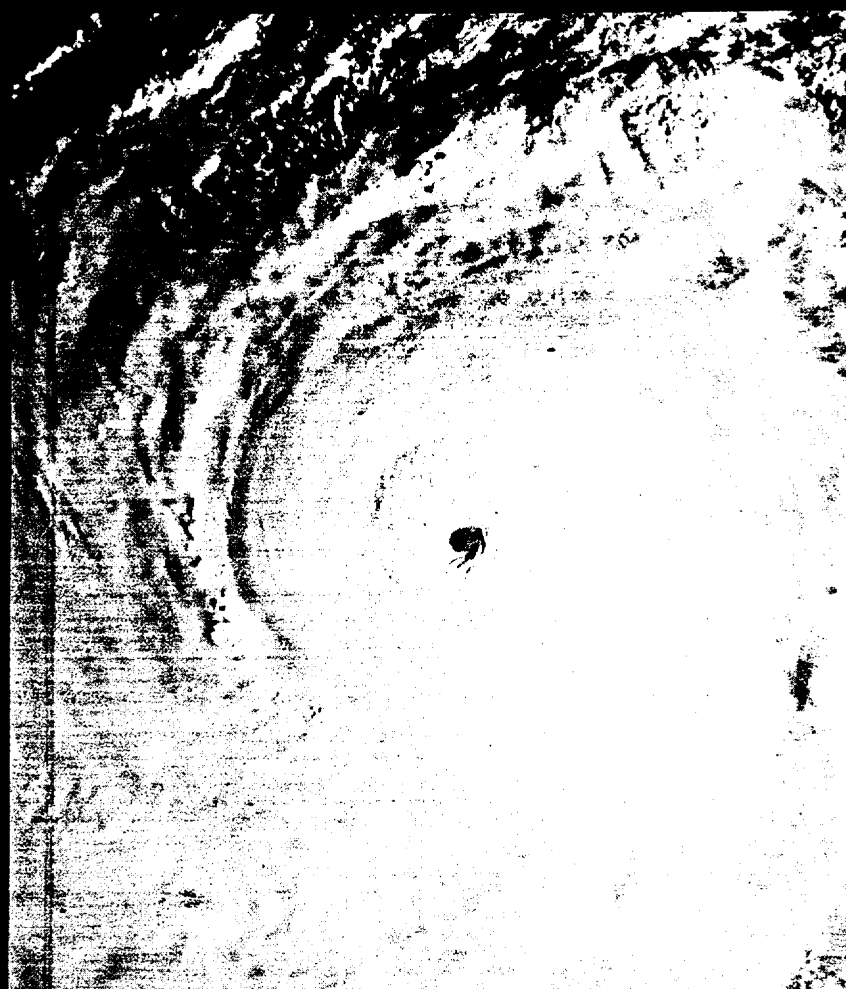
NAVAL OCEANOGRAPHY COMMAND

1979

AIR WEATHER SERVICE

ANNUAL TYPHOON REPORT



JOINT TYPHOON WARNING CENTER
GUAM, MARIANA ISLANDS

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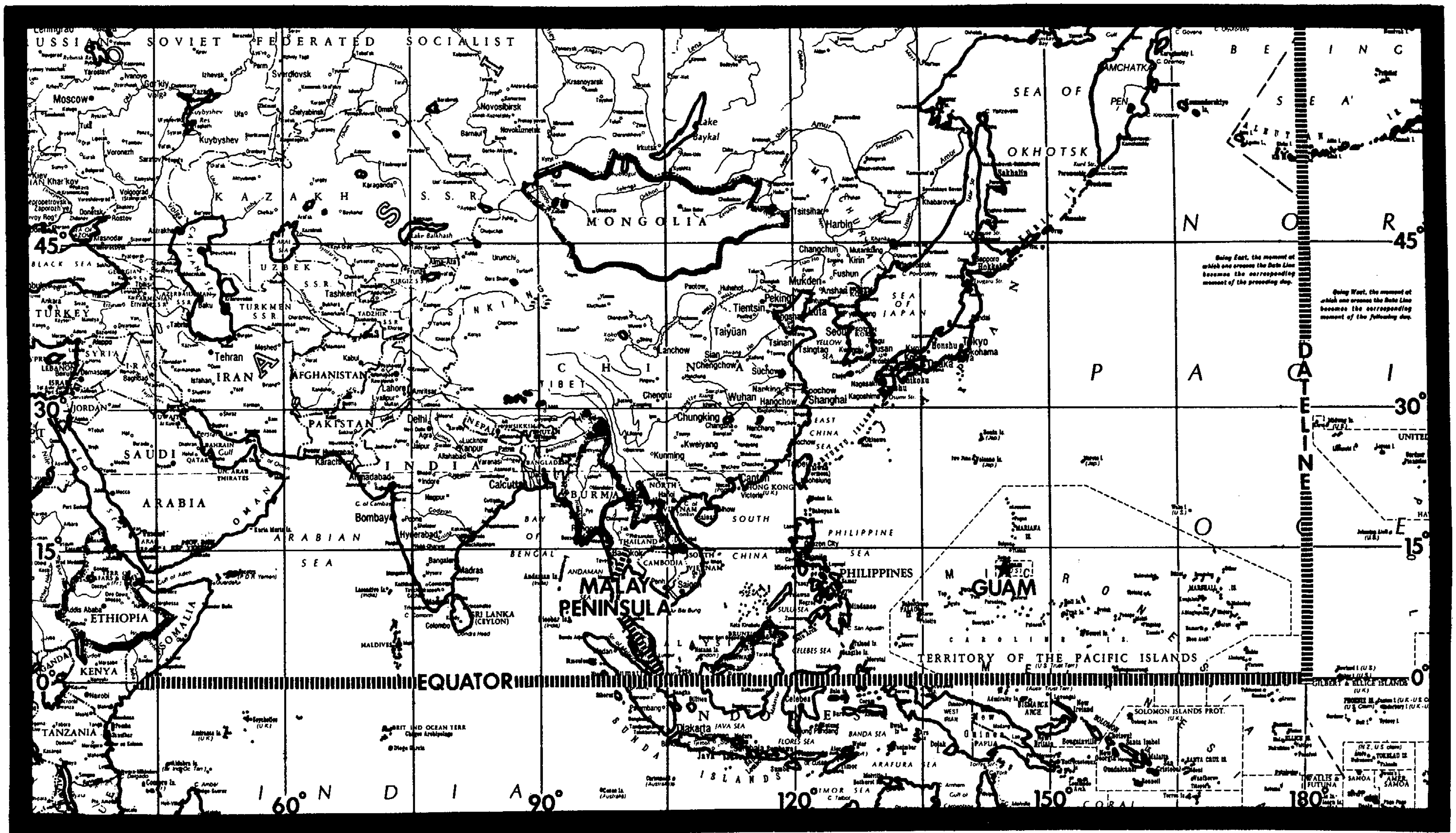

Indian Ocean Area (Malay Peninsula to Africa)

Pacific Area (Dateline to Malay Peninsula)

AREA OF RESPONSIBILITY - JOINT TYPHOON WARNING CENTER, GUAM

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FRONT COVER: *Super Typhoon Tip near maximum intensity of 160 kt (82 m/sec), 11 October 1979, 2127Z. The minimum sea-level pressure was 870 mb and the associated circulation pattern was 1200 nm (2222 km) in diameter at that time. Details on Tip can be found on page 72. (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. Naval Oceanography Command Center, Guam. The senior Air Force Officer assigned is designated as Director, JTWC and is responsible to the Commanding Officer, U. S. Naval Oceanography Command Center, 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 Naval Oceanography Command Center/ 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 JTWC area of responsibility and prepare an Annual Typhoon Report for issuance to interested agencies.

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 issuing warnings. The U. S. Naval Western Oceanography Center, 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 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 Air 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 for significant tropical cyclones; and (4) 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 deliberations at the Tropical Cyclone Conference.

2. DATA SOURCES

a. COMPUTER PRODUCTS:

The Naval Oceanography Command Center (NAVOCEANCOMCEN) 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 Oceanography Center (FLENUMOCEANCEN) at Monterey, California. With the installation of the Naval Environmental Display Stations (NEDS) during 1978, JTWC now has very timely access to necessary FLENUMOCEANCEN 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). Conventional data charts are prepared daily at 0000Z and 1200Z for the surface, 700 mb, and 500 mb levels. A chart of upper-air data is prepared 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, are 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 1979. A discussion of this role is presented in Chapter II.

e. RADAR RECONNAISSANCE:

During 1979, 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 1979 is discussed in Chapter II.

3. COMMUNICATIONS

a. 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 NAVOCEANCOMCEN GUAM.

(2) The Air Force Automated Weather Network (AWN) provides 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) provides the communications link with the computers at FLENUMOCEANCEN. JTWC is able to both receive environmental data from FLENUMOCEANCEN and access the computers directly to run various programs.

b. Besides providing forecasters with the ability to rapidly access computer products, the NEDS has recently become the backbone of the 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 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. Although the analysis of the 500 mb height field is stressed, knowledge 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. These charts are 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 1979 typhoon season include previous JTWC Annual Typhoon Reports and climatic publications from local sources, Naval Environmental Prediction Research Facility, Naval Postgraduate School, Air Weather Service, First Weather Wing and Chanute Technical Training Center. Publications from other Air Force and Navy activities, various universities and foreign countries are also used by the JTWC.

b. OBJECTIVE TECHNIQUES:

The following objective techniques were employed in tropical cyclone forecasting during 1979. A description of these techniques is presented in Chapter IV.

(1) TYFN75 (Analog)

(2) MOHATT (Steering)

(3) 12 HR EXTRAPOLATION

(4) CLIMATOLOGY

(5) HPAC (Combined extrapolation and climatology)

(6) TROPICAL CYCLONE MODEL (Dynamic)

(7) INJAH74 (Analog)

(8) CYCLOPS (Steering)

(9) TYAN78 (Analog)

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 are not available due to reconnaissance platform malfunctions or communication problems, synoptic data or extrapolation from previous fixes are 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. 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 cyclones 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 determine 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 reconnaissance platform 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 0200Z, 0800Z, 1400Z and 2000Z with the constraint that two consecutive warnings may not be more than seven hours apart. These variable warning times allow for maximum use of all available reconnaissance platforms and more effectively distribute the workload in multiple cyclone 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 1979 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 users with the reasoning behind the latest JTWC forecast. Prognostic reasoning messages are not prepared for tropical depressions nor for cyclones in the Indian Ocean area.

For the 1979 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, organization and the number of western Pacific storms in existence.

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

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 AND 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 1979 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 desirable.

(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 flew 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, which receives and processes DMSP data, is the primary fix site for the northwestern Pacific. 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.

d. Synoptic

In 1979, the JTWC also determined tropical cyclone positions based on the analysis of the surface/gradient level synoptic data. These positions were helpful in situations where the vertical structure of the tropical cyclone was weak or accurate surface positions from aircraft were not available due to flight restrictions.

3. AIRCRAFT RECONNAISSANCE SUMMARY

During the 1979 tropical season, the JTWC levied 289 six-hourly vortex fixes and 52 investigative missions. In addition to the levied vortex fixes, 150 supplemental fixes were also obtained. The number of levied investigative missions has increased steadily over the past four years in response to JTWC's increased efforts to detect initial tropical cyclone development.

of 1979's 28 tropical cyclones, investigative missions were not flown on four. The average vector error for all aircraft fixes received at the JTWC during 1979 was 13.0 nm (24.1 km).

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 LEVIED FIXES	PERCENT
COMPLETED ON TIME	258	89.3
EARLY	2	0.7
LATE	15	5.2
MISSED	14	4.8
TOTAL	289	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
1979	289	14	4.8

4. SATELLITE RECONNAISSANCE SUMMARY

The Air Force provides satellite reconnaissance support to JTWC using imagery data from DMSP polar orbiting spacecraft. Data from similar NOAA spacecraft (TIROS-N/NOAA-6) were not available to the tactical sites of the network but could be processed on a backup basis by the Air Force Global Weather Central (AFGWC).

The DMSP network consists of both tactical and centralized facilities. Tactical DMSP sites are located at Nimitz Hill, Guam; Clark AB, Philippines; Kadena AB, Japan; Osan AB, Korea; and Hickam AFB, Hawaii. These sites provide a combined coverage that blankets the JTWC area of responsibility in the western Pacific from near the dateline westward to the Malay Peninsula.

The centralized member of the DMSP network is the Air Force Global Weather Central located at Offutt AFB, Nebraska. AFGWC receives worldwide satellite imagery coverage four times daily from two DMSP spacecraft. In addition, AFGWC has the capability to process either TIROS-N or NOAA-6 should one of the primary DMSP spacecraft fail. Imagery taken over the JTWC area of responsibility is recorded on board the spacecraft and later downlinked to AFGWC via command/readout sites and communications satellites. With their coverage, AFGWC is able to fix a storm anywhere within the JTWC area of responsibility. As the only site in the network that receives coverage over the entire Indian Ocean, AFGWC has the primary responsibility for satellite reconnaissance in this area as well as a small portion of the central Pacific near the dateline. On occasion, AFGWC is tasked to provide storm positions in the western Pacific as backup to the tactical sites.

The thread that ties the network together is Det 1, 1WW colocated with JTWC atop Nimitz Hill, Guam. Based on available satellite coverage, Det 1 coordinates satellite reconnaissance requirements with JTWC and tasks the individual DMSP sites to provide the necessary storm fixes. The tasking concept is to fix every storm or tropical disturbance (alert area) once from each satellite pass over the area of the storm. When a satellite position is required as the basis for a warning (levy), a dual-site tasking concept is applied. Under this concept, two sites are tasked to fix the storm off the same satellite pass. This provides the necessary redundancy to virtually guarantee JTWC a successful satellite fix of the storm. Using the dual-site tasking concept, the satellite reconnaissance network was able to meet 98 percent of JTWC's satellite fix requirements. Dual-site tasking is not available over the Indian Ocean since only AFGWC receives the satellite coverage for most of that area.

The network provides JTWC with several products and services. The main service is one of surveillance. With the exception of Osan, each site reviews its daily coverage for any indications of development. If an area shows indications of development, JTWC is notified. Once JTWC issues either an alert or warning, the network is tasked to provide three products: storm positions, storm intensity estimates, and 24-hour storm intensity forecasts. Satellite storm positions are assigned position code numbers (PCN) depending on the availability of geography for precise gridding and the degree of organization of the storm's circulation center (Table 2-2). During 1979, the network provided JTWC with 1970 satellite fixes of tropical cyclones in warning status. A comparison of those fixes made on numbered tropical cyclones with their corresponding JTWC best track positions is shown in Table

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

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

PCN	WESTPAC 1974-1978 AVERAGE (ALL SITES)	WESTPAC 1979 (ALL SITES)	INDIAN OCEAN 1979 (ALL SITES)
1	13.3 (178)	14.4 (268)	13.5 (7)
2	18.5 (68)	17.9 (61)	23.1 (7)
3	21.2 (270)	18.6 (341)	23.4 (16)
4	25.6 (101)	20.5 (70)	18.0 (8)
5	37.1 (368)	37.8 (605)	34.1 (22)
6	47.2 (190)	43.3 (232)	42.2 (66)
1&2	14.8 (246)	15.0 (329)	18.3 (14)
3&4	22.0 (371)	18.9 (411)	21.6 (24)
5&6	40.6 (558)	39.4 (837)	40.2 (88)

2-3. Estimates of the storm's current and 24-hour forecast intensity are made once each day by applying the Dvorak technique (NOAA Technical Memorandum NESS 45 as revised) to daylight visual data. Satellite derived storm positions, intensity estimates, and forecasts constitute the satellite portion of the JTWC forecast data base.

The availability of satellite data varied during the year. At the start, the network had access to three DMSP spacecraft: F-1 (late-morning), F-2 (mid-morning), and F-3 (sunrise). In June, a fourth DMSP spacecraft, F-4, was launched into a late morning orbit. The network had access to these four spacecraft until mid-September when F-1 failed. Three months later, in early December, F-3 failed reducing the active DMSP fleet to only two spacecraft with similar mid- to late-morning coverages. The network was able to partially compensate for this loss by depending on AFGWC to provide fixes for the entire network based on its unique ability to process TIROS-N as a replacement for F-3. Therefore, the 1979 season ended with available satellite coverage at its lowest point for the entire year.

Besides the network provided fixes, JTWC also receives satellite-derived storm positions from several secondary sources. These include: U.S. Navy ships equipped for satellite direct readout; the National Environmental Satellite Service using NOAA and GOES data; and the Naval Polar Oceanography Center, Suitland, Maryland using stored DMSP and NOAA data. Fixes from these secondary sources are not included in the network statistics.

5. RADAR RECONNAISSANCE SUMMARY

Sixteen of the 28 significant tropical cyclones occurring over the western North Pacific during 1979 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 1143.

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, 1139 radar fixes were coded in this manner; 25% were good, 29% fair and 46% poor. Compared to the JTWC best track, the mean vector deviation for land radar sites was 15 nm (28 km).

Of the 16 tropical cyclones which were monitored with land radar, 11 were typhoons: Alice, Cecil, Ellis, Hope, Irving, Judy, Mac, Owen, Sarah, Tip and Vera. These 11 typhoons accounted for 89% of all radar fixes received for 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 erratic tracks.

The 54 WRS made four radar center fixes from their WC-130 aircraft when actual penetration was restricted. One ship radar center fix was received on Typhoon Bess. No radar fixes were received on Indian Ocean tropical cyclones.

6. TROPICAL CYCLONE FIX DATA

A total of 3318 fixes on 28 northwest Pacific tropical cylones and 166 fixes on 7 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 lists individual fixes sequentially for each tropical cyclone. Fix data is divided into four categories: Satellite, Aircraft, Radar and Synoptic. 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

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:

TABLE 2-4. FIX SUMMARY FOR 1979

	FIX SUMMARY						
	AIRCRAFT	DMSP	TIROS-N	GOES3	RADAR	SYNOPTIC	TOTAL
WESTERN PACIFIC							
TY ALICE	43	80	-	5	42	-	170
TY BESS	17	47	-	-	1*	-	65
TY CECIL	29	87	-	-	51	-	167
TS DOT	7	71	-	-	12	3	93
TD 05	-	20	-	-	11	2	33
TY ELLIS	12	66	-	-	14	7	99
TS FAYE	14	48	-	-	-	5	67
TD 08	1	29	-	-	-	7	37
ST HOPE	22	78	-	-	44	1	145
TS GORDON	8	40	-	-	25	-	73
TD 11	6	33	-	-	-	2	41
TY IRVING	25	124	-	-	148**	-	297
ST JUDY	26	140	-	-	177	2	345
TD 14	3	23	-	-	-	2	28
TS KEN	5	41	-	-	73	-	119
TY LOLA	17	63	-	-	-	-	80
TY MAC	14	86	-	-	55***	-	155
TS NANCY	-	33	-	-	-	15	48
TY OWEN	34	87	-	-	312	8	441
TS PAMELA	5	9	-	-	-	-	14
TS ROGER	6	32	-	-	-	6	44
TY SARAH	13	112	-	-	5	4	134
ST TIP	59	99	-	-	109	-	267
ST VERA	14	54	-	-	60***	9	137
TS WAYNE	11	44	-	-	-	1	56
TD 26	2	11	-	-	-	1	14
TY ABBY	40	66	7	-	-	3	116
TS BEN	4	20	2	-	7	-	33
TOTAL	437	1643	9	5	1146	78	3318
% OF TOTAL NO. OF FIXES	13.1	49.5	.3	.2	34.6	2.3	100

	DMSP	TIROS-N	SYNOPTIC	TOTAL
INDIAN OCEAN				
TC 17-79	28	5	-	33
TC 18-79	16	4	5	25
TC 22-79	8	2	2	12
TC 23-79	30	6	1	37
TC 24-79	19	3	-	22
TC 25-79	17	-	-	17
TC 26-79	20	-	-	20
TOTAL	138	20	8	166
% OF TOTAL NO. OF FIXES	83	13	4	100

* SHIP RADAR FIX
** INCLUDES TWO ACFT RADAR FIXES
*** INCLUDES ONE ACFT RADAR FIX

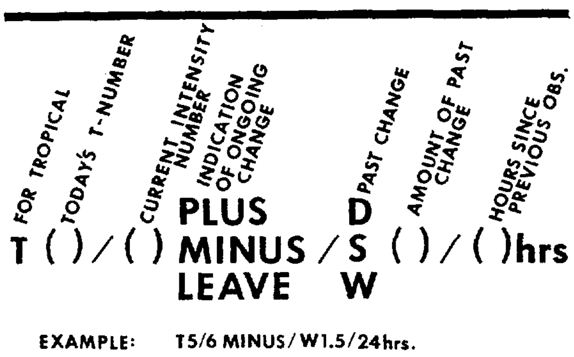
a. Satellite

(1) ACCRY - Position Code Number (PCN) (see Sec. 5) or Confidence (CONF) number (see table 2-5) is listed depending on method used to determine the fix position.

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

(2) DVORAK CODE - Intensity evaluation and trend utilizing DMSP visual satellite data. (For specifics refer to NOAA TM; NESS-45)



(3) SAT - Specific satellite used for fix position (DMSP 35, 36, 37 or 39, TIROS-N or Geostationary Operational Environmental Satellite (GOES, 135W)).

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

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

b. 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) 700 MB HGT - Minimum height of the 700 mb pressure surface within the vortex recorded in meters.

(3) OBS MSLP - 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 an elliptical eye, the lengths of the major and minor axes and the orientation of the major axis are respectively listed.

c. 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.

d. Synoptic

(1) INTENSITY ESTIMATE - TDO's analysis of low-level synoptic data to determine a cyclone's maximum sustained surface wind (knots).

(2) NEAREST DATA - Accuracy of fix based on distance (nautical miles) from the fix position to the nearest synoptic report or to the average distance of reports in data sparse cases.

CHAPTER III SUMMARY OF TROPICAL CYCLONES

1. WESTERN NORTH PACIFIC TROPICAL CYCLONES

During 1979, the western North Pacific experienced a below normal year of tropical cyclone activity with a total of 28 cyclones (Table 3-1). By comparison, 1978 was a near normal year with 32 cyclones and 1977 was a near record low year with a total of 21 cyclones. Five significant tropical cyclones never developed beyond tropical depression (TD) stage, and nine developed into tropical storms (TS). Of the 14 cyclones that developed to typhoon (TY) stage, only 4 reached the 130 kt (67 m/sec) intensity necessary to be classified as a super typhoon (ST). This season, beginning with Typhoon Bess, tropical cyclones attaining tropical storm strength or greater were assigned names on an alternating male/female basis. This change was a result of the 1979 Tropical Cyclone Conference, and the list of names can be found in CINCPACINST 3140.1N CH-1. A similar but different series of cyclone names is used for eastern North Pacific and North Atlantic cyclones. Each tropical cyclone's

TABLE 3-1. WESTERN NORTH PACIFIC

1979 SIGNIFICANT TROPICAL CYCLONES

CYCLONE	TYPE	NAME	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	MAX SFC WIND	MIN OBS SLP	NUMBER OF WARNINGS	DISTANCE TRAVELLED
01	TY	ALICE	01 JAN-14 JAN	14	110	930	51	2597
02	TY	BESS	20 MAR-25 MAR	6	90	958	21	1804
03	TY	CECIL	11 APR-20 APR	10	80	965	40	2535
04	TS	DOT	10 MAY-16 MAY	7	40	984	24	2876
05	TD	TD-05	23 MAY-24 MAY	2	30	998	6	2170
06	TY	ELLIS	01 JUL-06 JUL	6	85	955	22	1612
07	TS	FAYE	01 JUL-06 JUL	6	40	998	20	1837
08	TD	TD-08	24 JUL-25 JUL	2	20	1004	5	1264
09	ST	HOPE	27 JUL-03 AUG	10	130	898	33	3928
10	TS	GORDON	26 JUL-29 JUL	4	60	980	13	1058
11	TD	TD-11	03 AUG-06 AUG	4	25	997	14	1088
12	TY	IRVING	09 AUG-18 AUG	10	90	954	38	2732
13	ST	JUDY	16 AUG-26 AUG	11	135	887	39	2502
14	TD	TD-14	18 AUG-20 AUG	3	20	1006	9	605
15	TS	KEN	01 SEP-04 SEP	5	60	985	13	1418
16	TY	LOLA	02 SEP-08 SEP	7	90	950	23	1298
17	TY	MAC	15 SEP-24 SEP	10	70	984	35	1831
18	TS	NANCY	19 SEP-22 SEP	4	45	993	14	528
19	TY	OWEN	22 SEP-01 OCT	10	110	918	37	2151
20	TS	PAMELA	25 SEP-26 SEP	3	45	1002	6	984
21	TS	ROGER	03 OCT-07 OCT	6	45	985	16	1920
22	TY	SARAH	04 OCT-15 OCT	12	110	929	43	1194
23	ST	TIP	05 OCT-19 OCT	16	165	870	60	3972
24	ST	VERA	02 NOV-07 NOV	6	140	915	23	1868
25	TS	WAYNE	08 NOV-13 NOV	6	50	990	22	1559
26	TD	TD-26	01 DEC-02 DEC	2	30	998	6	1070
27	TY	ABBY	01 DEC-14 DEC	14	110	951	52	4044
28	TS	BEN	21 DEC-23 DEC	3	60	990	10	2245
			1979 TOTALS	149*			695	

*OVERLAPPING DAYS INCLUDED ONLY ONCE IN SUM.

maximum surface wind (MAX SFC WND), in knots, and minimum observed sea-level pressure (MIN OBS SLP), in millibars, were obtained from best estimates of all available data. The distance travelled, in nautical miles, was calculated from the JTWC official best track (see Annex A).

Table 3-2 provides further information on the monthly distribution of tropical cyclones and statistics on Tropical Cyclone Formation Alerts and Warnings. Even though there were 4 fewer cyclones this season compared to last season, there were 18 more warning days.

TABLE 3-2.

1979 SIGNIFICANT TROPICAL CYCLONE STATISTICS

WESTERN NORTH PACIFIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	(1959-78) AVERAGE
TROPICAL DEPRESSIONS	0	0	0	0	1	0	1	2	0	0	0	1	5	4.8
TROPICAL STORMS	0	0	0	0	1	0	2	0	4	1	1	1	10	10.0
TYPHOONS	1	0	1	1	0	0	2	2	2	2	1	1	13	18.0
ALL CYCLONES	1	0	1	1	2	0	5	4	6	3	2	3	28	32.8
(1959-78) AVERAGE	0.6	0.4	0.6	0.9	1.4	2.1	5.2	6.8	6.0	4.8	2.7	1.3	32.8	

FORMATION ALERTS

23 of the 27 (85%) Formation Alert Events developed into tropical cyclones.

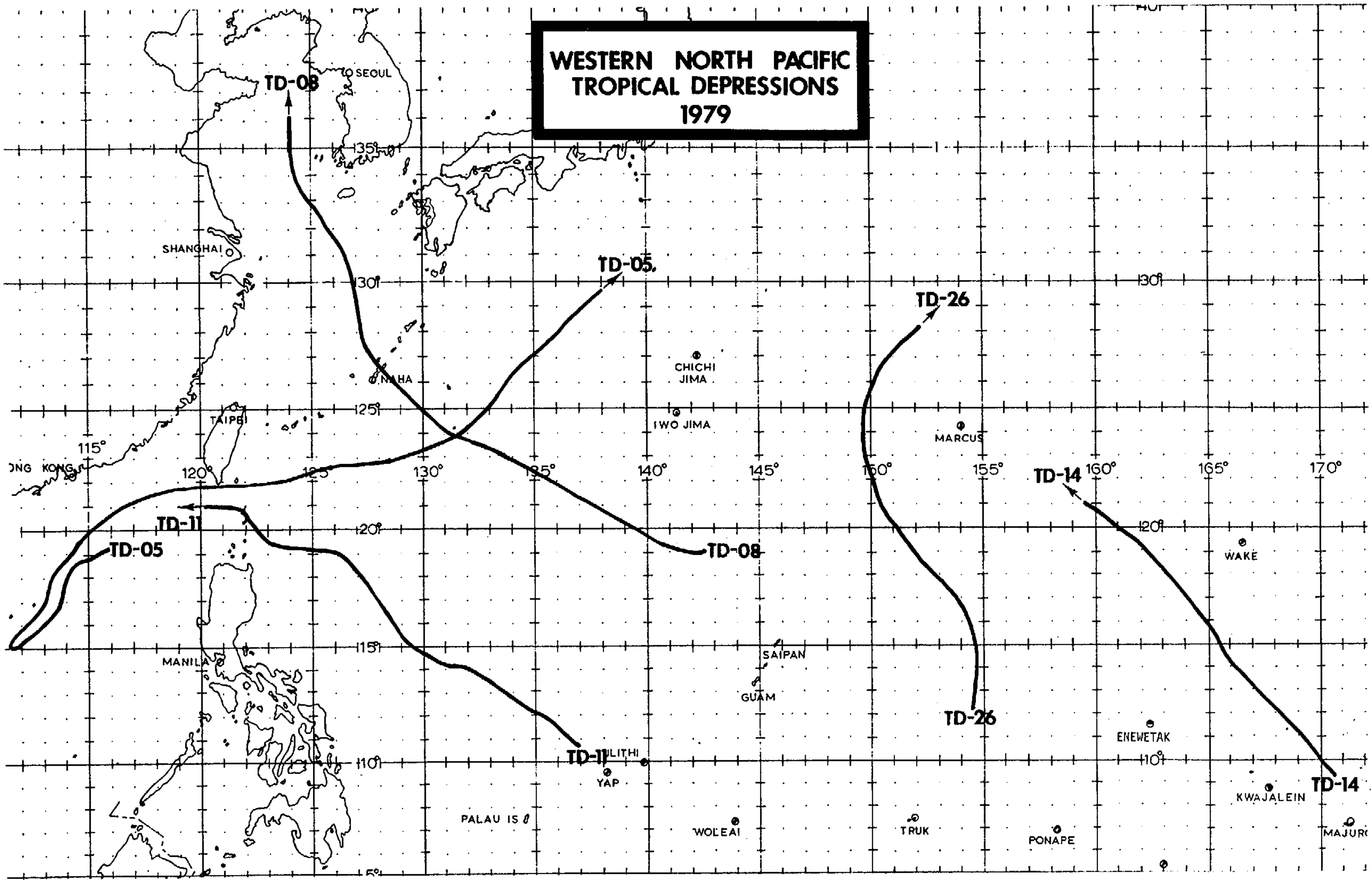
5 of the 28 (18%) tropical cyclones did not have a Formation Alert.

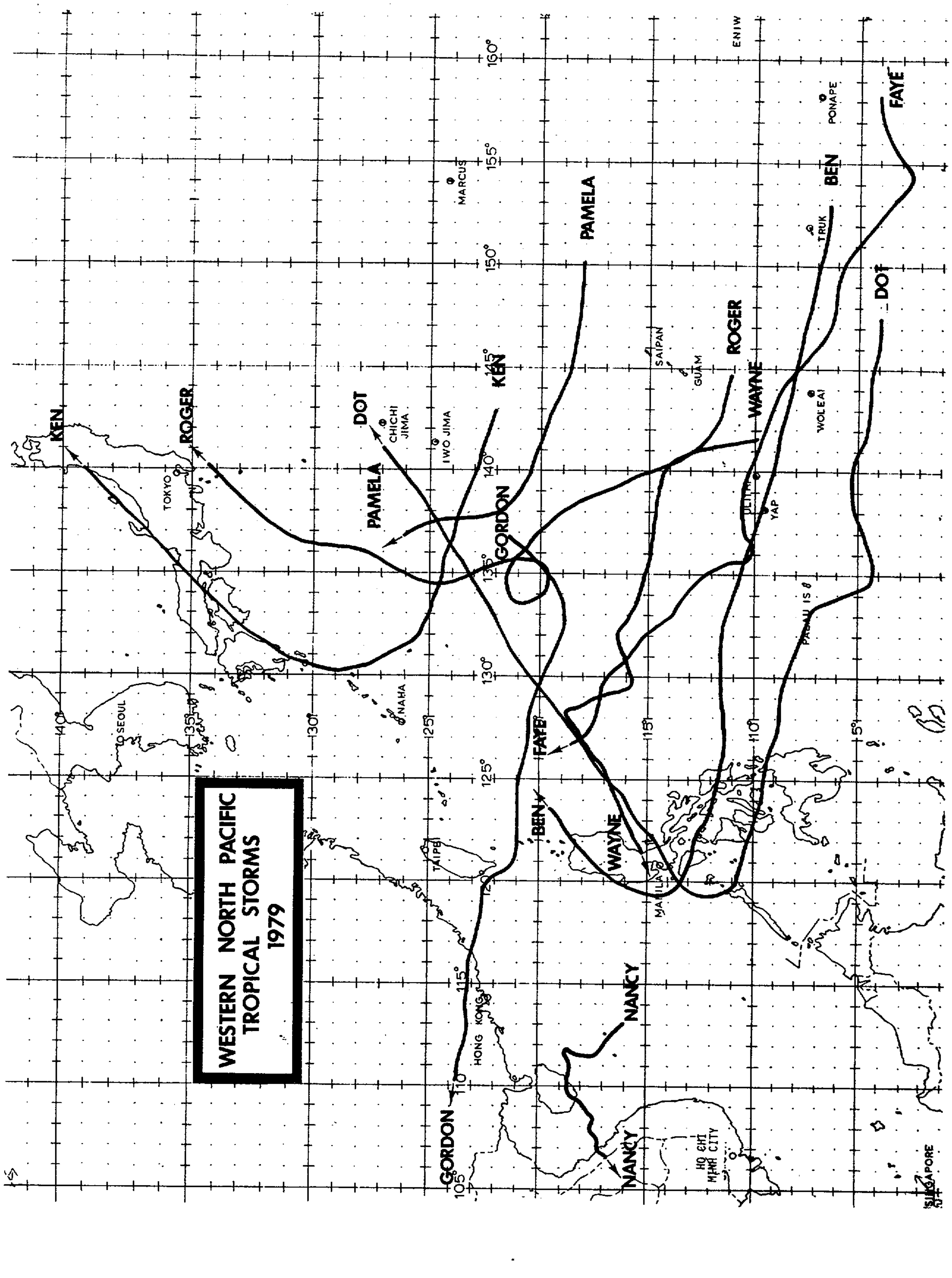
WARNINGS

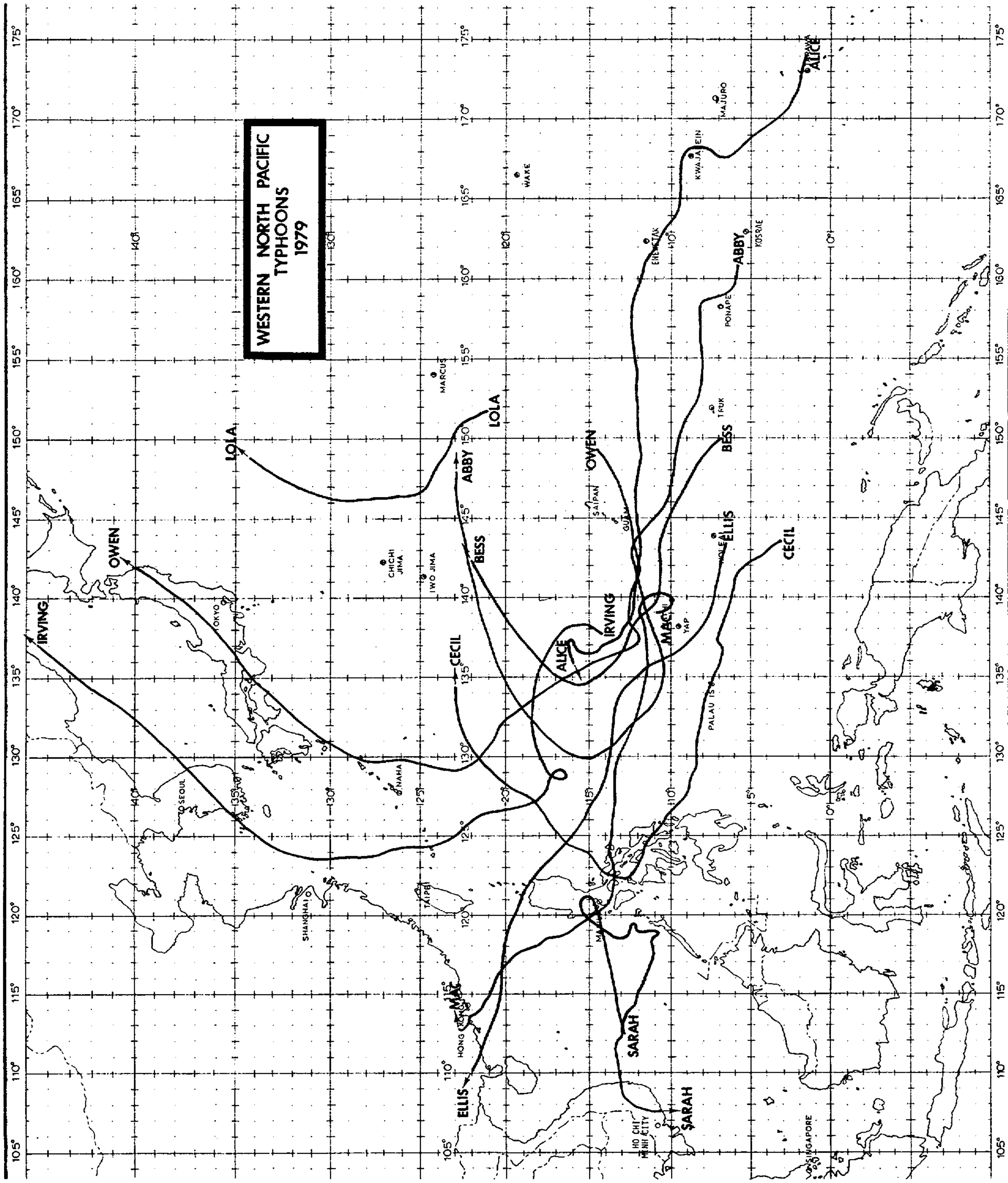
Number of warning days: 149

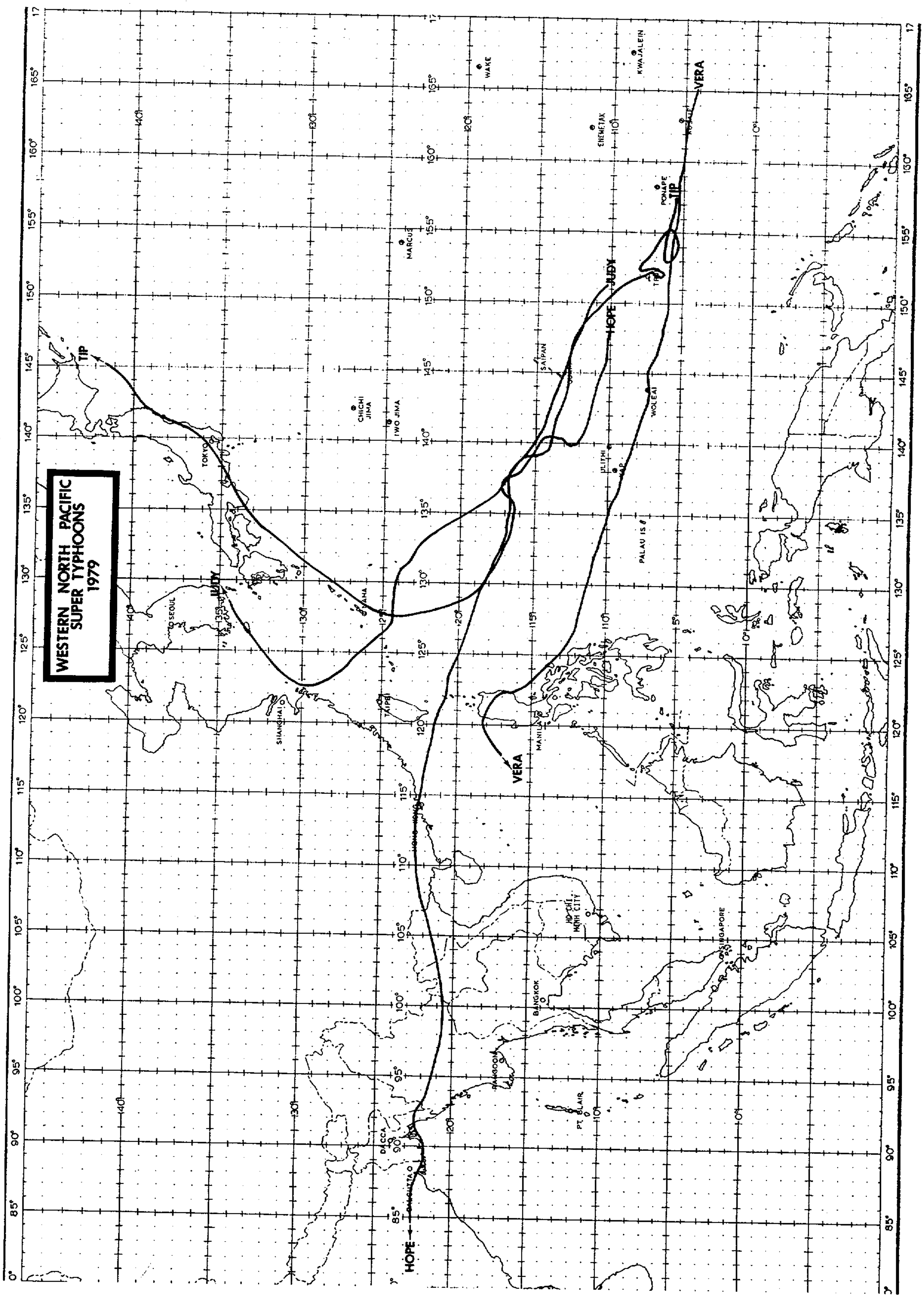
Number of warning days with 2 cyclones: 38

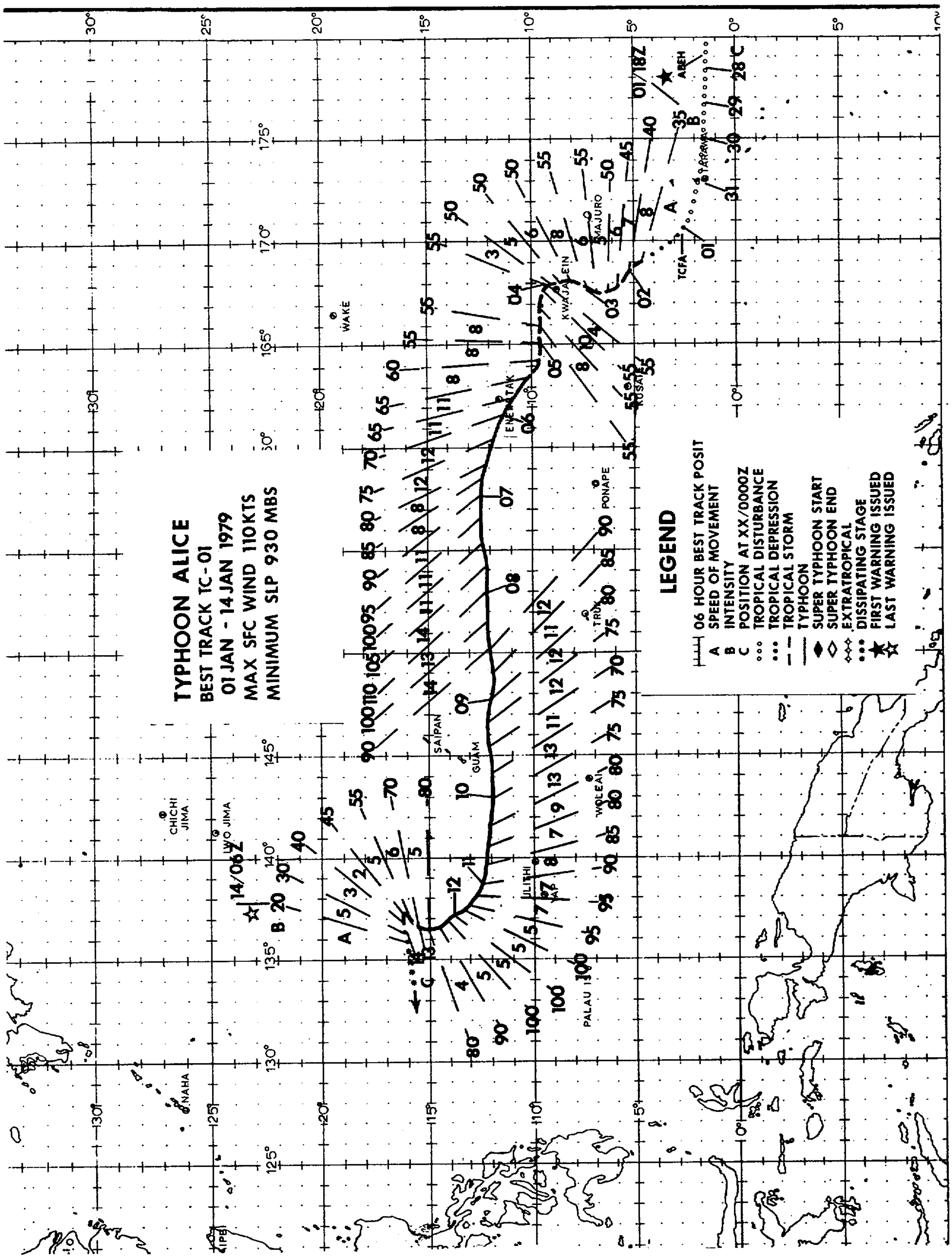
Number of warning days with 3 or more cyclones: 5


WESTERN NORTH PACIFIC
TROPICAL DEPRESSIONS
1979
TD-08
TD-05
TD-11
TD-26
TD-14
SEOUL
SHANGHAI
TAIPEI
NAHA
MANILA
CHICHI
JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
ENEWETAK
KWAJALEIN
WAKE
115°
120°
125°
130°
135°
140°
145°
150°
155°
160°
165°
170°
30°
25°
20°
15°
10°


WESTERN NORTH PACIFIC TROPICAL STORMS 1979
KEN
ROGER
DOT
PAMELA
GORDON
FAYE
BEN
WAYNE
NANCY
TOKYO
SEOUL
NAHA
TAIPEI
HONG KONG
MANILA
HO CHI MINH CITY
SINGAPORE
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
WOLEAI
ULITHI
YAP
PALAU IS
TRUK
PONAPE
ENIW
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°
160°
40°
35°
30°
25°
15°
10°
5°


WESTERN NORTH PACIFIC
TYPHOONS
1979
IRVING
OWEN
LOLA
ABBY
BESS
CECIL
ALICE
MAC
ELLIS
SARAH
MARCUS
WAKE
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
YAP
PALAU IS
TRUK
PONAPE
KOSRAE
KWAJALEIN
MAJURO
ENEWETAK
SEOUL
SHANGHAI
TAIPEI
NAHA
HONG KONG
MANILA
HO CHI MINH CITY
SINGAPORE


WESTERN NORTH PACIFIC
SUPER TYPHOONS
1979
TIP
JUDY
HOPE
VERA
TOKYO
SEOUL
SHANGHAI
TAIPEI
MANILA
HONG KONG
HO CHI MINH CITY
BANGKOK
RANGOON
SINGAPORE
DACCA
CALCUTTA
PT. BLAIR
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
YAP
WOLEAI
PALAU IS
TRUK
PONAPE
KUSAIE
ENEWETAK
KWAJALEIN


TYPHOON ALICE
BEST TRACK TC-01
01 JAN - 14 JAN 1979
MAX SFC WIND 110 KTS
MINIMUM SLP 930 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
CHICHI JIMA
IWO JIMA
NAHA
WAKE
SAIPAN
GUAM
ULITHI
YAP
WOLEAI
PALAU IS
TRUK
PONAPE
ENEWETAK
KWAJALEIN
MAJURO
KUSAIE
TARAWA
ABEH
TCFA
14/06Z
01/18Z

Typhoon Alice, the first tropical cyclone of the 1979 season, was actually first sighted as a tropical disturbance on the 27th of December 1978. Being over the Gilbert Islands quite close to the equator, the potential for development was considered poor. A tropical cyclone formation alert was issued at 0300Z 1 January 1979 when satellite data showed the disturbance progressively increasing in organization. Soon after, the suspect area accelerated northwest to higher latitudes where development conditions were more favorable, and by 011800Z, tropical storm Alice was named. Post-analysis showed that the tropical depression stage began near 010000Z at low latitudes, contrary to the general rule that cyclones do not form close to the equator.

