120.6E	98327
95	262010	15.9N	120.8E	LAND	FAIR					CNTR NFG WALL CLD			15.2N	120.6E	98327
96	262032	16.0N	120.5E	LAND	FAIR					CNTR NFG WALL CLD			15.2N	120.6E	98327
97	262105	16.0N	120.5E	LAND	FAIR					CNTR NFG WALL CLD			15.2N	120.6E	98327
98	262130	16.0N	120.4E	LAND	FAIR					CNTR			15.2N	120.6E	98327
99	262200	16.1N	120.3E	LAND	FAIR					CNTR			15.2N	120.6E	98327
100	262235	16.3N	120.2E	LAND	POOR					NFG WALL CLD			15.2N	120.6E	98327
101	262300	16.2	120.2E	LAND				12307	/////	EYE ELLIPTICAL			16.3N	120.6E	98321
102	262300	16.0N	120.0E	LAND		ELLIPTICAL				MOVG N 20KTS AXIS 18/12		WALLACE	16.0N	120.3E	
103	262308	16.3N	120.1E	LAND	POOR					NFG WALL CLD			15.2N	120.6E	98327
104	270000	16.5N	119.7E	LAND				12517	52820	EYE ELLIPTICAL			16.3N	120.6E	98321
105	270030	16.7N	119.5E	LAND				12517	4////	EYE ELLIPTICAL			16.3N	120.6E	98321
106	270100	16.6N	119.5E	LAND		CONCENTRIC				EYE MOVG N 20KTS		WALLACE	16.0N	120.3E	
107	270200	16.6N	119.0E	LAND				10417	4////				16.3N	120.6E	98321
108	270200	16.6N	119.2E	LAND		CIRCULAR	22			EYE MOVG W 10KTS		WALLACE	16.0N	120.3E	
109	270300	16.6N	119.0E	LAND				10411	4////	EYE CIRCULAR			16.3N	120.6E	98321
110	270300	16.6N	119.2E	LAND		CIRCULAR	20			EYE SINRY		WALLACE	16.0N	120.3E	
111	270400	16.6N	118.8E	LAND		CIRCULAR	36			EYE MOVG W 10KTS		WALLACE	16.0N	120.3E	
112	270500	17.0N	118.5E	LAND		CIRCULAR	14			EYE MOVG NW 6KTS		WALLACE	16.0N	120.3E	
113	270600	17.2N	118.3E	LAND		CIRCULAR	30			EYE MOVG NW 10KTS		WALLACE	16.0N	120.3E	
114	270800	16.8N	117.5E	LAND				10487	5////	EYE ELLIPTICAL			16.3N	120.6E	98321
115	271030	16.9N	117.3E	LAND				45///	7////	EYE FIX USING 10 DEG SPRL OVRLY			16.3N	120.6E	98321

TROPICAL STORM TESS

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	302130	14.4N 144.7E	PCN 6	T0.0/0.0	DMSP4A	INIT DBS	PGTW
2	310131	14.0N 144.0E	PCN 5		DMSP4A		PGTW
3	311015	14.2N 144.8E	PCN 5		DMSP3A		PGTW
4	312055	13.2N 144.5E	PCN 4	T1.0/1.0 /01.0/24HRS	DMSP37		PGTW
5	312255	13.1N 145.1E	PCN 5		DMSP3A		PGTW
6	010438	14.5N 143.7E	PCN 6		DMSP37		PGTW
7	011140	13.5N 143.9E	PCN 5		DMSP3A		PGTW
8	011554	13.6N 143.9E	PCN 6		DMSP4A		PGTW
9	012034	14.0N 143.9E	PCN 6	T2.0/2.0 /01.0/24HRS	DMSP37		PGTW
10	012241	14.3N 144.8E	PCN 5		DMSP3A		PGTW
11	020055	14.5N 145.5E	PCN 5		DMSP3A		PGTW
12	020414	17.5N 145.4E	PCN 6		DMSP37		PGTW
13	020913	17.1N 144.9E	PCN 6		DMSP37		RODN
14	021123	14.4N 145.8E	PCN 6		DMSP3A		PGTW
15	021336	14.7N 144.1E	PCN 5		DMSP3A		PGTW
16	021337	14.5N 144.6E	PCN 6		DMSP3A		RODN
17	022223	14.5N 145.2E	PCN 5	T2.5/2.5 /00.5/24HRS	DMSP3A		PGTW
18	030037	14.6N 145.3E	PCN 6		DMSP3A		PGTW
19	030900	13.3N 144.5E	PCN 6		DMSP37		PGTW
20	030900	13.1N 144.4E	PCN 6		DMSP37		RODN
21	031106	19.6N 144.5E	PCN 5		DMSP4A		PGTW
22	031314	19.9N 144.5E	PCN 6		DMSP3A		PGTW
23	032206	21.1N 144.5E	PCN 5	T3.5/3.5 /01.0/24HRS	DMSP4A		PGTW
24	040201	21.6N 144.5E	PCN 5		DMSP3A		PGTW
25	040340	22.4N 144.6E	PCN 6		DMSP37		PGTW
26	040340	22.7N 144.4E	PCN 4		DMSP37		RODN
27	041045	22.7N 147.0E	PCN 3		DMSP3A		PGTW
28	041301	23.2N 147.0E	PCN 6		DMSP3A		PGTW
29	042149	25.0N 148.2E	PCN 3	T4.0/4.0-/00.5/24HRS	DMSP3A		PGTW
30	042149	24.7N 147.9E	PCN 4	T4.0/3.0	DMSP3A	INIT DBS	RODN
31	050143	26.0N 148.5E	PCN 4		DMSP3A		PGTW
32	050821	27.3N 148.9E	PCN 4		DMSP37		PGTW
33	051031	27.7N 149.3E	PCN 3		DMSP3A		PGTW
34	051031	27.7N 149.5E	PCN 4		DMSP3A		RODN
35	051624	28.3N 150.1E	PCN 3		DMSP3A		PGTW
36	051624	28.2N 150.0E	PCN 3		DMSP3A		RKSO
37	052131	29.5N 152.0E	PCN 4	T3.5/3.5-/00.5/24HRS	DMSP3A		RODN
38	052131	29.9N 151.9E	PCN 4	T3.0/4.0 /W1.0/24HRS	DMSP3A		PGTW
39	060126	30.8N 153.1E	PCN 4		DMSP3A		PGTW
40	061013	32.9N 157.0E	PCN 6		DMSP3A	UPR ANTICYCLONE CI DOWN	PGTW
41	061607	33.3N 159.0E	PCN 6		DMSP3A		PGTW
42	061607	34.0N 159.4E	PCN 5		DMSP3A		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND DIR/VEL/RAD/RNG	MAX-FLT-LVL-WND DIR/VEL/RAD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION	EYE DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	012157	15.4N 144.3E	700MB	3032	995	30 180 90	220 27 180 90	3 5				+26 +26 +25 24	1
2	020303	17.3N 144.5E	700MB	3005	991	15 270 90	020 20 270 120	5 4				+12 +11	1
3	021504	18.3N 144.9E	700MB	3012	992		280 33 120 120	3 2				+12 +12	2
4	021910	18.6N 145.0E	700MB	2991	989		160 40 120 90					+12 +12	2
5	022106	18.4N 145.3E	700MB	2998	990		160 44 060 120	3 4				+10 +10	2
6	030131	18.2N 145.6E	1500FT	2990	990	25 190 120	130 31 190 120					+26 +24	3
7	030229	18.5N 145.6E	1500FT		988	55 350 90	130 35 060 60	1 2				+26 +26 +23 24	3
8	030302	18.7N 145.7E	700MB	2958								+14 +12	3
9	031429	19.6N 146.6E	700MB	2901	977		170 65 080 120	5 2	ELLIPTICAL	35 20 180		+14 +14 +12	4
10	031800	20.5N 146.4E	700MB	2918	981		160 50 360 90					+14 +14	4
11	032010	20.7N 146.3E	700MB	2922	981	35 270 90	120 77 050 90	5 3				+10 +14 +12	4
12	040003	21.2N 146.5E	700MB	2920	981	60 120 75	280 60 180 120	5 3				+14 +15 +14	5
13	041200	23.1N 147.6E	700MB	2876	973		220 77 120 90					+16 +10	5
14	041445	23.6N 147.4E	700MB	2984	974		120 62 240 90	3 5				+17 +11	5
15	050024	25.5N 148.0E	700MB	2901	976	65 190 100	160 85 040 100	2 4				+14 +15 +12	7
16	050300	26.1N 148.4E	700MB	2892	977	70 130 90	210 75 130 130	2 4				+13 +15 +13	7
17	060304	31.7N 153.2E	700MB	2874	975	55 190 30	240 80 120 90	5 5				+15 +16 +12	9