Although a climatologically unfavored period for western North Pacific tropical cyclone development, the fact that Alice did form supports the non-existence of a definitive "typhoon season" for WESTPAC; tropical cyclones are possible anytime of the year. The greatest forecasting difficulties and concomitant large forecast errors occurred during Alice's formative and dissipating stages. Double intensification also contributed to Alice's notoriety.

Early in her lifetime, Alice meandered through the Marshall Islands as if determined to visit each island. One week later, on 12 January 1979, President Carter declared the Marshall Islands a major disaster area.

A satellite reconnaissance fix at 022133Z showed Alice had moved northeastward when forecast to continue northwestward. Being a fix on a poorly defined satellite image (PCN 6), it was not taken verbatim; northwest movement continued to be forecast. An aircraft reconnaissance fix at 030053Z confirmed the earlier satellite fix as did a follow-on 030310Z aircraft fix. Post-analysis revealed that a mid-latitude, short-wave trough passed north of Alice during this time period. The trough extended deep enough into the tropics to weaken the mid-tropospheric ridge. This weakness permitted a southward intrusion of mid-latitude westerlies into Alice's vicinity, temporarily steering her northeastward. As the short-wave trough continued eastward, the subtropical ridge quickly reestablished itself north of Alice producing strong easterly steering flow, temporarily accelerating her from 4 to 10 kt (8 to 19 km/hr) toward the northwest when continued northeast movement was forecast. During this time, decision makers on Enewetak (also within the Marshall Islands), noting the low forecast confidence stated on prognostic reasoning messages, kept a condition of readiness which paid off.

From the 6th to the 11th, Alice traveled due west. On the 8th, Alice attained 110 kt (57m/sec) intensity and simultaneously accelerated to a speed of 14 kt (26 km/hr) (the fastest observed along track), whereupon she began weakening slowly.

During the 9th, Alice began an unexpected northward movement trend and showed further weakening. Post-analysis of low-level synoptic data and satellite imagery (Fig. 3-01-1) indicated that an approaching frontal shear-line was the responsible agent. The shear-line began interacting with Alice while she was southeast of Guam. As Alice neared Guam, radar data from Andersen AFB and aircraft data indicated that Alice's previously well-defined wall cloud became larger and somewhat less organized. Cooler, drier air north of the shear-line was likely responsible for this weakening trend. A weakness in the subtropical ridge vertically above the shear-line apparently allowed for Alice's northward deviation.

The most unusual portion of Alice's track occurred during the final 3 days of Alice's life. Based on interpretation of PE progs, the subtropical ridge was expected to persist and maintain Alice in the easterlies. As a result, the JTWC forecasts (supported by the majority of objective forecast aids) indicated westward movement until 120000Z, 18 hours after Alice had actually begun tracking northwestward. The subtropical ridge weakened in response to a long-wave trough deepening over eastern Asia. Easterly steering currents in Alice's vicinity diminished and veered in direction, permitting a more northward track. Alice reached a secondary intensity maximum of 100 kt (51 m/sec) during this period due to her slowing in speed of movement, the increased absolute vorticity of higher latitudes and good outflow aloft.

By the 13th, Alice turned northeastward and began weakening rapidly. The subtropical ridge was now completely severed and upper-air westerlies were shearing Alice significantly in the vertical. Close proximity of yet another frontal shear-line contributed to further weakening. The biggest surprise, however, came when Alice's low-level circulation turned almost 180 degrees back toward the west at about 131200Z under the influence of strong, low-level easterlies and weakened rapidly in the strong, vertical-shear environment. As a result of vertical decoupling, Alice as a shallow depression, dissipated during the following 12-hour period.

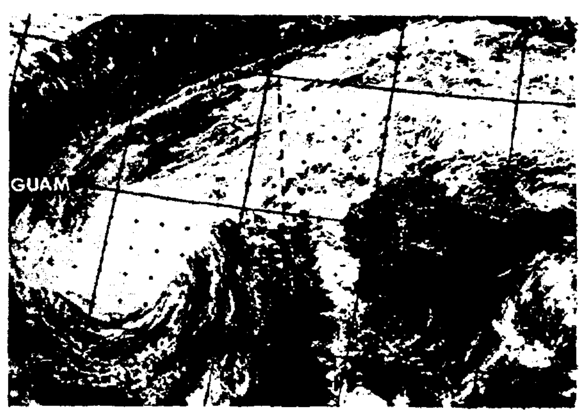
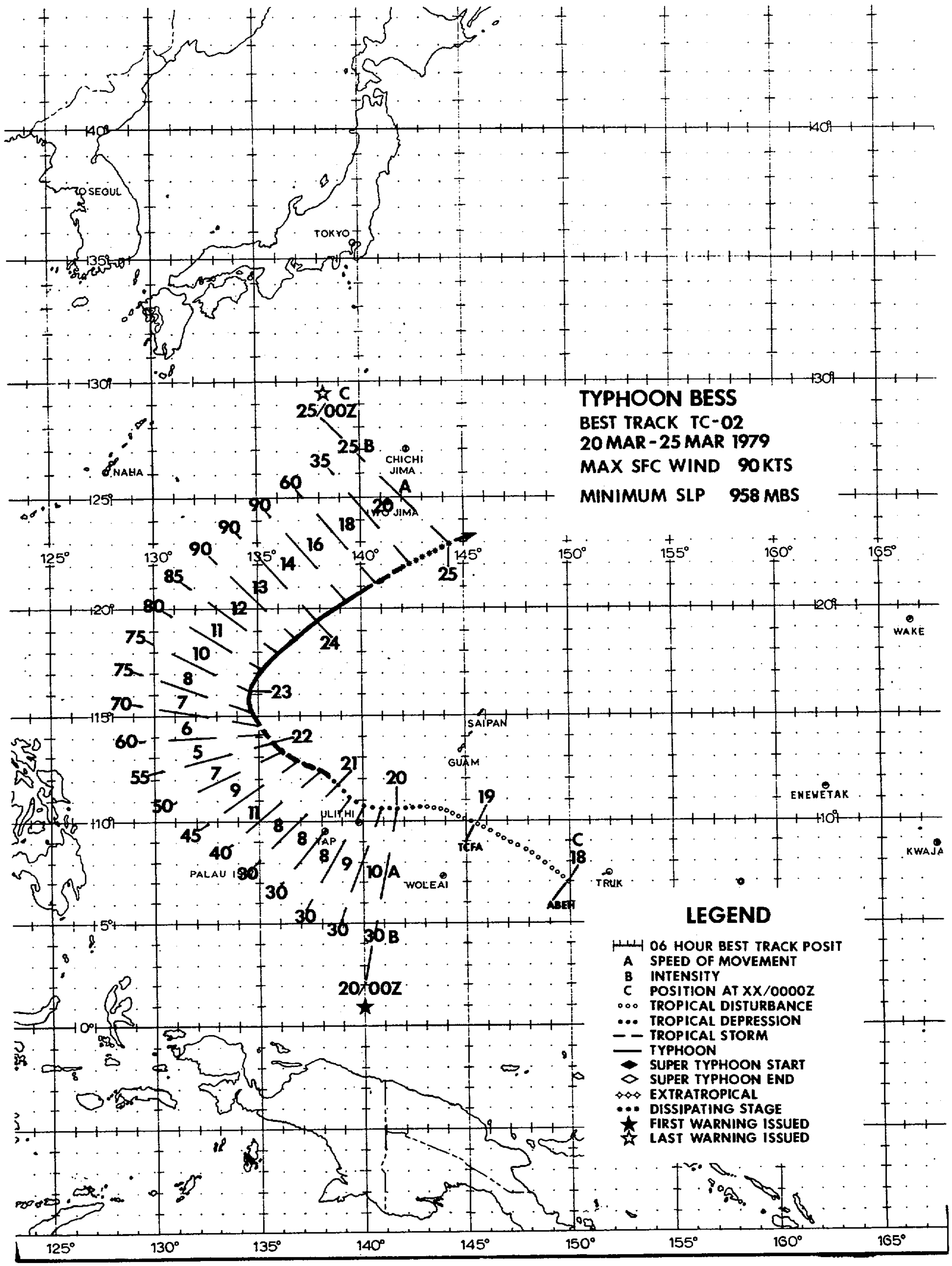


FIGURE 3-01-1. *Typhoon Alice merging with the trailing end of a frontal shear-line, 9 January 1979, 0054Z. (DMSP imagery)*


TYPHOON BESS
BEST TRACK TC-02
20 MAR-25 MAR 1979
MAX SFC WIND 90 KTS
MINIMUM SLP 958 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
ENEWETAK
WAKE
KWAJA
TCFA
25/00Z
20/00Z
125°
130°
135°
140°
145°
150°
155°
160°
165°

Since 1959, only three typhoons have developed over the Western Pacific in March. Of these three, only Bess developed in the last decade with Typhoon Tess developing in 1961 and Typhoon Sally in 1967. Tropical cyclone development in March is usually inhibited by a southward adjustment in the subtropical ridge axis. Although not recognized in advance, Typhoon Bess' development paralleled Typhoon Tess, which developed in the eastern Caroline Islands and reached tropical depression strength near Woleai Atoll. Continuing northwestward between Guam and Yap, both recurved northward near 135E (Fig. 3-02-1) before dissipating north of 20N under the influence of a strong vertical shear.

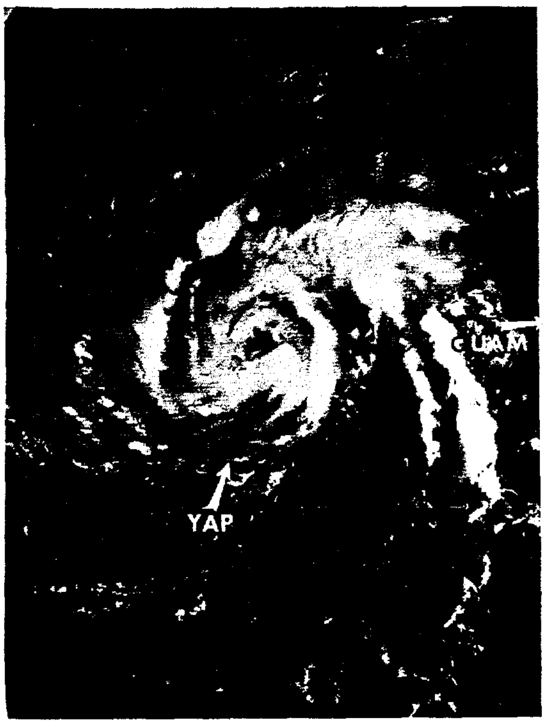


FIGURE 3-02-1. Typhoon Bess tracking northwestward between Guam and Yap at 8 kt (15 km/hr), 21 March 1979, 0103Z. Satellite imagery captured increased organization in the convective banding just prior to Bess reaching tropical storm intensity. (DMSP imagery)

Synoptic data at 160000Z suggested the existence of a weak surface circulation near 3.0N 152.5E at the base of a wave in the easterly flow. Satellite imagery at 160119Z indicated that an ill-defined area of convection existed near the surface circulation. By 161109Z, however, increased upper-level organization suggested development of a weak 200 mb anticyclone (Fig. 3-02-2). Increased curvature in the mid-level convective cloud pattern hinted at the possibility of tropical cyclone formation. As often observed in weak developing systems, 162207Z satellite imagery showed a significant decrease in the mid- to upper-level convective organization, while the synoptic analysis continued to support a weak circulation southeast of Guam. Continuing to pulsate, the suspect area presented a curious, but intensified upper-level convective pattern on 172151Z and 172333Z satellite imagery. Synoptic analysis at 180000Z indicated that, in addition to the circulation near 3.5N 147.5E, a secondary low had developed on the slow moving wave axis near 7.1N 150.0E and that the earlier ill-defined convection had been associated with these two circulations. As this secondary low tracked northward up the wave axis, increased cyclon-

FIGURE 3-02-2. Infrared imagery of very early development stage of Bess, 16 March 1979, 1109Z. Streamline pattern indicates an upper-level anticyclone. A surface circulation had not yet developed. (DMSP imagery)

ic shear between strong easterly flow north of the wave and weak equatorial westerlies south of the wave caused the northern circulation to become the dominant center as the initial low weakened. Simultaneously, the upper-level anticyclone intensified, producing an excellent outflow signature on 182315Z satellite imagery (Fig. 3-02-3). Although a formation alert was issued based on 182315Z satellite imagery, continued rapid development did not occur as expected. Aircraft data at 200259Z found strong enhanced easterly flow of 20-30 kt (10-15 m/sec) to the northeast, but only weak cyclonic flow to the south and east. Aircraft reports finally confirmed tropical storm strength early on the 21st (Fig. 3-02-4), five days after Bess was initially observed.

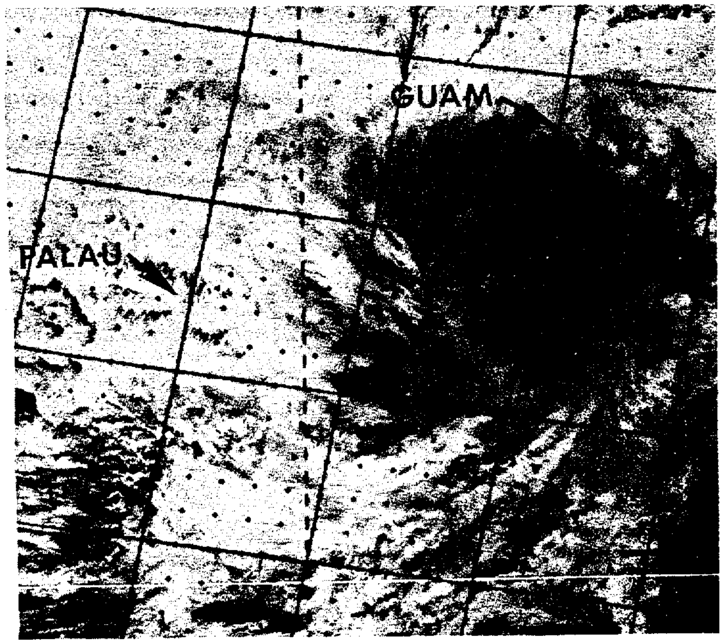


FIGURE 3-02-3. *Infrared imagery of Typhoon Bess developing under good upper-level outflow which is visible from the southeast through the northwest, 18 March 1979, 2315Z. (DMSP imagery)*

Sea Surface Temperature (SST) plays a vital role in the development and maintenance of tropical cyclones. A study by Charles P. Guard (1979) indicates that tropical cyclones which move over water cooler than 26C are less likely to intensify due to a reduction in latent heat. The study further states that tropical cyclones which develop prior to June intensify up to 10 kt (5 m/sec) after recurvature. This intensification, if experienced, will occur within the 12-24 hour period following recurvature. Typhoon Bess followed this recurvature pattern. The axis of recurvature was crossed at 230000Z. Slow intensification occurred over the next 18 hours with Bess reaching her maximum intensity of 90 kt (46 m/sec) at 231800Z. Bess maintained 90 kt (46 m/sec) for 18 hours and then rapidly weakened, dissipating by 250000Z. SST analyses during 24-27 March (Fig. 3-02-5) indicate that the area in which Bess weakened from 90-60 kt (46-31 m/sec) in a six-hour period corresponds closely to the location of water cooler than 26C. The reduction of latent heat input, coupled with increased vertical shear produced by strong westerlies aloft, literally sheared Bess apart during the final 12-18 hours.

FIGURE 3-02-4. *Typhoon Bess just prior to reaching her maximum intensity of 90 kt (46 m/sec), 23 March 1979, 0235Z. Bess displays a large elliptical eye with strong radial cirrus outflow in all directions. (DMSP imagery)*

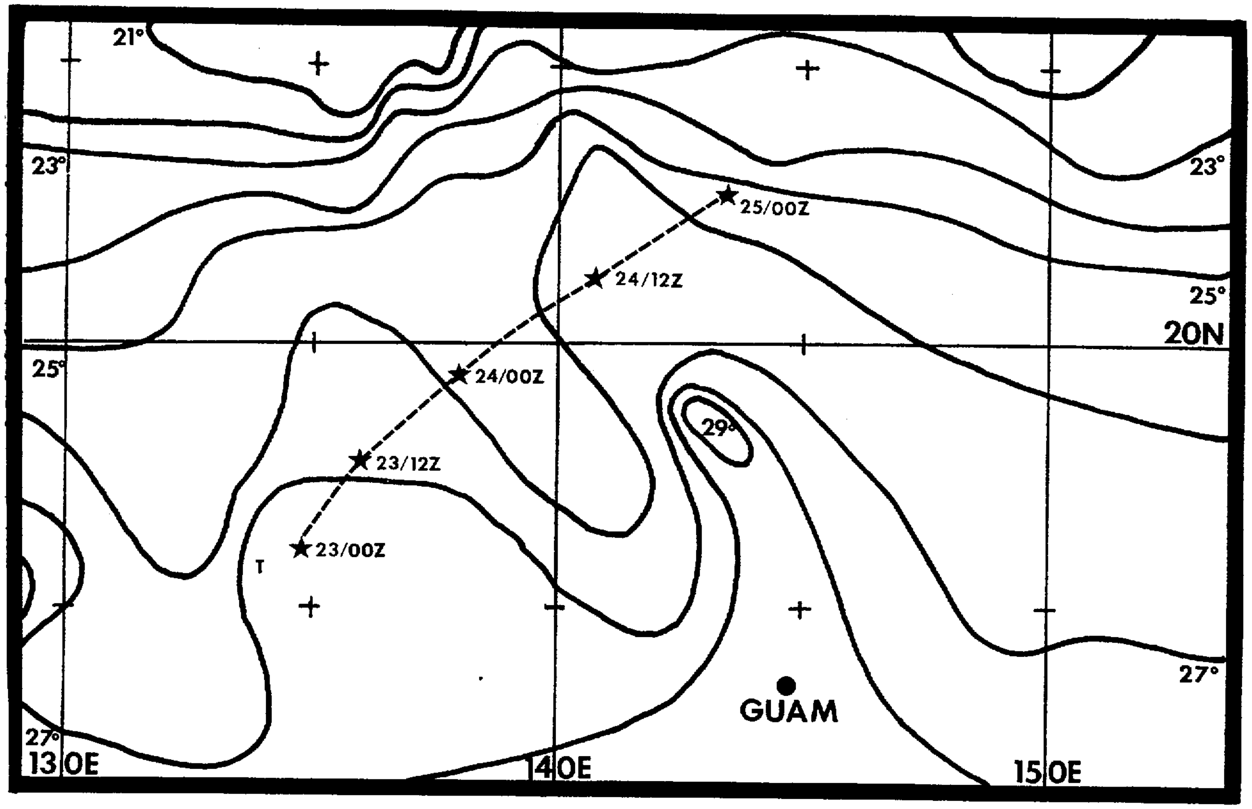
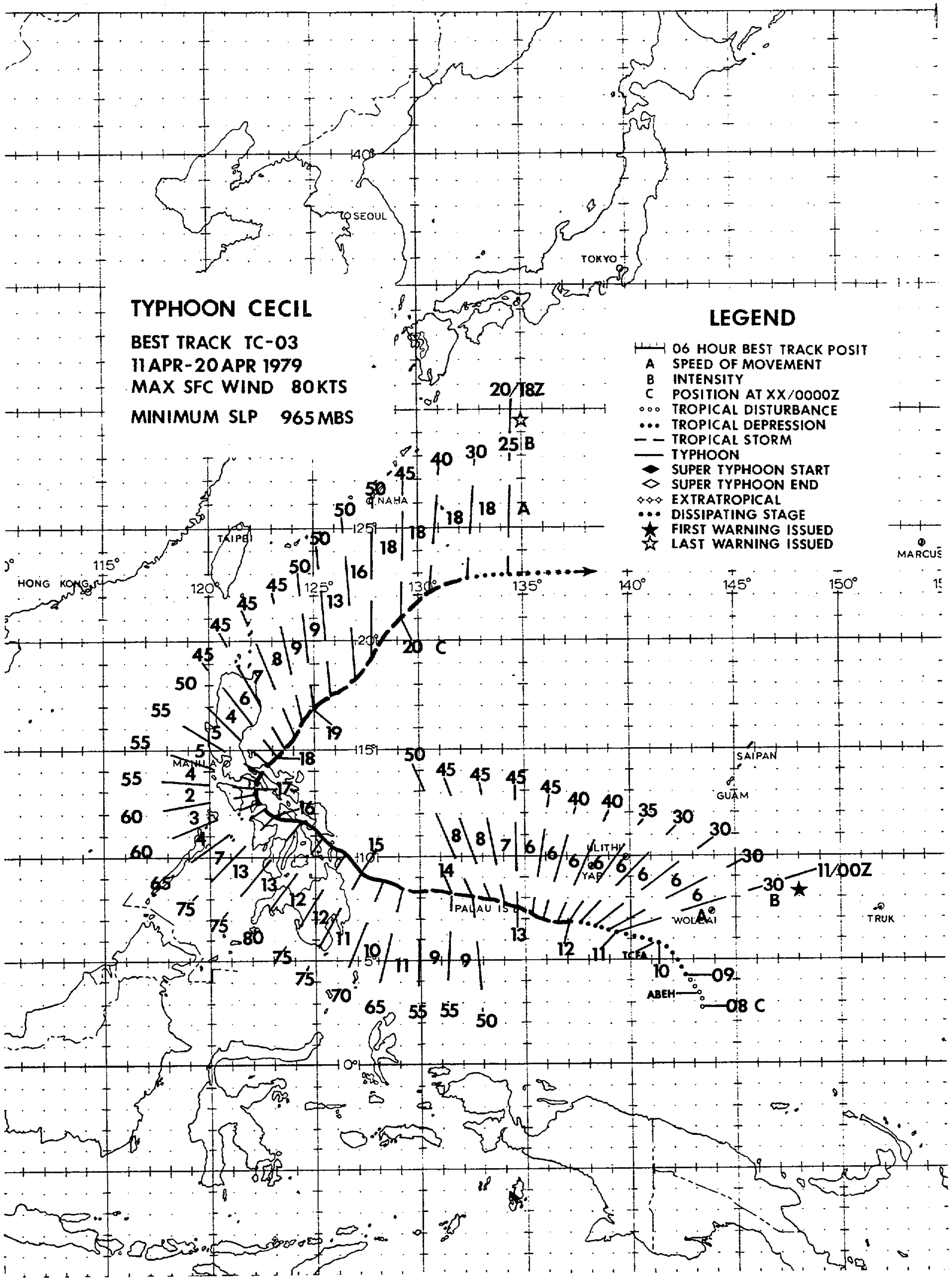


FIGURE 3-02-5. Composite of sea surface temperature analyses from 24-27 March 1979. Northeastward track of Typhoon Bess during dissipation stage is indicated by a dashed line with 12-hour positions.


TYPHOON CECIL
BEST TRACK TC-03
11 APR-20 APR 1979
MAX SFC WIND 80 KTS
MINIMUM SLP 965 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
NAHA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
MARCUS
20/18Z
11/00Z
115°
120°
125°
130°
135°
140°
145°
150°

Typhoon Cecil, the first tropical cyclone of 1979 in the Northwest Pacific given a male name, generated in mid-April from an easterly wave over the Philippine Sea. Cecil was forecast very well while on a climatological west-northwest track toward the central Philippines. Overall, post-analysis statistics showed that mean forecast errors were better than long-term averages. Nevertheless, JTWC warnings failed to forecast the crucial recurvature point in Cecil's track. Was there sufficient evidence to forecast this recurvature 24-48 hours in advance?

Post-analysis showed that recurvature occurred 36 hours after the 151200Z best track position. Satellite imagery (Fig. 3-03-1) located Cecil just south of Samar. At this time, the 500 mb subtropical ridge axis was at 17N with a small high pressure cell located over Northern Luzon. The 500 mb 36-hour PE prog maintained the ridge. Steering techniques based on this synoptic situation indicated westward movement for 72 hours. Analog techniques indicated west-northwestward movement. As a matter of fact, no objective forecast technique indicated recurvature prior to entrance into the South China Sea. The climatological average location of the 500 mb ridge axis is along 15N for April over the Philippines and the climatological recurvature point is 15-17N. Both synoptic and climatological data indicated a west-northwestward track over the Philippines with recurvature late in the forecast period in the South China Sea as Cecil tracked to the vicinity of 15N. Post-analysis, however, revealed that the ridge axis east of the Philippines abruptly shifted south between 161200Z and 170000Z with westerly winds intruding far to the south over the South China Sea. This pattern shift caused Cecil to recurve much earlier than anticipated. Within 48 hours, Cecil was well east of Luzon (Fig. 3-03-2). The ridge axis shift was the vital piece of information not present in any of the available prognostic tools. Thus, it appears even in post-analysis that forecasting of Cecil's recurvature 36 hours in advance was beyond state-of-the-art capabilities.

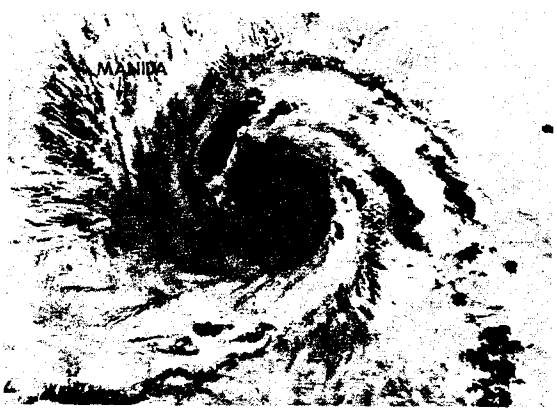


Figure 3-03-1. Infrared imagery of Typhoon Cecil 36 hours prior to recurvature with maximum sustained winds of 80 kt (41 m/sec), 15 April 1979, 1225Z. (DMSP imagery)

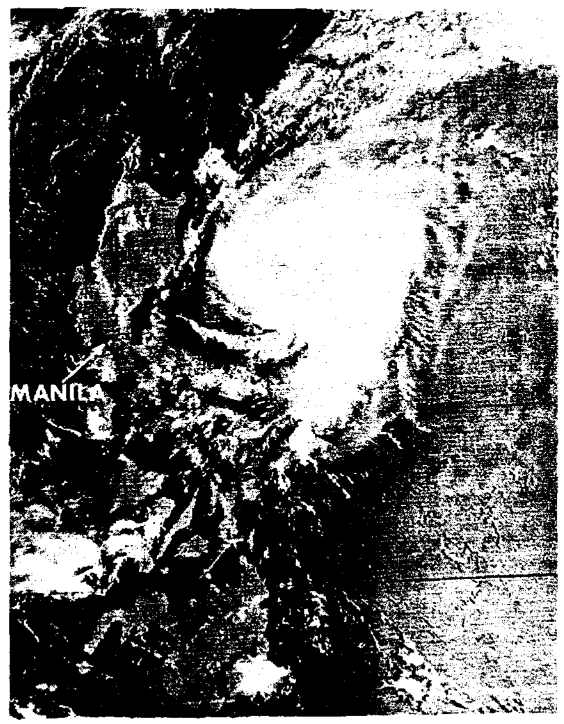
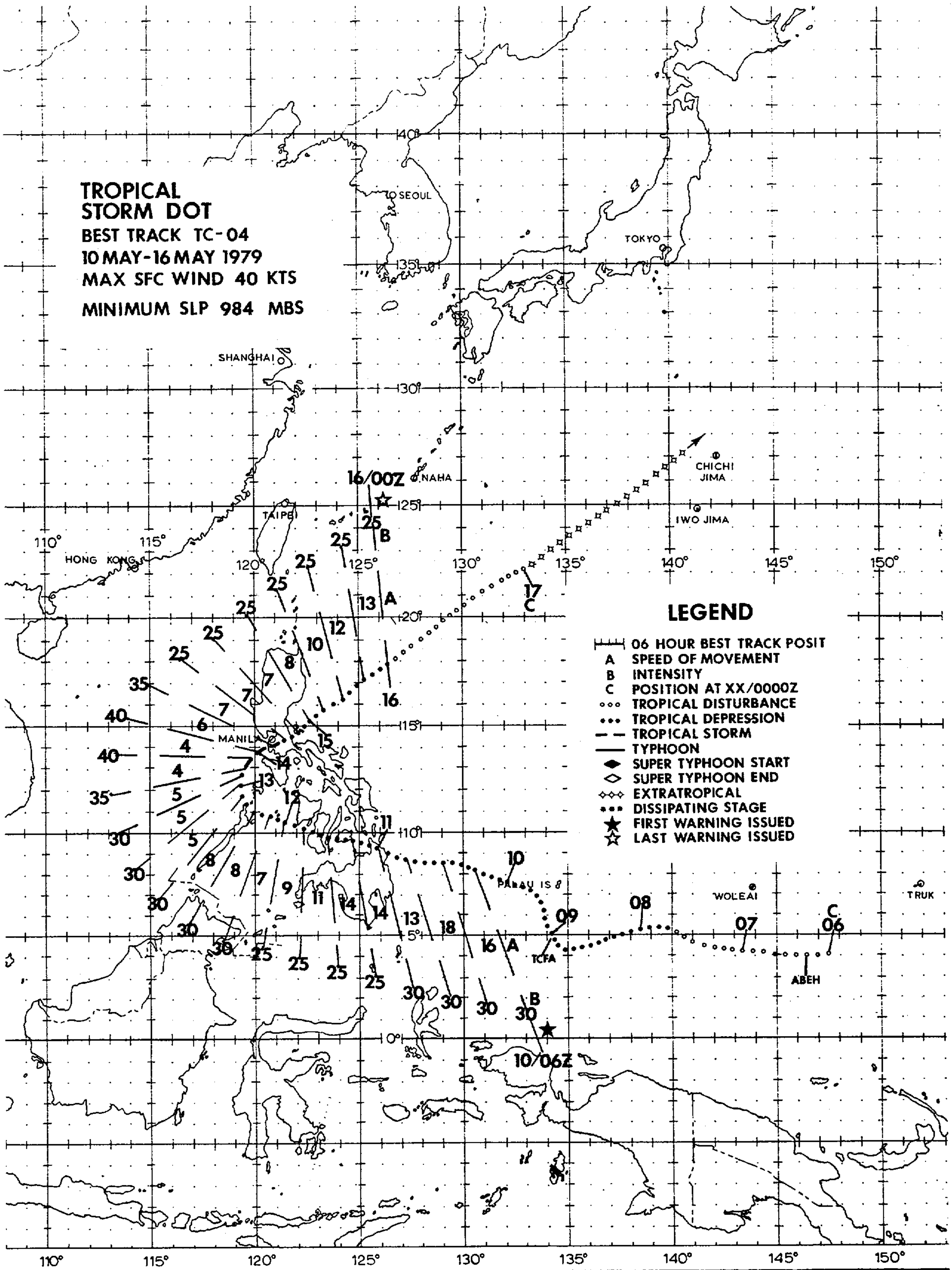


FIGURE 3-03-2. Cecil after recurvature with maximum sustained winds of 50 kt (26 m/sec), 19 April 1979, 0014Z. (DMSP imagery)


TROPICAL
STORM DOT
BEST TRACK TC-04
10 MAY-16 MAY 1979
MAX SFC WIND 40 KTS
MINIMUM SLP 984 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
CHICHI JIMA
IWO JIMA
PALAU IS
WOLEAI
TRUK
16/00Z
10/06Z
TCFA
ABEH
110°
115°
120°
125°
130°
135°
140°
145°
150°

Tropical Storm Dot did not reach tropical storm strength prior to landfall on the Philippine Islands (Fig. 3-04-1). Once Dot crossed the islands, tropical storm strength was attained lasting, however, less than 24 hours (Fig. 3-04-2). Dot's development was cut short by the eventual frictional effects of Luzon and increasing vertical wind shear aloft.

TS Dot slowly formed in an area of broad, low-level easterlies, high surface pressures, and strong upper-level shear. The conditions for significant tropical cyclone development were poor while the system existed east of the Philippine Islands. After crossing the Philippines, however, Dot reached tropical storm strength while over the South China Sea.

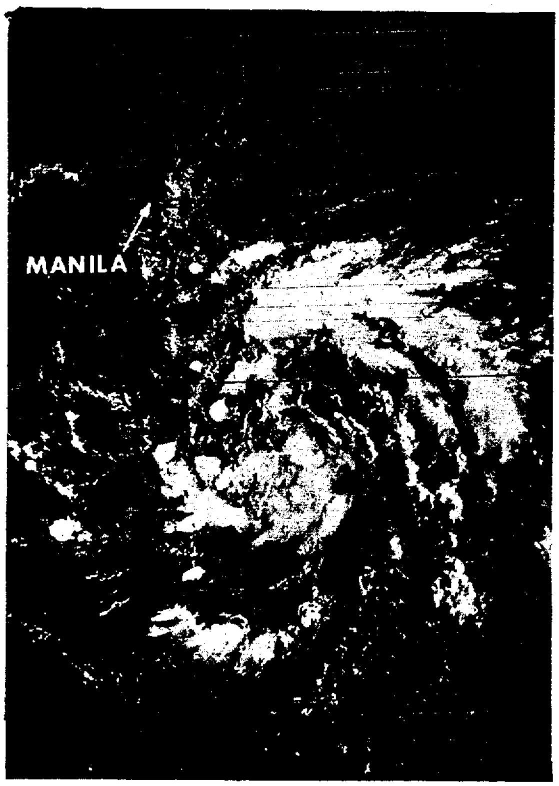


FIGURE 3-04-1. *Tropical Storm Dot at 30 kt (15 m/sec) intensity while over northern Mindanao, 11 May 1979, 0029Z. (DMSP imagery)*

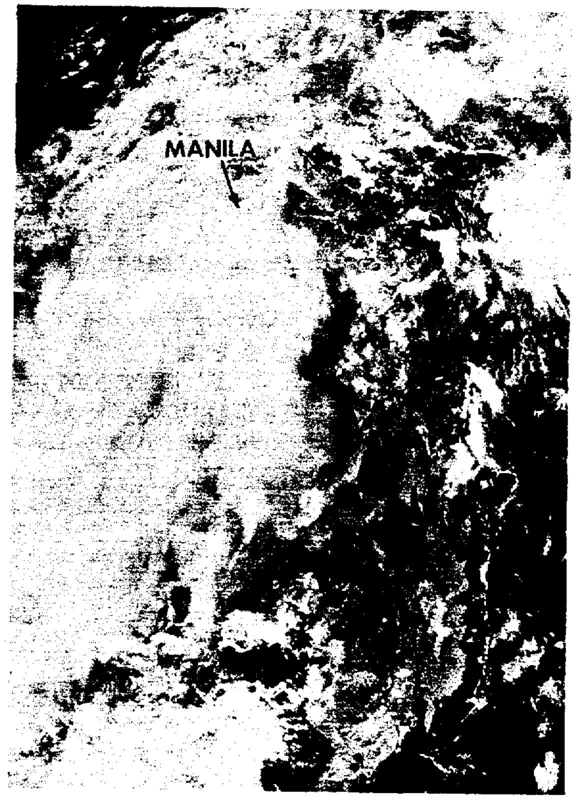
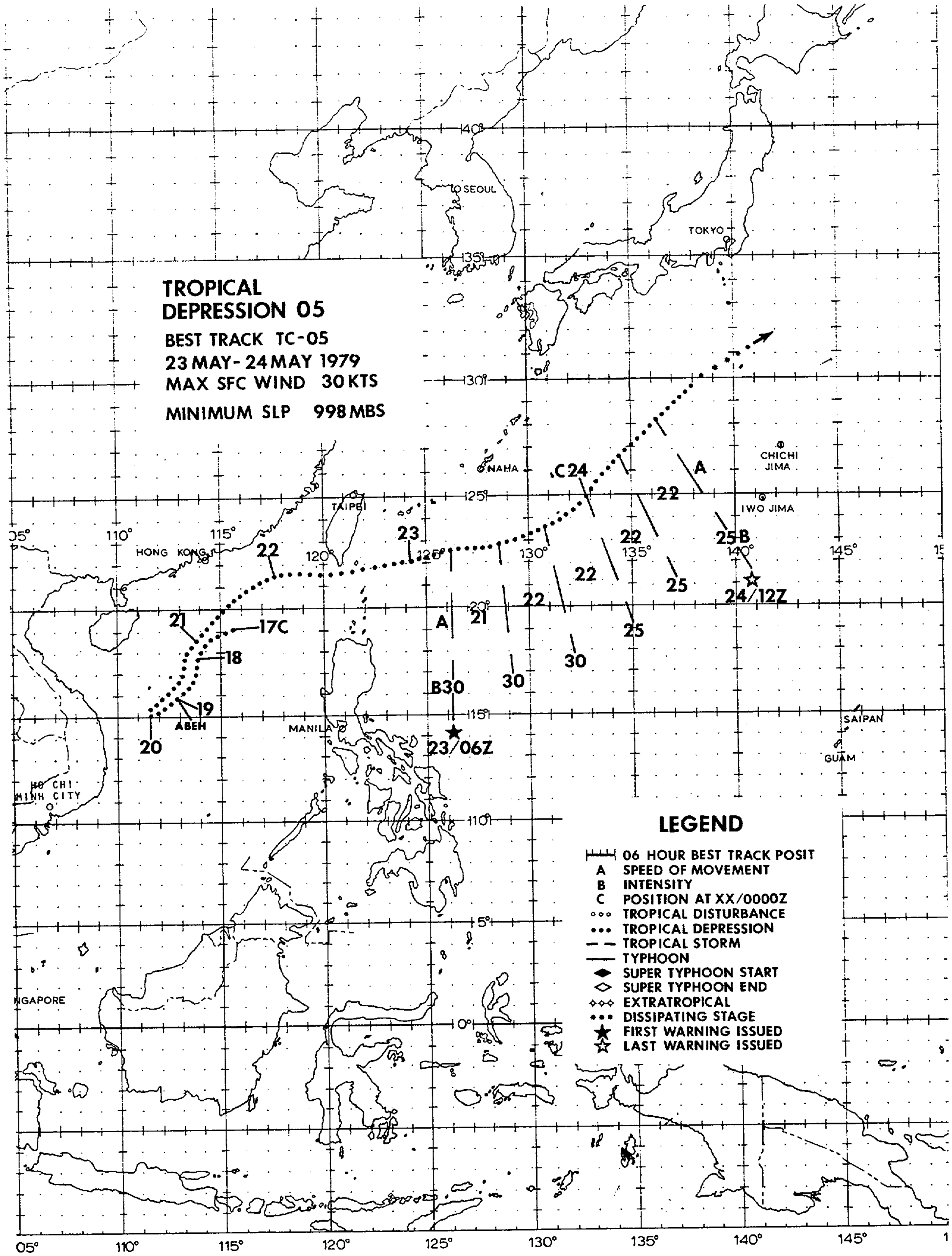


FIGURE 3-04-2. *Tropical Storm Dot while recurving toward Manila, 12 May 1979, 2353Z. (DMSP imagery)*


TROPICAL
DEPRESSION 05
BEST TRACK TC-05
23 MAY-24 MAY 1979
MAX SFC WIND 30 KTS
MINIMUM SLP 998 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
HO CHI MINH CITY
SINGAPORE
23/06Z
24/12Z
C24
B30
25B
17C
ABEH
105°
110°
115°
120°
125°
130°
135°
140°
145°

Early season disturbances in the South China Sea, as discussed by Ramage (1971), may develop as a result of active monsoon troughs which extend eastward across Southeast Asia into the South China Sea (SCS). During late May, increased convergence in the enhanced southwest monsoon flow produced a significant increase in convection across the SCS, and several weak surface circulations were noted along the monsoon trough between Hainan Island and northern Luzon. Surface/gradient level synoptic analysis at 170000Z confirmed the existence of an elongated pressure trough with several 1005 mb centers. The main circulation, located northeast of the Paracel Islands, was actually north of the main convective area which covered most of the SCS south of the trough. Characteristics of SCS monsoon depressions include: strong enhanced southwesterly flow with light winds near the depression center; large areas of convection associated with convergence in the southwesterly flow with little curvature in towards the center; a relatively flat surface pressure regime of large areal extent; and, a mid-tropospheric cyclonic circulation over the area (Ramage, 1971). These conditions were observed in this area.