TROPICAL DEPRESSION 32

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	152341	15.2N 129.7E	PCN 6	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	152341	15.0N 130.1E	PCN 5	T1.5/1.5	DMSP36	INIT OBS	NNUL
3	152342	16.7N 131.4E	PCN 5	T1.0/1.0	DMSP36	INIT OBS	RPMK
4	160149	16.2N 129.0E	PCN 5		DMSP37		NNUL
5	161223	15.4N 129.7E	PCN 6		DMSP36	CI UP	PGTW
6	161431	16.4N 129.8E	PCN 6		DMSP35		NNUL
7	162324	16.5N 129.7E	PCN 6	T2.5/2.5 /D1.0/24HRS	DMSP36		NNUL
8	162324	16.9N 130.1E	PCN 5	T1.0/1.0 /D1.0/24HRS	DMSP36		PGTW
9	162324	17.1N 130.3E	PCN 5	T1.5/1.5 /D0.5/24HRS	DMSP36		RPMK
10	170313	16.4N 129.0E	PCN 5		DMSP35		NNUL
11	170930	16.9N 129.3E	PCN 6		DMSP37	CI SAME	PGTW
12	170931	16.6N 130.3E	PCN 6		DMSP37		NNUL
13	170932	17.1N 128.6E	PCN 6		DMSP37		RODN
14	171206	16.9N 130.7E	PCN 6		DMSP36		NNUL
15	171206	17.0N 129.3E	PCN 6		DMSP36		PGTW
16	171613	17.4N 130.5E	PCN 6		DMSP35		NNUL
17	171613	17.1N 129.5E	PCN 6		DMSP35		PGTW
18	171613	18.1N 130.4E	PCN 6		DMSP35	UPPER LVL	RPMK
19	172212	17.0N 128.5E	PCN 5		DMSP37		NNUL
20	172212	14.6N 126.8E	PCN 3	T3.0/3.0-/D2.0/23HRS	DMSP37		PGTW
21	172212	14.6N 126.7E	PCN 3	T3.0/3.0	DMSP37	INIT OBS	RODN
22	172307	14.8N 126.7E	PCN 3		DMSP36		PGTW
23	180255	15.1N 128.0E	PCN 5	T2.0/2.5 /W0.5/27HRS	DMSP35		NNUL
24	180255	14.9N 127.0E	PCN 3		DMSP35		PGTW
25	180255	15.2N 127.2E	PCN 3	T1.5/1.5 /S0.0/27HRS	DMSP35		RPMK
26	181052	14.5N 127.4E	PCN 5		DMSP37	BASED ON CONTINUITY OF FEATURES	PGTW
27	181052	14.8N 127.6E	PCN 5		DMSP37	NO APPARENT CNTR	RODN
28	181536	14.3N 126.8E	PCN 6		DMSP35	BASED ON CONTINUITY OF FEATURES	PGTW
29	181537	14.3N 126.3E	PCN 5		DMSP35		RPMK
30	182158	16.0N 125.9E	PCN 5	T1.0/2.0 /W2.0/24HRS	DMSP37		PGTW
31	190237	13.4N 125.6E	PCN 3		DMSP35		PGTW
32	190237	13.8N 124.9E	PCN 5	T1.0/2.0 /W1.0/24HRS	DMSP35		NNUL
33	191032	13.5N 124.8E	PCN 5		DMSP37		PGTW
34	191033	13.8N 125.2E	PCN 5		DMSP37		RODN
35	191518	13.5N 124.3E	PCN 5		DMSP35		PGTW
36	191518	14.0N 124.0E	PCN 5		DMSP35		RPMK

TYPHOON VIOLA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	152154	3.1N 155.7E	PCN 6	T0.0/0.0	DMSP 16	INIT J4S	PGTW
2	161042	5.9N 154.8E	PCN 6		DMSP 16	CI UP	PGTW
3	162049	6.2N 151.6E	PCN 6		DMSP 17		PGTW
4	162142	6.4N 151.3E	PCN 6	T1.5/1.5 /D1.5/24HRS	DMSP 16		PGTW
5	170830	8.1N 149.3E	PCN 5		DMSP 17	CI UP	PGTW
6	171024	8.1N 148.9E	PCN 6		DMSP 16		PGTW
7	171613	8.3N 148.0E	PCN 6		DMSP 15		PGTW
8	171913	8.5N 148.6E	PCN 6		DMSP 15		NNUL
9	172030	9.3N 148.8E	PCN 6		DMSP 17		PGTW
10	172307	9.4N 145.9E	PCN 5	T3.0/3.0 /D1.5/25HRS	DMSP 16		PGTW
11	172307	9.4N 145.7E	PCN 3	T3.0/3.0	DMSP 16	INIT OBS	NNUL
12	180113	9.5N 145.4E	PCN 5		DMSP 15		PGTW
13	181006	11.3N 143.3E	PCN 6		DMSP 16		PGTW
14	181354	11.3N 142.2E	PCN 6		DMSP 15		PGTW
15	181355	11.1N 141.8E	PCN 6		DMSP 15		RODN
16	181355	11.2N 141.7E	PCN 4		DMSP 14		NNUL
17	182152	11.4N 139.5E	PCN 3		DMSP 17		NNUL
18	182158	11.2N 141.3E	PCN 5		DMSP 17		PGTW
19	182249	11.2N 140.3E	PCN 3	T4.0/4.0 /D1.0/24HRS	DMSP 16		NNUL
20	182249	11.5N 141.1E	PCN 5	T3.5/3.5 /D0.5/24HRS	DMSP 16		PGTW
21	190237	12.2N 139.6E	PCN 5	T3.5/3.5+	DMSP 15	INIT J4S	RPMK
22	190237	11.7N 140.0E	PCN 5		DMSP 15		PGTW
23	190237	12.3N 140.4E	PCN 1		DMSP 15		NNUL
24	190951	12.3N 138.4E	PCN 6		DMSP 17		PGTW
25	191130	12.4N 138.0E	PCN 6		DMSP 16		PGTW
26	191133	13.1N 138.2E	PCN 4		DMSP 16		NNUL
27	191336	12.4N 137.7E	PCN 6		DMSP 15		PGTW
28	192132	14.2N 138.5E	PCN 1	T4.5/4.5 /D1.0/23HRS	DMSP 17		PGTW
29	192133	14.4N 138.2E	PCN 1		DMSP 17		NNUL
30	192232	14.2N 138.2E	PCN 5		DMSP 16		PGTW
31	192232	14.0N 138.2E	PCN 5		DMSP 16		RPMK
32	201013	15.1N 138.8E	PCN 1		DMSP 17		PGTW
33	201013	15.1N 138.9E	PCN 1		DMSP 17		RODN
34	201113	15.2N 138.0E	PCN 1		DMSP 16		PGTW
35	201114	15.1N 138.8E	PCN 2		DMSP 16		NNUL
36	201500	15.3N 138.3E	PCN 1		DMSP 15		PGTW
37	201501	15.3N 138.5E	PCN 2		DMSP 15		NNUL
38	202113	15.3N 137.6E	PCN 2		DMSP 17		PGTW
39	202113	15.3N 137.5E	PCN 2		DMSP 17		RODN
40	202356	16.0N 137.2E	PCN 2	T5.5/5.5 /D1.0/24HRS	DMSP 16		PGTW
41	210200	16.1N 137.0E	PCN 1	T6.0/6.0	DMSP 15	INIT J4S	RPMK
42	210201	16.2N 137.9E	PCN 1		DMSP 15		PGTW
43	210201	16.2N 137.6E	PCN 1		DMSP 15		NNUL
44	210954	16.7N 137.9E	PCN 1		DMSP 17	CI UP	PGTW
45	210954	16.4N 137.0E	PCN 1		DMSP 17		NNUL
46	211056	17.0N 137.6E	PCN 1		DMSP 16		PGTW
47	211238	16.5N 137.5E	PCN 1		DMSP 16		RPMK
48	211443	17.2N 137.1E	PCN 1		DMSP 15		PGTW
49	211443	16.9N 137.6E	PCN 2		DMSP 15		NNUL
50	212053	18.1N 136.2E	PCN 5		DMSP 17		PGTW
51	212235	14.4N 129.9E	PCN 2	T5.0/5.0	DMSP 17	INIT J4S	RODN
52	212338	18.3N 129.7E	PCN 1	T5.0/5.5 /W0.5/24HRS	DMSP 16		PGTW
53	220143	18.5N 129.7E	PCN 1	T5.0/6.0-/W1.0/24HRS	DMSP 15		RPMK
54	220143	18.6N 129.7E	PCN 1		DMSP 15		PGTW
55	220143	19.9N 129.0E	PCN 1		DMSP 15		NNUL
56	220934	19.7N 128.4E	PCN 5		DMSP 17		PGTW
57	220934	20.3N 128.2E	PCN 4		DMSP 17		RPMK
58	221220	20.2N 128.2E	PCN 5		DMSP 16		PGTW
59	221255	21.2N 128.2E	PCN 6		DMSP 16		NNUL
60	221625	20.2N 128.0E	PCN 5		DMSP 15		PGTW
61	222215	21.5N 129.3E	PCN 1	T4.5/5.0 /W0.5/23HRS	DMSP 17		PGTW
62	222321	21.4N 129.3E	PCN 1		DMSP 16		PGTW
63	231056	24.1N 131.5E	PCN 3		DMSP 17	CI 00Z	PGTW
64	231056	23.9N 130.7E	PCN 3		DMSP 17		RODN
65	231056	24.0N 130.7E	PCN 4		DMSP 17		NNUL
66	231056	23.9N 130.7E	PCN 3		DMSP 17		RKSD
67	231203	24.3N 131.8E	PCN 5		DMSP 16		PGTW
68	232155	25.2N 133.9E	PCN 6	T3.0/4.0 /W1.5/24HRS	DMSP 17		PGTW
69	232303	25.2N 133.7E	PCN 4		DMSP 16		PGTW
70	240248	25.3N 134.6E	PCN 4		DMSP 15		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) DRT/ INV/ DP/SST	MSN NO.
1	170710	4.2N 140.7E	1500FT		998	30 270	53 110	35 340 120	5 10			+23 +23 29	2
2	172118	5.2N 144.4E	700MB	1045	995	55 030	25 070	40 330 100	10 10			+11 +12 +10	3
3	180208	9.4N 144.9E	700MB	1002	999	40 300	50 080	50 300 100	4 5	CIRCULAR	90	+10 +10 +10	3
4	180541	10.4N 144.4E	700MB	1025	993	30 120	30 090	38 300 120				+14 +14	5
5	180832	10.4N 144.0E	700MB	1017	991	35 070	60 100	44 070 60	4 5	CIRCULAR	50	+12 +12 +12	5
6	182100	11.5N 141.1E	700MB	2984	984	40 060	35 140	48 060 120	3 5	ELLIPTICAL	30 20 360	+14 +10	6
7	190028	11.7N 140.0E	700MB	2984	986	55 010	30 100	55 010 60				+11 +11	6
8	191223	11.4N 139.7E	700MB	2984	986	55 050	50 150	57 050 90	3 5			+14 +12	6
9	191505	13.3N 137.5E	700MB	2984	977		100	77 090 35	10 7	CIRCULAR	600	+11 +15 + 9	7