Initially, TD 05 drifted southwestward east of the Paracel Islands. By 200000Z a slow, eastward-tracking 500 mb short-wave over central China caused TD 05 to accelerate northeastward. As TD 05 accelerated, increased cyclonic shear at the surface southeast of Taiwan caused the system to transition from a monsoon depression to a tropical depression with a small anticyclonic outflow center evident aloft. (Many SCS monsoon depressions never make this transition, usually dissipating after 3-4 days.) Totally divorced from the monsoon trough, TD 05 tracked eastward through the Bashi Channel and then along the remnants of a weak frontal boundary. TD 05 was not forecast to intensify significantly, but it merged with an extratropical frontal boundary near 22.0N 124.8E and produced an improved satellite signature at 230018Z (Fig. 3-05-1) which included a banding-type eye. (Banding-type eyes are usually characteristic of more intense tropical cyclones.) Synoptic analyses during the life of TD 05 never indicated an intensity above 30 kt (15 m/sec). The lowest pressure recorded was 998 mb measured by a ship close to the circulation center. This pressure equates to approximately 32 kt (17 m/sec) (Atkinson and Holliday, 1975).

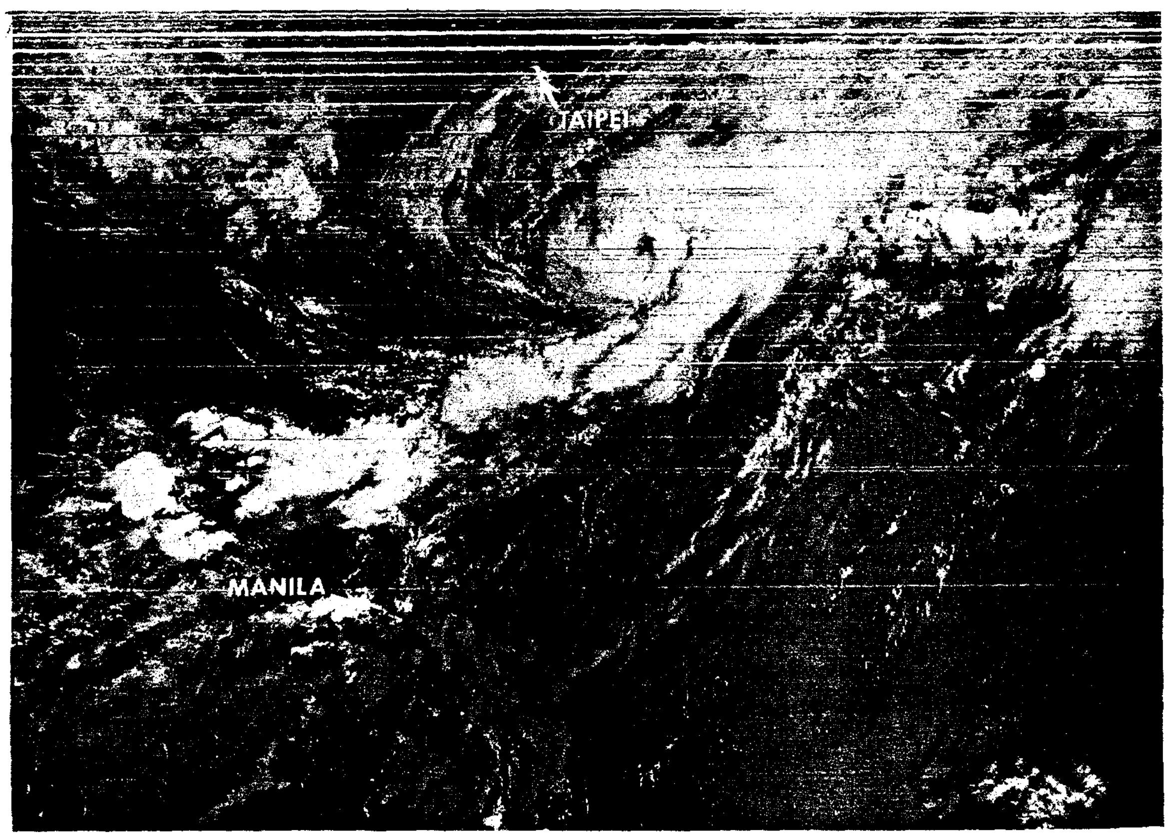
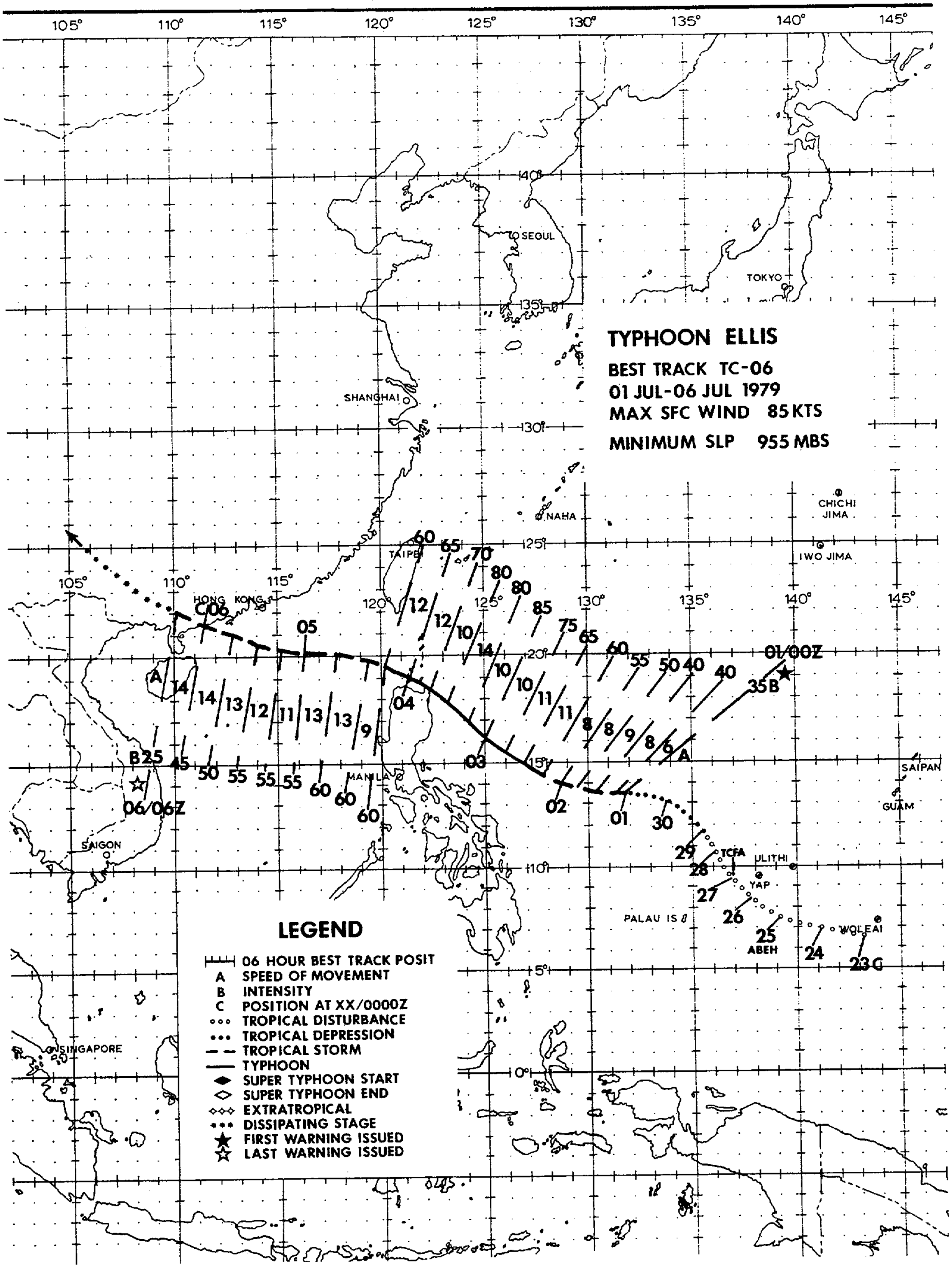


FIGURE 3-05-1. *TD 05 at 30 kt (15 m/sec) intensity with banding-type eye moving east-northeastward at 20 kt (37 km/hr), 23 May 1979, 0018Z. (DMSP imagery)*



TYPHOON ELLIS
BEST TRACK TC-06
01 JUL-06 JUL 1979
MAX SFC WIND 85 KTS
MINIMUM SLP 955 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
105°
110°
115°
120°
125°
130°
135°
140°
145°
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
MANILA
SAIGON
SINGAPORE
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TCFA
01/00Z
06/06Z

The tropical disturbance, which later became Typhoon Ellis, was first noted on satellite and synoptic data on 25 June 1979. The surface/gradient-level analysis showed that a broad monsoon trough had developed between Guam and the Philippine Islands. At upper-levels, a Tropical Upper Tropospheric Trough (TUTT) was oriented northeast-southwest between the Volcano Islands and the central Philippine Islands. This TUTT allowed excellent upper-level outflow to the northeast and was expected to induce intensification of the tropical disturbance southeast of the TUTT axis. Therefore, a Tropical Cyclone Formation Alert (TCFA) was issued for the area valid at 270000Z. However, significant development did not occur. Reconnaissance aircraft could find only a very broad surface circulation with relatively high surface pressures. The surface circulation drifted under the TUTT and the associated convection was suppressed; development was thereby thwarted. Based on the superposition of the TUTT and the surface circulation and the fact that the overall satellite signature had not improved, the TCFA was cancelled at 282000Z.

The area was closely monitored, and when satellite imagery showed increased convective development and surface data showed decreasing pressures and increasing winds, a second TCFA was issued valid at 300600Z. Subsequent aircraft investigation revealed a minimum sea-level pressure of 1000 mb and surface winds in excess of 35 kt (18 m/sec). Based on this new information, the first warning on TS Ellis was issued at 010000Z July. Ellis was in a favorable position at that time and steady intensification occurred over the next 2 days.

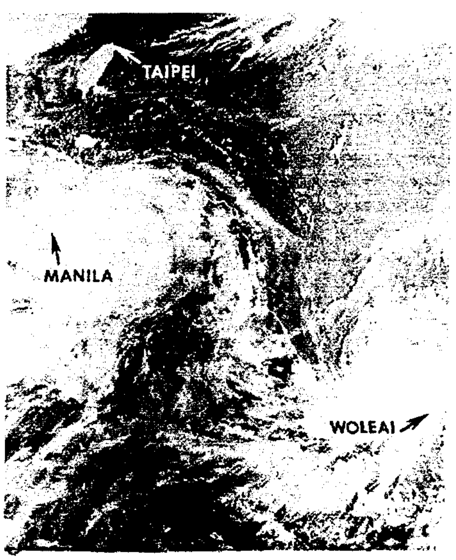


FIGURE 3-06-1. Typhoon Ellis (left) at maximum intensity of 85 kt (44 m/sec), 2 July 1979, 2356Z. TS Faye (right) is developing north of Woleai. (DMSP imagery)

For his entire lifetime, Ellis followed an uncomplicated, classic west-northwest track at near climatological speeds ranging from 9-14 kt (17-26 km/hr). Post-analysis indicates that Ellis was moving under the influence of the east-southeasterly steering flow on the southern edge of the subtropical mid-tropospheric ridge. Ellis' nearly straight track is due primarily to the fact that this ridge did not change in intensity or orientation during the period.

Ellis reached typhoon strength at 021200Z and a maximum intensity of 85 kt (44 m/sec) at 030000Z (Fig. 3-06-1). Continued intensification was anticipated, but a slow weakening trend was actually observed. As with Tropical Storm Faye, this weakening was associated with a drastic change in the upper-level flow pattern.

During Ellis' developing stage, the TUTT was located to the north-northwest and was providing the necessary outflow channel to the northeast. By 020000Z, however, an upper-level anticyclone over central China began to ridge eastward, forcing the TUTT to the northeast. Strong upper-level northeasterly winds associated with this anticyclone began to exert pressure on Ellis, shearing the convective activity to the southwest. Continuing west-northwest in this shearing environment, Ellis weakened steadily. By the time he was in the South China Sea, Ellis had weakened to tropical storm strength and was a completely exposed low-level circulation (Fig. 3-06-2).

With winds of 54 kt (26 m/sec), Ellis made landfall on the Chinese coast at 060000Z, 164 nm (296 km) southwest of Hong Kong and dissipated rapidly over land thereafter.

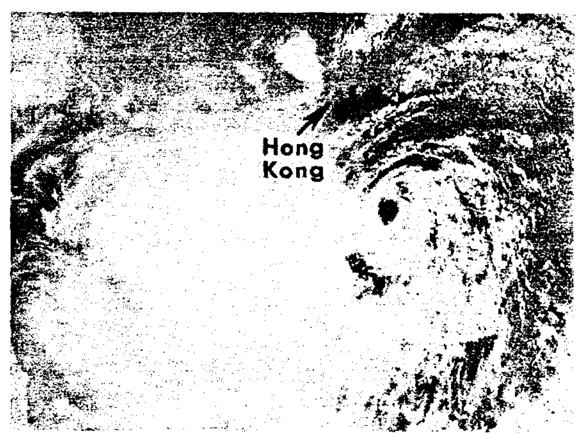
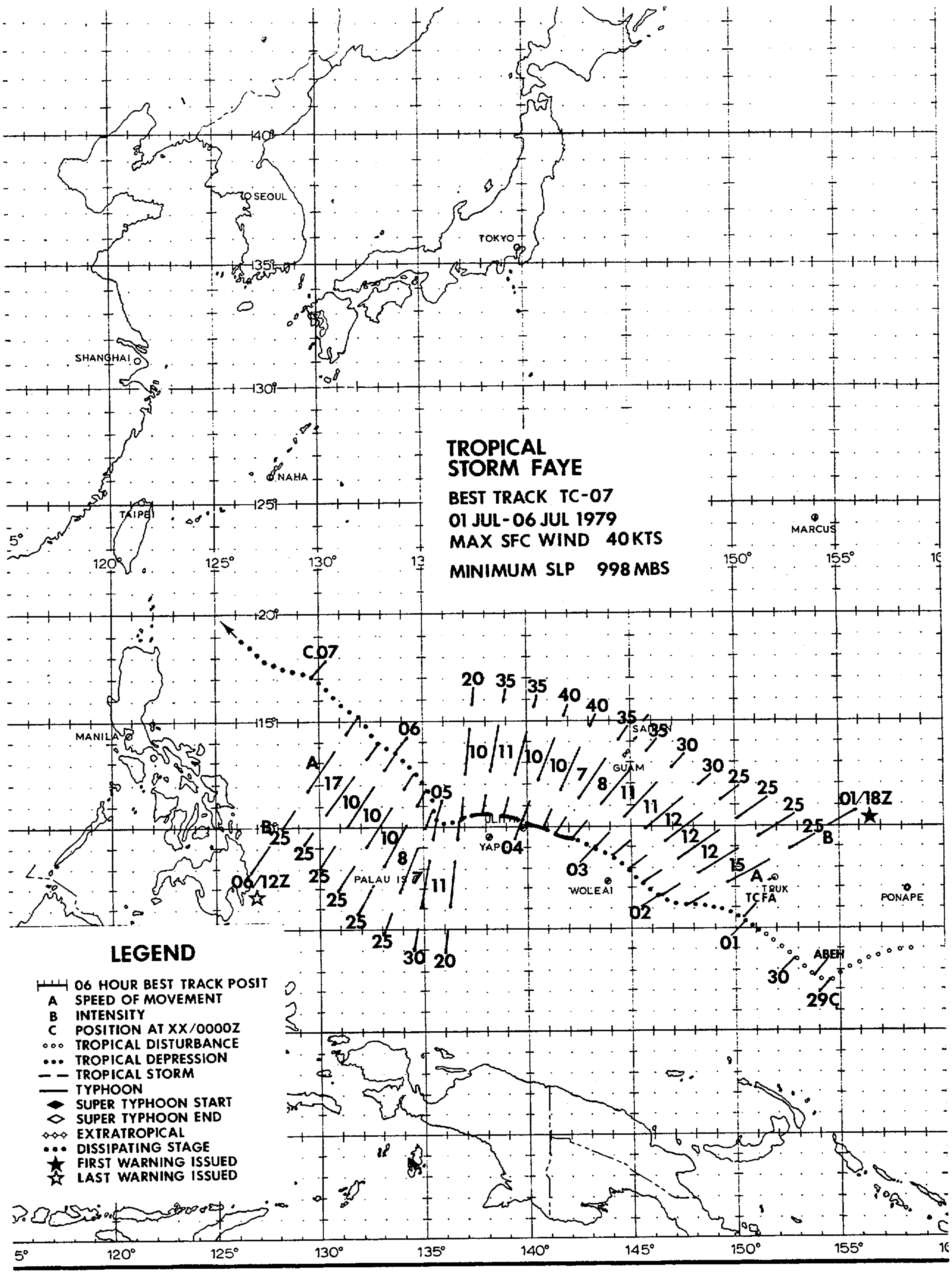


FIGURE 3-06-2. Tropical Storm Ellis as an exposed low-level circulation in the South China Sea, 5 July 1979, 0101Z. (DMSP imagery from Det 5, 1WW, Clark AB, RP)


TROPICAL STORM FAYE
BEST TRACK TC-07
01 JUL-06 JUL 1979
MAX SFC WIND 40 KTS
MINIMUM SLP 998 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
MANILA
MARCUS
GUAM
SAIPAN
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
ABEH
TCFA
01/18Z
06/12Z
120°
125°
130°
135°
140°
145°
150°
155°

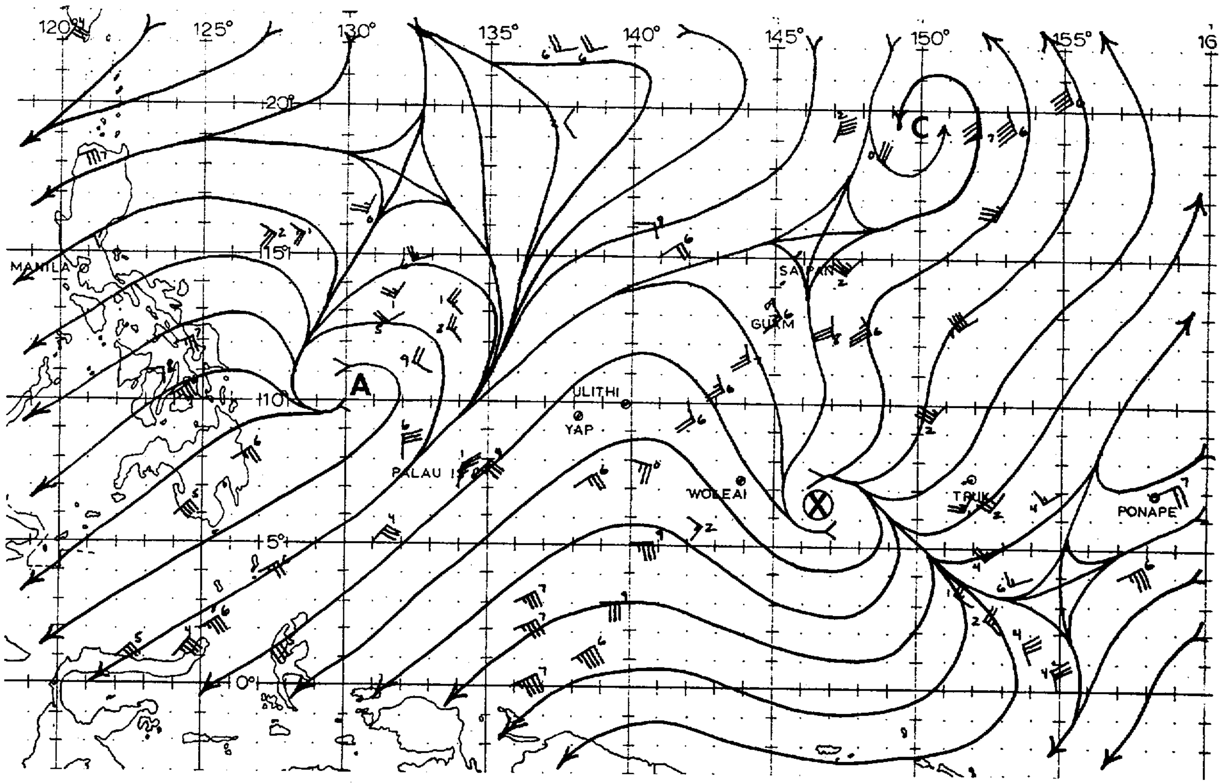


FIGURE 3-07-1. Upper-level streamline analysis at 020000Z July 1979.

Tropical Storm Faye proved a most interesting case study, not because it developed into an intense tropical cyclone, but because typhoon intensity was not attained as forecast.

TD 07 was first analyzed as a closed surface circulation about 800 nm (1482 km) southeast of Guam on the 28th of June. The associated convective activity remained disorganized until 011200Z July. At that time a TUTT cell developed north of the system; thereby providing an excellent upper-level outflow channel to the northeast (Fig. 3-07-1). The wind data plotted in figures 3-07-1, -3 and -5 are a combination of RAOBS, AIREPS and satellite-derived winds for the 250 mb to 150 mb levels.

Diffluence over TD 07 was extensive and well-defined. The satellite signature also showed improved outflow (Fig. 3-07-2), and further intensification was expected.

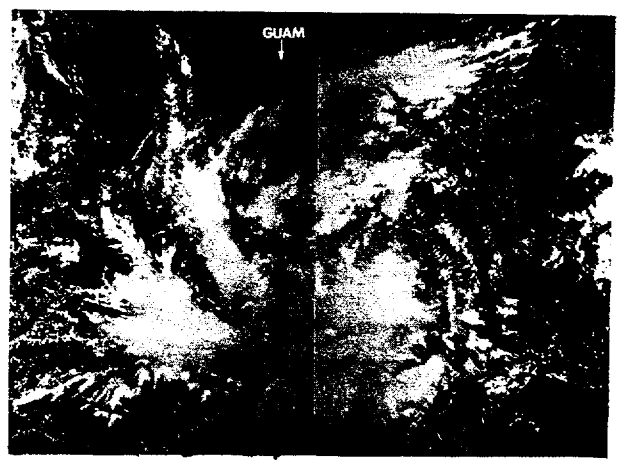


FIGURE 3-07-2. The tropical depression that was to become TS Faye, 02 July 1979, 0022Z. (DMSP imagery)

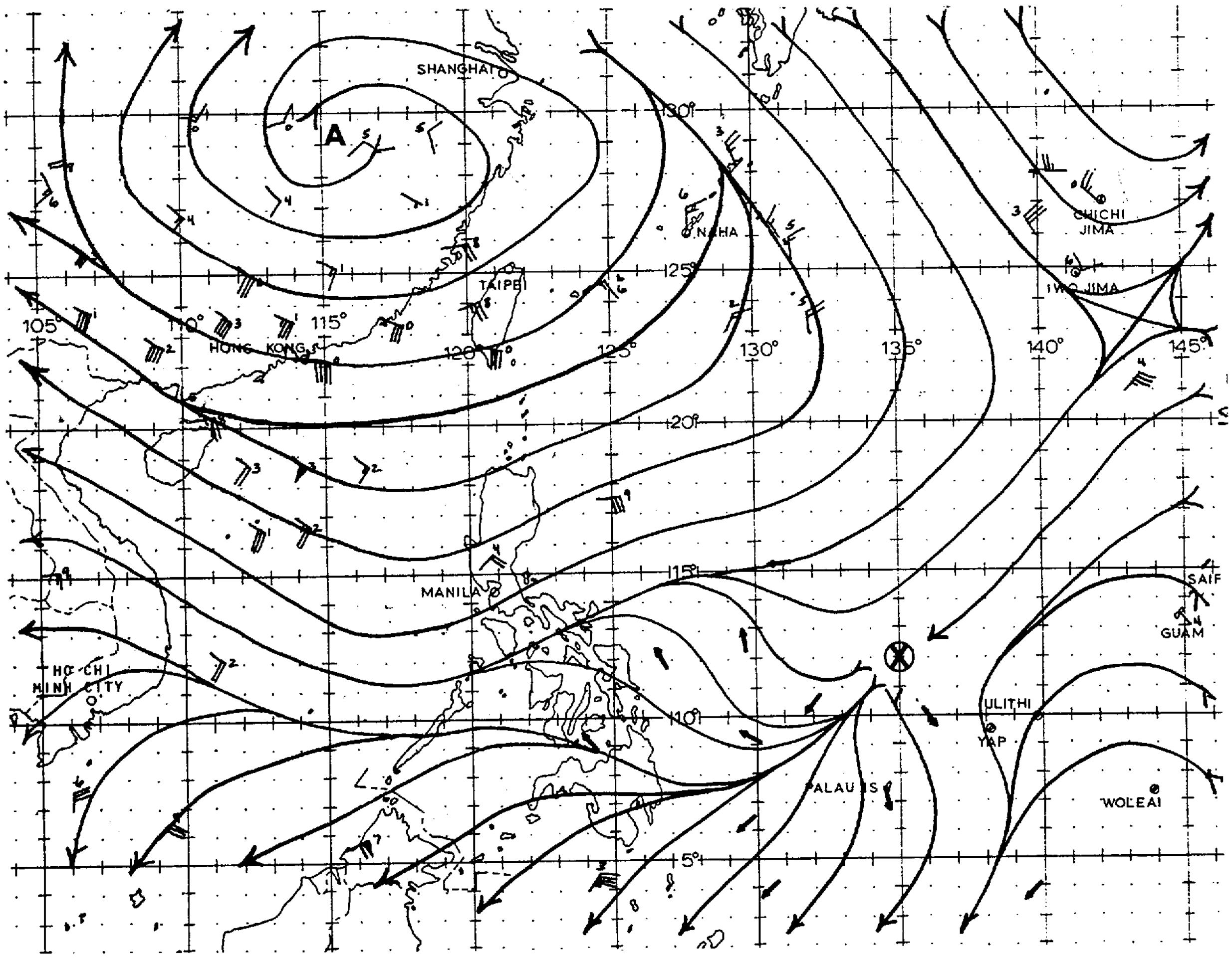


FIGURE 3-07-3. Upper-level streamline analysis at 051200Z July 1979.

The flow pattern over the depression (TD 07) remained favorable for development for the next two days and tropical storm intensity was reached by 031800Z. Continued intensification was still anticipated with typhoon strength forecast within 18 hours.

Instead of intensification, however, Faye weakened. Post-analysis shows that Faye's weakening, and subsequent dissipation, was linked to a radical change in the upper-level flow pattern. Whereas figure 3-07-1 shows a tropical cyclone in excellent position for intensification, figure 3-07-3 shows just the opposite. By 051200Z, a large upper-level anticyclone over China was beginning to build southeastward into the western Pacific toward Faye. Faye's outflow channel to the north became restricted and her low-level circulation center became exposed (Fig. 3-07-4). The mid- to upper-level centers and the associated convection were sheared off to the southwest by increased northeasterly winds at the upper-levels.

FIGURE 3-07-4. TD 07 (FAYE), 05 July 1979, 1202Z. Strong upper-level northeasterlies have begun to shear off the convection to the southwest. (DMSP imagery, Moonlight Visual)

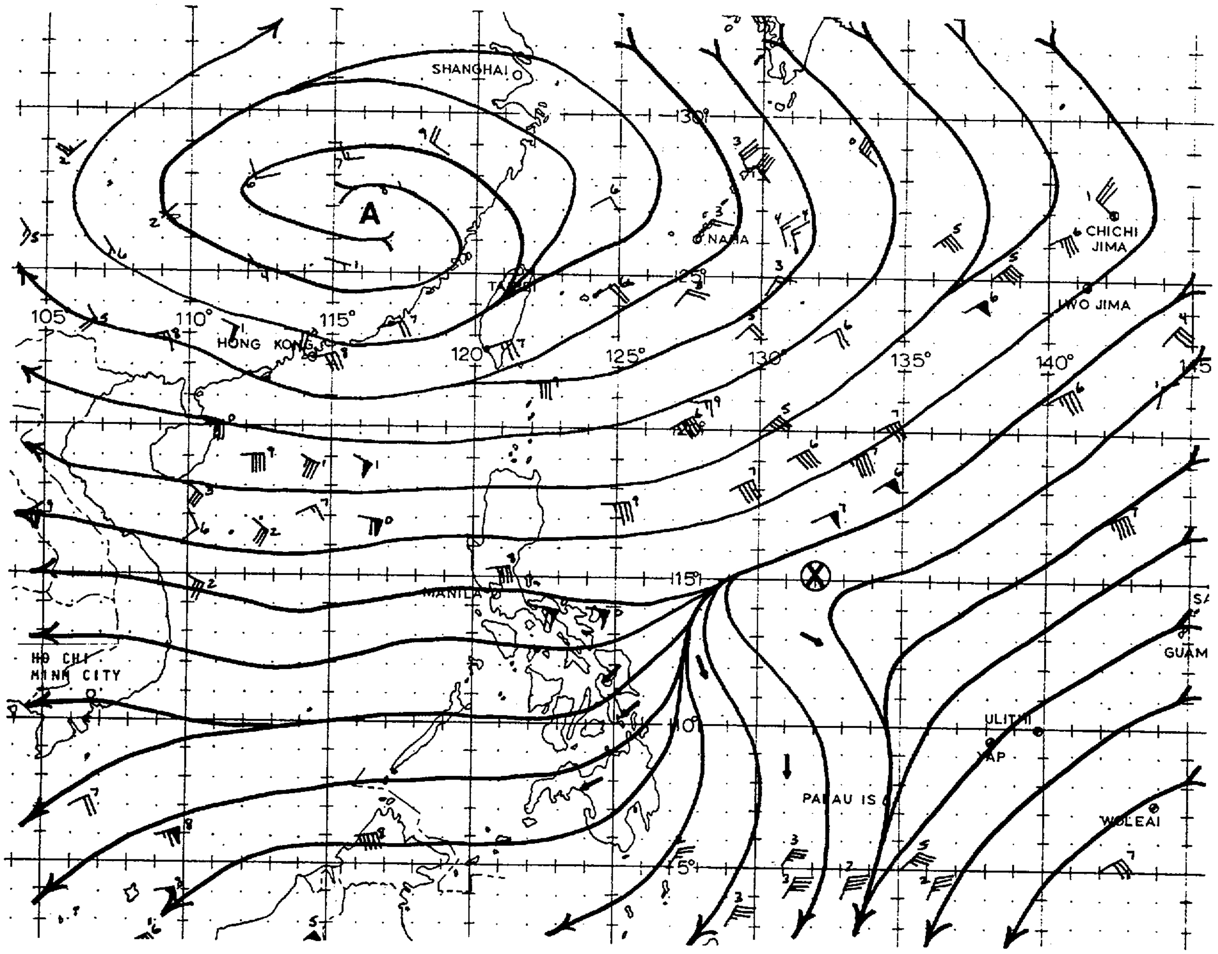


FIGURE 3-07-5. Upper-level streamline analysis at 061200Z July 1979.

Displacement between surface and upper-level centers was observed often during the 1979 season (e.g., see discussions on Hope, Irving, Ellis). Development is usually arrested in this situation, until the system becomes aligned in the vertical. In the case of TS Faye, the upper-level pattern failed to improve. Figure 3-07-5 shows that by 061200Z the upper-level ridge had intruded as far east as Guam and that northeast winds aloft had increased to 50 kt (26 m/sec). At that time, Faye's low-level circulation was fully exposed (Fig. 3-07-6).

This exposed low-level circulation meandered northwestward for two days and eventually dissipated northeast of Luzon.

The short history of Tropical Storm Faye is an excellent example of premature dissipation induced by strong vertical wind shear.

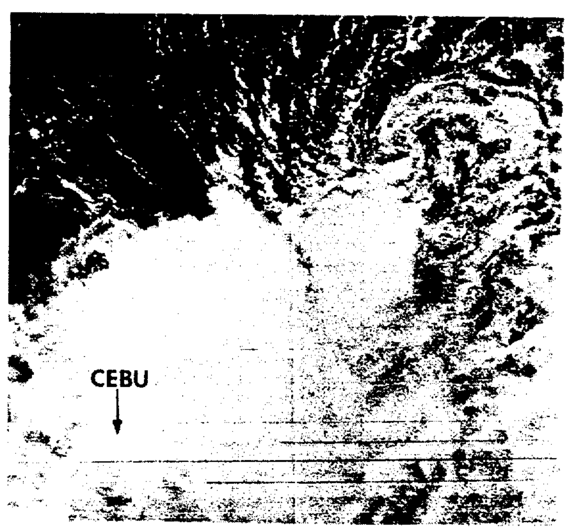
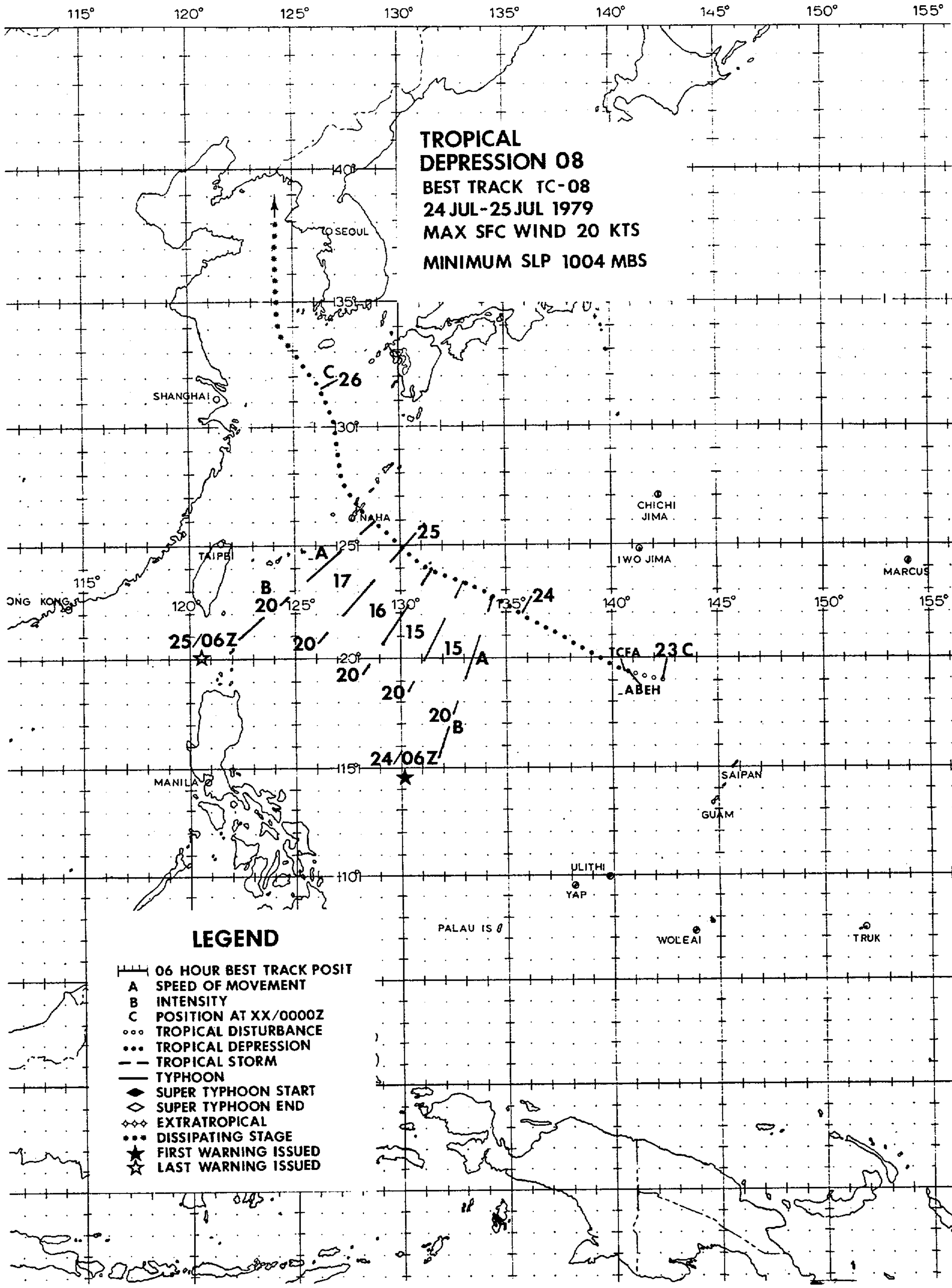


FIGURE 3-07-6. TD 07 (FAYE) is now a fully exposed low-level circulation, 06 July 1979, 1518Z. (DMSP imagery, Moonlight Visual)

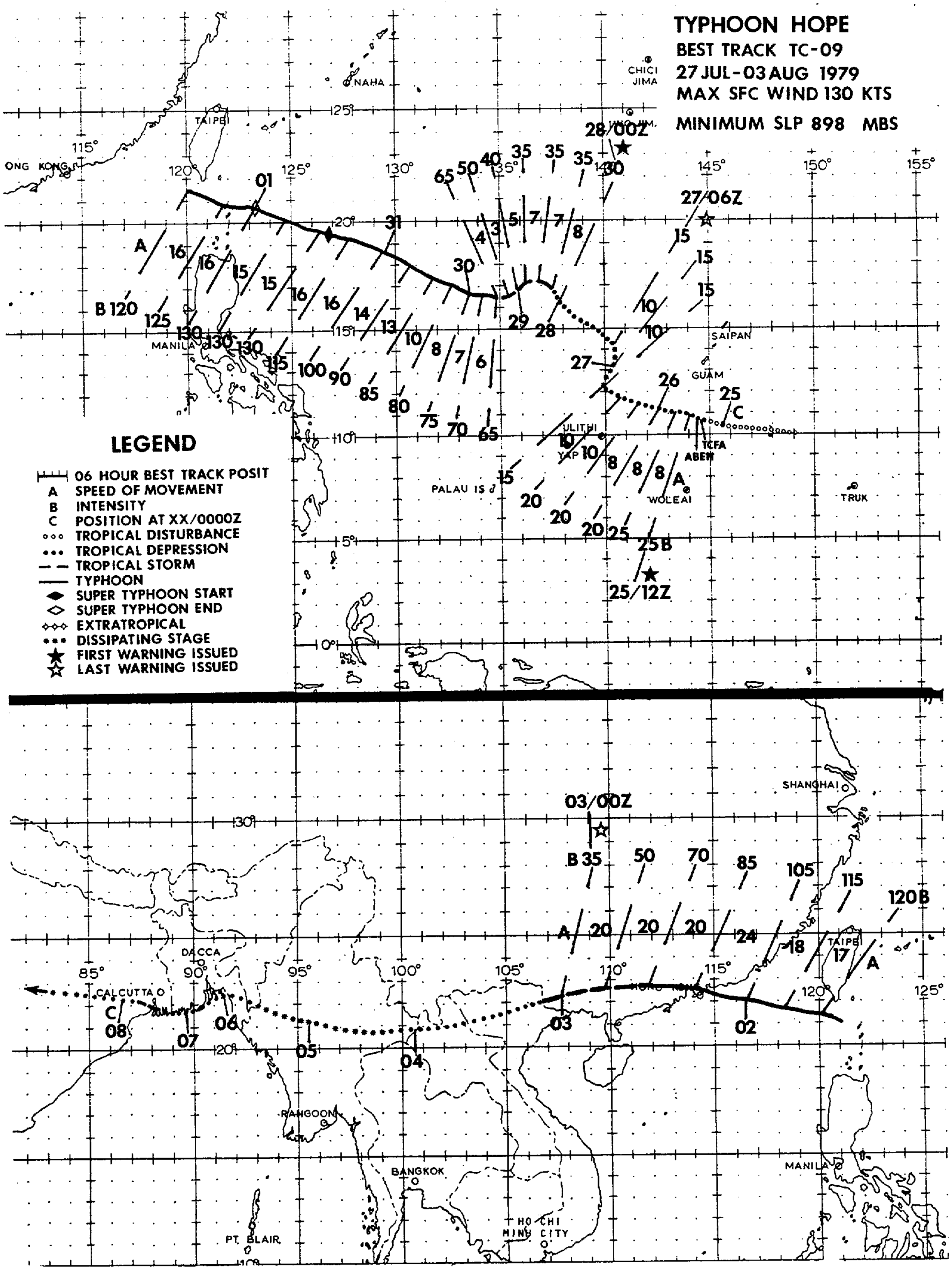

TROPICAL
DEPRESSION 08
BEST TRACK TC-08
24 JUL-25 JUL 1979
MAX SFC WIND 20 KTS
MINIMUM SLP 1004 MBS
115°
120°
125°
130°
135°
140°
145°
150°
155°
SEOUL
SHANGHAI
NAHA
TAIPEI
HONG KONG
CHICHI JIMA
IWO JIMA
MARCUS
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
ABEH
TCFA
23 C
24
25
26
C
A
B
17
16
15
20
25/06Z
24/06Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

For the greater part of its life, TD 08 was an exposed low-level circulation with the major convective activity detached to the north of the surface center (Fig. 3-08-1). Aircraft reconnaissance confirmed an exposed surface circulation approximately 100 nm (185 km) south of the convective center at 241016Z.

TD 08 was not expected to intensify to tropical storm strength as a result of strong vertical shear which began on 231200Z. However, initial warnings were issued based on the forecast track which indicated passage directly over Okinawa.

Post-analysis indicated that the calm-wind center did indeed track over Okinawa with most of the convective activity tracking well north of the island.

FIGURE 3-08-1. Infrared imagery of TD 08 at maximum intensity of 20 kt (37 m/sec), 24 July 1979, 1244Z. TD 08's 241200Z surface center (⊗) is depicted relative to surface ship reports (—↘) and 700 mb aircraft reports (←↘). (DMSP imagery)


TYPHOON HOPE
BEST TRACK TC-09
27 JUL-03 AUG 1979
MAX SFC WIND 130 KTS
MINIMUM SLP 898 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
NAHA
CHICHI JIMA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
TCFA
ABEH
28/00Z
27/06Z
25/12Z
03/00Z
SHANGHAI
DACCA
CALCUTTA
RANGOON
BANGKOK
HO CHI MINH CITY
PT. BLAIR

The disturbance which eventually developed into the first super typhoon of 1979 became evident on satellite imagery at 250000Z July as a focal point of cumulus banding. Future intensification was indicated as the disturbance was situated within an area of strong upper-level diffluence associated with the southern periphery of an east-west oriented TUTT. This outflow mechanism aloft, combined with an improved satellite signature, dictated issuance of a Tropical Cyclone Formation Alert at 250751Z; the alert box described an area southwest of Guam. Subsequent aircraft reconnaissance at 250900Z described a cyclonic circulation with wind speeds of 15-25 kt (8-10 m/sec) and a central pressure of 1004 mb centered near 11.1N 144.5E. Based on this aircraft data and the proximity to Guam, the first warning on TD 09 (Hope) was issued at 251200Z.

From the 25th through the 26th of July, while TD 09 (Hope) tracked to the west-northwest, the TUTT axis shifted northward and strong upper-level northeast flow dominated the area. The resultant shear produced by this uni-directional upper-level flow displaced the convective activity to the southwest of the surface circulation, indicating a loss of vertical alignment and subsequent weakening. By 270600Z, the center of the convective activity was displaced 120 nm (222 km) southwest of the low-level circulation center. Surface analyses, at this time, indicated the southwest monsoonal flow was being channeled principally into Tropical Storm Gordon located 750 nm (1389 km) to the northwest of TD 09 (Hope). With further weakening of Hope expected, a final warning was issued at 270451Z advising that the area would be closely monitored for possible regeneration. Post-analysis showed that from 271200Z through 280000Z, the TUTT weakened with resultant reduced shear over TD 09 (Hope). Conditions for development being improved, reorganization took place and TD 09 began to develop. Unfortunately, the improvement in the surface circulation went unnoticed as it occurred during the night when only infrared satellite imagery, on which low-level clouds are difficult to distinguish, was available. An aircraft investigation on the morning of the 28th reported a surface pressure of 999 mb with 45-50 kt (23-27 m/sec) winds in the heavy convective activity to the southwest of the surface center. A warning was issued at 280221Z indicating the regeneration of TD 09 (Hope).

By 280000Z, Tropical Storm Gordon had moved into the Luzon Straits. Due to the orographic blocking of the Philippine land mass, the majority of the strong southwest monsoonal flow was diverted into Hope. This increased low-level inflow coupled with decreasing upper-level shear resulted in a much improved vertical structure with feederband activity developing in the south; 282052Z aircraft reconnaissance supported this improved organization trend. Post-analysis indicates that TD 09 (Hope) could have been upgraded to tropical storm intensity 12-24 hours prior to the warning upgrade at 290000Z, as 35-45 kt (18-23 m/sec) winds were reported in feederband activity as much as 24 hours earlier (Fig. 3-09-1). By 290920Z, a well-defined eye with a central surface pressure of 972 mb and 65-70 kt (33-36 m/sec) surface winds were reported by aircraft data; the 291200Z warning upgraded Hope to a typhoon.

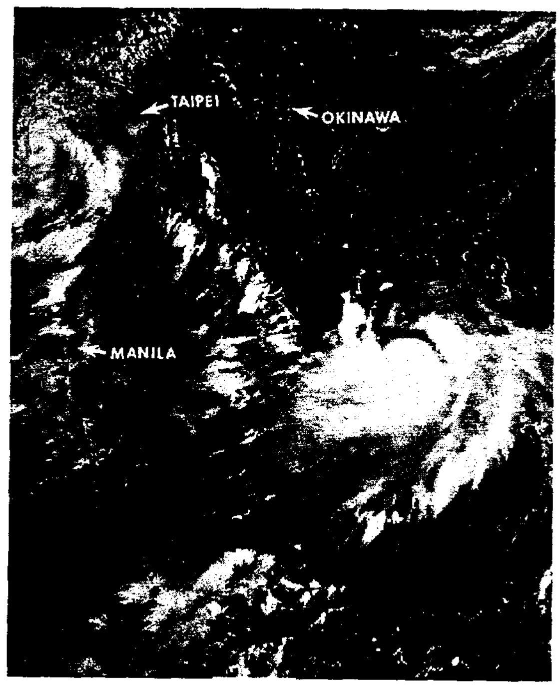


FIGURE 3-09-1. *Hope (right) at tropical storm intensity 570 nm (1056 km) northeast of Guam, 29 July 1979, 0219Z. Tropical Storm Gordon (left) is 100 nm (185 km) east of Hong Kong. (DMSP imagery)*

The 291200Z 200 mb analysis indicated the TUTT had again established itself north of Hope. Due to the east-west orientation of the TUTT, strong westerly flow along its southern periphery enhanced Hope's upper-level anticyclonic outflow. Aircraft reconnaissance at 292031Z indicated a sharp decrease in surface pressure to 961 mb with the temperature/dewpoint data correlating to an equivalent potential temperature (θ_e) of 359K. An empirically derived forecast aid that relates pressure and θ_e indicates that once the traces intersect, rapid intensification can be expected within 18-30 hours (Fig. 3-09-2). The intensification equates to a possible mean pressure decrease of 44 mb and a mean wind speed increase of 50-60 kt (26-30 m/sec). Typhoon Hope verified this study 36 hours after the intersection occurred; reconnaissance aircraft reported a surface pressure of 898 mb and wind speeds of 100-120 kt (51-62 m/sec). By 311200Z, Hope attained super typhoon intensity of 130 kt (67 m/sec) (Fig. 3-09-3).

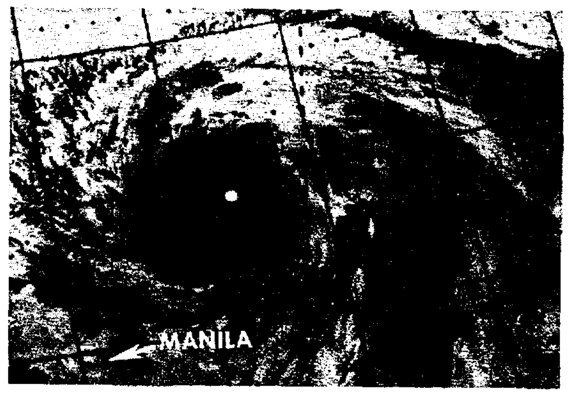


FIGURE 3-09-3. Infrared imagery of Hope just after attaining super typhoon intensity of 130 kt (67 m/sec), 31 July 1979, 1244Z. (DMSP imagery)

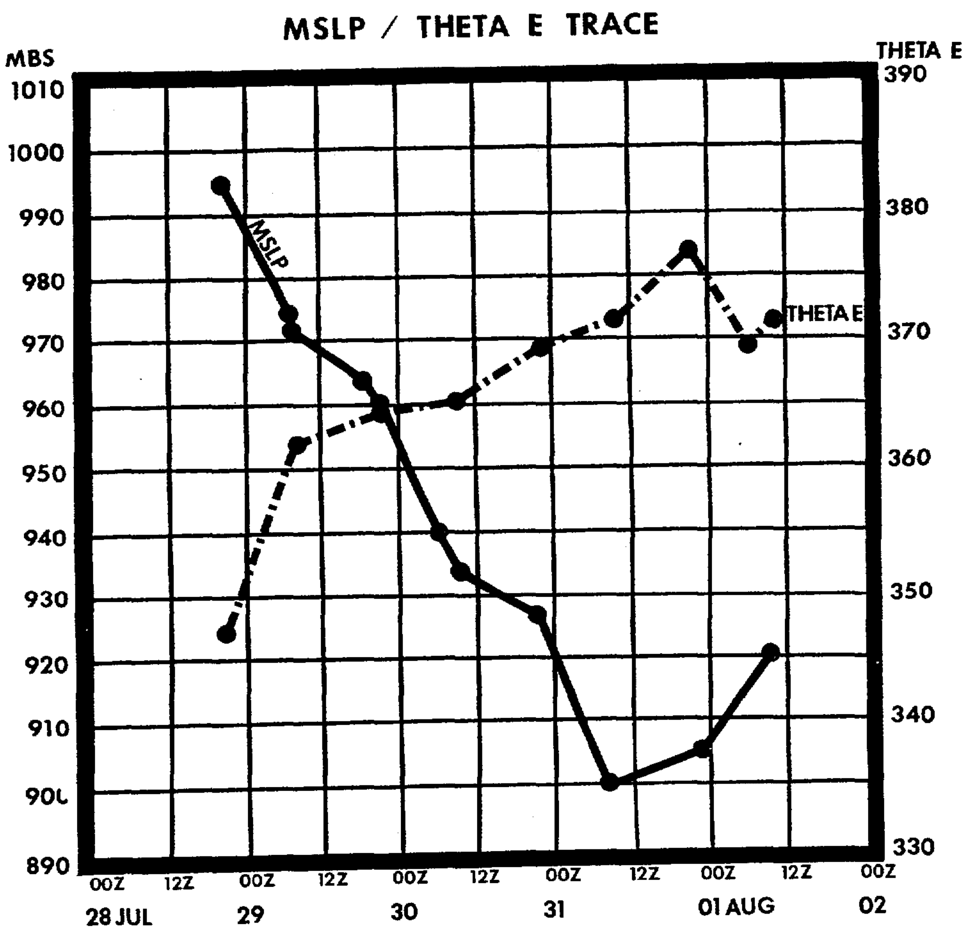


FIGURE 3-09-2. Time cross-section of Hope's minimum sea-level pressure versus equivalent potential temperature (THETA E (θ_e)) derived from aircraft reconnaissance.

Hope entered the Luzon Straits approximately 4 days after Tropical Storm Gordon. Hope's compact wind structure and a slight weakening trend were noted as Heng Chun (WMO 46752) on the southern tip of Taiwan reported sustained winds of 40 kt (21 m/sec) with gusts to 86 kt (44 m/sec) at 011000Z as Hope passed 45 nm (83 km) south of the station. Two persons on the Batanes Islands and one person on Taiwan were killed as a result of the torrential rainfall experienced as Hope tracked through the Luzon Straits.

Typhoon Hope made landfall less than 10 nm (19 km) north of Hong Kong at 020530Z (Fig. 3-09-4) with maximum sustained winds of 70 kt (36 m/sec) and gusts to 110 kt (57 m/sec) reported. Figure 3-09-5 is a time sequence of the surface observations received from the Royal Observatory of Hong Kong during Hope's passage. Extensive wind and rain damage, 3 deaths and over 258 injuries were reported. Damage to shipping within Hong Kong harbor was heavy as 17 ships broke their moorings and 8 ships collided.

Subsequent to passage over Hong Kong, Hope moved into southern China and weakened. The final warning was issued at 030111Z downgrading Hope to tropical storm intensity. Hope's uncomplicated northwest track after development into a typhoon resulted in minimal right-angle track errors with her unexpected acceleration accounting for the majority of the discrepancy.

Although weakening considerably during passage over southeast Asia, Hope did maintain a satellite signature and exited into the northern Bay of Bengal 110 nm (204 km) southeast of Dacca, Pakistan at 060500Z.

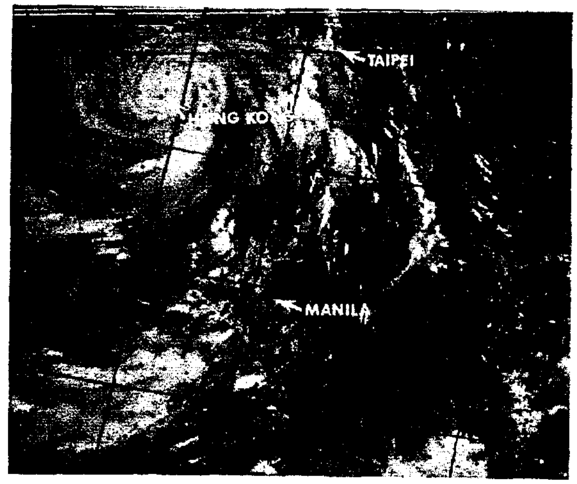


FIGURE 3-09-4. Typhoon Hope at 100 kt (51 m/sec) intensity, 3 hours prior to closest point of approach to Hong Kong, 2 August 1979, 0247Z. (DMSP imagery)

Strengthened once again by pre-existing strong southwest monsoonal flow, Hope reintensified from 070000Z through 071800Z with maximum sustained winds of 35 kt (18 m/sec) reported on 071200Z surface analysis. A tropical cyclone warning was not issued due to Hope's proximity to land and her expected movement into northeastern India within 12 hours. Hope, however, was discussed at length in the Significant Tropical Weather Advisory (ABEH PGTW).

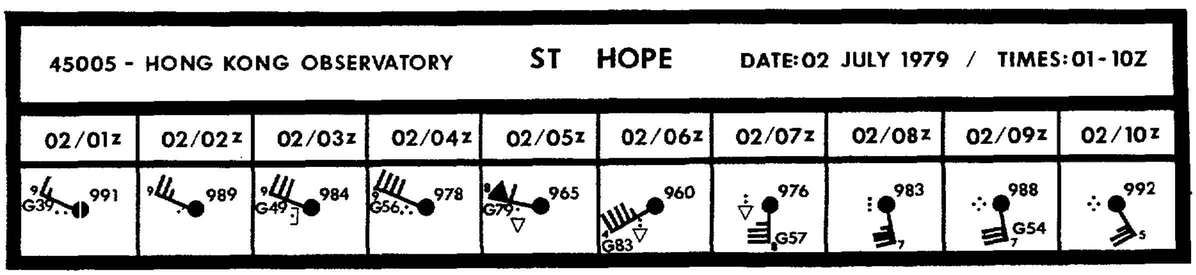
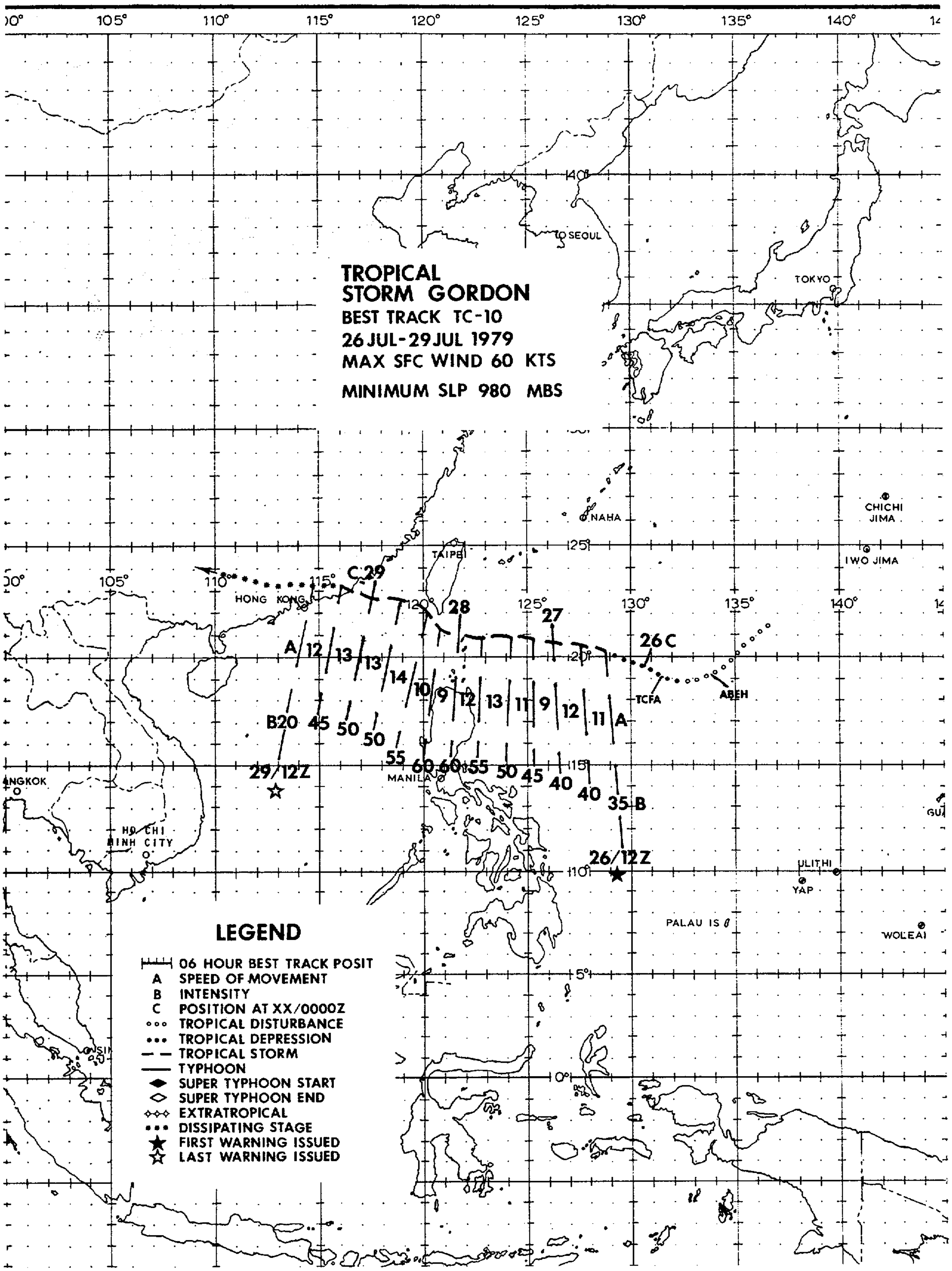


FIGURE 3-09-5. Hourly surface synoptic observations from the Royal Observatory of Hong Kong (ROHK) during passage of Typhoon Hope.



TROPICAL
STORM GORDON
BEST TRACK TC-10
26 JUL-29 JUL 1979
MAX SFC WIND 60 KTS
MINIMUM SLP 980 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
MANILA
HO CHI MINH CITY
ULITHI
YAP
PALAU IS
WOLEAI
TCFA
ABEH
26/12Z
29/12Z

Gordon, the 10th significant tropical cyclone of 1979, developed in late July in the monsoon trough near 20N-135E and eventually made landfall east-northeast of Hong Kong. A stronger sister, Hope (TD 09), followed Gordon several days later on a similar track into Hong Kong. Note that TD 09 (Hope) and TD 10 (Gordon) are alphabetically out of sequence because TD 10 was upgraded to tropical storm stage before TD 09.

Post-analysis revealed that Gordon reached tropical storm intensity at the time of the first warning. CINCPACINST 3140.1N, section 2.5.1., paragraph b states that warnings will be issued when "maximum sustained wind speeds are forecast to increase to 34 or more knots within 48 hours." In this case, there was no lead time between the first warning and tropical storm stage. Figures 3-10-1 and 3-10-2 illustrate why this occurred. TD 10 developed rapidly within the 22-hour time period between these figures. Synoptic data indicated increasing southwest monsoon flow into the area during this period; yet no definitive surface circulation could be located. The most significant finding of the post-analysis was that Gordon could not be traced back 48 hours prior to the first warning from available synoptic and satellite data, and, therefore, falls into the category of a rapid developing system.

Gordon's track took an unexpected jog northwestward while passing south of Taiwan (Fig. 3-10-3). (Typhoon Hope took a similar, but less pronounced, jog.) This northward adjustment is historically evident from tropical cyclones that pass south of Taiwan. The influence of Taiwan's high mountain range is thought to be responsible. As tropical cyclones pass south of Taiwan, they induce lee-side troughing west of the mountains over the Formosa Strait and track northwestward in response.

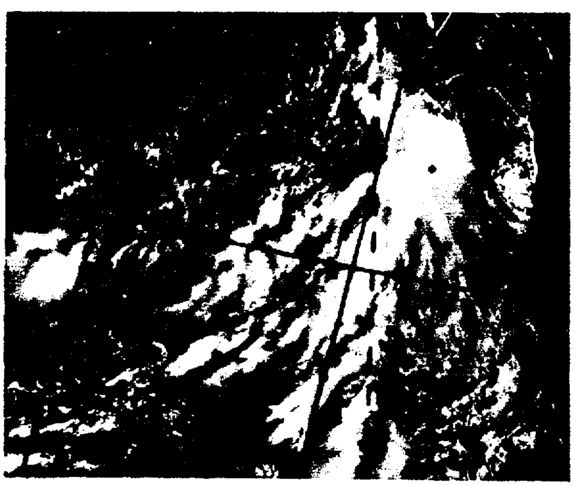


FIGURE 3-10-1. Tropical Storm Gordon in its infancy 4 hours prior to being discussed on the Significant Tropical Weather Advisory (ABEH PGTW), 25 July 1979, 0151Z. (DMSP imagery)

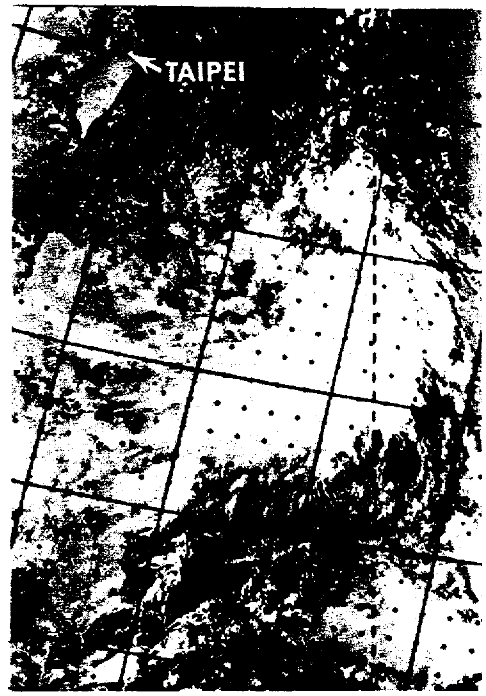
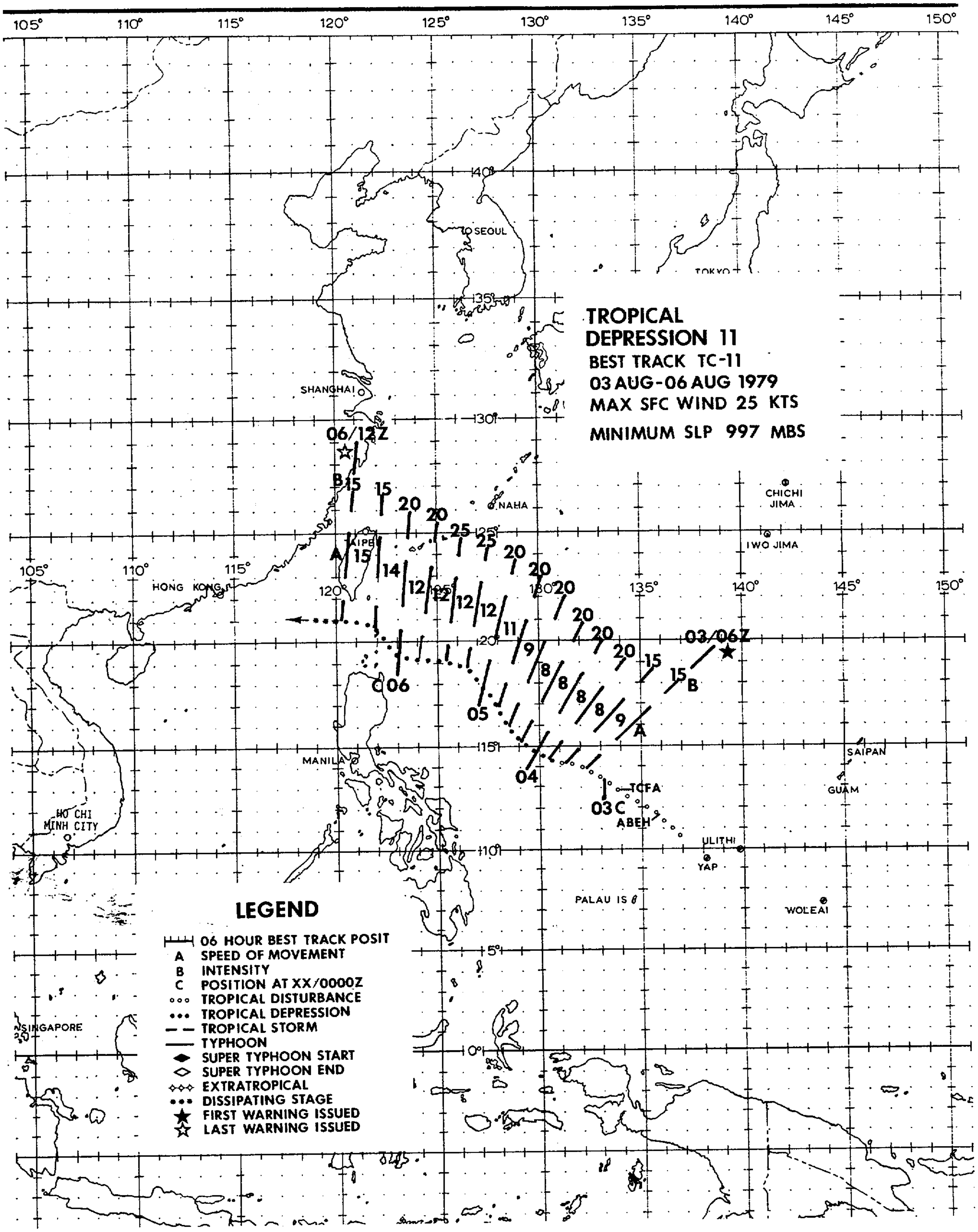


FIGURE 3-10-2. Tropical Storm Gordon 22 hours after Figure 3-10-1 showing increased development, 25 July 1979, 2350Z. A Tropical Cyclone Formation Alert was issued 6 hours prior to this time. (DMSP imagery)

FIGURE 3-10-3. Kaohsiung radar presentation of Gordon at 282103Z after passing south of Taiwan. (Photograph courtesy of the Central Weather Bureau, Taipei, Taiwan.)



TROPICAL DEPRESSION 11
BEST TRACK TC-11
03 AUG-06 AUG 1979
MAX SFC WIND 25 KTS
MINIMUM SLP 997 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
06/12Z
03/06Z
TCFA
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
HO CHI MINH CITY
SINGAPORE
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
ABEH

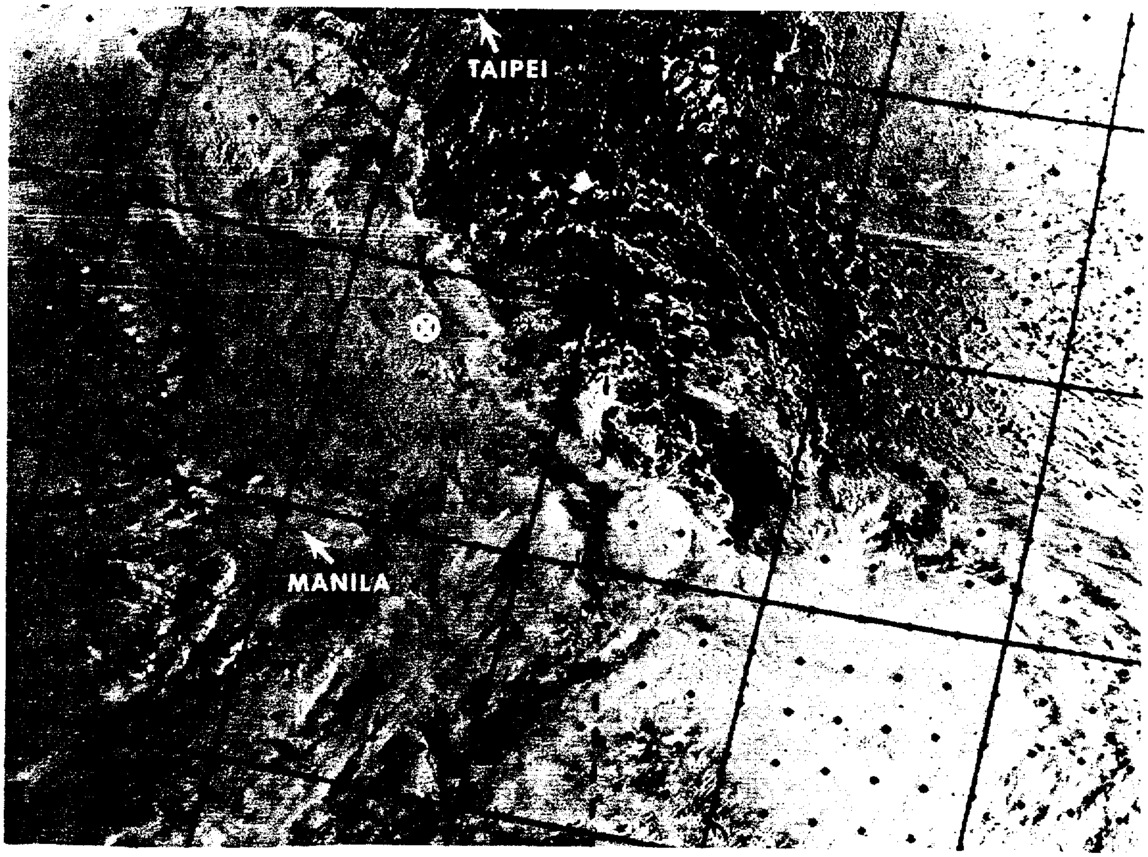
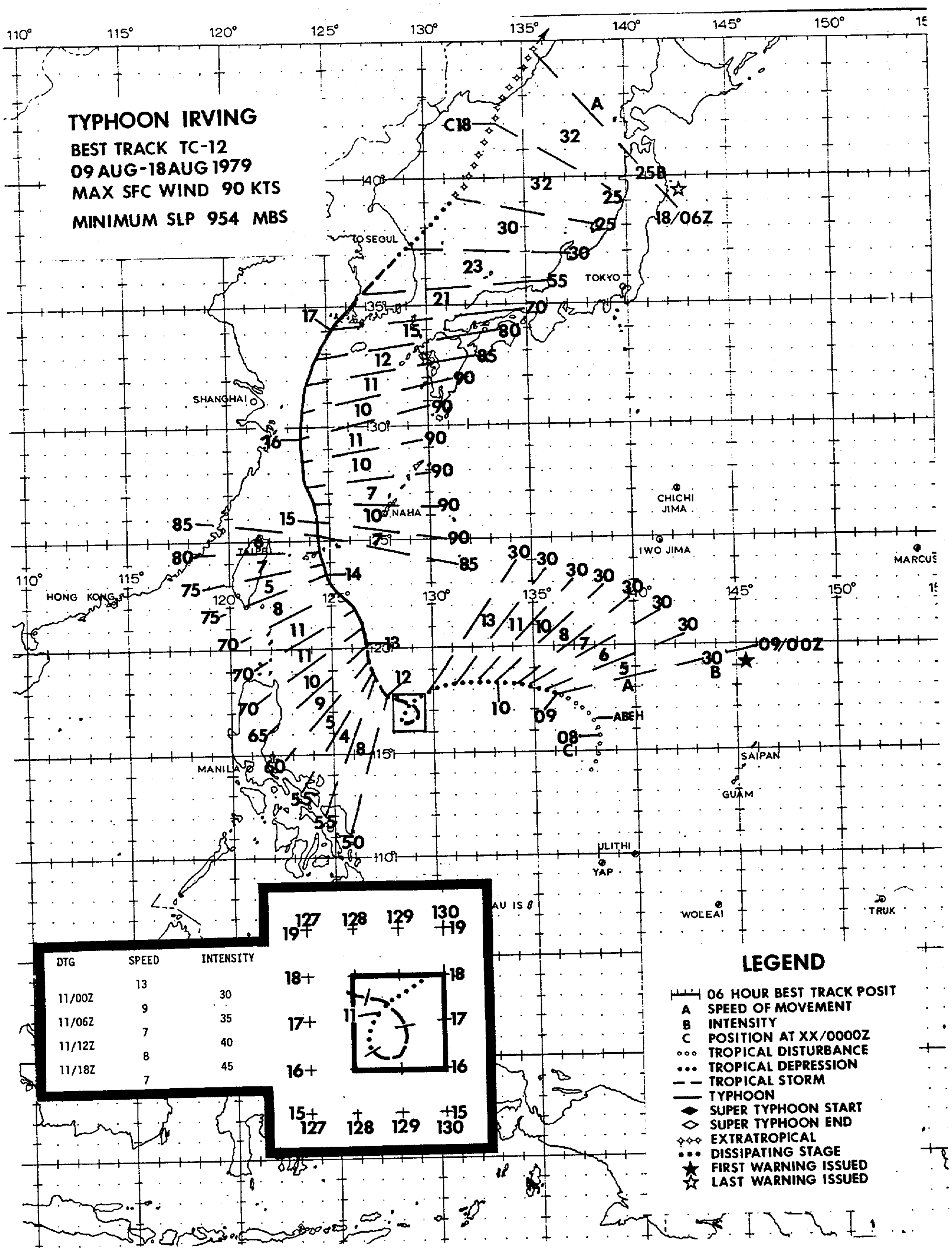


FIGURE 3-11-1. *Tropical Depression 11 at 20 kt (10 m/sec) intensity, 5 August 1979, 2153Z. The TD symbol (⊗) is superimposed at location of surface circulation center as determined by aircraft reconnaissance at 052222Z. Considerable vertical shear existed over the system and was the reason that it did not develop into tropical storm strength. (DMSP imagery)*


TYPHOON IRVING
BEST TRACK TC-12
09 AUG-18 AUG 1979
MAX SFC WIND 90 KTS
MINIMUM SLP 954 MBS
110°
115°
120°
125°
130°
135°
140°
145°
150°
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ULITHI
YAP
WOLEAI
TRUK
ABEH
09/00Z
18/06Z
DTG
SPEED
INTENSITY
11/00Z
11/06Z
11/12Z
11/18Z
13
9
7
8
7
30
35
40
45
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

Surges in the southwest monsoon frequent the western North Pacific during the early tropical cyclone season and produce widespread convection from the Malay Peninsula to as far east as Guam. During the same period, the 500 mb monsoon trough fluctuates eastward across the South China Sea (SCS) and occasionally into the Philippine Sea. By late July 1979, an eastward extension of the mid-level monsoon trough was the main synoptic feature west of Guam. The 500 mb trough axis extended along 15N from northern Vietnam through the central SCS and then eastward into a quasi-stationary low pressure center over the Philippine Sea.

On 7 August at 1200Z, a developing surface circulation was observed at the eastern end of the monsoon trough near 14.1N 137.7E. This weak circulation tracked cyclonically around the eastern periphery of the broad 500 mb low pressure center in the Philippine Sea. Taking on the characteristics of a monsoon depression (Ramage, 1971), Irving was described in aircraft reconnaissance data received from 9-11 August as a weak depression with poor vertical alignment and maximum surface winds located 150 to 180 nm (278 to 333 km) west of the surface center. At this stage, Irving displayed an exposed low-level circulation in satellite imagery with maximum convection located to the west of the surface center (Fig. 3-12-1). Ship synoptic data during the same period indicated that 25-35 kt (13-18 m/sec) winds extended outward 120 nm (222 km) south of the surface center.

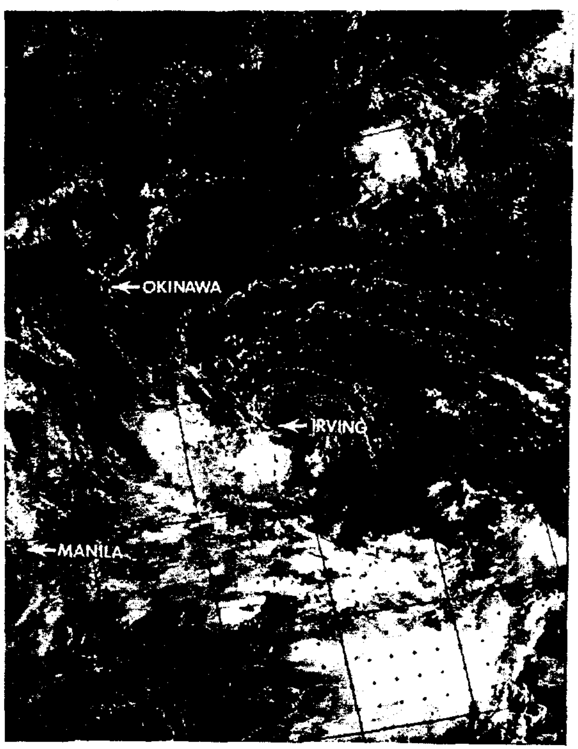


FIGURE 3-12-1. Typhoon Irving as a weak tropical depression with an exposed low-level circulation, 10 August 1979, 0126Z. Prior to intensification, aircraft reconnaissance consistently observed the maximum convection to the west of the surface center. (DMSP imagery)

By the 11th, the monsoon surge had weakened and receded westward, leaving a cut-off 500 mb low over the Philippine Sea in the vicinity of Irving's surface circulation. Irving executed a small, tight cyclonic loop on the 11th. During the loop, vertical alignment between the surface and the 500 mb center improved, and Irving intensified to tropical storm intensity. Simultaneously, a break developed in the 500 mb subtropical ridge to the north, and Irving tracked north-northwestward towards the Ryukyu Islands while intensifying further to typhoon strength. Although originally forecast to recurve south of Japan, strengthening of the 500 mb ridge southeast of Japan caused Typhoon Irving to track over the western East China Sea and accelerate north-northeastward across Korea before merging with an extratropical frontal boundary north of Japan.

Although not a spectacular typhoon, Irving's apparent sinusoidal motion, unusually large wind radii, failure to rapidly deepen and damage to southern Korea are noteworthy. Sinusoidal motion of tropical cyclones has been observed for many years, especially when short-term movements are observed by accurate fix platforms such as land radar (Fig. 3-12-2) and reconnaissance aircraft. Sinusoidal motion was observed from 131600Z to 151800Z as Irving tracked north-northwestward through the East China Sea. Radar reports from the Ryukyu Islands

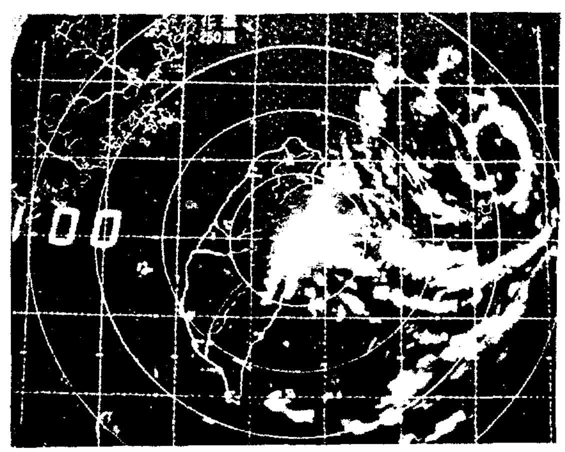


FIGURE 3-12-2. Typhoon Irving as seen by the radar at Haulien, Taiwan. Irving tracked north-northwestward across the southern Ryukyu Islands and was accurately tracked by eight radar sites, 14 August 1979, 1700Z. (Photograph courtesy of the Central Weather Bureau, Taipei, Taiwan)

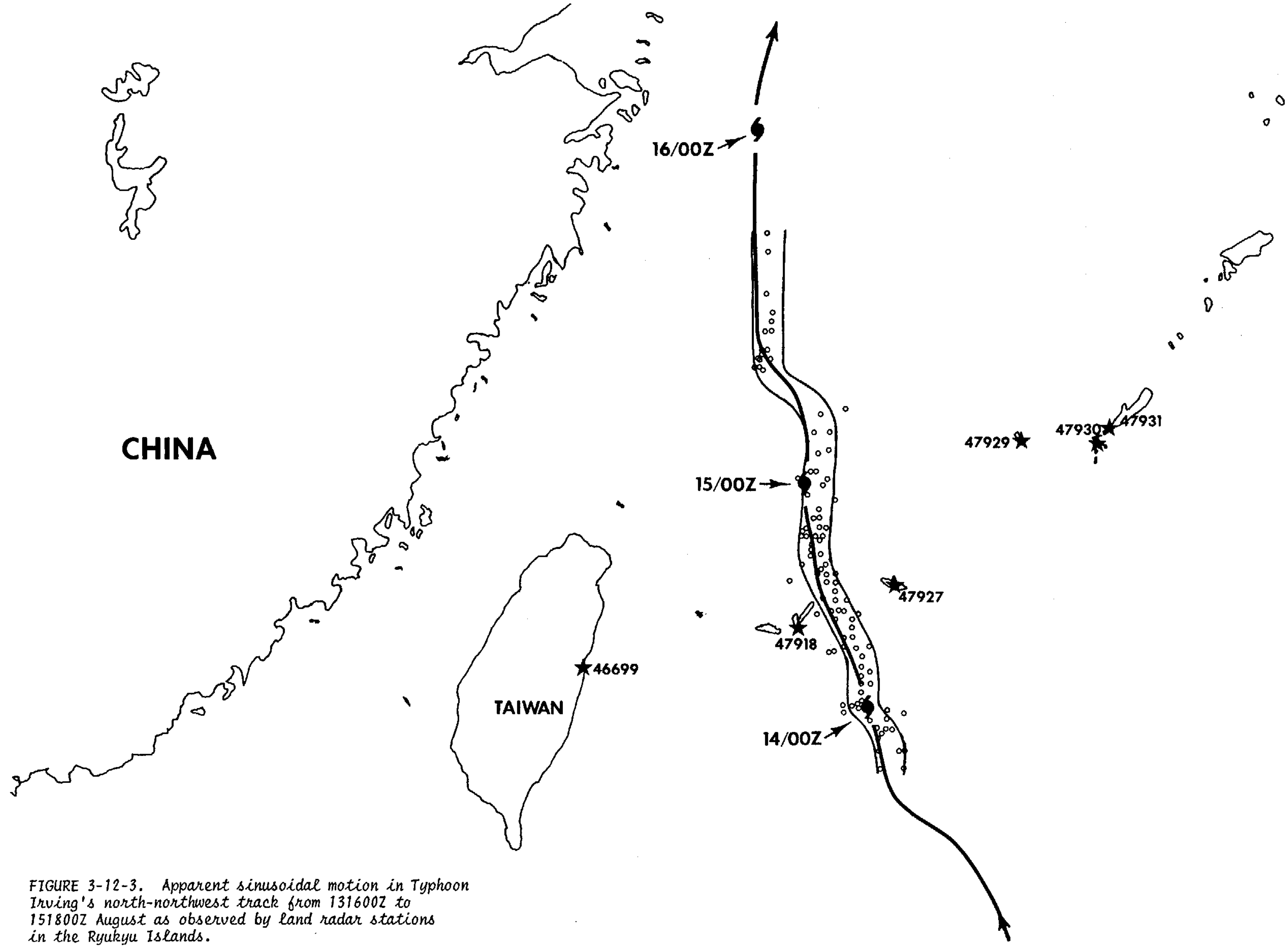


FIGURE 3-12-3. *Apparent sinusoidal motion in Typhoon Irving's north-northwest track from 131600Z to 151800Z August as observed by land radar stations in the Ryukyu Islands.*

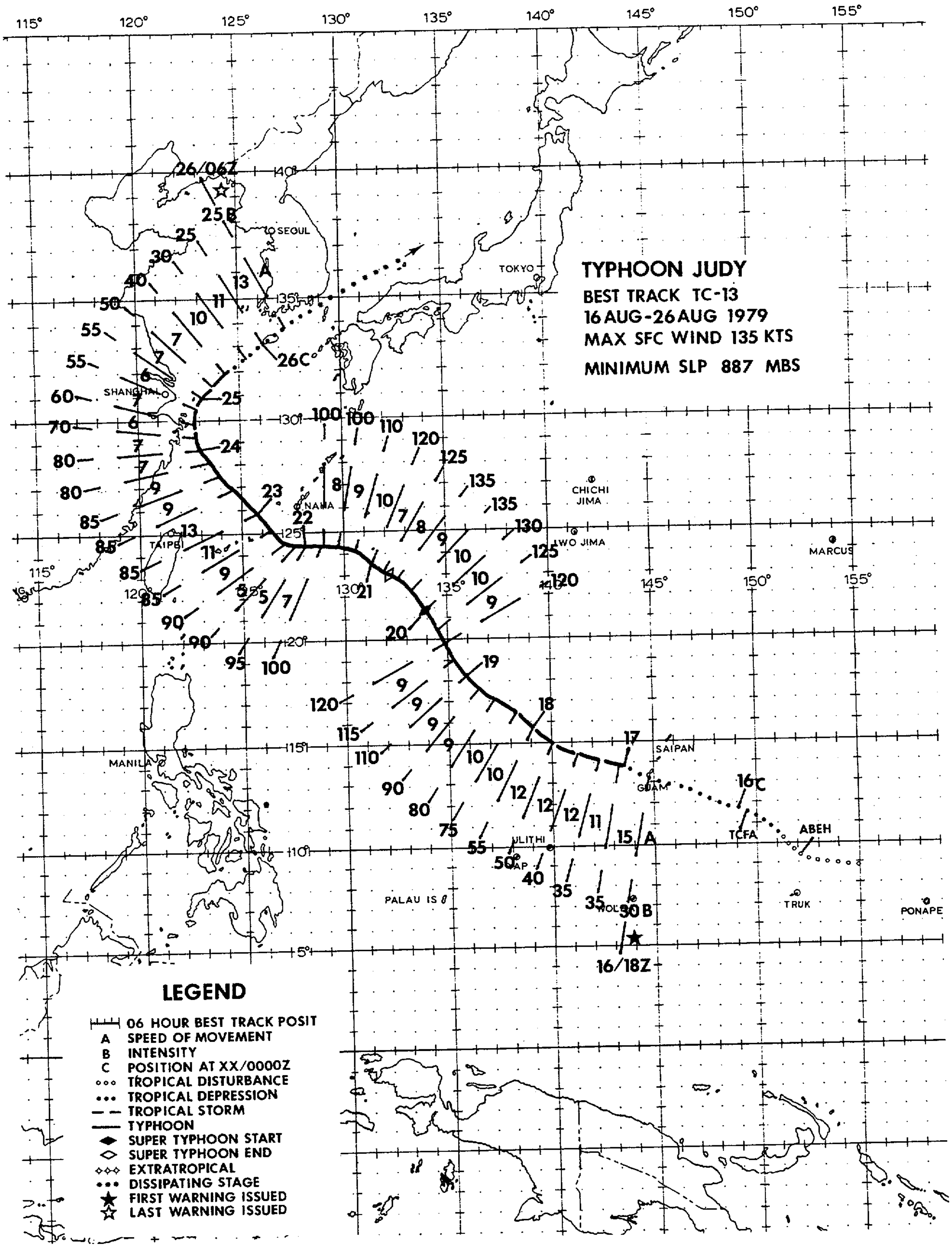
clearly indicate that Irving oscillated about an overall north-northwest track (Fig. 3-12-3).