10	280023	14.0N 136.9E	700MM	2831	970	55	050	120	240	47	100	27	4	2													
11	280250	14.3N 136.1E	700MM	2792	966	47	100	27	020	78	310	20	2	2	CIRCULAR		400	+15	+15	+11							8
12	281447	15.3N 134.3E	700MM	2720	938				060	94	340	25	4	1	CIRCULAR		250	+12	+18	+10							9
13	210308	15.1N 132.9E	700MM	2354	912	120	120	15	200	120	160	10	5	4	CIRCULAR		250	+13	+26	+ 5							10
14	210515	15.4N 132.5E	700MM	2331	913	120	200	15	190	127	050	10							+30	+16							10
15	210900	15.5N 132.0E	700MM	2312	911				150	105	220	30	3	4	CIRCULAR		220	+16	+29	+15							11
16	211637	17.1N 131.2E	700MM	2361	917				070	101	360	20	2	5	CIRCULAR		200	+12	+21	+14							11
17	220044	18.2N 129.4E	700MM	2452			25	080	120	140	40	080	30		ELLIPTICAL	65	40	350		+17	+17						12
18	220322	19.7N 129.0E	700MM	2431	925		30	130	30	180	120	110	40	5	2	CIRCULAR		350	+15	+16	+15						12
19	221530	20.7N 128.4E	700MM	2346	938					170	110	100	60	5	5	CIRCULAR		300	+13	+17	+ 8						13
20	222112	21.1N 128.7E	700MM	2393	944		50	240	120	040	75	320	15	5	10	CIRCULAR		100	+11	+15	+15						13
21	232144	25.2N 132.4E	700MM	2494	994		25	090	30	180	58	090	90	5	4				+18	+16	+ 9						15
22	240030	25.2N 133.9E	1500FT		993		25	170	15	190	33	170	15	5	1				+23	+23	+23	23					15

TROPICAL STORM WINNIE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	232155	8.5N 141.9E	PCN 6	T0.0/0.0	DMSP3A	INIT JTS	PGTW
2	250047	10.5N 155.3E	PCN 6	T0.0/0.0 /S0.0/24HRS	DMSP3A		PGTW
3	250945	12.2N 154.4E	PCN 6		DMSP3A		PGTW
4	251331	12.5N 153.7E	PCN 6		DMSP3A		PGTW
5	252228	12.5N 151.1E	PCN 6	T0.0/0.0 /S0.0/21HRS	DMSP3A		PGTW
6	260031	12.3N 150.4E	PCN 6		DMSP3A	SECONDARY PSN 13.7N 154.9E	PGTW
7	261110	11.4N 147.4E	PCN 5		DMSP3A		PGTW
8	262211	11.0N 148.5E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP3A		PGTW
9	271052	12.4N 149.6E	PCN 6		DMSP3A		PGTW
10	271255	13.0N 149.2E	PCN 6		DMSP3A		PGTW
11	272037	14.2N 147.5E	PCN 6		DMSP37		PGTW
12	272153	14.3N 147.4E	PCN 5	T2.0/2.0 /D2.0/24HRS	DMSP3A		PGTW
13	280137	14.9N 147.5E	PCN 5		DMSP3A		PGTW
14	281035	17.0N 146.8E	PCN 6		DMSP3A		PGTW
15	281618	19.2N 146.7E	PCN 6		DMSP3A		PGTW
16	282138	20.7N 146.2E	PCN 3	T3.5/3.5 /D1.5/24HRS	DMSP3A		PGTW
17	290119	21.0N 146.4E	PCN 4		DMSP3A		PGTW
18	290858	23.1N 146.0E	PCN 4		DMSP37		PGTW
19	290859	23.2N 147.9E	PCN 6		DMSP37		RODN
20	291012	23.2N 148.2E	PCN 5		DMSP3A		PGTW
21	291600	24.7N 149.7E	PCN 3		DMSP3A		PGTW
22	291959	27.0N 152.9E	PCN 6		DMSP37	UPR LVL ANTICYCLONE	PGTW
23	291959	27.2N 153.1E	PCN 6		DMSP37		RODN
24	292119	27.3N 153.7E	PCN 5	T2.0/2.0 /W1.5/24HRS	DMSP3A		PGTW
25	300101	24.6N 156.3E	PCN 6		DMSP3A		PGTW
26	300101	29.3N 157.9E	PCN 6	T1.0/1.0	DMSP3A	INIT JTS	RODN
27	300839	30.5N 146.0E	PCN 6		DMSP37	CI OOWX	PGTW
28	301000	30.4N 146.9E	PCN 6		DMSP3A		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	MIN HGT	OBS MSLP	MAX-SFC-WND WIND/VEL/RAD/RNG	MAX-FLT-LVL-WND WIND/VEL/RAD/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIENTATION/DIAM	EYE TEMP (C) OUT/ IN/ DP/SST	MSW NO.
1	270700	11.6N 149.5E	1500FT		992	35 230 50	310 35 240 80	7 2			+25 +26 +25 23	6
2	270830	11.9N 149.5E	700MM	3038	994			5 5			+16 +12	6
3	272050	14.3N 149.1E	700MM	3017	991	35 360 10	140 36 060 60	4 2			+12 +13 +11	5
4	280419	15.3N 147.6E	700MM	2972	987	35 080 10	220 41 130 60	5 2			+12 +12 +12	5
5	280730	16.2N 147.4E	700MM	2988	989	65 050 50	160 49 030 60	4 2			+12 +12 + 8	5
6	281210	17.9N 146.7E	700MM	2953	984		140 60 050 60	4 1			+12 +14 +11	7
7	281447	19.4N 146.3E	700MM	2972	984		200 52 150 90	4 4			+13 +13 +12	7
8	281805	19.5N 146.3E	700MM	2935	982		160 54 040 60	4 4			+13 +13 +13	7
9	282031	20.1N 146.2E	700MM	2884	975	50 140 30	230 48 140 90	4 2			+14 +15 +11	8
10	290019	20.9N 146.2E	700MM	2916			150 60 090 120				+14 +14	9
11	290224	21.4N 146.4E	700MM	2908	980	65 290 30	180 52 280 90	3 5			+13 +15 +13	9
12	291708	26.2N 151.1E	700MM	2897	978		280 64 220 100	4 2			+14 +15 +14	9