The relationship between Irving's surface and 500 mb centers during the earlier stages of development produced unusually large surface wind radii. Synoptic and aircraft data between 092000Z and 120000Z indicate that Irving's maximum wind band actually existed 150-200 nm (278-370 km) west of the large, calm-wind surface center. Although the maximum wind bands did eventually migrate towards the surface center, the wind radii remained large for the duration of Irving. The large wind radii may be related to Irving's developmental interaction with the 500 mb monsoon low and its large areal extent. Irving never became a tight, well-developed tropical cyclone. Aircraft reconnaissance during the period of eyewall development indicated that Irving had a large 30 nm (56 km) diameter eye with the radius of over 30 kt (15 m/sec) winds extending outward 400 nm (741 km) in the eastern semicircle.

Unlike Super Typhoon Hope, Typhoon Irving (Fig. 3-12-4) did not follow the intensification pattern suggested by JTWC's Equivalent Potential Temperature (θ_e)/Minimum Sea-level Pressure Study. This study indicates that sea-level pressure should fall about 44 mb and maximum surface winds should intensify an average of 55 kt from the point where the θ_e and pressure curves intersect (see Super Typhoon Hope, Figure 3-09-2). The reason why Irving failed to intensify further is not known.

Typhoon Irving was the first tropical cyclone to strike Korea in 1979. Rapidly weakening as he made landfall, Irving spared southern Korea from the destructive typhoon force winds he had maintained through most of the East China Sea. Korea did, however, receive torrential rains which produced widespread flooding. The hardest hit area was the island of Cheju Do where 4.3 inches (109.7mm) of rain were reported at Cheju. Official estimates reported 150 dead or missing, 1000-2000 homeless and approximately 10-20 million US dollars damage to food and agriculture.

FIGURE 3-12-4. Although Typhoon Irving did not develop according to intensification studies, Irving did possess good feederband activity and cirrus outflow, 14 August 1979, 0228Z. (DMSP imagery)


TYPHOON JUDY
BEST TRACK TC-13
16 AUG-26 AUG 1979
MAX SFC WIND 135 KTS
MINIMUM SLP 887 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
TRUK
PONAPE
ABEH
TCFA
26/06Z
16/18Z

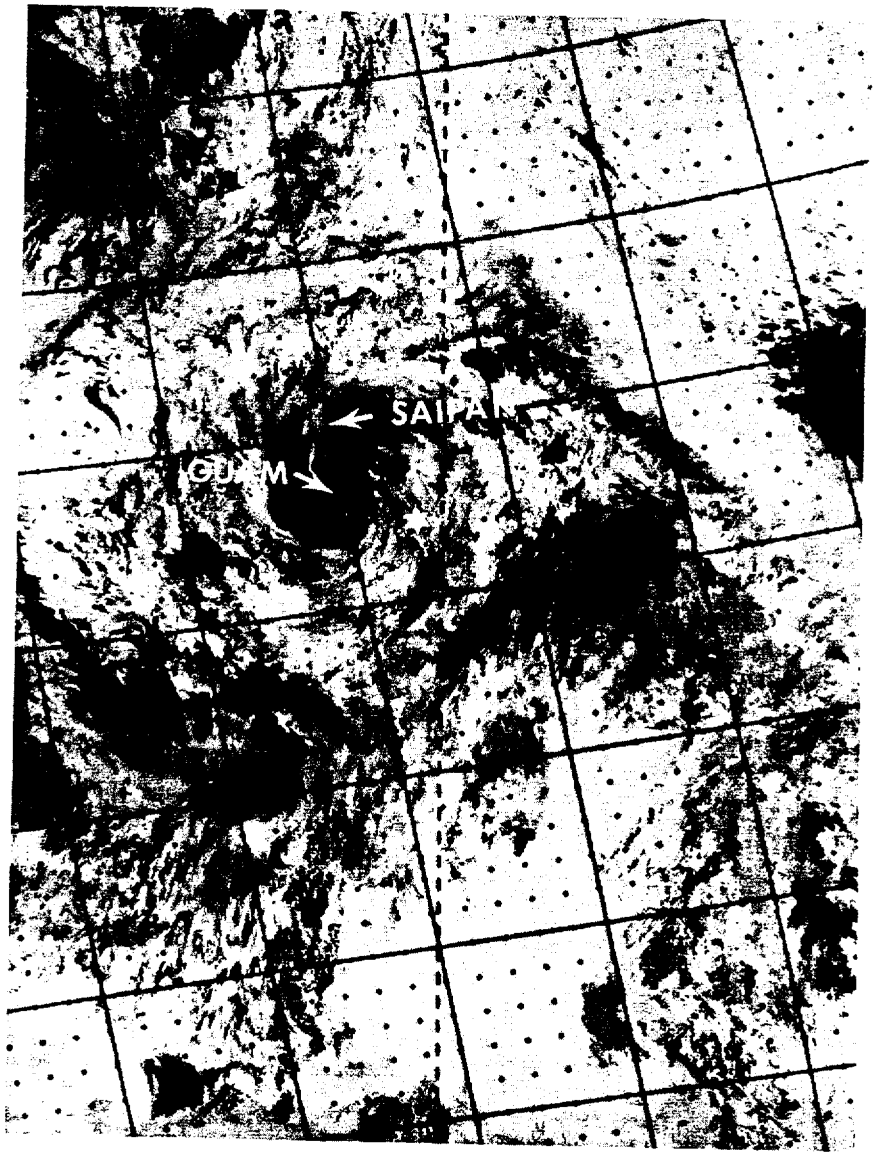


FIGURE 3-13-1. Infrared imagery of tropical disturbance (Judy) while southeast of Guam, 16 August 1979, 1120Z. The star denotes the approximate location of a weak surface center discovered by a reconnaissance aircraft about 4 hours earlier. (DMSP imagery)

Of all the typhoons of 1979, Judy's significance was only surpassed by Super Typhoon Tip. Judy eventually developed into the year's second super typhoon, but more importantly, she served as a reminder of how rapidly a minor tropical disturbance can develop into a dangerous tropical cyclone.

Surface synoptic data from the beginning to the middle of August showed that the area south and east of Guam was fairly inactive. Good cross-equatorial flow was present, but only a few flare-ups of convective activity were noted. Surface circulations were broad, ill-defined and transient. By 15 August, however, synoptic and satellite data revealed a tropical disturbance, about 120 nm (222 km) east-northeast of Truk, which was to eventually become Typhoon Judy.

This area was closely monitored by JTWC, and when the satellite signature began to improve, a Tropical Cyclone Formation Alert was issued at 152100Z.

No significant pressure falls were observed over the area as the disturbance drifted slowly west-northwestward. A reconnaissance aircraft at 160700Z was able to define only a weak surface circulation with a MSLP of approximately 1006 mb and observed surface winds in the south semicircle of 10 kt (5 m/sec) or less (Fig. 3-13-1).

Rapid intensification was not expected at that time, but at 161635Z, less than 10 hours after the aircraft investigation, weather radar at Andersen Air Force Base, Guam, located a well-defined circulation center moving west-northwest toward Guam at 15 kt (28 km/hr). Gradient-level wind reports from Guam, Truk, Palau and Ulithi at 161200Z also showed that the low-level inflow pattern associated with the disturbance had increased in areal extent. The disturbance continued tracking toward Guam and at 161800Z the center passed over the Naval Oceanography Command Center (NAVOCEANCOMCEN), Guam building on Nimitz Hill (Fig. 3-13-2). NAVOCEANCOMCEN reported a MSLP of 1001.0 mb and a wind gust to 51 kt (26 m/sec) at that time. Based on this "first-hand" information, JTWC issued the first warning on Tropical Storm Judy at 161900Z. Post-analysis revealed, however, that Judy did not reach tropical storm strength until 170000Z.

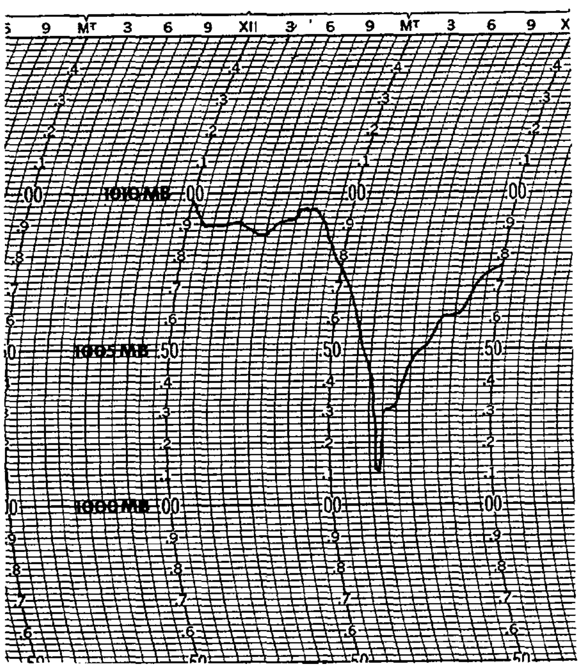


FIGURE 3-13-2. Microbarograph trace recorded at NAVOCEANCOMCEN, Guam during the passage of TD 13 (Judy) at about 161800Z, August 1979.

Judy intensified steadily while following a nearly climatological west-northwest track at 10-12 kt (19-22 km/hr) for the next 24 hours. She reached typhoon strength at approximately 180300Z. After that, a long-wave trough in the mid-level westerlies, moving over Japan toward the Pacific, fractured the subtropical mid-tropospheric ridge north of Judy, allowing her to track more to the northwest.

During the next 36-hour period, after reaching typhoon strength, Judy's central pressure dropped 69 mb and she attained super typhoon strength at 200000Z. Her lowest central pressure, 887 mb, was measured by a reconnaissance aircraft at 192145Z. Three distinct, concentric wall clouds were also noted at that time (Fig. 3-13-3). Super typhoon intensity was maintained until 201500Z, with gradual weakening thereafter.

Forecast aids indicated that Judy would pass to the south of Okinawa, but based on her persistence track and the deep trough that existed over Japan at 500 mb, Judy was forecast to recurve east of Okinawa. The steering aids were reacting to the mid-level PE Forecast series which built the ridge back between Japan and Judy. The numerical forecasts had not been verifying well up to that point, and, thus, the well-entrenched trough was forecast to persist. The numerical forecasts proved to be correct, however, and Judy did pass south of Okinawa before beginning to recurve into the East China Sea.

The rapidly intensifying ridge was expected to drive Judy into the Asian mainland south of Shanghai. The 500 mb analysis at 241200Z provided the first indication that Judy was not going to make landfall. At that time, she was just off the Chinese coast, but north of the mid-level ridge axis. Three-hourly synoptic reports from Sheng-Szu were watched closely and when the winds backed from east at 40 kt (21 m/sec) to north at 35 kt (18 m/sec), there was little doubt that Judy had, in fact, recurved to the northeast.

As Judy recurved, she was downgraded to tropical storm strength based on land synoptic data. Transition to an extratropical system occurred at 261200Z while Judy passed through the Korea Strait.

Due to being still relatively weak while passing over Guam, damage there was insignificant. Damage to Okinawa was also minimal, even though sustained winds of 40 kt (21 m/sec) were experienced for a 28-hour period. Southern Korea did not fare as well, however. One hundred eleven people were killed, over 8,000 houses were inundated, 57 vessels were destroyed and many thousands of acres of crops were ruined by Judy's torrential rains and strong winds.

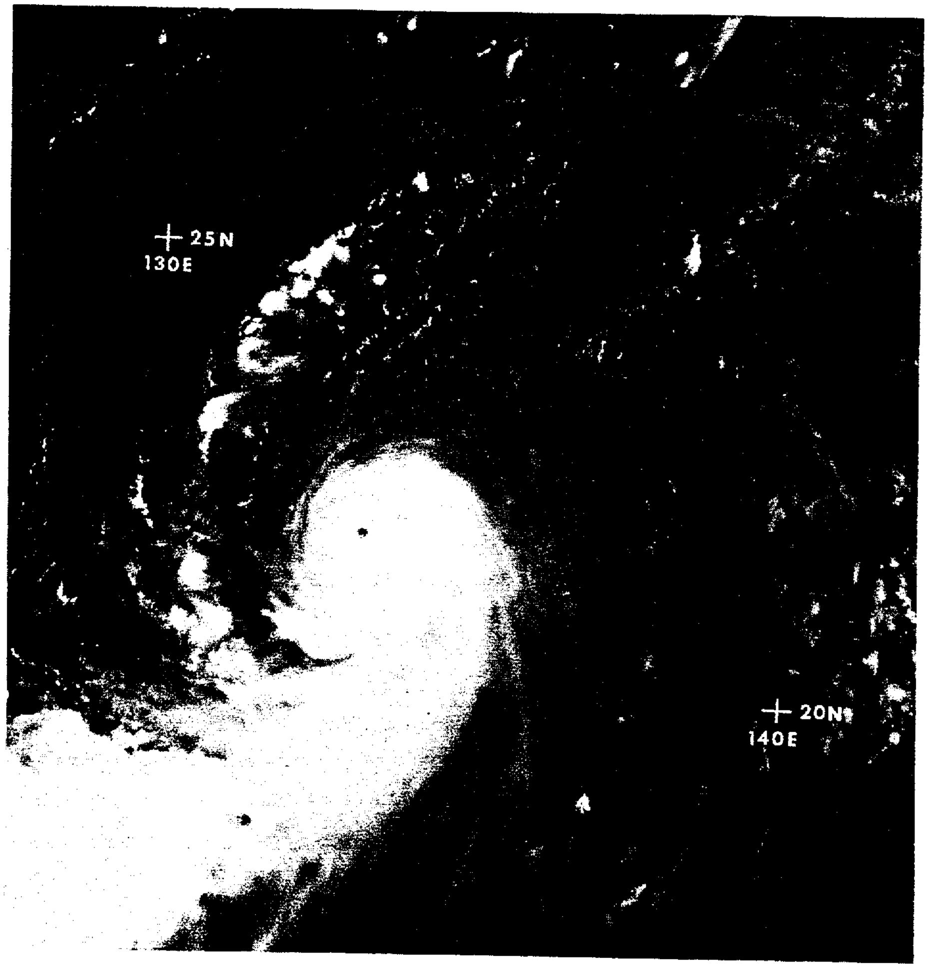
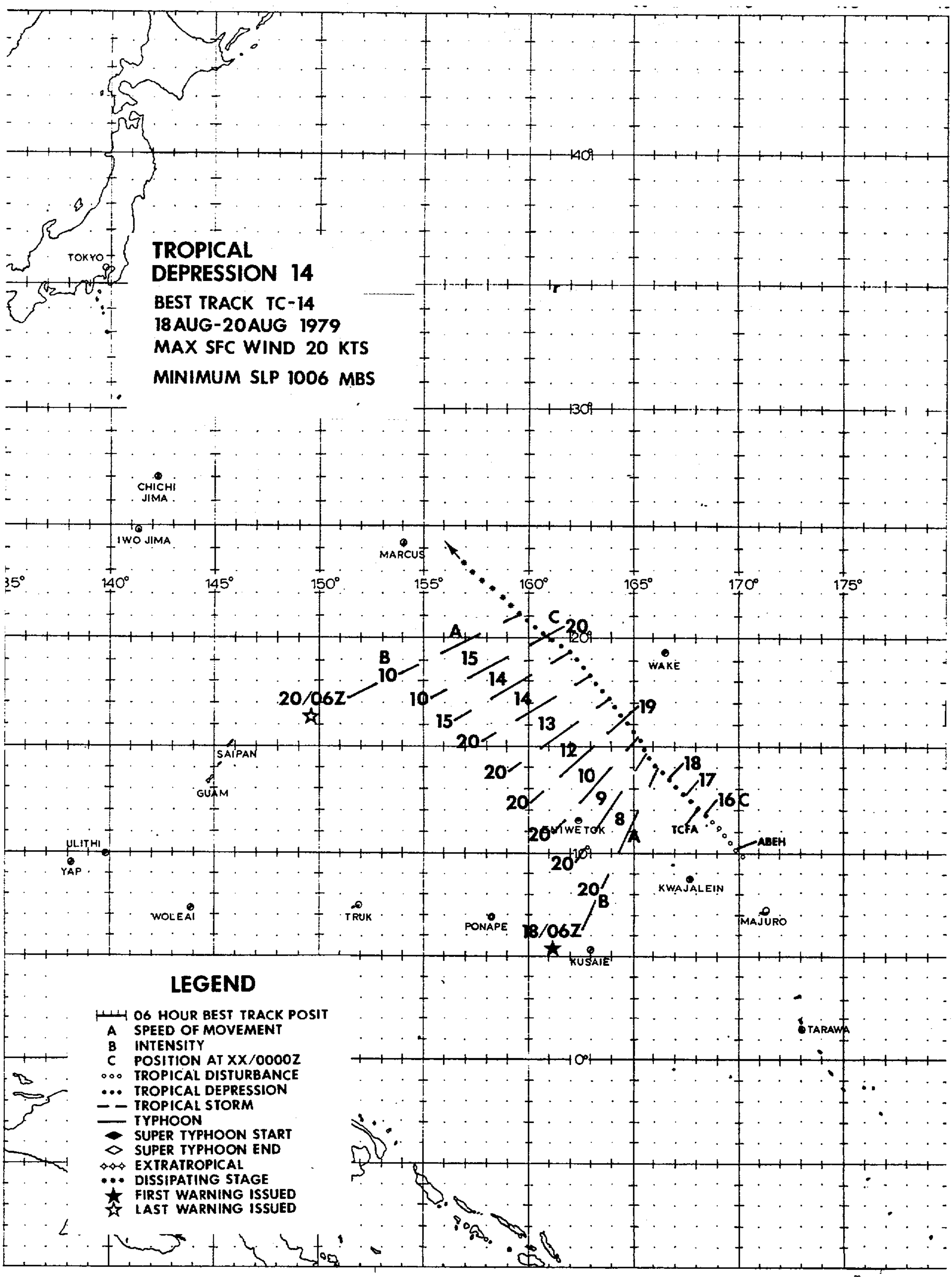
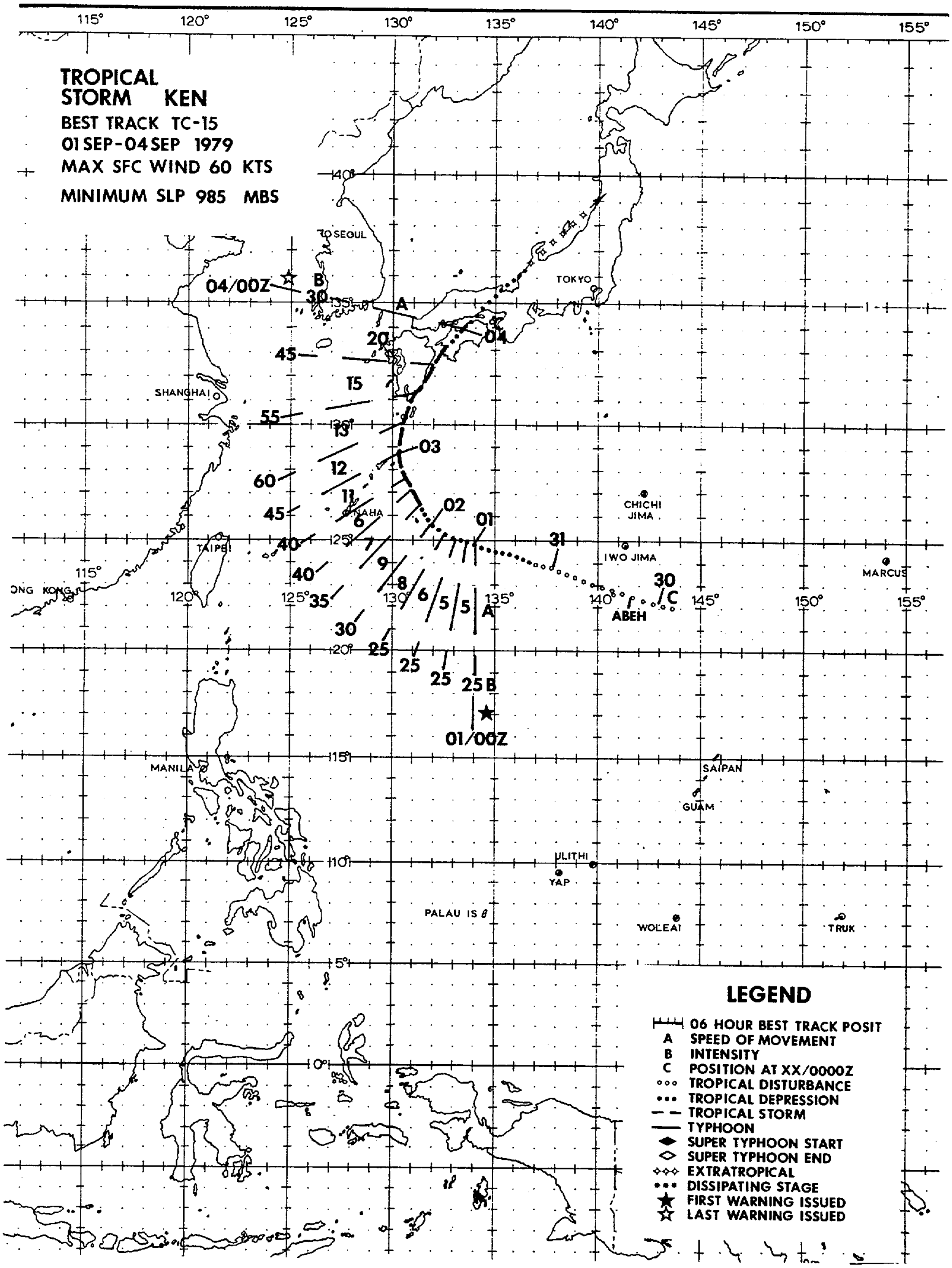
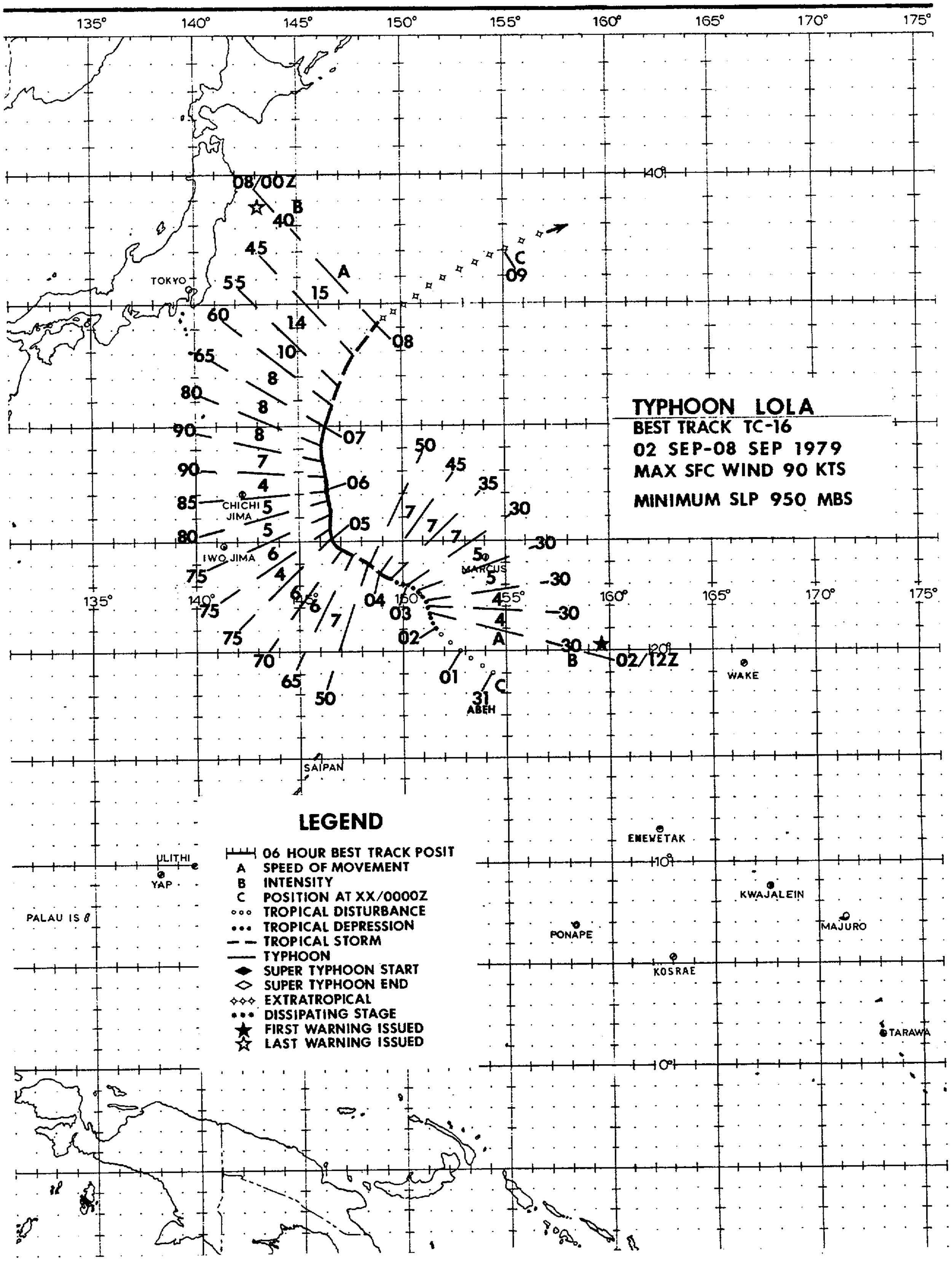


FIGURE 3-13-3. *Judy as a super typhoon, 20 August 1979, 0219Z. (DMSP imagery)*



TROPICAL DEPRESSION 14
BEST TRACK TC-14
18AUG-20AUG 1979
MAX SFC WIND 20 KTS
MINIMUM SLP 1006 MBS
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
YAP
WOLEAI
TRUK
PONAPE
KUSAIE
KWAJALEIN
MAJURO
TARAWA
ENIWETOK
TCFA
ABEH
20/06Z
18/06Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED


TROPICAL
STORM KEN
BEST TRACK TC-15
01 SEP-04 SEP 1979
MAX SFC WIND 60 KTS
MINIMUM SLP 985 MBS
115°
120°
125°
130°
135°
140°
145°
150°
155°
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
ABEH
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
04/00Z
01/00Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED


TYPHOON LOLA
BEST TRACK TC-16
02 SEP-08 SEP 1979
MAX SFC WIND 90 KTS
MINIMUM SLP 950 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
135°
140°
145°
150°
155°
160°
165°
170°
175°
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
ULITHI
YAP
PALAU IS
ENEWETAK
PONAPE
KWAJALEIN
MAJURO
KOSRAE
TARAWA
08/00Z
02/12Z

TROPICAL STORM KEN (15)
AND TYPHOON LOLA (16)

Ken and Lola developed almost concurrently along the periphery of an upper-level TUTT. Satellite imagery on 1 September 1979 (Fig. 3-16-1) shows a number of disturbances organized into a line of convection ringing the TUTT in question from north of Kadena to south of Marcus. Ken developed from the disturbance just east of Kadena. At this same time, the disturbance which developed into Lola is south of Marcus and appears quite weak. The largest and most menacing middle disturbance northwest of Guam (Fig. 3-16-1) did not develop.

During the next 48 hours, the TUTT deepened southwestward over the middle disturbance and suppressed its convection. At the same time, it divided the convective line into the two distinct systems, Ken and Lola (Fig. 3-16-2).

After forming, Ken and Lola began to move in similar recurvature tracks. Ken tracked northward into the Sea of Japan reaching a maximum intensity of 60 kt (31 m/sec). Lola intensified into a typhoon and eventually transitioned into an extra-tropical system over the cooler waters east of Japan.

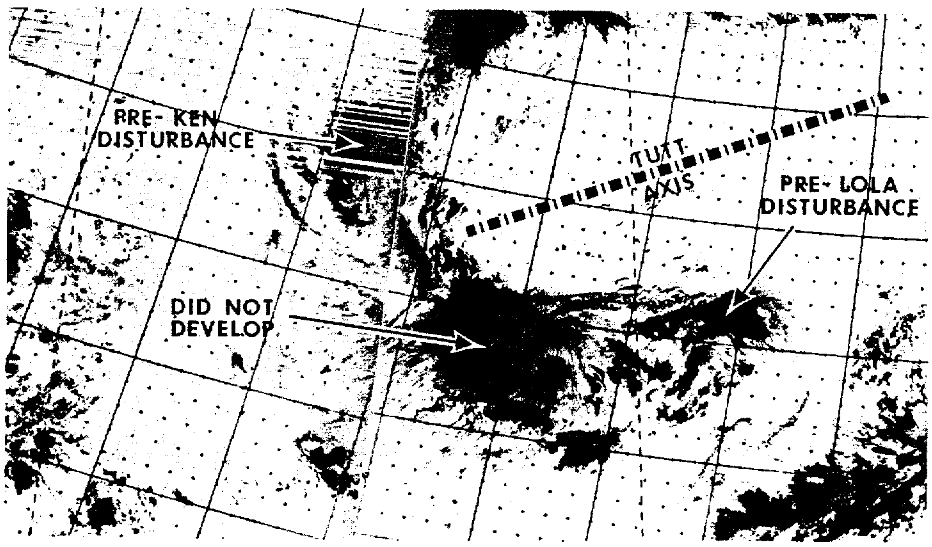


FIGURE 3-16-1. Line of tropical disturbances from which TS Ken and TY Lola eventually developed, 312257Z Aug - 010039Z Sep 1979. (DMSP imagery)

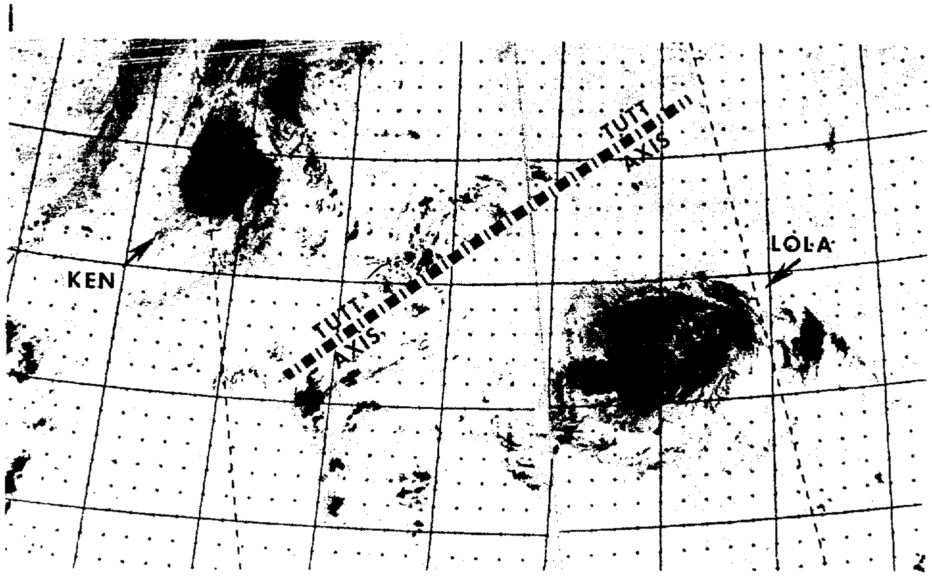
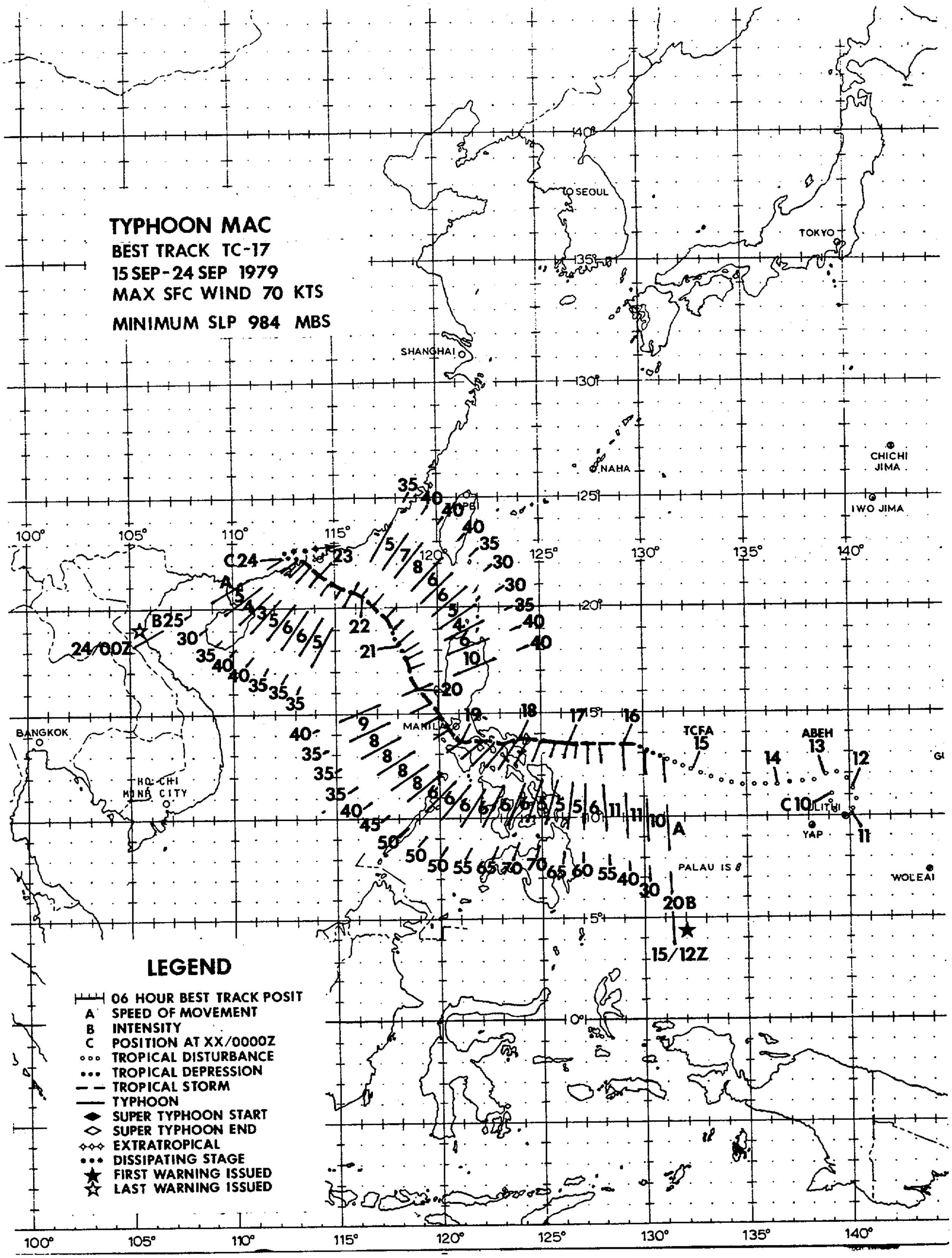


FIGURE 3-16-2. Ken at 45 kt (23 m/sec) intensity and Lola at 30 kt (15 m/sec) intensity, 022221Z - 030003Z Sep 1979. (DMSP imagery)


TYPHOON MAC
BEST TRACK TC-17
15 SEP-24 SEP 1979
MAX SFC WIND 70 KTS
MINIMUM SLP 984 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
BANGKOK
HO CHI MINH CITY
MANILA
PALAU IS
YAP
ULITHI
WOLEAI
TCFA
ABEH
24/00Z
15/12Z
100°
105°
110°
115°
120°
125°
130°
135°
140°

TYPHOON MAC (17) AND TROPICAL STORM NANCY (18)

Typhoon Mac developed from a weak surface circulation northeast of Yap in September 1979. This circulation tracked westward, reaching tropical storm intensity by 160000Z. Mac followed the climatological intensification rate for tropical cyclones approaching the Philippines and reached typhoon intensity prior to making landfall. Frictional effects caused Mac to weaken slowly as he tracked across southern Luzon towards the South China Sea. The unexpected development of Tropical Storm Nancy east of Hai-nan Island influenced Mac's track in the South China Sea.

JTWC's real-time forecasts do not always reflect the actual intensity of a tropical cyclone. Rapid intensification or weakening, peripheral data unavailable due to geographical restrictions, and tight maximum wind bands, which are not initially detected, all reduce the accuracy of intensity estimates provided in tropical cyclone warnings. These intensity discrepancies often go unrecognized until discovered during post-analysis, as in the case of Typhoon Mac.

Reanalysis of aircraft reconnaissance data from 16-18 September indicates that Mac most probably intensified to typhoon intensity by 161800Z. During the period 16-18 September, aircraft reconnaissance at 160503Z reported 68 kt (35 m/sec) at 1500 ft (457 m) and 60 kt (31 m/sec) on the surface prior to encountering moderate turbulence which forced the aircraft to climb through the overcast stratocumulus cloud layer above. Subsequent reconnaissance data at 170810Z confirmed typhoon intensity by locating 80-90 kt (41-46 m/sec) surface winds in a 10-nm (19 km) wide band tucked under the strong eastern feederband. Mac made landfall prior to the next scheduled aircraft fix with geographical constraints severely reducing peripheral data collection.

Although real-time data were available which indicated Mac had possibly reached typhoon intensity, the isolated reports of strong winds were dismissed as gusts associated with lower velocity sustained winds. (Aircraft data are occasionally not used verbatum when they fall outside reasonable limits after being analyzed with available surface reports, satellite data intensity estimates and the JTWC Maximum-Wind Minimum-Pressure Relationship (Atkinson and Holliday, 1977).) During post-analysis, the reconnaissance data were re-examined using an intensity study of tropical cyclones crossing the Philippines (Sikora, 1976). For typhoons with maximum sustained winds of less than 80 kt (41 m/sec), the study shows that an average intensification of 30 kt (15 m/sec) can be expected for tropical cyclones which follow a track similar to Mac's. Reanalysis of the period between 151800Z and 180000Z shows, in fact, that Mac intensified to typhoon intensity before weakening from frictional effects over Catanduanes Island on 18 September (Fig. 3-17-1).

The unexpected development of a second tropical cyclone in the South China Sea (SCS) produced a series of track and intensity modifications in Typhoon Mac. Upon exiting the Philippines, Mac, which was originally forecast to track west-northwest into the SCS, began a Fujiwhara interaction (Fig. 3-18-2) with the rapidly developing Tropical Storm Nancy located near Hai-nan Island. Instead of tracking west-northwest, Mac tracked north-northwest, skirting Cubi Point Naval Air Station, Philippines, on his new track toward Hong Kong. Strong anticyclonic outflow from Nancy sheared Mac's convection towards the southwest with aircraft reconnaissance reporting an exposed low-level circulation of 30-35 kt (15-18 m/sec) intensity on the 20th.

Weak steering currents allowed Nancy to take a cyclonic track across southern Hai-nan Island before heading southwestward into Vietnam. Nancy's southwestward track towards landfall forced Mac further north than originally forecast. Mac eventually passed just south of Hong Kong. Ironically, Nancy's development, which caused Mac to track towards Hong Kong, also helped to spare Hong Kong from potential typhoon force winds. Nancy's upper-level outflow, which dominated the SCS from 19-23 September, produced strong vertical shear over Mac and slowed his rate of reintensification. Typhoon Mac only reached minimal tropical storm intensity prior to making landfall west of Hong Kong.

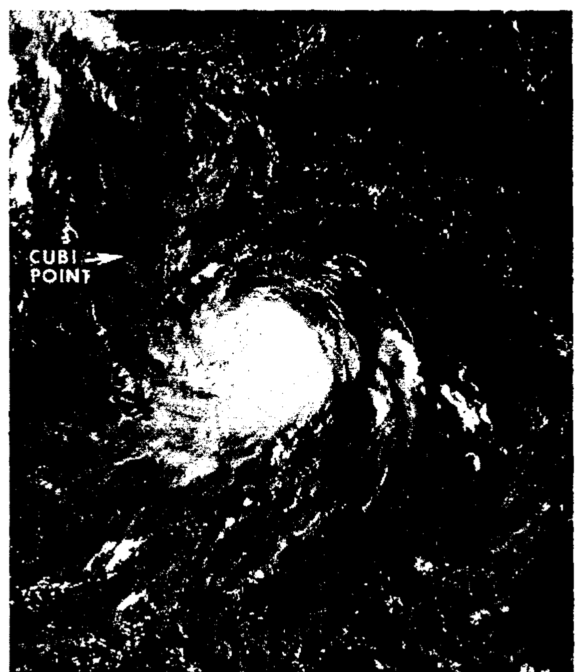
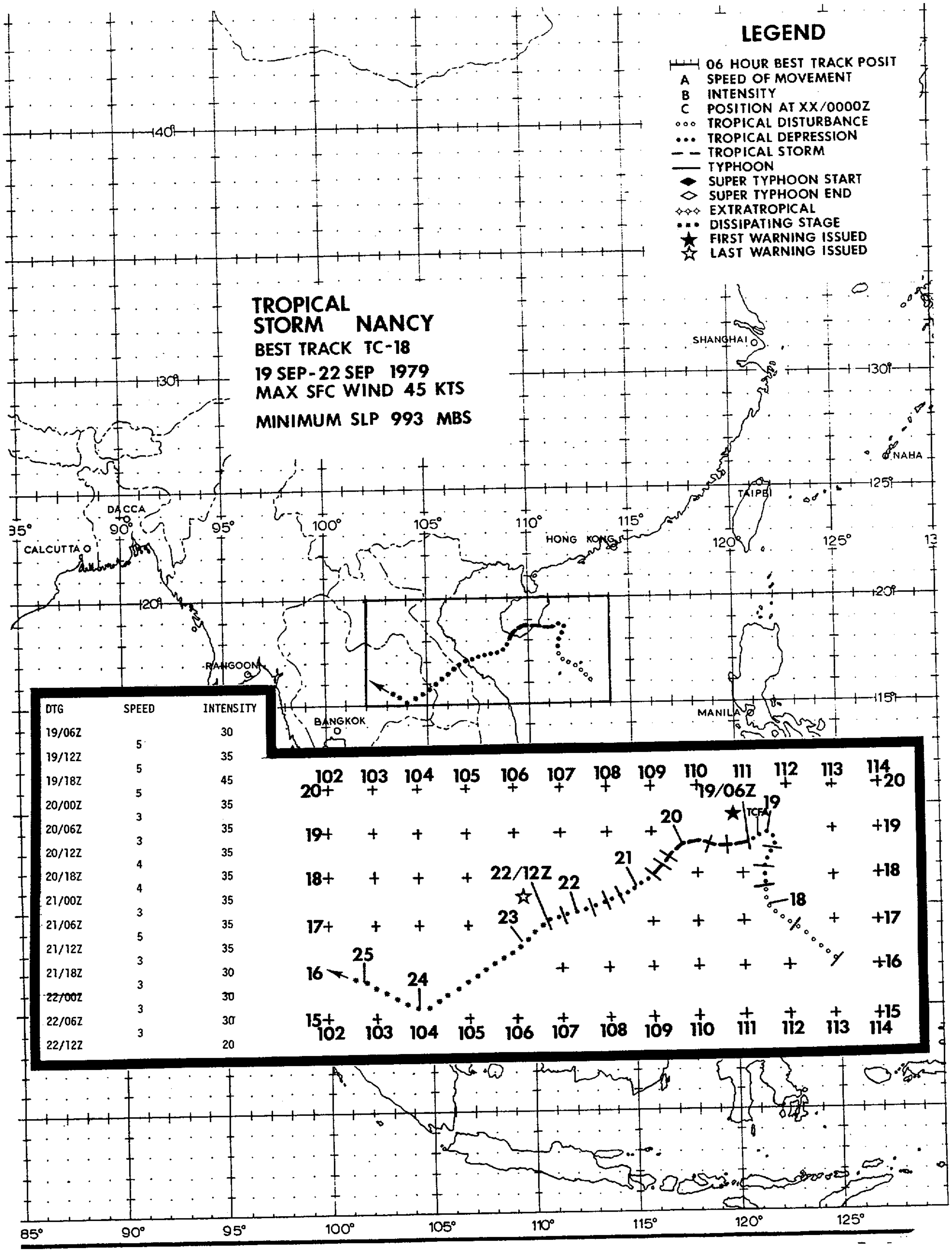


FIGURE 3-17-1. Typhoon Mac after crossing Catanduanes Island, Philippines, 18 September 1979, 0038Z. (DMSP imagery)



DTG	SPEED	INTENSITY
19/06Z	5	30
19/12Z	5	35
19/18Z	5	45
20/00Z	3	35
20/06Z	3	35
20/12Z	4	35
20/18Z	4	35
21/00Z	3	35
21/06Z	5	35
21/12Z	3	35
21/18Z	3	30
22/00Z	3	30
22/06Z	3	30
22/12Z		20

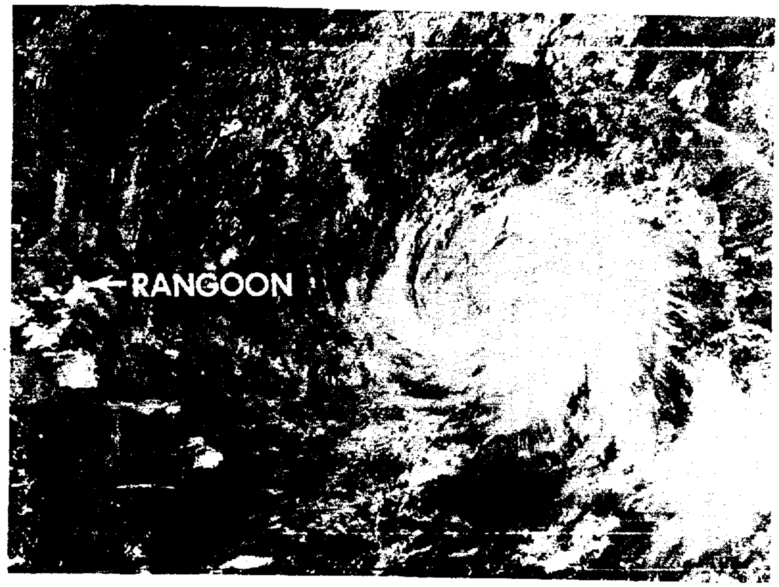


FIGURE 3-18-1. Tropical Storm Nancy at 35 kt (18 m/sec) intensity just after landfall on the southern end of Hai-nan Island, 20 September 1979, 0143Z. (DMSP imagery from Det 8, 1WW, Kadena AB, Okinawa)

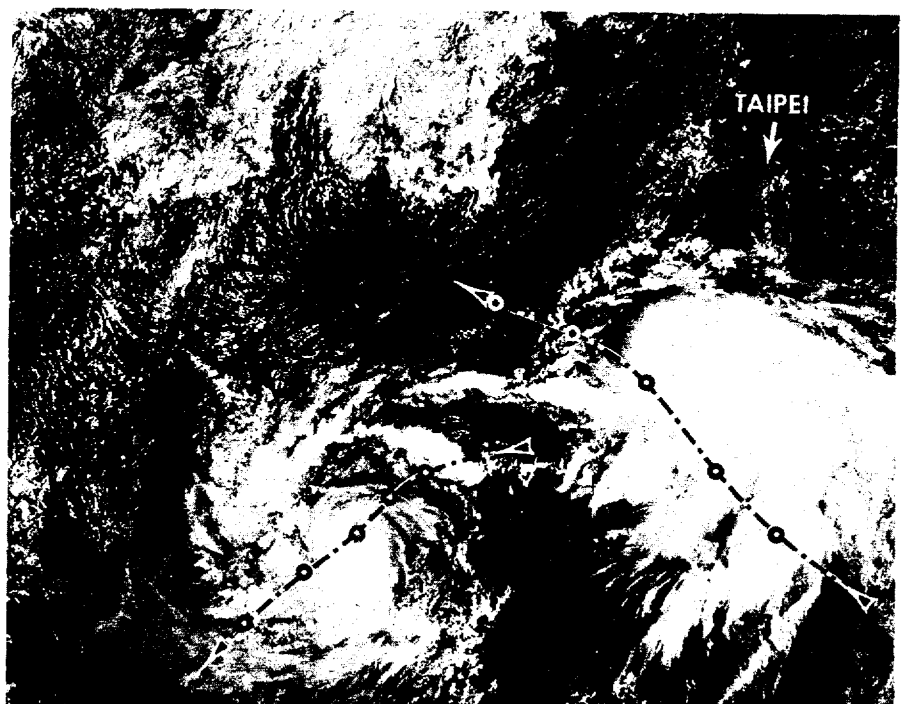
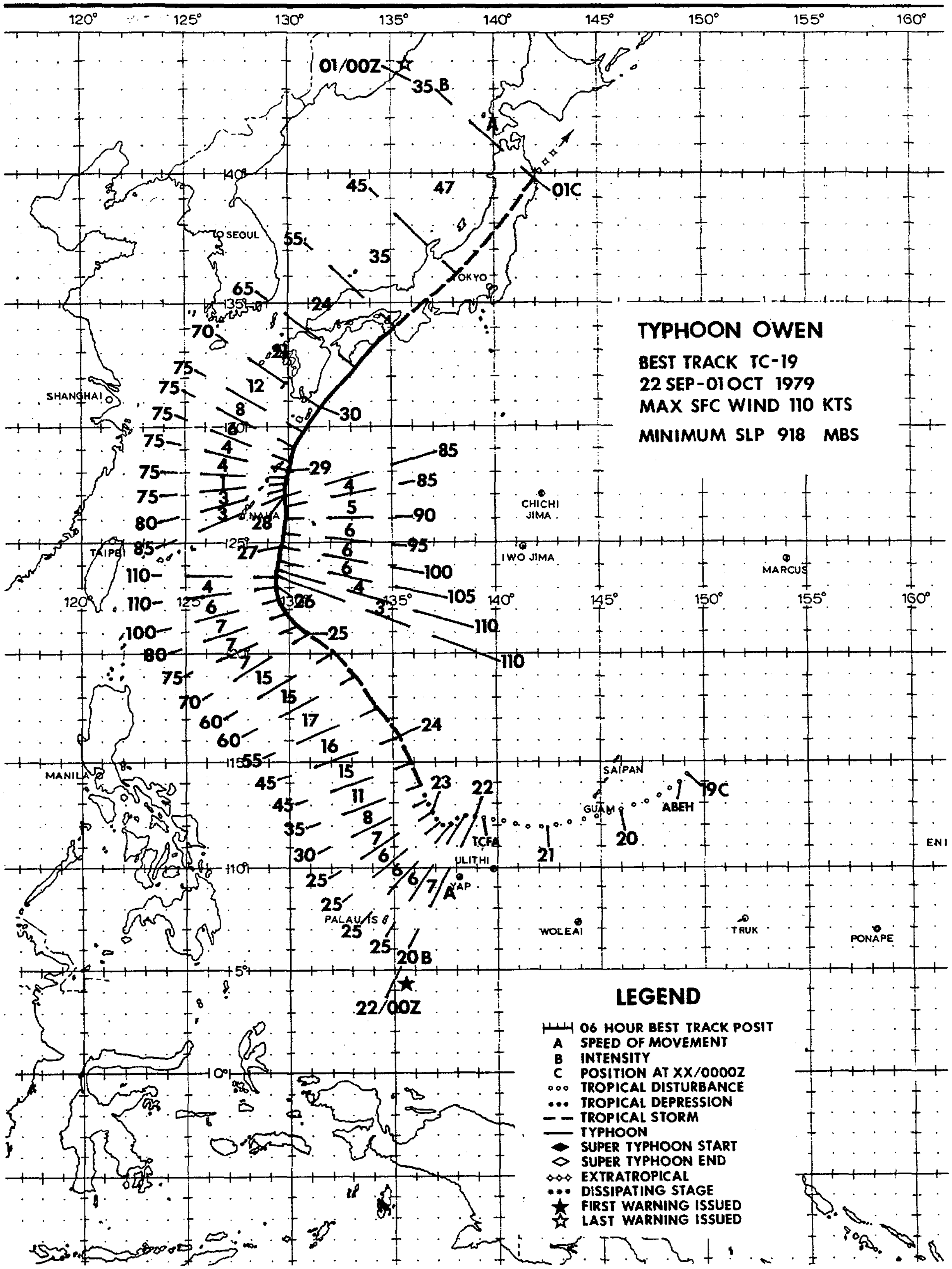


FIGURE 3-18-2. Typhoon Mac and Tropical Storm Nancy undergoing Fujiwhara interaction over the South China Sea, 22 September 1979, 0302Z. The 48-hour tracks before and after picture time are superimposed (Dots bracket 24-hour intervals). (DMSP imagery from Det 5, 1WW, Clark AB, RP)


TYPHOON OWEN
BEST TRACK TC-19
22 SEP-01 OCT 1979
MAX SFC WIND 110 KTS
MINIMUM SLP 918 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
01/00Z
22/00Z
01C
19C
TCFA
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ABEH
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
ENI
120°
125°
130°
135°
140°
145°
150°
155°
160°

Typhoon Owen developed from a disturbance which tracked south of Guam during 20 September 1979. Two days later, satellite imagery (Fig. 3-19-1) showed that the system was organizing at the same time that aircraft reconnaissance data indicated a definite surface circulation with a 1000 mb central pressure. This prompted JTWC to issue a tropical depression warning on the system at 220000Z.

During the 2 days prior to and 1 day after 22 September, the system moved on a generally westward track at 5 to 8 kt (9 to 15 km/hr). This speed and direction was in good agreement with climatological tracks. Also, the 500 mb analysis showed a strong subtropical ridge which indicated westward steering. Based on this information, JTWC forecast westward movement for the first 8 warnings. However, Owen unexpectedly turned sharply to the north and began moving at speeds of 15 kt (28 km/hr).

Post-analysis revealed a possible reason for this movement. Figure 3-19-2 shows the 221200Z analyses at 500 mb and 200 mb superimposed. An upper-level trough is evident on the 200 mb analysis just west of the cyclone. Southerly winds of 50 kt (26 m/sec) were observed on the eastern periphery of the trough. Considerable vertical shear existed in the layer from 500 mb to 200 mb. It appears that the steering and depth of this upper-level trough rather than 500 mb steering was the dominant feature in Owen's movement. Under its influence, Owen tracked generally northward throughout his lifetime, although undergoing major changes in speed. He slowed to a barely perceptible 1-kt (2 km/hr) movement just northeast of Okinawa (at the latitude of the subtropical ridge axis) and then dramatically accelerated to 24 kt (44 km/hr) 36 hours later under vertically consistent westerly steering. At this time, Owen made landfall near Osaka, Japan and began weakening in intensity while still accelerating to 47 kt (87 km/hr). Eventually, he transitioned into an extratropical system but not before reaching a maximum intensity of 110 kt (57 m/sec) (Fig. 3-19-3) on 26 September.

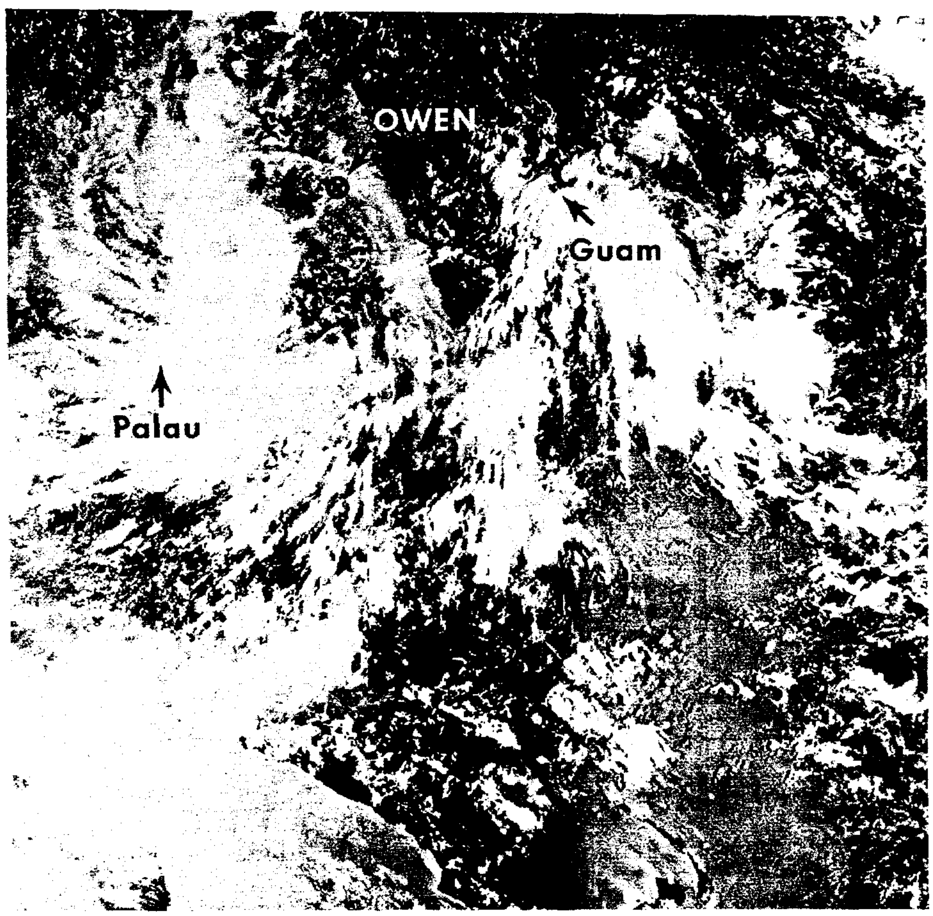


FIGURE 3-19-1. Typhoon Owen as a tropical disturbance, 21 September 1979, 2326Z. (DMSP imagery)

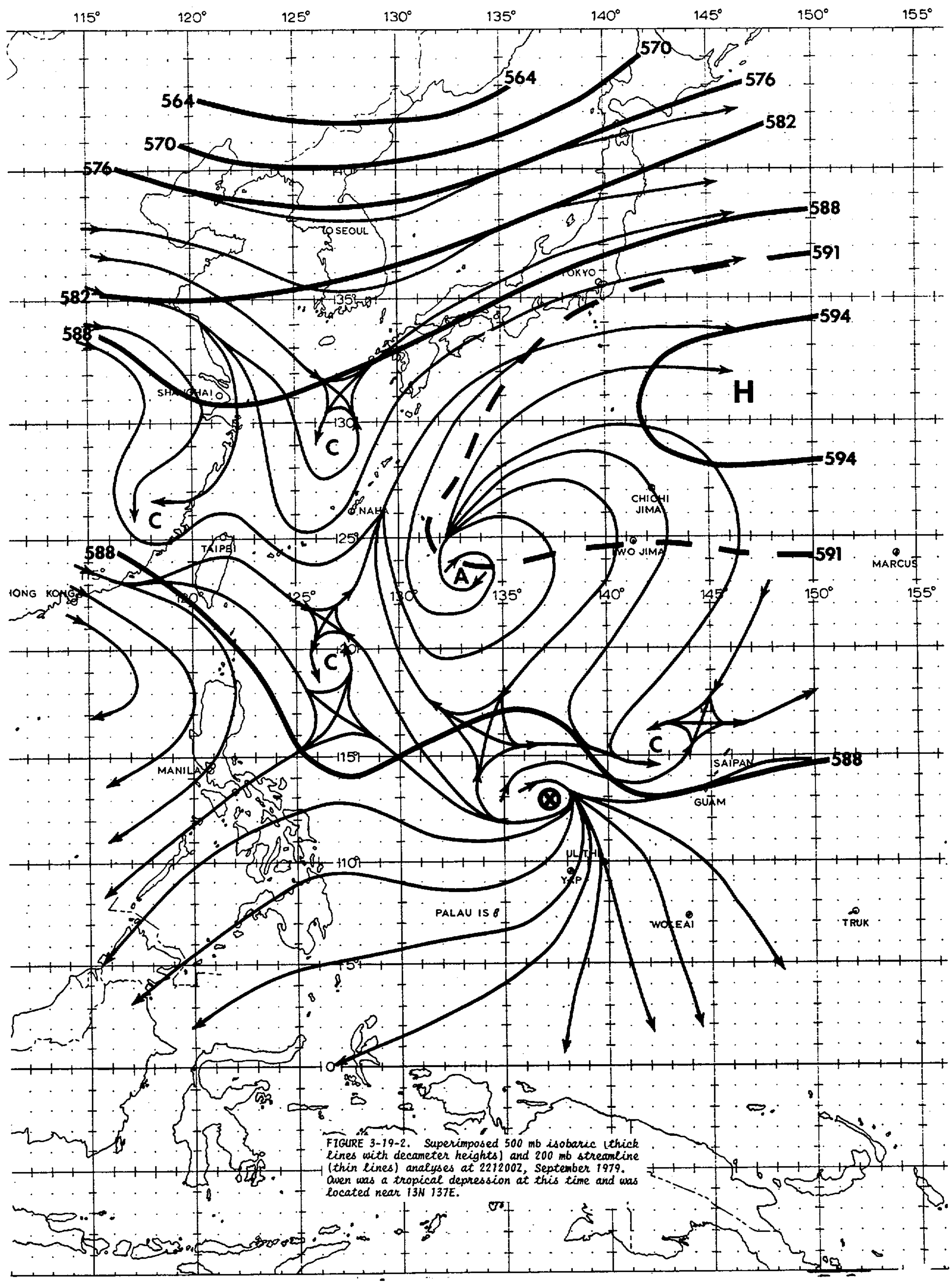
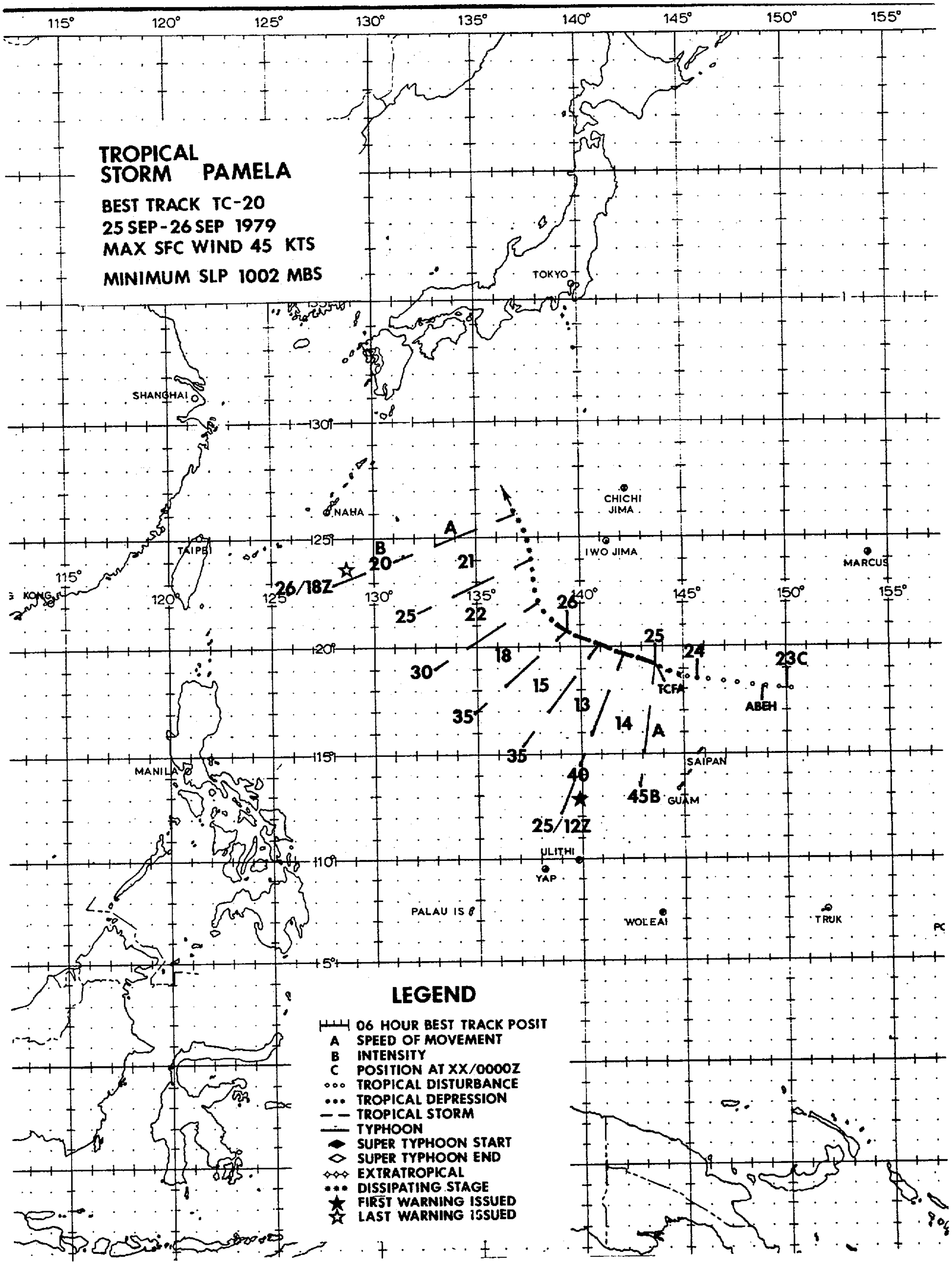


FIGURE 3-19-2. Superimposed 500 mb isobaric (thick lines with decameter heights) and 200 mb streamline (thin lines) analyses at 221200Z, September 1979. Owen was a tropical depression at this time and was located near 13N 137E.

FIGURE 3-19-3. Typhoon Owen at maximum intensity of 110 kt (57 m/sec), 26 September 1979, 0145Z. (DMSP imagery)


TROPICAL STORM PAMELA
BEST TRACK TC-20
25 SEP-26 SEP 1979
MAX SFC WIND 45 KTS
MINIMUM SLP 1002 MBS
115°
120°
125°
130°
135°
140°
145°
150°
155°
TOKYO
SHANGHAI
NAHA
CHICHI JIMA
IWO JIMA
MARCUS
TAIPEI
KONG
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
TCFA
ABEH
26/18Z
25/12Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

Developing at the apex of a wave in the easterly flow in late September 1979, Tropical Storm Pamela tracked westward, north of the Mariana Islands, and dissipated in Typhoon Owen's eastern feeder band under strong vertical shear (Fig. 3-20-1).

A JTWC pressure-wind relationship study (Atkinson and Holliday, 1977) suggested TS Pamela's maximum intensity should have ranged between 25-30 kt (13-15 m/sec) for the concomitant 1002-1003 mb minimum sea-level pressure reported. Instead, aircraft data at 250827Z reported a very narrow, transient wind band of 60 kt (31 m/sec) north and east of the surface center. The ARWO on this mission indicated that surface winds may have been even higher than the reported 60 kt (31 m/sec). Subsequent aircraft investigations were not able to locate winds greater than 25 kt (13 m/sec). The occurrence of maximum winds which exceed the range of the JTWC tropical cyclone pressure-wind relationship is encountered several times each season. Although several explanations have been offered for these anomalies, none have been substantiated.

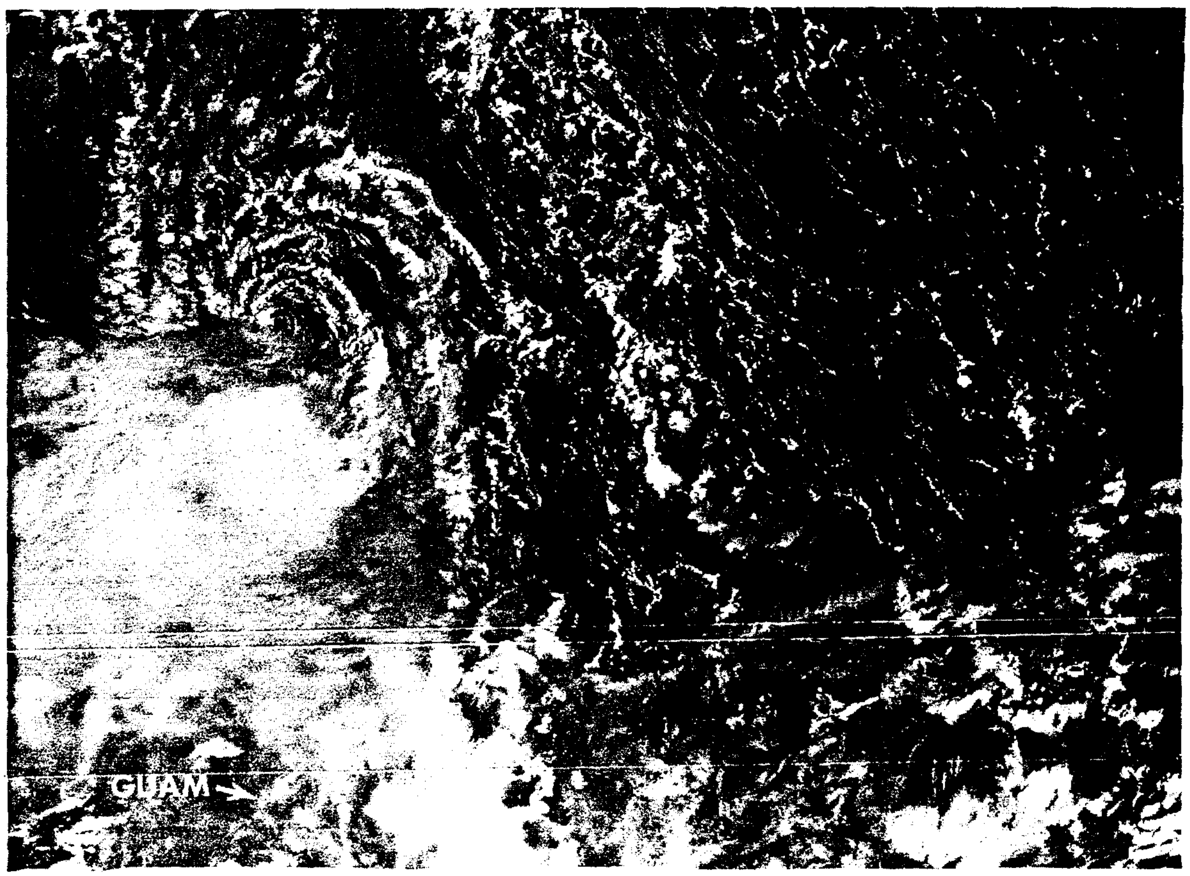
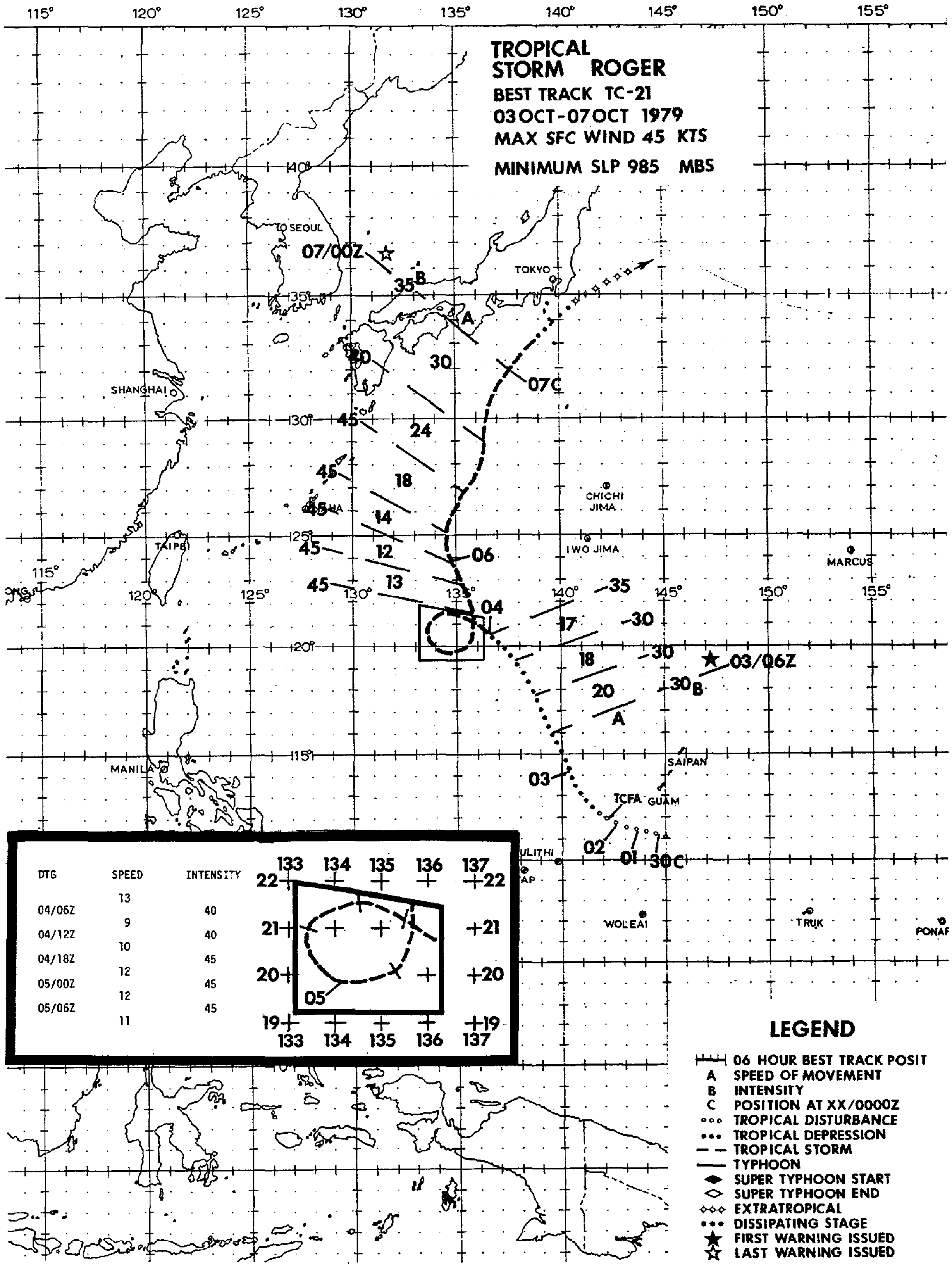


FIGURE 3-20-1. Tropical Storm Pamela with maximum sustained winds of 45 kt (23 m/sec), 24 September 1979, 2232Z. The exposed low-level circulation was a result of strong vertical shear produced by Typhoon Owen. (DMSP imagery)


TROPICAL STORM ROGER
BEST TRACK TC-21
03OCT-07OCT 1979
MAX SFC WIND 45 KTS
MINIMUM SLP 985 MBS
115° 120° 125° 130° 135° 140° 145° 150° 155°
SEOUL
TOKYO
SHANGHAI
TAIPEI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ULITHI
WOLEAI
TRUK
PONAPE
07/00Z
03/06Z
TCFA
DTG
SPEED
INTENSITY
04/06Z
04/12Z
04/18Z
05/00Z
05/06Z
13
9
10
12
12
11
40
40
45
45
45
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

As Typhoon Owen began recurving toward Japan, activity increased in the monsoon trough that extended over the Caroline Islands. The increased activity was noted in the Significant Tropical Weather Advisory (ABEH PGTW) on 28 September. For the next 5 days, 2 weak surface circulations and associated cloud clusters within the broad trough, one southwest of Guam and the other southeast of Guam, were closely monitored. As Owen began weakening over Japan, the southwest monsoon flow into the trough oriented NW-SE increased on 30 September, and a line of strong convective activity developed from the southern Philippines to a position south of Guam.

Post-analysis indicated the existence of a weak circulation southwest of Guam which was to become Tropical Storm Roger. During the entire time preceding the issuance of the first warning on Roger, JTWC's attention was focused on another area of major convective activity 5° west of the circulation center which was associated with strong low-level convergence and cyclonic shear. Gradient-level winds at Yap of 56 kt (29 m/sec), Palau 52 kt (27 m/sec) and Guam 28 kt (14 m/sec) are indicative of the strong low-level winds around the periphery of the trough. Thus, the initial and the reissued formation alerts (020600Z Oct and 022200Z Oct) covered the area of heavy convective activity rather than the actual surface circulation center.

Numbered warnings began at 0600Z on 3 October when a reconnaissance aircraft at 030220Z reported a surface pressure of 998 mb and estimated surface winds of 40 kt (21 m/sec) in a band of strong southwesterly flow 60 nm (111 km) south of the surface center. The aircraft also observed a calm wind center at the surface of 30 nm (56 km) in diameter with clear skies over the area.

Synoptic and satellite data at 031200Z indicated that TD 21 was beginning to separate from the broad trough as convective activity was becoming more directly associated with the circulation center (Fig. 3-21-1). TD 21 was upgraded to a tropical storm at 0600Z on 4 October based on 35 kt (18 m/sec) surface winds and a 982 mb sea-level pressure reported by aircraft reconnaissance at 040308Z. Post-analysis indicates tropical storm intensity was attained 6 hours earlier.

A break in the mid-tropospheric subtropical ridge north of Roger existed as Owen recurved over Japan. The strong mid-level southeasterly steering current along the southwestern periphery of the ridge was responsible for Roger's 15 to 20 kt (8 to 10 m/sec) northwestward movement. The ridge retreated eastward between 0000Z and 1200Z on 4 October as a mid-level trough deepened over Korea. The loss of definitive steering flow permitted Roger to execute a cyclonic loop. After emerging from the loop, Roger continued on a northwestward track until north of the ridge axis, after which he accelerated north-northeastward. Extra-tropical transition was complete by 070600Z as Roger merged with a cold front south of Japan.

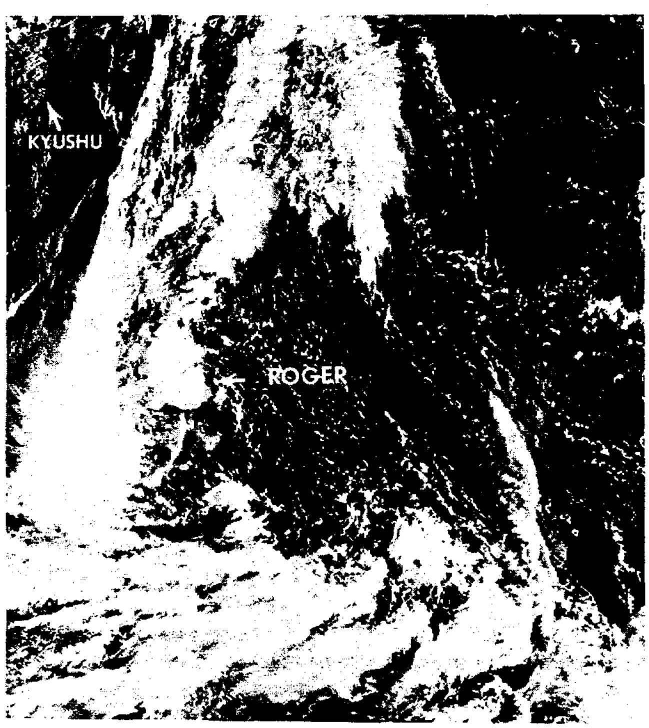
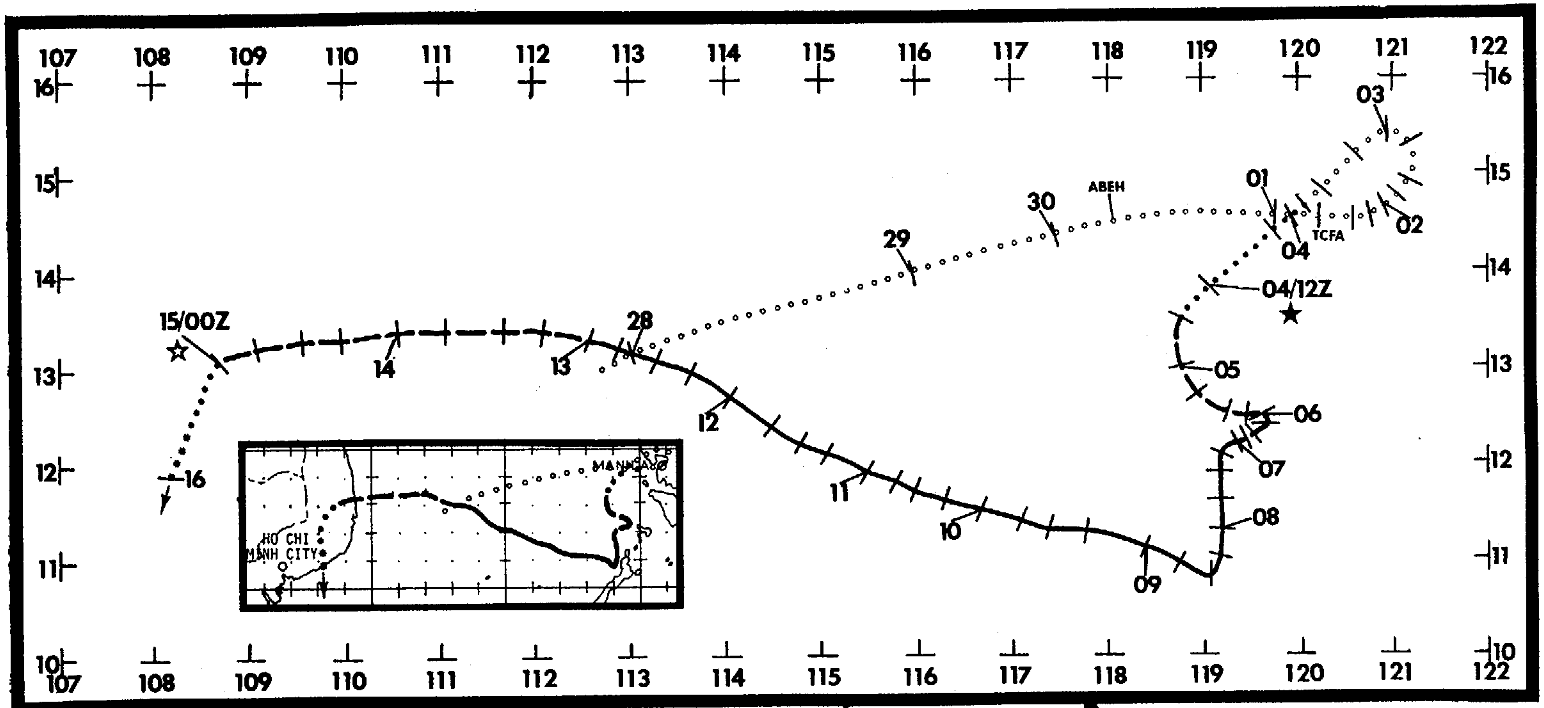


FIGURE 3-21-1. Tropical Storm Roger at 35 kt (18 m/sec) intensity 04 October 1979, 0054Z. (DMSP imagery)



TYPHOON SARAH

BEST TRACK TC-22
04 OCT-15 OCT 1979
MAX SFC WIND 110 KTS
MINIMUM SLP 929 MBS

DTG	SPEED	INTENSITY
04/12Z	5	30
04/18Z	5	35
05/00Z	4	40
05/06Z	3	40
05/12Z	2	40
05/18Z	2	40
06/00Z	1	40
06/06Z	1	40
06/12Z	1	45
06/18Z	1	50
07/00Z	2	60
07/06Z	2	75
07/12Z	3	75
07/18Z	3	75
08/00Z	3	75
08/06Z	2	75
08/12Z	3	75
08/18Z	4	75
09/00Z	6	85
09/06Z	5	90
09/12Z	4	90
09/18Z	4	95
10/00Z	3	110
10/06Z	3	110
10/12Z	3	100
10/18Z	3	100
11/00Z	4	100
11/06Z	3	90
11/12Z	3	85
11/18Z	4	75
12/00Z	5	75
12/06Z	5	70
12/12Z	4	65
12/18Z	4	65
13/00Z	4	60
13/06Z	5	60
13/12Z	6	60
13/18Z	6	60
14/00Z	5	55
14/06Z	5	50
14/12Z	5	50
14/18Z	5	35
15/00Z		20

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ∘∘∘ TROPICAL DISTURBANCE
- ••• TROPICAL DEPRESSION
- — — TROPICAL STORM
- —— TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇◇ EXTRATROPICAL
- ••• DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED

Typhoon Sarah spawned in the monsoonal trough during late September 1979. This trough extended from the southwestern portion of the South China Sea toward Luzon. A northeast monsoon surge existed north of the trough, while the southwest monsoon dominated the area south of the trough. The circulation was steered initially by the southwest monsoon and then later by the first northeast surge of the fall from the Asian mainland. During the last few days of September, the circulation meandered slowly toward Luzon under the influence of the southwest monsoon, and then looped over Luzon during the first three days of October as a mid-tropospheric short-wave trough moved eastward north of Luzon. Once the short-wave trough had moved east of the circulation, the northeast surge intensified and became more of an influence as the circulation finished its loop and began its south-southwest track.

On 5 and 6 October, Sarah, now a tropical storm, apparently was again influenced by another mid-tropospheric short-wave trough which moved across Sarah's longitudinal position and induced the brief eastward movement in her track. At this time, the southwest monsoon also increased in intensity and may have been another factor in steering Sarah eastward. For almost the entire period that Sarah was tracking southward, there was a weakness in the mid-tropospheric ridge between the Philippines and the Asian mainland, enabling Sarah's track to be influenced by short-wave troughs. This weakness in the ridge resulted in mid-tropospheric flow that was too weak to significantly affect the steering of Sarah. This weakness allowed the surface winds to dictate Sarah's direction of motion through the first 8 days of October. Figures 3-22-1 and 3-22-2 illustrate the surface and mid-level flow patterns which influenced Sarah during this phase of her track.

During Sarah's depression stage, strong easterlies in the upper-troposphere restricted Sarah's outflow to the northeast, thus inhibiting development into a tropical storm. As Sarah proceeded southward, the easterlies decreased in strength, outflow increased, and Sarah intensified to tropical storm and then typhoon strength. It is very interesting to note that Sarah intensified to typhoon strength while tracking southward which is quite unusual for a tropical cyclone. Several aircraft reconnaissance flights reported that Sarah had attained typhoon strength even though her cloud structure was not well organized.

During the first several days of October when Sarah was ~~slowly developing~~ to typhoon strength and moving south, Palawan Island and the central Philippines were battered by high winds and rain. These areas were inundated by flooding and landslides which caused massive crop damage and death. Many villages were cut off from any source of food, fresh water, and other necessities for survival. Four deaths were attributed to Sarah. On 8 October, Sarah finally began to track westward and the weather finally cleared over Palawan Island and the central Philippines. Sarah's change in track was due to the strengthening of the mid-tropospheric ridge north of Sarah from Luzon across the South China Sea into Asia. Aircraft reconnaissance early on the 9th reported that Sarah's structure had become better organized. Earlier aircraft reported that Sarah was not vertically aligned; but on the 9th, the mid-level center had become vertically aligned with the surface center. With vertical alignment and improved upper-level outflow, Sarah's intensity increased to 110 kt (57 m/sec) as she became a most impressive storm. This is in contrast to her unusual origin.