2. NORTH INDIAN OCEAN CYCLONE FIX DATA

TC18-78

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	130650	10.4N	89.0E	PCN 6		DMSP35		KGWC
2	140058	11.5N	89.5E	PCN 6		DMSP35		KGWC
3	140632	11.8N	89.6E	PCN 6	T1.5/1.5 /00.5/24HRS	DMSP35		KGWC
* 4	141339	11.6N	87.8E	PCN 6		DMSP35		KGWC
* 5	141716	11.5N	88.1E	PCN 6		DMSP35		KGWC
6	150040	12.5N	89.4E	PCN 5		DMSP35		RPMK
7	150840	12.5N	89.9E	PCN 6		DMSP35		KGWC
8	150956	13.1N	90.2E	PCN 6	T2.5/2.5 /01.0/24HRS	DMSP35		KGWC
* 9	151323	13.0N	92.9E	PCN 6		DMSP35		KGWC
* 10	151557	13.2N	92.4E	PCN 6		DMSP35		KGWC
11	160204	13.3N	89.7E	PCN 6		DMSP35		KGWC
12	160538	13.8N	90.2E	PCN 6	T2.5/2.5 /01.0/24HRS	DMSP35		KGWC
13	160943	13.3N	90.2E	CONF 1		DMSP		FWFS
14	161305	14.1N	91.3E	PCN 6		DMSP35		KGWC
15	161947	14.1N	91.3E	PCN 6		DMSP		KGWC
16	161920	13.3N	90.8E	PCN 6		DMSP35		KGWC
17	171147	14.8N	92.4E	PCN 6		DMSP35		KGWC
18	171552	14.5N	92.1E	CONF 1	T3.5/3.5 /01.5/24HRS	DMSP		FWFS
19	170520	14.5N	92.0E	PCN 4	T2.5/2.5-/01.5/24HRS	DMSP35		KGWC
20	171429	20.0N	93.8E	PCN 2		DMSP35		KGWC
21	171902	20.5N	94.3E	PCN 6		DMSP35		KGWC

TC19-78

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	250056	12.7N	91.9E	PCN 6	T1.0/1.0	DMSP37	INIT DBS	KGWC
2	250659	13.0N	90.8E	PCN 3	T1.5/1.5	DMSP35	INIT DBS	KGWC
3	251337	15.1N	89.8E	PCN 5		DMSP37	GOOD FEEDER BAND TO NORTH	KGWC
4	260036	15.2N	87.9E	PCN 4	T2.5/2.5 /01.0/20HRS	DMSP37	FEEDER BAND IN SE QUAD	KGWC
5	260641	15.5N	87.9E	PCN 4	T2.5/2.5 /01.0/24HRS	DMSP35		KGWC
6	261317	17.1N	88.9E	PCN 6		DMSP37		KGWC
7	261723	14.0N	87.1E	PCN 6		DMSP35		KGWC
8	270017	14.3N	87.3E	PCN 6		DMSP37	HVY CONVECTION NE	KGWC
9	270423	19.1N	88.1E	PCN 6		DMSP35		KGWC
10	270505	19.1N	88.3E	PCN 6	T3.0/3.0 /00.5/24HRS	DMSP35		KGWC
11	271258	20.5N	88.8E	PCN 6		DMSP37	DECREASED ORGANIZATION	KGWC
12	271705	20.4N	90.0E	PCN 6		DMSP35		KGWC
13	280906	20.0N	92.6E	PCN 6		DMSP35		RODN