After Sarah reached peak intensity early on 10 October, she began to slowly weaken as she tracked west-northwestward (Fig. 3-22-3). Sarah continued on a west-northwest track until dissipation over Vietnam on 17 October. After 20 days, she dissipated within 300 nm (556 km) of her origin as a monsoon depression on 28 September.

FIGURE 3-22-3. Sarah with 60 kt (31 m/sec) intensity one day prior to landfall over Vietnam, 13 October 1979, 0136Z. (DMSP imagery)

FIGURES 3-22-1 and 3-22-2 are on following pages.

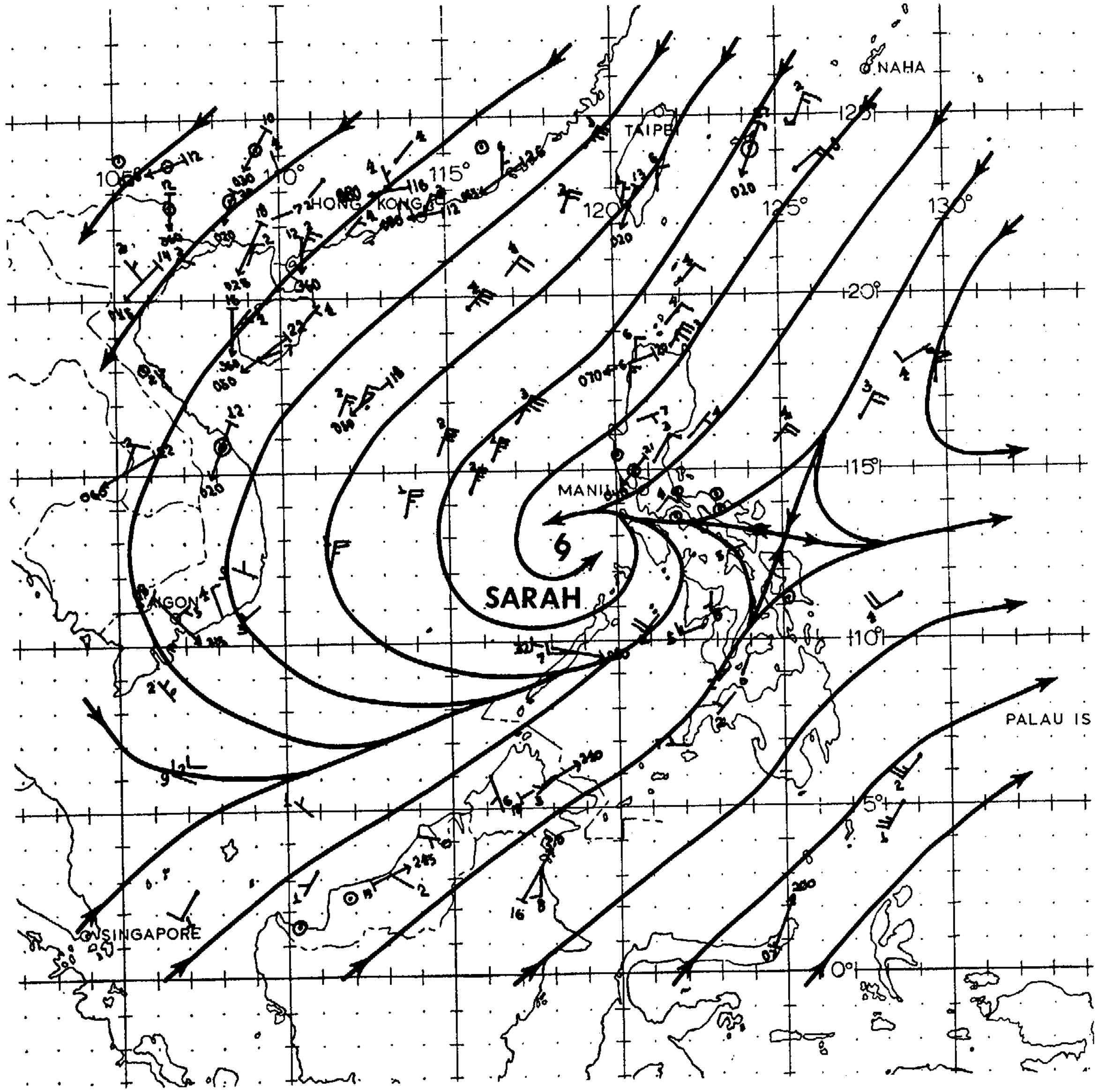


FIGURE 3-22-1. The 050000Z October 1979 surface ( ) / gradient-level (ddd ff) wind data and streamline analysis. Wind speeds are in knots.

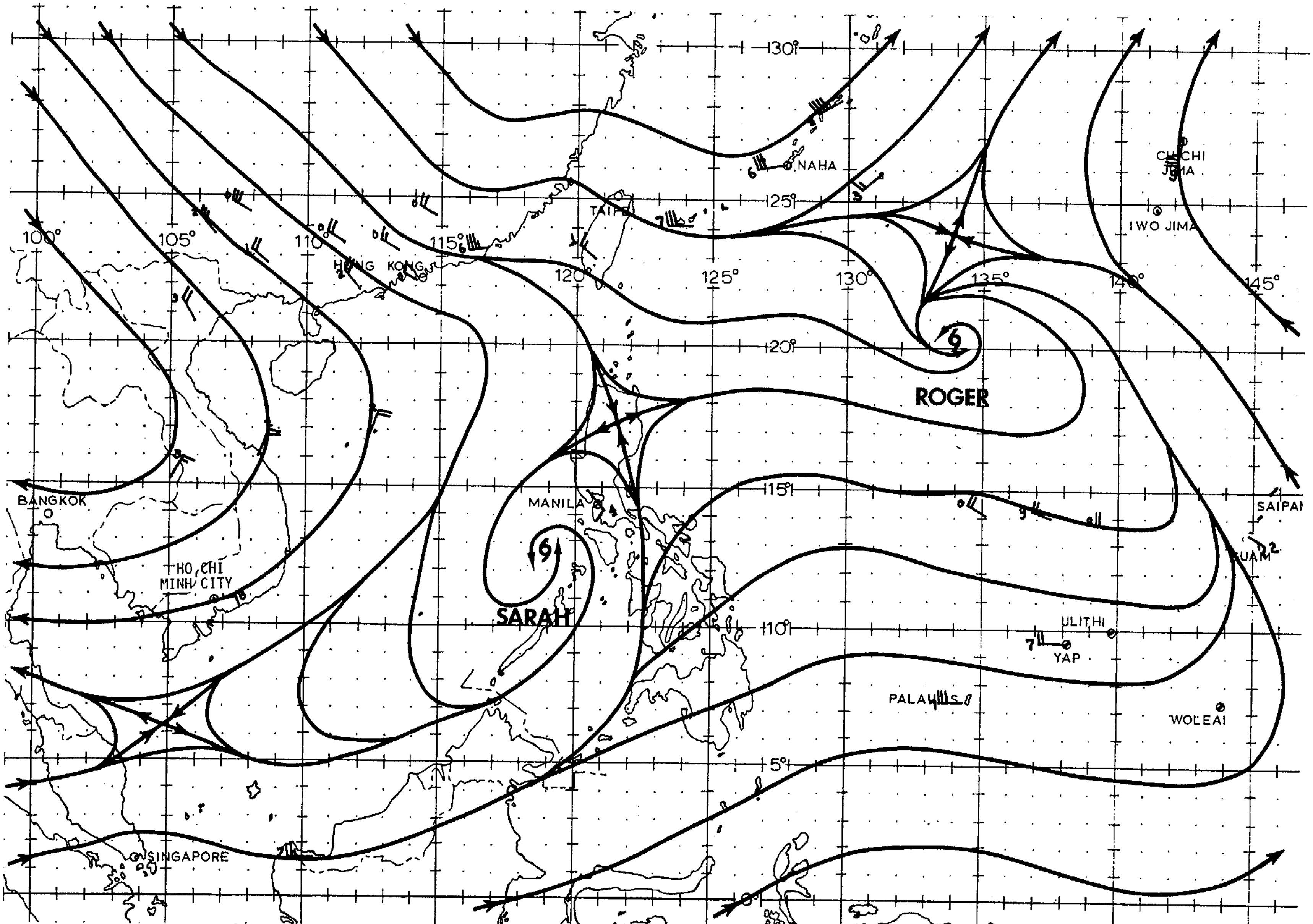
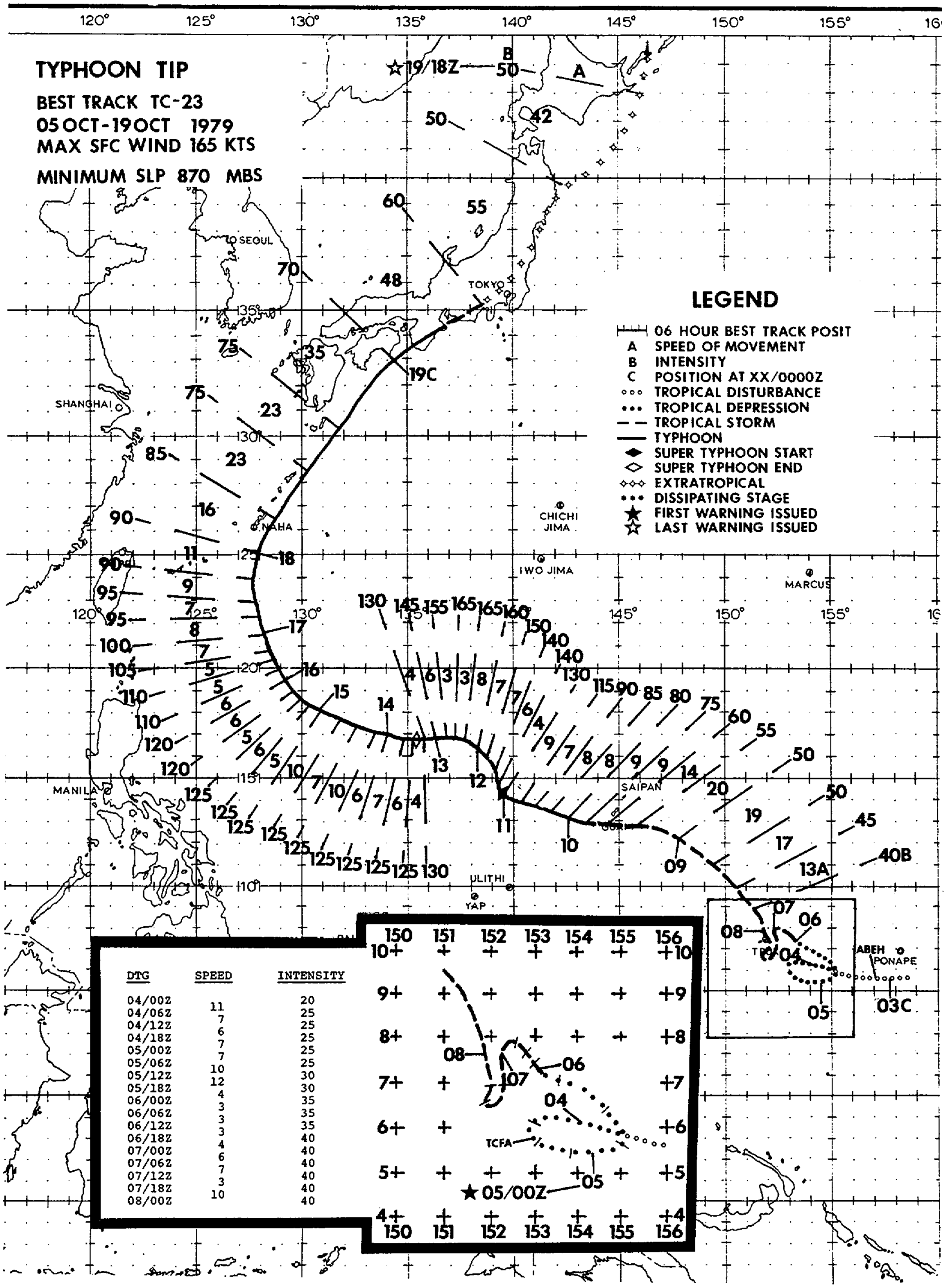


FIGURE 3-22-2. *The 050000Z October 1979 500 mb streamline analysis. Wind speeds are in knots.*



DTG	SPEED	INTENSITY
04/00Z	11	20
04/06Z	7	25
04/12Z	6	25
04/18Z	7	25
05/00Z	7	25
05/06Z	10	25
05/12Z	12	30
05/18Z	4	30
06/00Z	3	35
06/06Z	3	35
06/12Z	3	35
06/18Z	4	40
07/00Z	6	40
07/06Z	7	40
07/12Z	3	40
07/18Z	10	40
08/00Z		40

Super Typhoon Tip was the most significant typhoon of the 1979 season, and possibly the most significant tropical cyclone this century. Forty aircraft reconnaissance missions were flown on Tip, which produced 60 fixes, and thus made it one of the most closely watched cyclones in recent memory. Aircraft and synoptic data showed that Tip achieved the lowest sea-level pressure ever observed in a tropical cyclone (870 mb) and also had the largest circulation pattern on record (nearly 1200 nm (2222 km) in diameter).

Satellite and synoptic data during the early part of October revealed an active monsoon trough that extended from the Marshall Islands through the Caroline Islands to Luzon. Three distinct circulations developed in this trough: One near Manila, which would become Typhoon Sarah; another southwest of Guam, which would become Tropical Storm Roger; and the last between Truk and Ponape, which was destined to become Super Typhoon Tip.

It is not possible to discuss the development of Tip without, at the same time, examining the development of TS Roger. The surface analysis for 030000Z showed the three circulations in the monsoon trough with strong cross-equatorial flow, most of which was feeding into TS Roger. This situation was enhanced, in part, by an extratropical trough north of Roger over Southern Japan. The split in the surface flow pattern near Guam tended to keep Tip from developing rapidly while southeast of Guam. The upper-level analysis at the same time showed a large anticyclone north of Guam in close association with TS Roger and a developing TUTT cell about 300 nm (556 km) east of Marcus Island. The TUTT cell was moving slowly westward. Only strong upper-level northeasterlies existed over Truk and Ponape.

The satellite signature of the tropical disturbance near Truk continued to show improvement despite the initially unfavorable upper-air pattern. A Tropical Cyclone Formation Alert was issued at 040900Z, when a reconnaissance aircraft found a closed surface circulation about 120 nm (222 km) southeast of Truk with a MSLP of 1003.9 mb and a maximum observed surface wind of 25 kt (13 m/sec).

A reconnaissance aircraft fixed the disturbance the following day about 100 nm (185 km) southeast of the previous position. Based on indications of continual development, the first warning on TD 23 was issued at 050000Z. Although the surface pressure did not drop significantly, the observed surface winds did increase, and as a result, TD 23 was upgraded to Tropical Storm Tip at 060000Z.

During the period from 050000Z to 071800Z, TS Tip gave the JTWC forecasters a striking example of what the term "erratic movement" really means. TS Tip first executed a cyclonic loop southeast of Truk, then accelerated to the northwest, only to stall and meander to a position south of Truk. It was difficult to keep track of TS Tip's surface position during this period. The best track is based almost entirely on aircraft surface positions, because the satellite fixes were based on upper-level outflow centers, and even the 700 mb center, as observed by aircraft reconnaissance, was considerably displaced from the surface center. Changes in the surface wind direction reported by Truk assisted JTWC in monitoring TS Tip during this period of erratic behavior.

Post-analysis shows that Tip's slow development and early erratic behavior are related to the weak, yet extensive circulation patterns that were associated with TS Roger. While near Truk, TS Tip was still competing with TS Roger for strong southerly surface inflow and, until the 8th, was coming out second best. During the period of erratic movement, JTWC continued to forecast a northwestward track with passage south of Guam. These forecasts were based primarily on the mid-level steering winds observed at Guam and obtained by the reconnaissance aircraft. These fairly strong winds were from the southeast and were expected to steer Tip toward Guam. However, at this stage of development, Tip was evidently too far south of this wind band and the steering in the immediate vicinity of Tip remained weak.

On 8 October, the expected northwest movement began. Roger was far to the north becoming extratropical, and the southerly winds that had been flowing north began to veer toward Tip. The TUTT cell earlier near Marcus Island migrated to a position northwest of Guam, affording Tip an excellent outflow channel to the north. Synoptic and subsequent aircraft data revealed that the southeasterly mid-level winds finally began to influence TS Tip, and the 080208Z aircraft fix confirmed that Tip was heading toward Guam at approximately 13 kt (24 km/hr). The minimum sea level pressure dropped to 995 mb and surface winds were 40 kt (21 m/sec).

Tropical Storm Tip continued to intensify and accelerate, eventually to 20 kt (37 km/hr) as he headed toward Guam. Until 6 hours before reaching Guam, Tip's persistence track and JTWC's forecasts indicated that he would pass directly over the center of the island. Six hours before expected landfall, however, reconnaissance aircraft and radar positions from Andersen AFB showed that TS Tip had turned to the west. Tip actually passed south of Guam, reaching CPA at about 25 nm (46 km) south of the southern end of the island at 091015Z. Maximum winds of 48 kt (25 m/sec) with gusts to 64 kt (33 m/sec) were recorded at the Naval Oceanography Command Center on Nimitz Hill. Andersen AFB recorded 6.5 inches of rain between 081800Z and 091800Z, and an additional 2.61 inches between 091800Z and 091900Z.

Shortly after passing Guam, Tip reached typhoon strength and continued on a basic west-northwest track. The analyses over the next few days showed that Typhoon Tip was moving into an area of strong upper-level divergence which appeared to cover most of the western Pacific. Rapid intensification was forecast based upon the favorable upper-level pattern and the continued drop in surface pressure as observed by the reconnaissance aircraft. Intensification was much more rapid than expected, however, as the pressure between the 9th and the 11th dropped 98 mb to 898 mb. Tip reached super typhoon strength at that time with maximum winds of 130 kt (67 m/sec) reported by aircraft reconnaissance. The surface analyses revealed that the circulation pattern associated with Typhoon Tip had increased to a diameter of 1200 nm (2222 km) which broke the previous record of 720 nm (1333 km) set by Typhoon Marge in August 1951.

Super Typhoon Tip intensified still further, and at 120353Z, a reconnaissance aircraft recorded the lowest sea-level pressure ever observed in a tropical cyclone: 870 mb. This was 6 mb lower than the previous record set by Super Typhoon June in November 1975. The 700 mb height was 1944 meters and the 700 mb temperature within the eye was an exceptionally high 30° C (Fig. 3-23-1). The Aerial Reconnaissance Weather Officer (ARWO) on that particular mission remarked that "...one unusual feature was the spiral striations on the wall cloud. It looked like a double helix spiraling from the base of the wall cloud to the top, making about two revolutions in

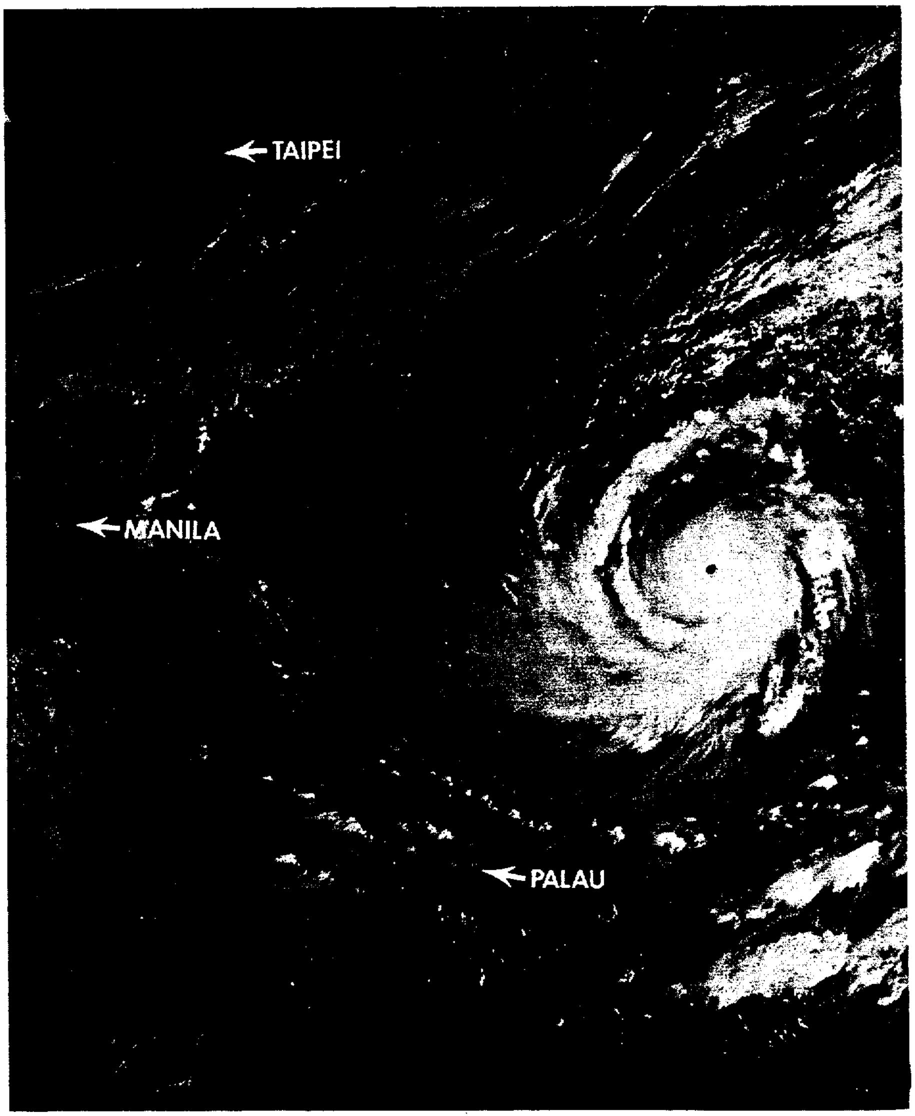


FIGURE 3-23-1. Super Typhoon Tip shortly before the record MSLP of 870 mb was observed by reconnaissance aircraft, 12 October 1979, 0012Z. (DMSP imagery).

climbing."[1] Tip maintained super typhoon strength for the next 54 hours while moving to the northwest at between 3 and 7 kt (6 and 13 km/hr). Estimated maximum wind intensity of 165 kt (85 m/sec) was reached at 120600Z.

The immense circulation pattern associated with Typhoon Tip extended from the surface through 500 mb (and probably higher) and essentially split the subtropical mid-tropospheric ridge south of Japan. This would have allowed an average typhoon to recurve sharply to the north, but Tip was an atypical system and the northwestward movement persisted for the next three days.

Steering forecast aids were useless during this period because they merely steered Tip in his own large storm-induced flow. Persistence and climatology became the primary forecast aids during this stage in Tip's life.

From the 13th to the 17th, the radius of surface and gradient-level 30 kt (15 m/sec) or greater winds extended over 600 nm (1111 km) from Typhoon Tip's center. The radius of over 50 kt (26 m/sec) winds was over 150 nm (278 km) (Fig. 3-23-2). The aircraft reconnaissance data likewise showed that 700 mb winds of 105 kt (54 m/sec) existed more than 120 nm (222 km) from Tip's center during this period (Fig. 3-23-3).

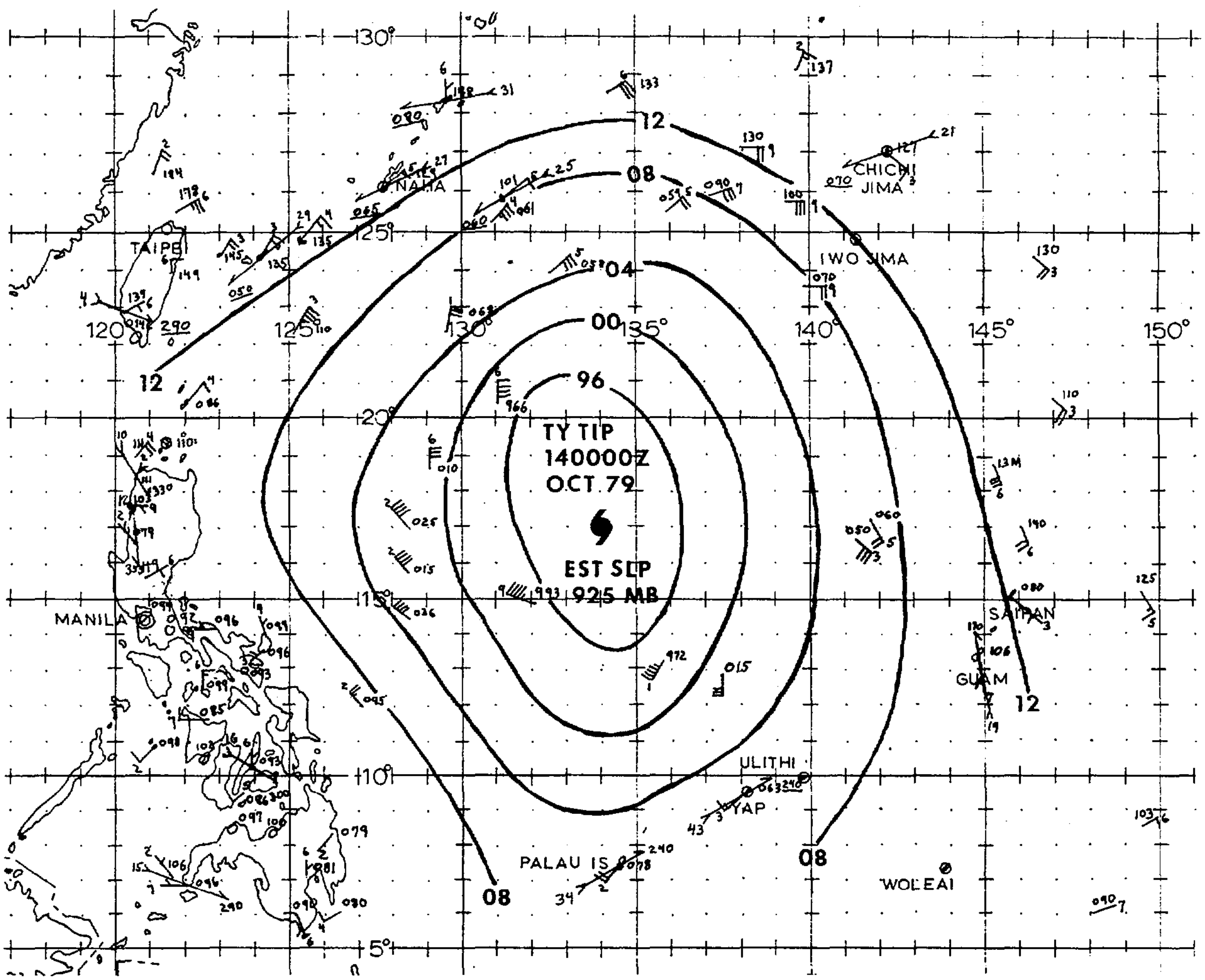


FIGURE 3-23-2. The 140000Z October 1979 surface (⟶)/gradient-level (ddd⟵ff) wind data and pressure analysis in the vicinity of Super Typhoon Tip. Wind speeds are in knots.

[1]PATRICK W. GIESE, Capt, USAF: Mission ARWO.

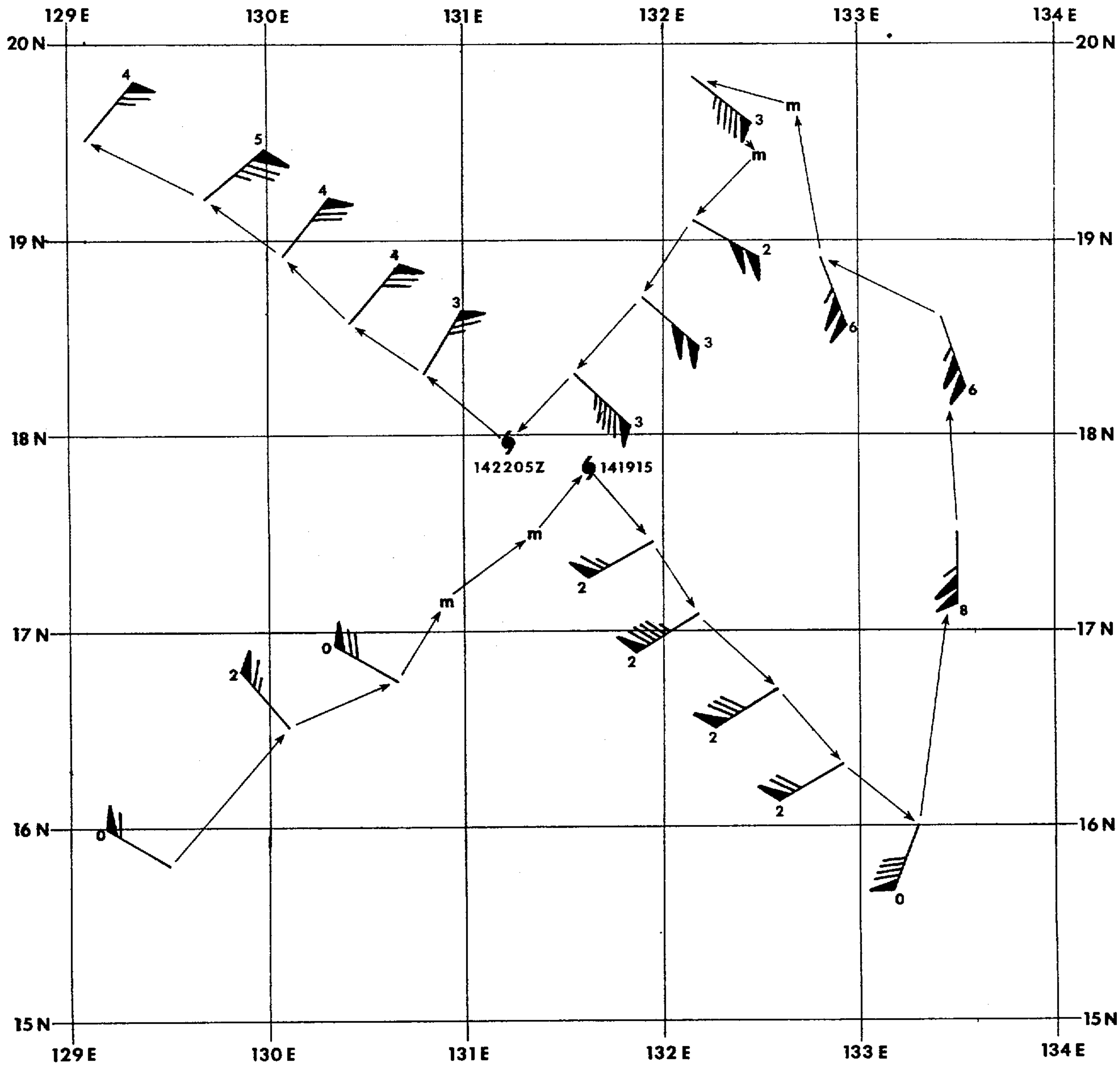


FIGURE 3-23-3. Plot of aircraft reconnaissance data from the 26th mission into Super Typhoon Tip on 15 October 1979. Tip's positions were fixed at 141915Z and 142205Z. Wind barbs are the measured 700 mb winds. The tens digit of the wind direction is also plotted with the wind barbs. An "m" indicates no 700 mb wind data available.

After the 17th, Tip began to weaken as the large circulation pattern began to shrink. This, together with the effects of a mid-level trough moving toward Japan from China, caused Tip to begin tracking northward. By the 18th, he was accelerating to the northeast under the influence of the increased mid-level southwesterlies.

During recurvature, Tip passed within 35 nm (65 km) of Kadena AB on Okinawa, which reported maximum sustained winds of 38 kt (20 m/sec) with gusts to 61 kt (31 m/sec).

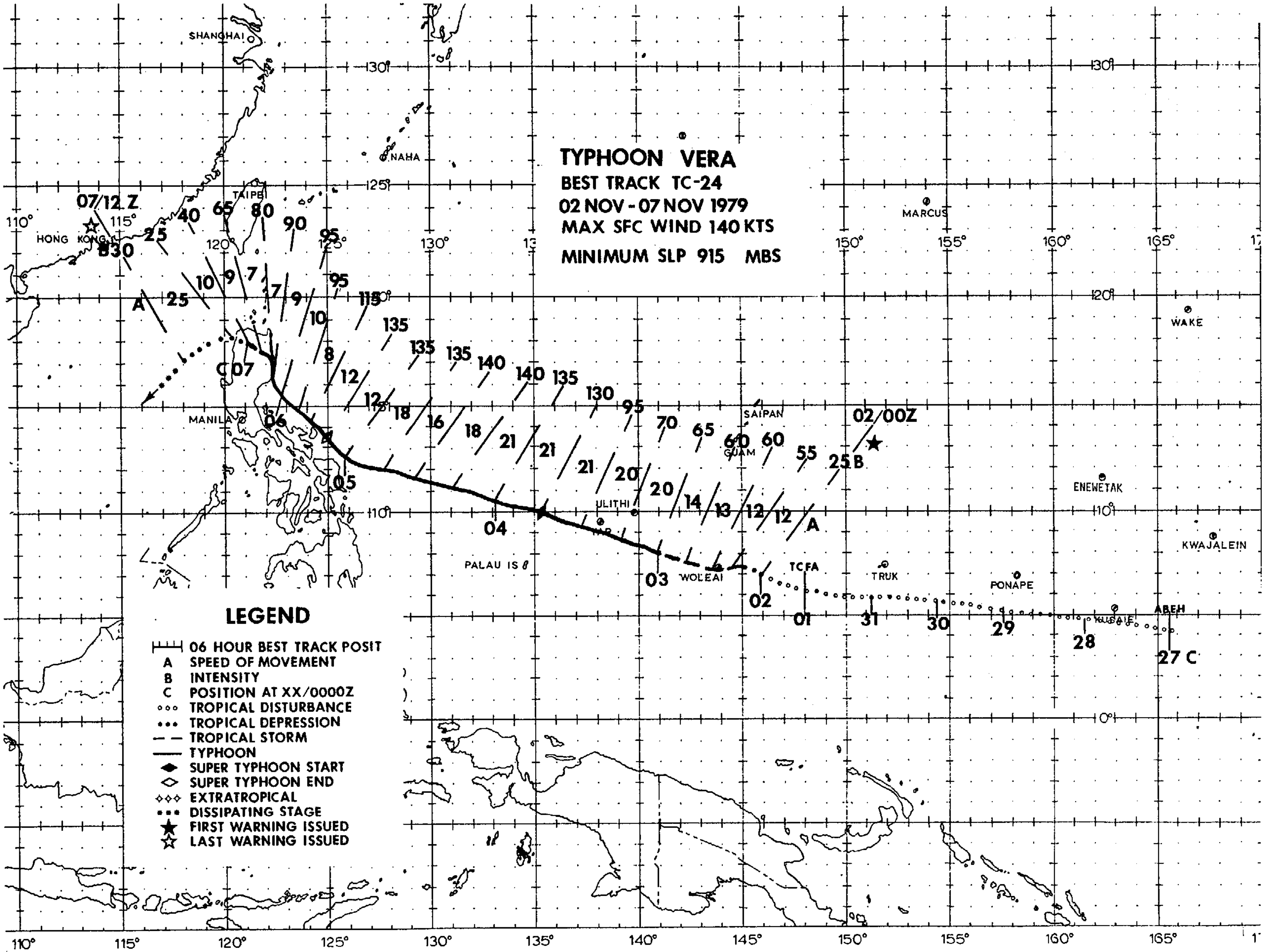
At approximately 190100Z, after reaching a forward speed of between 35 and 45 kt (65 and 83 km/hr), Typhoon Tip, with maximum winds of 70 kt (36 m/sec), made landfall on the Japanese island of Honshu, about 60 nm (111 km) south of Osaka. Synoptic and radar data from stations on the island showed that Tip maintained a speed in excess of 45 kt (83 km/hr) as he passed to the north of Tokyo and eastward into the Pacific Ocean. According to satellite imagery, Tip completed extratropical transition over Honshu.

The extratropical low pressure center (the remnants of Tip) maintained winds of storm force, 48 kt (25 m/sec), until the 21st when it moved to a position east of Kamchatka and finally began to fill rapidly.

The majority of the severe damage occurred in Japan where the agricultural and fishing industries sustained losses into the millions of dollars. Flooding from Tip's rains also breached a fuel retaining wall at Camp Fuji, west-northwest of Yokosuka. The fuel caught fire causing 68 casualties, including 11 deaths, among the U.S. Marines stationed there.

Considering the size and strength of Super Typhoon Tip, the Western Pacific faired well. Luckily, the maximum intensity was reached while the system was still far from any inhabited areas. The potential for mass destruction was always there, but from a strictly meteorological standpoint, Tip was also a thing of great beauty. One of the Aerial Reconnaissance Weather Officers stated, shortly after she returned from a mission, that "...the second penetration was beyond description. This is unquestionably the most awe-inspiring storm I have ever observed. In the 2½ hours that transpired between the first and second fixes, the moon had risen sufficiently to shine into the eye through an 8 nm clear area at the top of the eyewall. To say it was spectacular is totally inadequate...'awesome' is a little closer."[1]

[1]CAROL L. BELT, 1LT, USAF: Mission ARWO.



TYPHOON VERA
BEST TRACK TC-24
02 NOV - 07 NOV 1979
MAX SFC WIND 140 KTS
MINIMUM SLP 915 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
PALAU IS
ULITHI
WOLEAI
SAIPAN
GUAM
MARCUS
WAKE
ENEWETAK
KWAJALEIN
TRUK
PONAPE
KUSAIE
ABEH
TCFA
07/12 Z
02/00Z

Vera, the fourth and final super typhoon of 1979, originated in an active near-equatorial trough (NET) which extended through the Caroline and Marshall Islands. Vera was first analyzed as a weak surface circulation 100 nm (185 km) southeast of Ponape on 27 October and was included on JTWC's Significant Tropical Weather Advisory (ABEH PGTW) for the next 4 days as it remained in the NET. Low-level inflow during this period was split between several weak eddies.

By 300000Z, synoptic data indicated that the low-level inflow was now concentrated into the developing cyclone. Meanwhile, the convective activity increased rapidly over a 24-hour period from 310000Z to 010000Z. A Tropical Cyclone Formation Alert was issued at 010000Z November based on increased upper-level outflow and a continued decrease in surface pressure.

Aircraft reconnaissance at 012100Z found an ill-defined circulation center with a central pressure of 1004 mb and estimated surface winds of 15 kt (8 m/sec). Numbered warnings began at 020000Z based on an improved satellite signature. Rapid intensification occurred, and TD 24 was upgraded to Tropical Storm Vera 6 hours later. Vera continued to intensify, reaching typhoon strength by 0000Z on 3 November while 190 nm (352 km) south-southeast of Yap. At this time, the 200 mb analysis revealed that a large upper-level anticyclone, previously located northwest of Vera at 010000Z, was weakening and was no longer restricting Vera's outflow to the north. By 020000Z, the anticyclone situated over Vera had become the dominant upper-level synoptic feature over the western Pacific.

From the time of the first warning until her approach to the Philippines northeast of Samar, Vera moved on a virtually straight west-northwest track. The major influence on her movement was the unusually strong mid-tropospheric subtropical ridge over the western Pacific. The strength of the easterly current south of the ridge steered Vera at forward speeds of 20 to 22 kt (37 to 41 km/hr)--almost twice the climatological average--as she passed 35 nm (65 km) south of Yap. As a result, although JTWC's forecast tracks were consistent and accurate, forecast forward speeds lagged behind Vera's actual speeds. The underestimates were considerable during the early stages of acceleration.

Vera continued to intensify during her west-northwestward acceleration and reached super typhoon intensity only 18 hours after being upgraded to a typhoon. Reconnaissance aircraft reports indicated Vera maintained super typhoon strength for over 24 hours before weakening as she approached Catanduanes Island. The peak wind reported on Catanduanes Island was 50 kt (26 m/sec) at 051200Z as Vera passed just off the coast.

The island chain began restricting low-level inflow as Vera continued northwestward toward northern Luzon. Vera made landfall north of Tarigtig Point packing winds of 90 kt (46 m/sec).

After landfall, the onset of enhanced low-level northeasterly flow over the Taiwan Straits coupled with strong upper-level southwesterlies over the Philippines resulted in vertical disorganization and rapid weakening of Vera. Radar and aircraft reports indicated the low-level circulation continued to track northwestward over the Cagayan River valley and exit into the South China Sea near Culili Point south of Laoag. The upper-level circulation sheared off near Tuguegarao and was tracked using satellite imagery northward over Aparri then east-northeastward into the Philippine Sea. Surface synoptic and ship reports at 070000Z indicated that a secondary surface center existed near Baguio. At the same time, the primary center was crossing the Cordillera Central Mountain range 95 nm (176 km) to the north (Fig. 3-24-1).

After exiting into the South China Sea, the strong northeast monsoon flow accelerated Vera southwestward, and the final warning was issued at 1200Z on the 7th downgrading Vera to a tropical depression.