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	OVERLAY CODE	SAT	COMMENTS	SITE
1	050847	10.5N 71.5E	PCN 6	T2.0/2.0	DMSP35	INIT JHS	KGWC
2	051325	10.6N 71.0E	PCN 6		DMSP37	CI OUTFLOW WEST	KGWC
3	052129	10.5N 71.6E	PCN 6		DMSP35	INCREASED CONV ACTIVITY	KGWC
4	060205	10.3N 72.6E	PCN 6	T3.0/3.0	DMSP37	INIT JHS BASED ON CI OUTFLOW	KGWC
5	060529	11.5N 71.5E	PCN 2	T3.5/3.5	DMSP35	INIT JHS RAGGED EYE FORMING	KGWC
6	061003	11.9N 71.0E		T3.0	TIROSN	COD 1 DEG RAD CNTR	NRPG
7	061447	13.5N 70.9E	PCN 6		DMSP37	CENTER POORLY DEFINED	KGWC
8	061911	13.5N 70.4E	PCN 6		DMSP35		KGWC
9	070146	13.2N 68.3E	PCN 6	T4.5/4.5 /01.5/24HRS	DMSP37	BANDING MORE ORGANIZED	KGWC
10	070512	13.9N 67.1E	PCN 1	T4.5/4.5 /01.0/24HRS	DMSP35	EYE CI COVERED	KGWC
11	070956	13.0N 66.9E		T5.0	TIROSN	COD EXTENDS 150NM RAD OF CNTR	NRPG
12	071627	15.4N 66.1E	PCN 4		DMSP37		KGWC
13	071953	15.4N 65.3E	PCN 4		DMSP35		KGWC
14	080127	16.0N 63.7E	PCN 2		DMSP35	EYE 5 NM DIA	KGWC
15	080735	16.5N 63.5E	PCN 2	T6.0/6.0 /01.5/24HRS	DMSP35	EYE 20 NM DIA	KGWC
16	080948	17.5N 62.5E		T5.0	TIROSN		NRPG
17	081407	17.5N 62.9E	PCN 6		DMSP		KGWC
18	081835	17.9N 62.8E	PCN 4		DMSP35	NO EYE VSBL	KGWC
19	082019	18.2N 62.7E	PCN 4		DMSP35	BASED ON CONSERVATIVE FEATURES	KGWC
20	090249	18.6N 62.3E	PCN 2		DMSP37	RAGGED EYE VSBL LESS ORGANIZED	KGWC
21	090717	19.7N 62.2E	PCN 2	T4.5/5.5 /W1.5/24HRS	DMSP35		KGWC
22	091120	20.3N 62.8E			TIROSN	COD EXTENDS 100NM RAD OF CNTR	NRPG
23	091529	20.3N 62.8E	PCN 6		DMSP37	COD ORIENTED NE-SW	KGWC
24	091954	20.5N 62.5E	PCN 4		DMSP35	DECREASED INTENSITY	KGWC
25	100229	21.8N 63.3E	PCN 4		DMSP37		KGWC
26	100559	22.2N 63.8E	PCN 3	T3.0/4.0 /W1.5/24HRS	DMSP35	NO SIGNIFICANT LLCC	KGWC
27	101111	22.3N 64.1E		T3.0	TIROSN	45NM ILL DEFINED EYE	NRPG
28	101510	23.1N 65.2E	PCN 6		DMSP37	UPPER LVL ANTICYCLONE	KGWC
29	101941	23.5N 66.9E	PCN 6		DMSP35	BASED ON APRNT LLCC	KGWC
30	110209	22.5N 66.0E	PCN 3		DMSP37	EXPOSED LLCC	KGWC
31	110642	22.9N 66.8E	PCN 3	T1.5/2.5 /W1.5/24HRS	DMSP35		KGWC
32	110905	23.0N 68.0E			TIROSN	NO OUTFLOW	NRPG
33	111450	22.9N 68.7E	PCN 6		DMSP37	NO CLEARLY DEFINED LLCC	KGWC
34	111923	23.0N 69.1E	PCN 6		DMSP35		KGWC
35	120150	22.6N 68.6E	PCN 6		DMSP37		KGWC
36	120523	22.5N 69.1E	PCN 4		DMSP35		KGWC

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE 45WAM TDOFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	080710	14.7N 63.5E	ACFT					EYE 32 MILES WIDE		

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SAT	COMMENTS	SITE
1	192114	7.9N	90.6E	PCN 6		DMSP37		KGWC
2	200055	8.0N	91.0E	PCN 6	T3.0/3.0	DMSP37	INITIAL OBS U/I ANTICYCLONE	KGWC
3	200542	8.0N	90.7E	PCN 1	T3.5/3.5	DMSP35	INITIAL OBS EYE DIAM 15NM	KGWC
4	201336	8.3N	89.5E	PCN 4		DMSP37		KGWC
5	201542	7.9N	90.2E	PCN 6		DMSP35		KGWC
6	210035	7.6N	88.8E	PCN 3	T3.5/3.5	DMSP37	INITIAL OBS	KGWC
7	210526	7.3N	88.0E	PCN 2	T4.0/4.0 /00.5/24HRS	DMSP35		KGWC
8	211316	7.3N	87.4E	PCN 6		DMSP37		KGWC
9	211805	7.2N	87.3E	PCN 6		DMSP35		KGWC
10	220016	6.7N	86.3E	PCN 2		DMSP37		KGWC
11	220506	6.4N	85.6E	PCN 2	T5.0/5.0 /01.0/24HRS	DMSP35		KGWC
12	220903	7.0N	85.1E		T5.0	TTH05N	CDO EXTENDS 40NM RAD FROM CNTR	NRPG
13	221257	6.7N	84.8E	PCN 2		DMSP37		KGWC
14	221747	6.8N	84.6E	PCN 2		DMSP35		KGWC
15	230138	7.1N	83.7E	PCN 2		DMSP37		KGWC
16	230529	7.1N	83.3E	PCN 2	T6.5/6.5 /01.5/24HRS	DMSP35		KGWC
17	230850	7.0N	83.0E			TTH05N	WELL DEFINED EYE	NRPG
18	231237	7.4N	81.7E	PCN 2		DMSP37		KGWC
19	231724	7.4N	81.4E	PCN 1		DMSP35		KGWC
20	240118	8.5N	80.5E	PCN 2	T5.0/6.0 /W1.5/20HRS	DMSP37		KGWC
21	240511	9.0N	79.9E	PCN 1		DMSP35		KGWC
22	241400	9.3N	78.2E	PCN 3		DMSP37		KGWC
23	241853	9.9N	77.5E	PCN 5		DMSP35		KGWC
24	250058	11.1N	75.7E	PCN 3	T4.0/5.0 /W1.0/23HRS	DMSP37		KGWC
25	250553	11.0N	74.6E	PCN 4		DMSP35		KGWC
26	251015	11.2N	73.7E			TTH05N		NRPG
27	251339	11.3N	73.3E	PCN 3		DMSP37		KGWC
28	251935	12.2N	72.7E	PCN 5		DMSP35	UPR LVL ANTICYCLONE	KGWC
29	260220	12.5N	71.5E	PCN 5	T4.5/4.5 /00.5/22HRS	DMSP		KGWC
30	260535	12.3N	71.3E	PCN 5		DMSP35		KGWC
31	261006	13.1N	71.6E		T4.0	TTH05N		NRPG
32	261320	13.7N	70.9E	PCN 5		DMSP37		KGWC
33	261817	14.3N	71.5E	PCN 5		DMSP35		KGWC
34	270201	14.2N	71.6E	PCN 5	T1.0/2.0-/W3.5/24HRS	DMSP37		KGWC
35	270559	14.6N	68.6E	PCN 3		DMSP35		KGWC
36	270956	14.8N	69.0E		T3.0	TTH05N	UPPER LVL SHEARING OFF	NRPG
37	271442	15.1N	67.4E	PCN 3		DMSP37		KGWC
38	271941	15.1N	67.4E	PCN 4		DMSP35		KGWC
39	280141	14.9N	67.6E	PCN 3	T2.0/3.0 /W1.0/20HRS	DMSP37		KGWC
40	280641	14.9N	69.9E	PCN 3	T1.5/2.5 /W1.5/24HRS	DMSP35		KGWC
41	280945	17.5N	70.9E			TTH05N		NRPG
42	281423	15.1N	67.8E	PCN 5		DMSP37		KGWC
43	281923	15.8N	68.2E	PCN 5		DMSP35		KGWC
44	290121	16.8N	68.2E	PCN 5		DMSP37		KGWC
45	290623	17.0N	68.6E	PCN 5	T0.0/1.0 /W1.5/24HRS	DMSP35		KGWC
46	291402	18.3N	68.9E	PCN 5		DMSP37		KGWC

APPENDIX

1. CONTRACTIONS

AC&W	Aircraft Control and Warning System
ACCRY	Accuracy
ACFT	Aircraft
AIREP	Aircraft Weather Report(s) (Commercial and Military)
ANT	Antenna
APT	Automatic Picture Transmission
ARWO	Aerial Reconnaissance Weather Officer
ATT	Attenuation
AVG	Average
AWN	Automated Weather Network
BRG	Bearing
CDO	Central Dense Overcast
CI	Current Intensity
CLD	Cloud
CLSD	Closed
CNTR	Center
CONF	Confidence (number)
DEG	Degree(s)
DIAM	Diameter
DIR	Direction
DMSP	Defense Meteorological Satellite Program
ELEV	Elevation
FLT	Flight
GOES	Geostationary Operational Environmental Satellite
HATRACK	Hurricane and Typhoon Tracking (numerical forecast)
HGT	Height
HPAC	Mean of XTRP and Climatology
HU	Hurricane
HR	Hour(s)
HVY	Heavy
ICAO	International Civil Aviation Organization
IR	Infrared
KM	Kilometer(s)
KT	Knot(s)
LLCC	Low Level Circulation Center
LVL	Level
M	Meter(s)
M/SEC	Meters per Second
MAX	Maximum
MB	Millibar(s)
MET	Meteorological
MIN	Minimum
MOHATT	Modified Hatrack
MSN	Mission
NAV	Navigational
NEDN	Naval Environmental Data Network
NEDS	Naval Environmental Display Station
NESS	National Environmental Satellite Service
NET	Near Equatorial Trough
NM	Nautical Mile(s)
NOAA	National Oceanic and Atmospheric Administration
NTCC	Naval Telecommunications Center
OBS	Observation(s)
PCN	Position Code Number
PSBL	Possible
PTLY	Partly
QUAD	Quadrant
RADOB	Radar Observation
RECON	Reconnaissance
RNG	Range
RPD	Rapid
SAT	Satellite
SFC	Surface
SLP(MSLP)	Sea Level Pressure (Minimum Sea Level Pressure)
SMS	Synchronous Meteorological Satellite
SPOL	Spiral Overlay
SRP	Selective Reconnaissance Program
STNRY	Stationary

ST	Super Typhoon
TC	Tropical Cyclone
TCARC	Tropical Cyclone Aircraft Reconnaissance Coordinator
TCM	Tropical Cyclone Model
TD	Tropical Depression
TIROS	Television Infrared Observation Satellite
TS	Tropical Storm
TY	Typhoon
TUTT	Tropical Upper Tropospheric Trough
VEL	Velocity
VIS	Visual
VSBL	Visible
WESTPAC	Western Pacific
WMO	World Meteorological Organization
WND	Wind
WRS	Weather Reconnaissance Squadron
XTRP	Extrapolation
Z	Zulu Time (Greenwich mean time)

2. DEFINITIONS

BEST TRACK - A subjectively smoothed path, versus a precise and very erratic fix-to-fix path, used to represent tropical cyclone movement.

CENTER - The axis or pivot of a tropical cyclone. Usually determined by wind, temperature or pressure distribution.

CYCLONE - A closed atmospheric circulation rotating about an area of low pressure (counterclockwise in the northern hemisphere).

EPHEMERIS - Position of a body (satellite) in space as a function of time. When no geographical reference is available for gridding satellite imagery, then only ephemeris gridding is possible which is solely based on the theoretical satellite position and is susceptible to errors from satellite pitch, orbit eccentricity and the non-spherical earth.

EXTRATROPICAL - A term used in warnings and tropical summaries to indicate that a cyclone has lost its "tropical" characteristics. The term implies both poleward displacement from the tropics and the conversion of the cyclone's primary energy sources from release of latent heat of condensation to baroclinic processes. The term carries no implications as to strength or size.

EYE - "EYE" is used to describe the central area of a tropical cyclone when it is more than half surrounded by wall cloud.

MAXIMUM SUSTAINED WIND - Maximum surface wind speed averaged over a 1-minute period of time. Peak gusts over water average 20 to 25 percent higher than sustained wind.

RECURVATURE - The turning of a tropical cyclone from an initial path toward the west of northwest to the north then northeast.

SIGNIFICANT TROPICAL CYCLONE - A tropical cyclone becomes "significant" with the issuance of the first numbered warning by the responsible warning agency.

SUPER TYPHOON/HURRICANE - A typhoon/hurricane in which the maximum sustained surface wind (1-minute mean) is 130 kt or greater.

TROPICAL CYCLONE - A nonfrontal low pressure system of synoptic scale developing over tropical or subtropical waters and having a definite organized circulation.

TROPICAL CYCLONE AIRCRAFT RECONNAISSANCE COORDINATOR - A CINCPACAF representative designated to levy tropical cyclone aircraft weather reconnaissance requirements on reconnaissance units within a designated area of the PACOM and to function as coordinator between CINCPACAF, aircraft weather reconnaissance units, and the appropriate typhoon/hurricane warning center.

TROPICAL DEPRESSION - A tropical cyclone in which the maximum sustained surface wind (1-minute mean) is 33 kt or less.

TROPICAL DISTURBANCE - A discrete system of apparently organized convection--generally 100 to 300 miles in diameter--originating in the tropics or subtropics, having a non-frontal migratory character, and having maintained its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field. As such, it is the basic generic designation which, in successive stages of intensification, may be classified as a tropical depression, tropical storm or typhoon (hurricane).

TROPICAL STORM - A tropical cyclone with maximum sustained surface winds (1-minute mean) in the range of 34 to 63 kt, inclusive.

TROPICAL UPPER TROPOSPHERIC TROUGH (TUTT) - "A dominant climatological system, and a daily synoptic feature, of the summer season over the tropical North Atlantic, North Pacific and South Pacific Oceans," from Sadler, James C., Feb. 1976: Tropical Cyclone Initiation by the Tropical Upper Tropospheric Trough. (NAVENVPREDRSCHFAC Technical Paper No. 2-76).

TYPHOON/HURRICANE - A tropical cyclone in which the maximum sustained surface wind (1-minute mean) is 64 kt or greater. West of 180 degrees longitude they are called typhoons and east of 180 degrees they are called hurricanes. Foreign governments use these or other terms for tropical cyclones and may apply different intensity criteria.

WALL CLOUD - An organized band of cumuliform clouds immediately surrounding the central area of a tropical cyclone. The wall cloud may entirely enclose the eye or only partially surround the center.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Annual Typhoon Report 1978

2. GOVT ACCESSION NO.: (9)

3. RECIPIENT'S CATALOG NUMBER: Rept. for

4. TITLE (and Subtitle): (6) ANNUAL TYPHOON REPORT, 1978,

5. TYPE OF REPORT & PERIOD COVERED: Annual (JAN-DEC 1978)

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS
FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER (FLEWEACEN/JTWC), GUAM
FPO SAN FRANCISCO 96630

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER (FLEWEACEN/JTWC), GUAM
FPO SAN FRANCISCO 96630

(11)

12. REPORT DATE: 1978

13. NUMBER OF PAGES: 166

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

(12) 176p.

15. SECURITY CLASS. (of this report): UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Approved for public release; distribution unlimited.

(10) Dean R. Morford
James K. Lavin

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Tropical cyclones	Tropical storms
Tropical cyclone forecasting	Tropical depressions
Tropical cyclone research	Typhoons
Tropical cyclone steering model	Meteorological satellite
Tropical cyclone fix data	Aircraft reconnaissance

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This Annual publication summarizes the tropical cyclone season in the western North Pacific, Bay of Bengal, and the central North Pacific. A brief narrative is given on each typhoon in the western North Pacific including the best track. Pertinent reconnaissance data used to construct the best tracks are provided. Forecast verification data and statistics for the JTWC are summarized. Research efforts at the JTWC are discussed briefly.

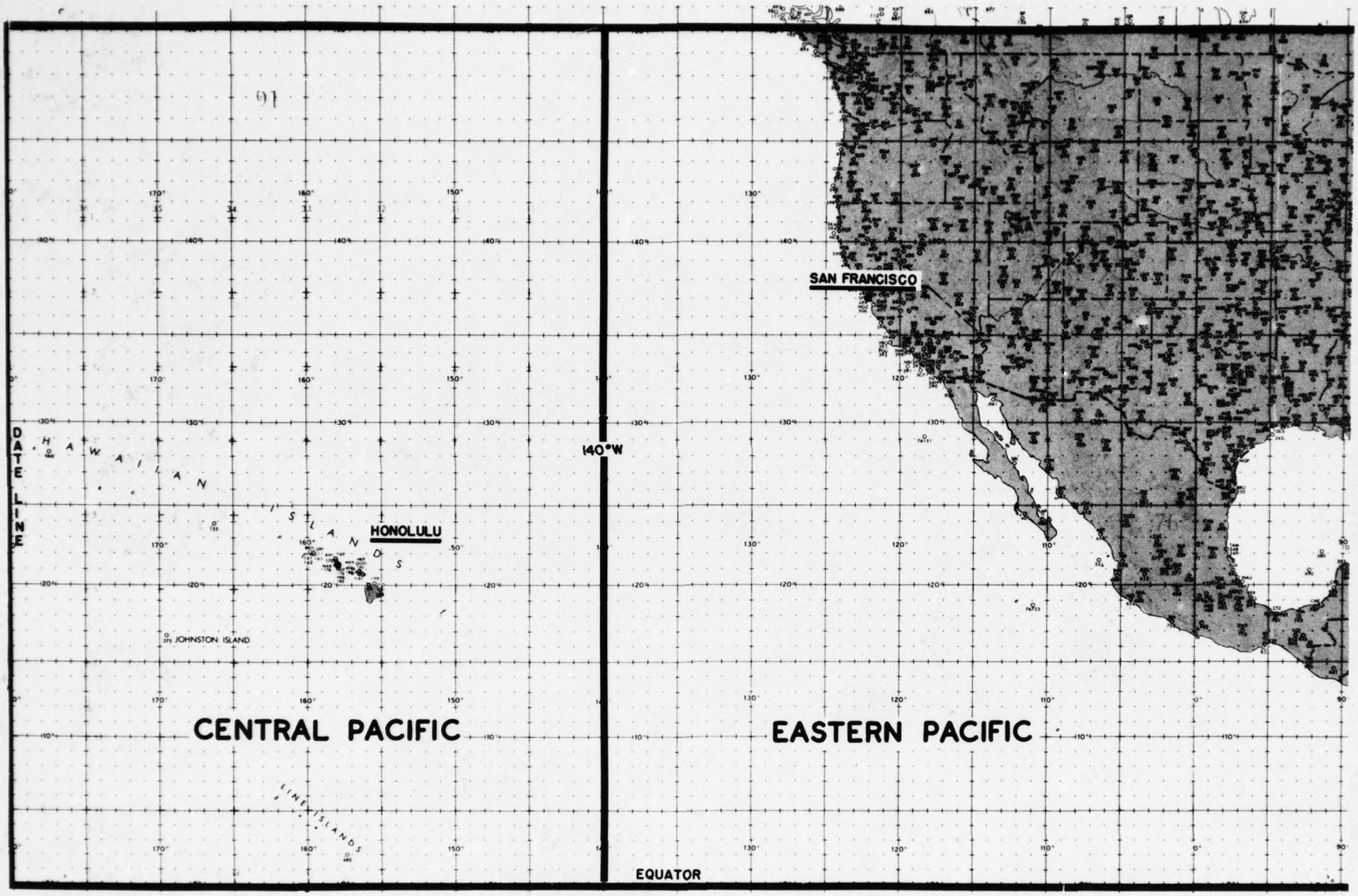
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S/N 0102-014-6601

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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