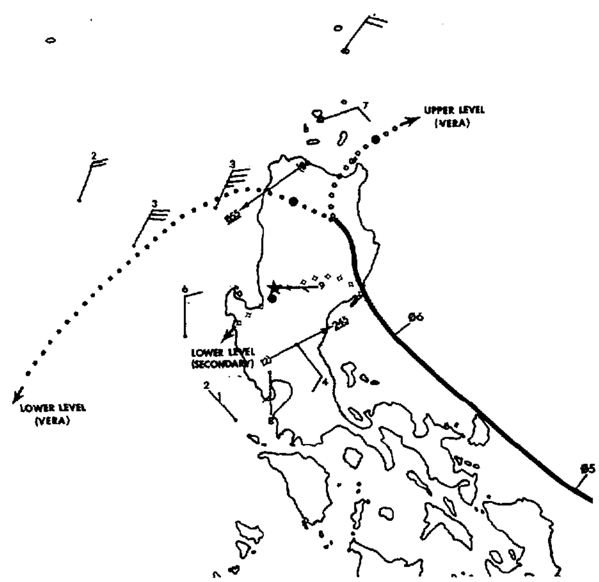
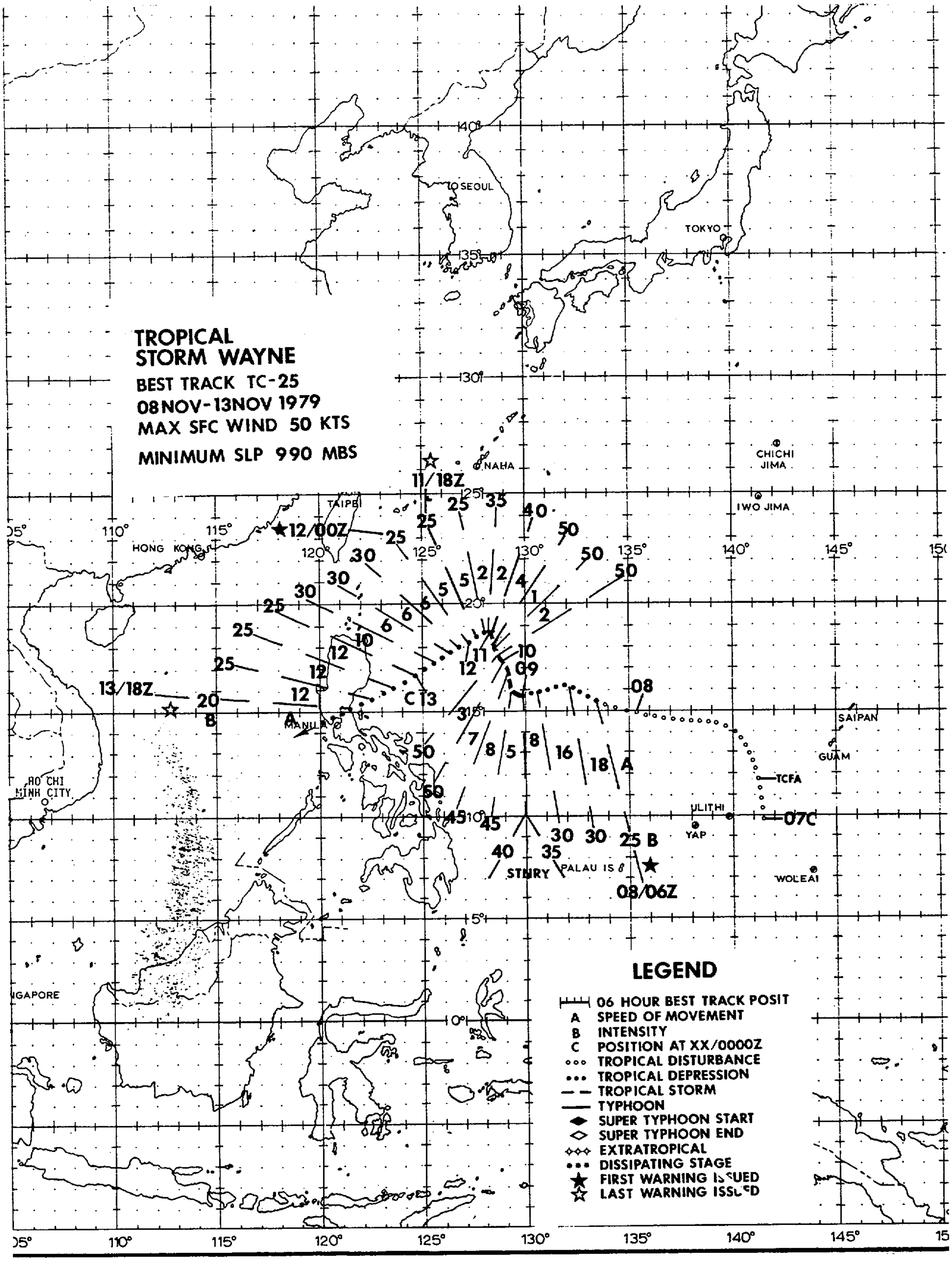


FIGURE 3-24-1. Tracks of low-level and upper-level centers after the upper-level sheared off over northern Luzon. Synoptic and ship reports at 070000Z November indicate secondary low-level center near Baguio (WMO 98328) (indicated by a star). The 070000Z center positions are indicated by solid dots. Wind speeds are in knots.


TROPICAL STORM WAYNE
BEST TRACK TC-25
08NOV-13NOV 1979
MAX SFC WIND 50 KTS
MINIMUM SLP 990 MBS
SEOUL
TOKYO
NAHA
CHICHI JIMA
IWO JIMA
TAIPEI
HONG KONG
MANILA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
HO CHI MINH CITY
TCFA
07C
11/18Z
12/00Z
13/18Z
08/06Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

Tropical Strom Wayne was first detected as a mid-level circulation on satellite imagery in early November. Figure 3-25-1 shows the broad cloud structure associated with the system. Aircraft reconnaissance around this period showed that the disturbance was most developed at mid-levels. Wayne moved northward initially and began developing a more definitive surface circulation which became evident in synoptic data on 7 November. Wayne lasted only a relatively short time, but he still proved to be one of the more difficult storms to forecast for 1979.

JTWC's first forecasts called for recurvature. They were based on the 080000Z November 500 mb synoptic situation which showed a weakness in the subtropical ridge with westerlies extending south to 23°N latitude. Steering flow at all levels, however, was not consistent and strong low-level easterlies prevented Wayne from recurving toward the east. On 9 November, an extratropical system with accompanying surface frontogenesis developed north of Wayne. This caused a break in the otherwise persistent easterly flow and Wayne began to track northward. JTWC forecasts again reflected recurvature and called for early dissipation due to the strong shear from low-level easterlies and upper-level westerlies. The extratropical system moved rapidly eastward bypassing Wayne. By 11 November, strong northeasterlies had once again been established, and Wayne turned back to the west, ultimately, tracking west-southwest toward the central Philippines. At the same time, strong shear did weaken Wayne as it tracked toward the Philippines (Figure 3-25-2) and dissipation occurred as he made landfall over Luzon.

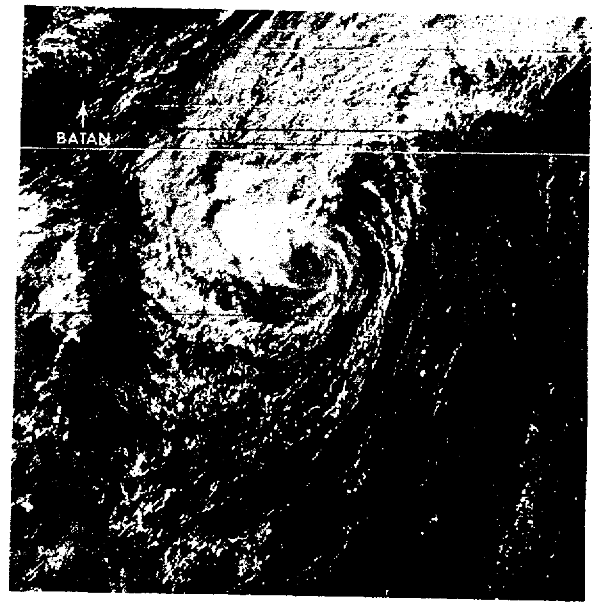


FIGURE 3-25-2. *Tropical Storm Wayne weakening due to strong shear as it approached the Philippines, 12 November 1979, 0100Z. (DMSP imagery)*

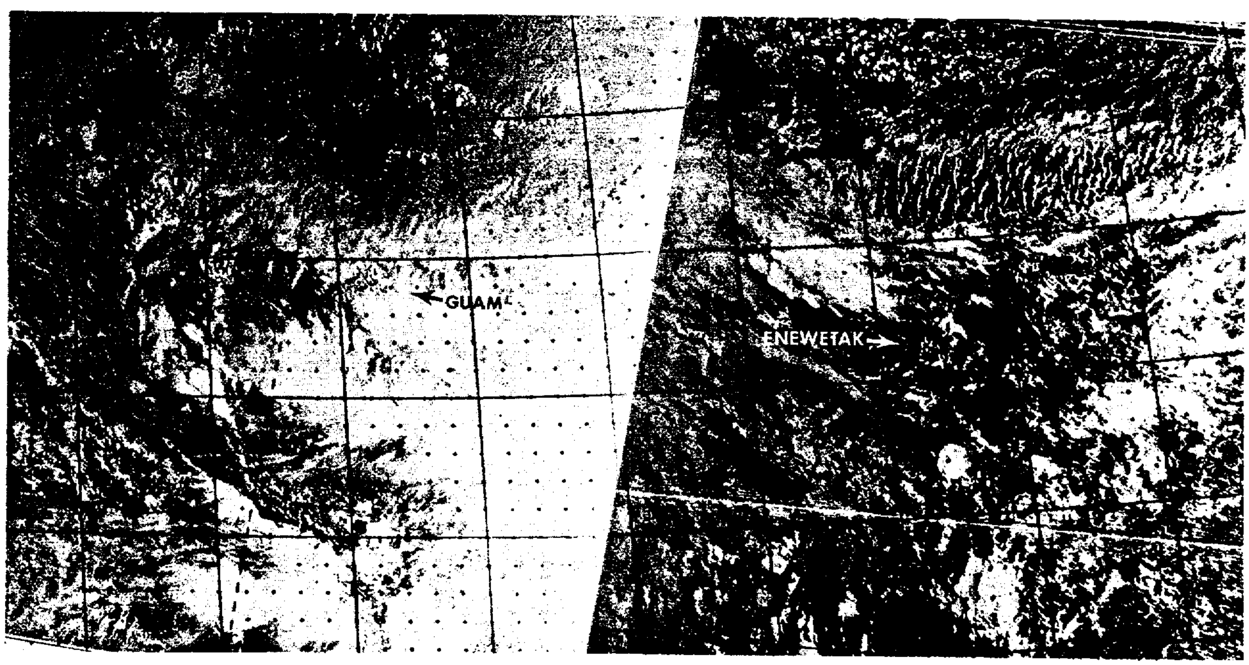
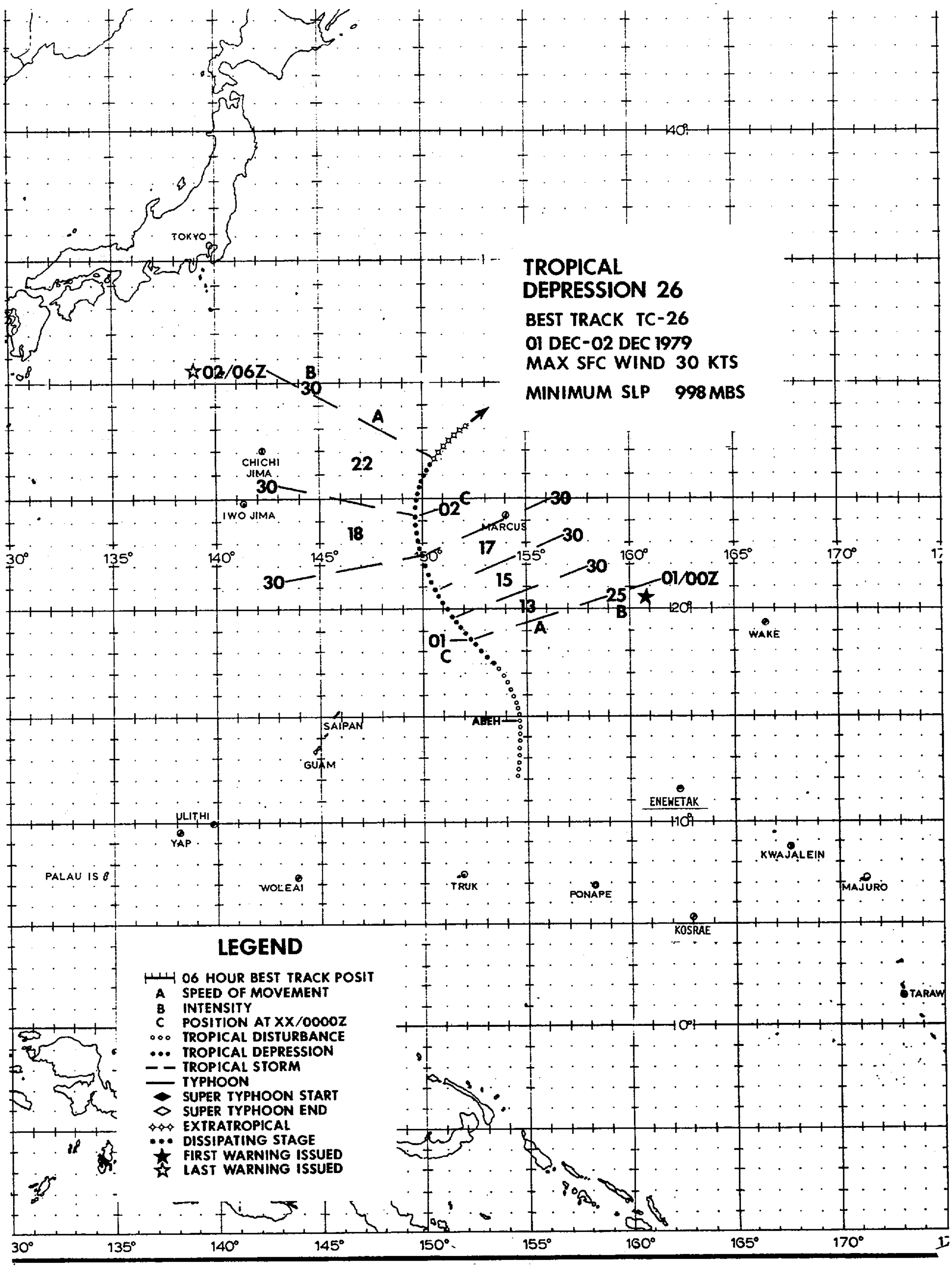


FIGURE 3-25-1. *Disturbance stage of Tropical Storm Wayne when the system was mainly a mid-level circulation, 6 November 1979, 1208Z. (DMSP imagery)*



TROPICAL DEPRESSION 26
BEST TRACK TC-26
01 DEC-02 DEC 1979
MAX SFC WIND 30 KTS
MINIMUM SLP 998 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
ENEWETAK
KWAJALEIN
MAJURO
KOSRAE
WAKE
ABEH
02/06Z
01/00Z

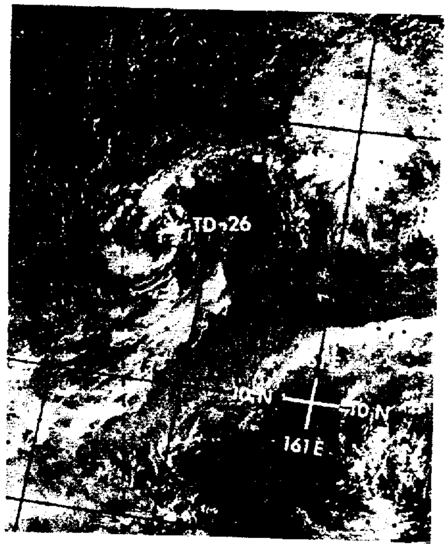


FIGURE 3-26-1. Tropical Depression 26 developed north-northeast of the Truk Islands and appeared to be the surface reflection of a mid-level circulation. Surface data suggest the existence of a weak circulation 400 nm (741 km) northeast of Tropical Depression 26 and a broad circulation (Typhoon Abby) to the southeast, 29 November 1979, 2255Z. (DMSP imagery)

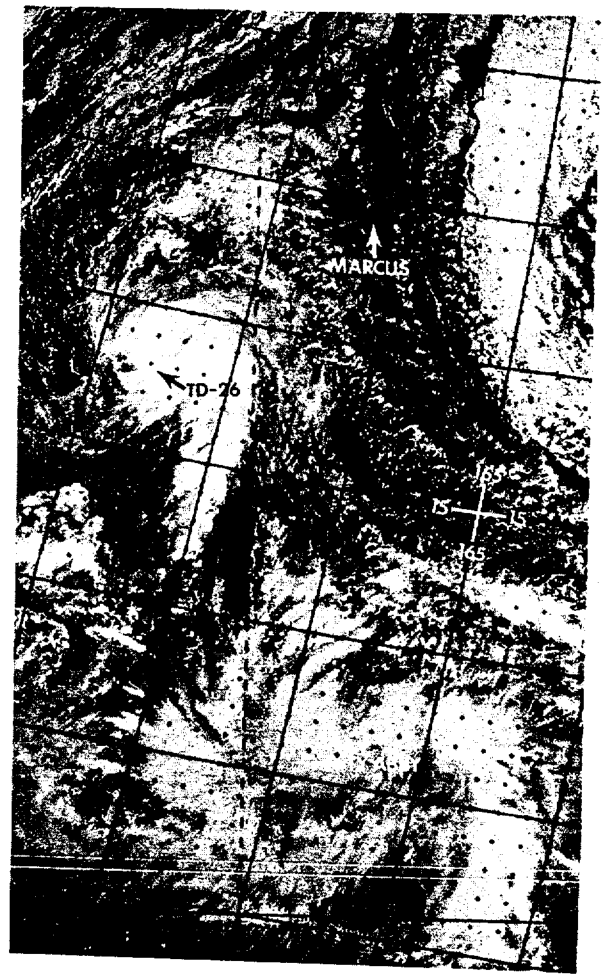


FIGURE 3-26-2. Tropical Depression 26 developed an identifiable surface circulation and intensified as it tracked north-northwestward. A ship, transiting the area, passed through the storm center and reported 35 kt (18 m/sec) winds in heavy showers. Based on synoptic data, the first warning was issued on Tropical Depression 26, but 35 kt-or-greater winds were never reported again. This photo shows Tropical Depression 26 at its maximum convective intensity, 30 November 1979, 2237Z. (DMSP imagery)

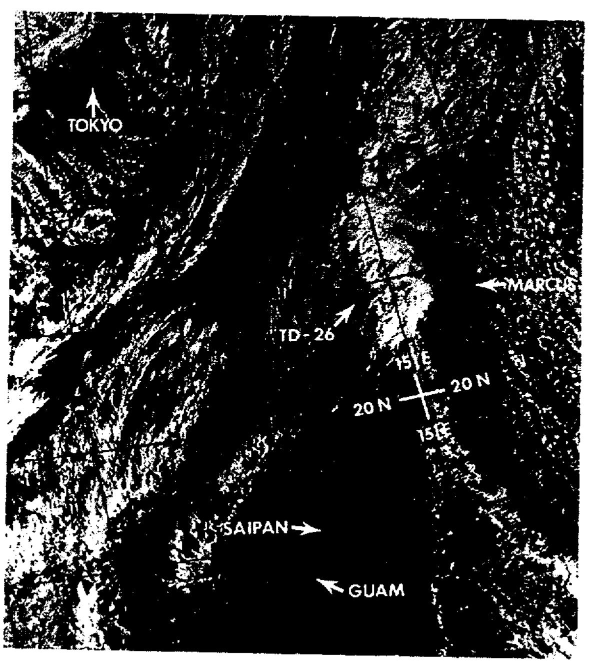
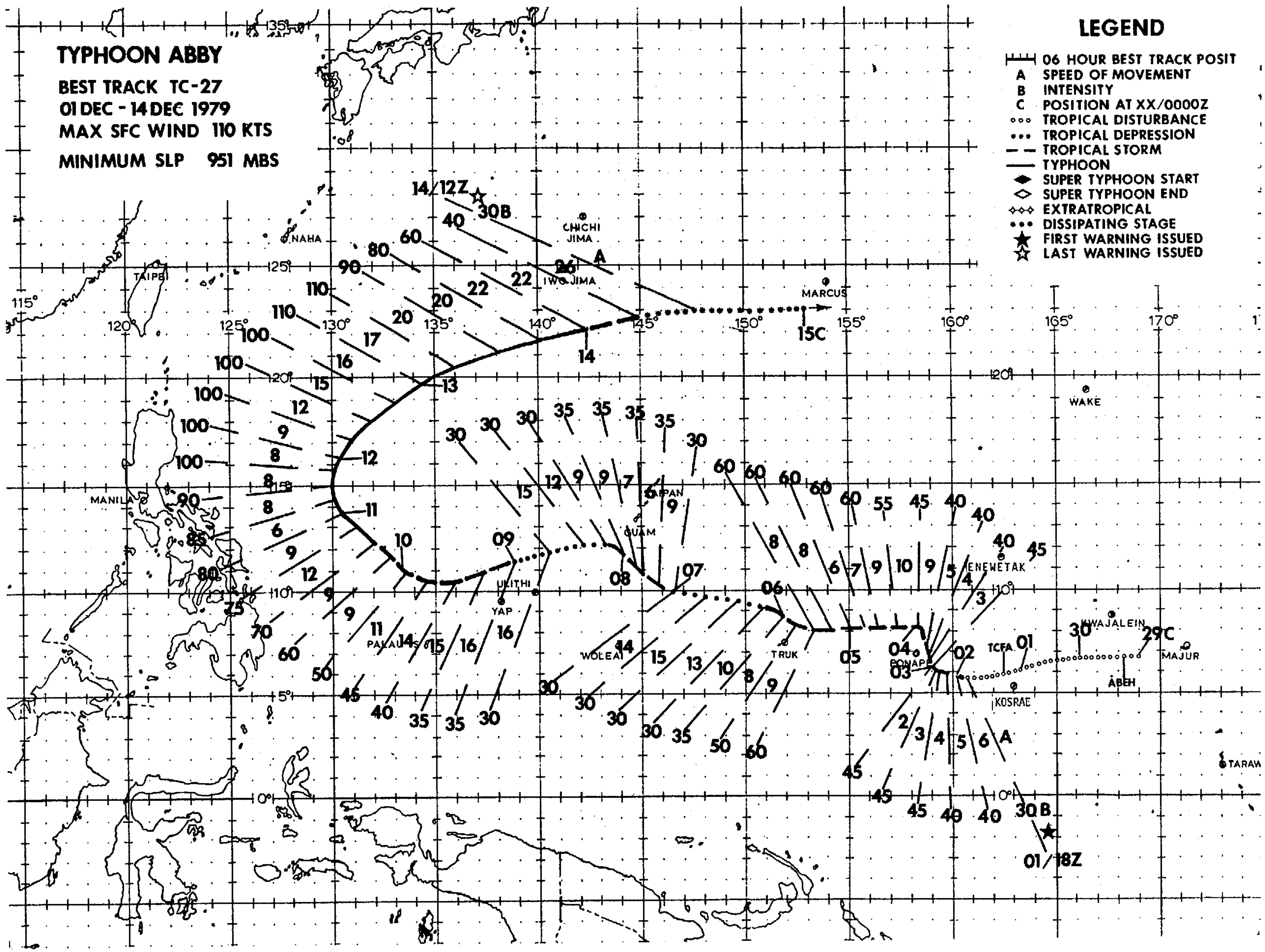


FIGURE 3-26-3. Tropical Depression 26 passed west of Marcus Island and merged with an extratropical frontal boundary. Tropical Depression 26 sheared in the vertical with the low-level exposed surface circulation remaining on the western edge of the convection, 2 December 1979, 0036Z. (DMSP imagery)


TYPHOON ABBY
BEST TRACK TC-27
01 DEC - 14 DEC 1979
MAX SFC WIND 110 KTS
MINIMUM SLP 951 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
14/12Z
30B
01/18Z
30 B
15C
29C
TCFA 01
NAHA
TAIPEI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ULITHI
YAP
PALAU
WOLEAI
TRUK
PONAPE
KOSRAE
ENEWETAK
KWAJALEIN
MAJUR
ABEH
TARAW

Abby, the last typhoon of the 1979 season, developed over the Marshall Islands during early December. Abby proved to be an unusual cyclone in several ways. Throughout much of Typhoon Abby's existence, Abby was not vertically aligned. Aircraft reconnaissance located the mid-level circulation center displaced as much as 55 nm (102 km) from the surface center. At one point, two centers were identified; a point to be discussed later. In addition, Abby fluctuated between tropical depression and tropical storm strength several times before reaching typhoon strength 10 days after formation.

Within 24 hours of the first warning, aircraft reconnaissance observed surface winds of 45 kt (23 m/sec) and a sea-level pressure of 996 mb. The surface and 700-mb centers were displaced by 12 nm (22 km). Abby continued to intensify to 60 kt (31 m/sec) on 4 October while increasing the displacement between the surface and 700-mb centers.

Abby deviated from a westward track to a north-northwestward track on 3 December with a reduced forward speed of movement. The temporary northward movement was associated with a deepening mid-tropospheric trough which moved rapidly northeastward away from Japan on 1 December. Abby resumed a westward track with increased forward speed after the trough axis passed east of Abby late on the 3rd.

All available information (climatology, analog aids, analyses and numerical forecasts) indicated continued intensification as Abby tracked towards Guam. This expected intensification was reflected in JTWC warnings during this period. However, the opposite occurred. As Abby moved west of Truk, she weakened to less than tropical storm strength. An upper tropospheric anticyclone north of Abby restricted Abby's outflow and resulted in the observed weakening (Fig. 3-27-1). By 7 December, Abby reintensified to minimum tropical storm strength as she moved westward and away from the influence of the restricting anticyclone. Abby then tracked west-northwestward under the influence of a mid-tropospheric long-wave trough oriented along 142E. As the trough moved east of Abby, the subtropical mid-tropospheric ridge again built eastward, providing a mechanism which steered Abby towards the west-southwest. During the 8th, Abby once again weakened to less than tropical storm strength and increased her forward speed of movement.

Abby was not vertically aligned from the issuance of the first warning through the 9th. On the 9th, aircraft reconnaissance making a supplemental fix at 0617Z observed that Abby possessed multiple 700 mb centers. By the time of entry into Abby for a levied 0830Z fix, only one well organized, intensifying center was found. The following is a storm mission summary by the Aerial Reconnaissance Weather Officer (ARWO), who made the double penetration into Abby: "This mission started out as a normal fix but ended up being unusual. On our way inbound for the supplemental fix, there was no problem reading winds at flight level or on the surface. Winds were 20-25 kt the entire way. An area of thunderstorm activity became visible ahead of us. As we neared it, the doppler indicated that the 700 mb center was in the middle of the thunderstorm. Not eager to go find this out, we went back to find the surface center. Enroute, we saw surface winds in excess of 35 kt which led us to a fairly disorganized surface center just east of the main thunderstorm. Over it was a fairly small light and variable wind center. Radar showed little curvature in the shower pattern, but the surface winds did indicate a weak circulation existed at this first position. No weather existed to the east of our first fix, and this position was right on the JTWC forecast track. On the second fix, things had changed. As we came in the second time, we encountered considerable precipitation. Doppler and search radar indicated a center with a possible wall cloud forming considerably west of our first fix. Winds were stronger at flight level and we penetrated a wall cloud of about 80% coverage. When we broke through, we encountered our strongest winds at flight level. The surface center was under the eastern wall cloud with a small light and variable wind center at 700 mb centered in the eye. Lightning started in the eastern wall cloud and spread around the

FIGURE 3-27-1 is on following page.

FIGURE 3-27-2. Typhoon Abby's two outflow centers are indicated by arrows, 9 December 1979, 0144Z. (DMSP imagery) *Figure 3-27-1 is on next page.*

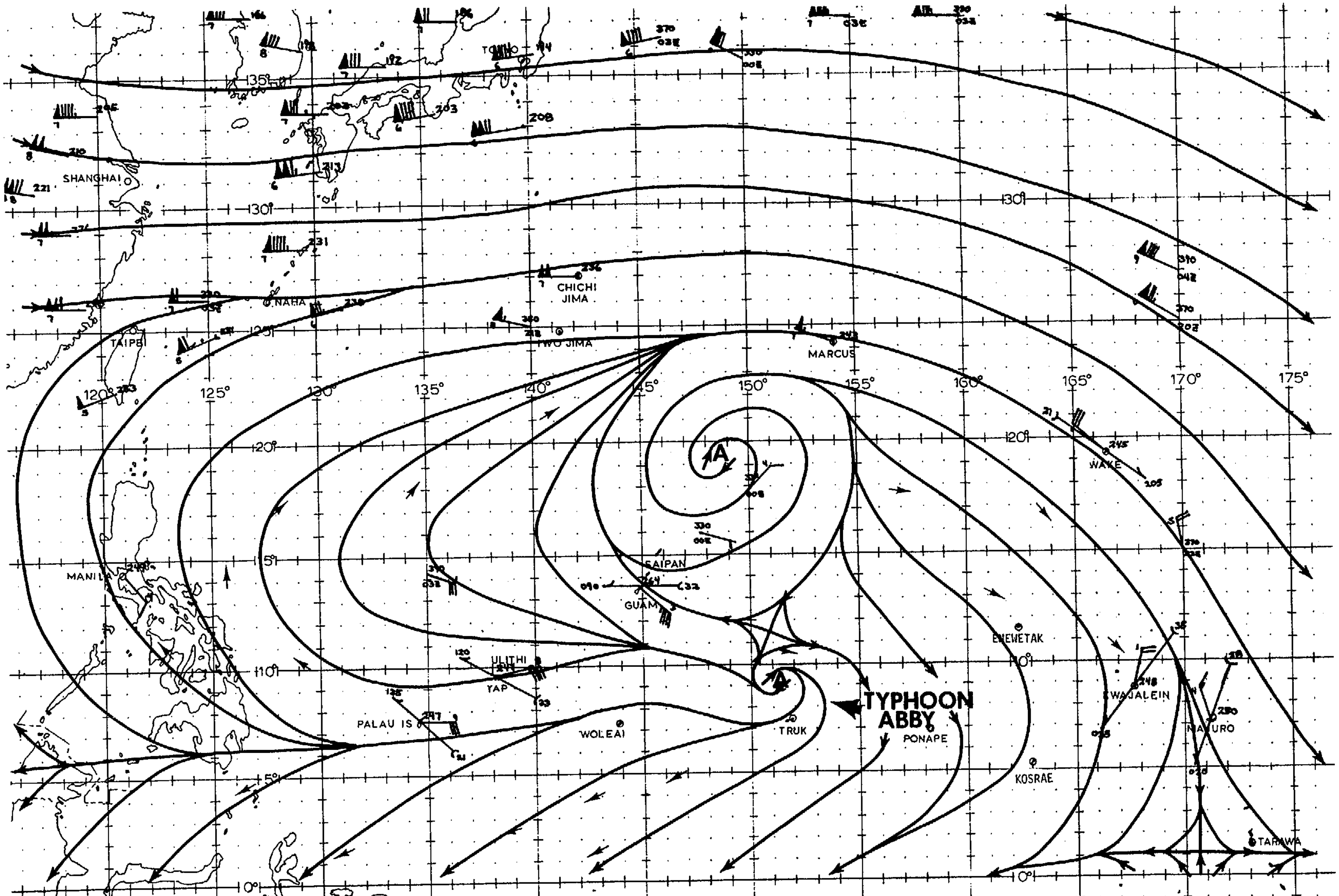


FIGURE 3-27-1. 200 mb streamline analysis at 060000Z December 1979 depicting the more dominant anticyclone northeast of Guam which greatly restricted Typhoon Abby's outflow. Wind data are a combination of RAOBS, AIREPS and satellite-derived ( ) winds for the 250 mb to 150 mb levels. RAOB winds are depicted at 200 mb ( ) and 100 mb (ddd ff). Wind speeds are in knots.

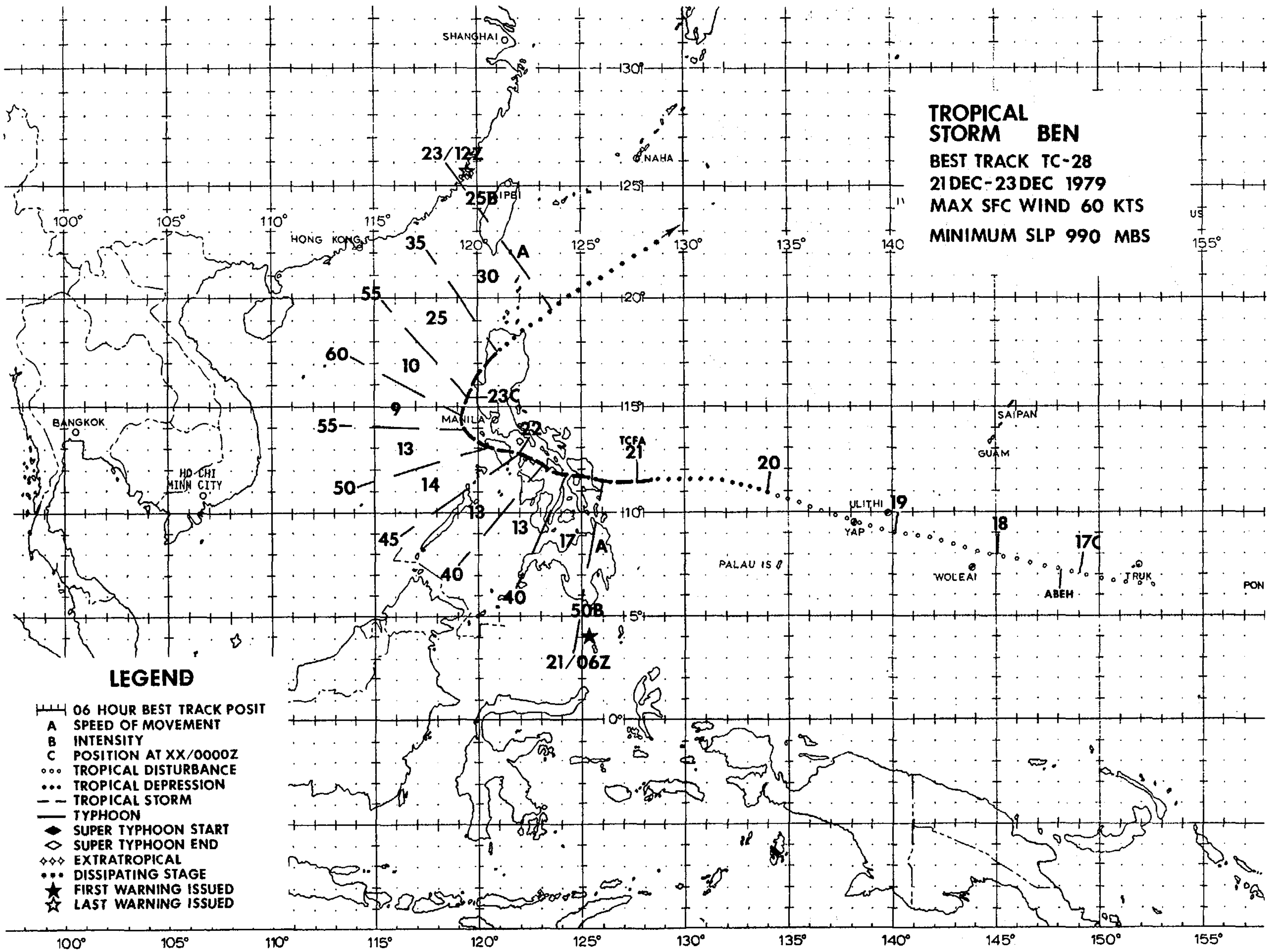
eye. Our drop was made as close to the surface center as was possible and indicated a good 988 mb sea-level pressure. The 700 mb height was down 72 meters from the first fix. The positions were 85 miles apart causing me to believe that two centers existed for a short time with the latter becoming the predominate one. The pressure profile seems to indicate this theory...."[1] Satellite imagery at 090144Z also indicated the possible existence of multiple outflow centers (Fig. 3-27-2). While Abby was reorganizing into a single center, she began to reintensify to tropical storm strength. By the 10th, Abby had attained typhoon strength which made her the last typhoon of the decade.

A mid-tropospheric short-wave trough moved from mainland China into the Sea of Japan and deepened on the 10th. In response to the short-wave trough, the subtropical mid-tropospheric ridge again receded eastward north of Abby. The interaction of these two synoptic features allowed Abby to again track northwest. On the 11th, Typhoon Abby recurved in response to another mid-tropospheric short-wave trough, which extended further south than the trough on the 10th. This last trough in the series moved into the northern part of the South China Sea and deepened, causing Abby to finally follow a recurvature track.

Typically, recurving typhoons have their maximum intensities either less than 12 hours after recurvature or prior to recurvature (Riehl, 1971). Abby, however, did not reach maximum intensity until 36 hours after recurvature. By 13 December, Typhoon Abby reached maximum intensity of 110 kt (57 m/sec) with a minimum sea-level pressure of 951 mb (Fig. 3-27-3). As Abby continued toward the east-northeast, she approached a regime of very strong westerlies in the middle-and upper-troposphere. The strong westerlies induced Abby's acceleration and rapid weakening. Abby dissipated on the 14th due to strong vertical shear between the surface and middle levels.

FIGURE 3-27-3. Typhoon Abby just after recurvature, 12 December 1979, 0021Z. (DMSP imagery)

[1]CHARLES B. STANFIELD, Capt, USAF: Mission ARWO.


TROPICAL STORM BEN
BEST TRACK TC-28
21 DEC-23 DEC 1979
MAX SFC WIND 60 KTS
MINIMUM SLP 990 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SHANGHAI
NAHA
HONG KONG
MANILA
BANGKOK
HO CHI MINH CITY
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
ABEH
TRUK
PON
TCFA
23/12Z
21/06Z
100°
105°
110°
115°
120°
125°
130°
135°
140°
145°
150°
155°

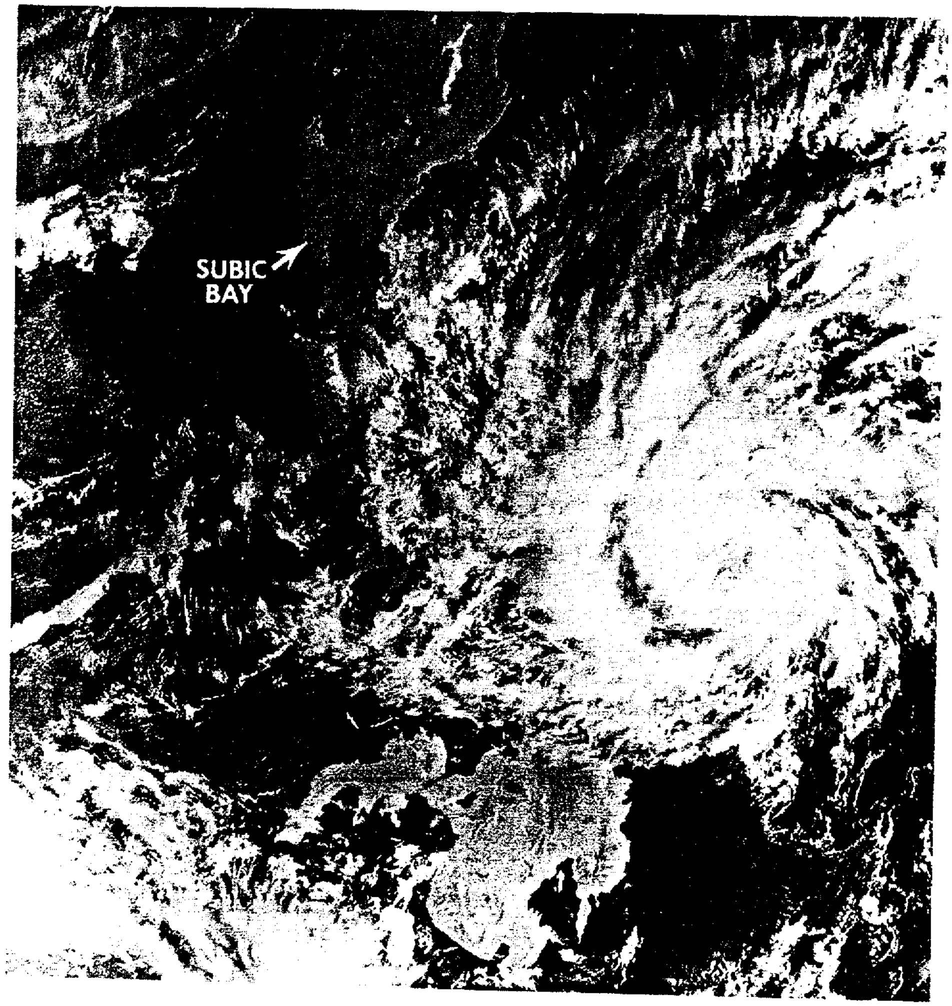


FIGURE 3-28-1. Tropical Storm Ben at 40 kt (21 m/sec) intensity, 21 October 1979, 0059Z. Ben was the last tropical cyclone in the western North Pacific during 1979. (DMSP imagery)

2. NORTH INDIAN OCEAN TROPICAL CYCLONES

During 1979, 7 significant tropical cyclones occurred in the North Indian Ocean area (Table 3-3). As usual, the transition seasons between the northeast and southwest monsoon periods were the favored "cyclone seasons" (Table 3-4). This was an above normal season with most activity occurring during the fall transition period.

TABLE 3-3 NORTH INDIAN OCEAN

1979 SIGNIFICANT TROPICAL CYCLONES

CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	MAX SFC WIND	EST MIN SLP	NUMBER OF WARNINGS	DISTANCE TRAVELLED
TC 17-79	06 MAY-12 MAY	7	85	967	26	1267
TC 18-79	18 JUN-20 JUN	3	50	985	12	581
TC 22-79	21 SEP-23 SEP	3	25	1000	10	694
TC 23-79	21 SEP-25 SEP	5	55	980	14	1108
TC 24-79	29 OCT-01 NOV	4	35	995	13	720
TC 25-79	16 NOV-17 NOV	2	40	994	8	547
TC 26-79	23 NOV-25 NOV	3	30	995	10	1071
	1979 TOTALS	24*			93	

*OVERLAPPING DAYS INCLUDED ONLY ONCE IN SUM.

TABLE 3-4.

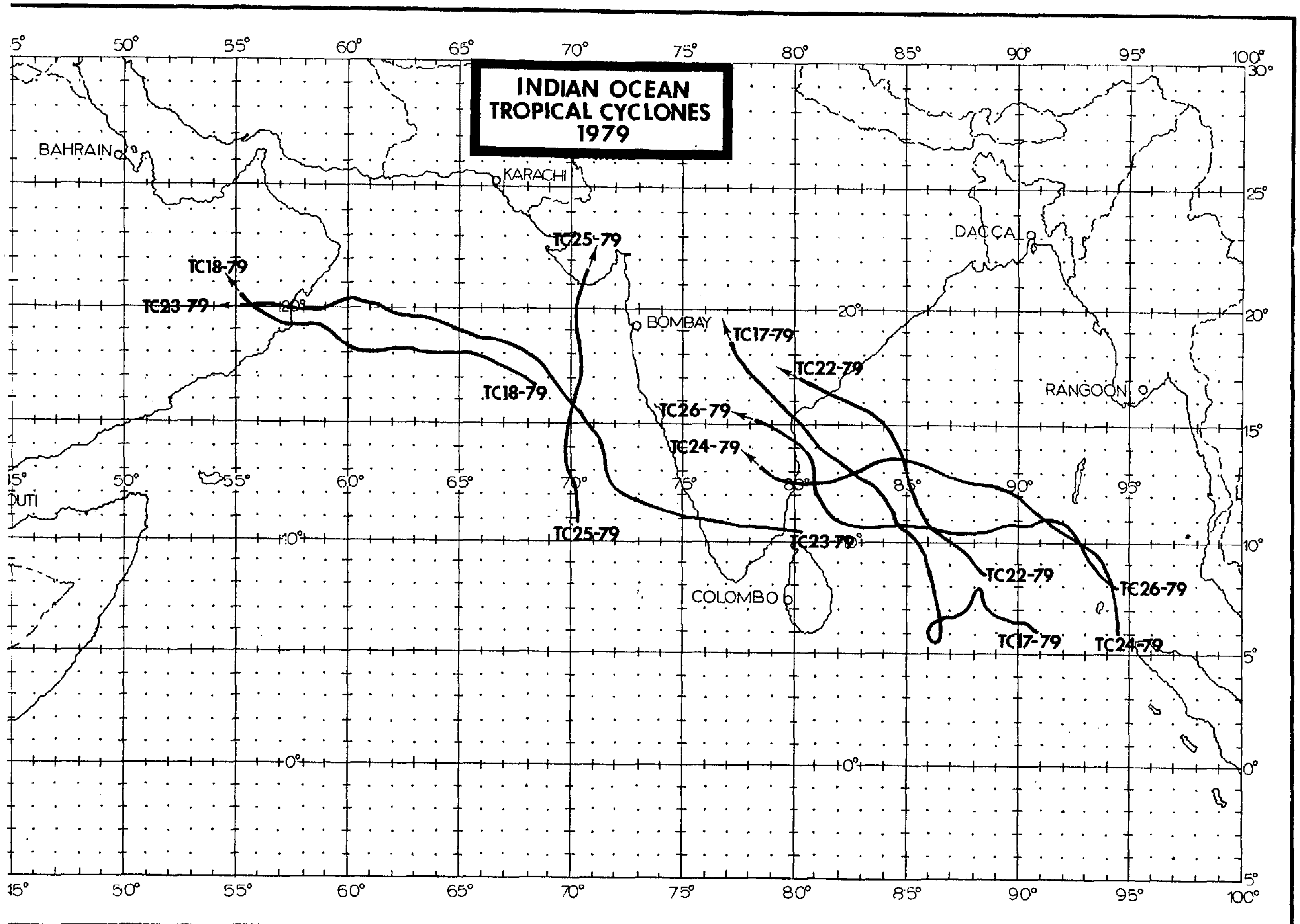
1979 SIGNIFICANT TROPICAL CYCLONE STATISTICS

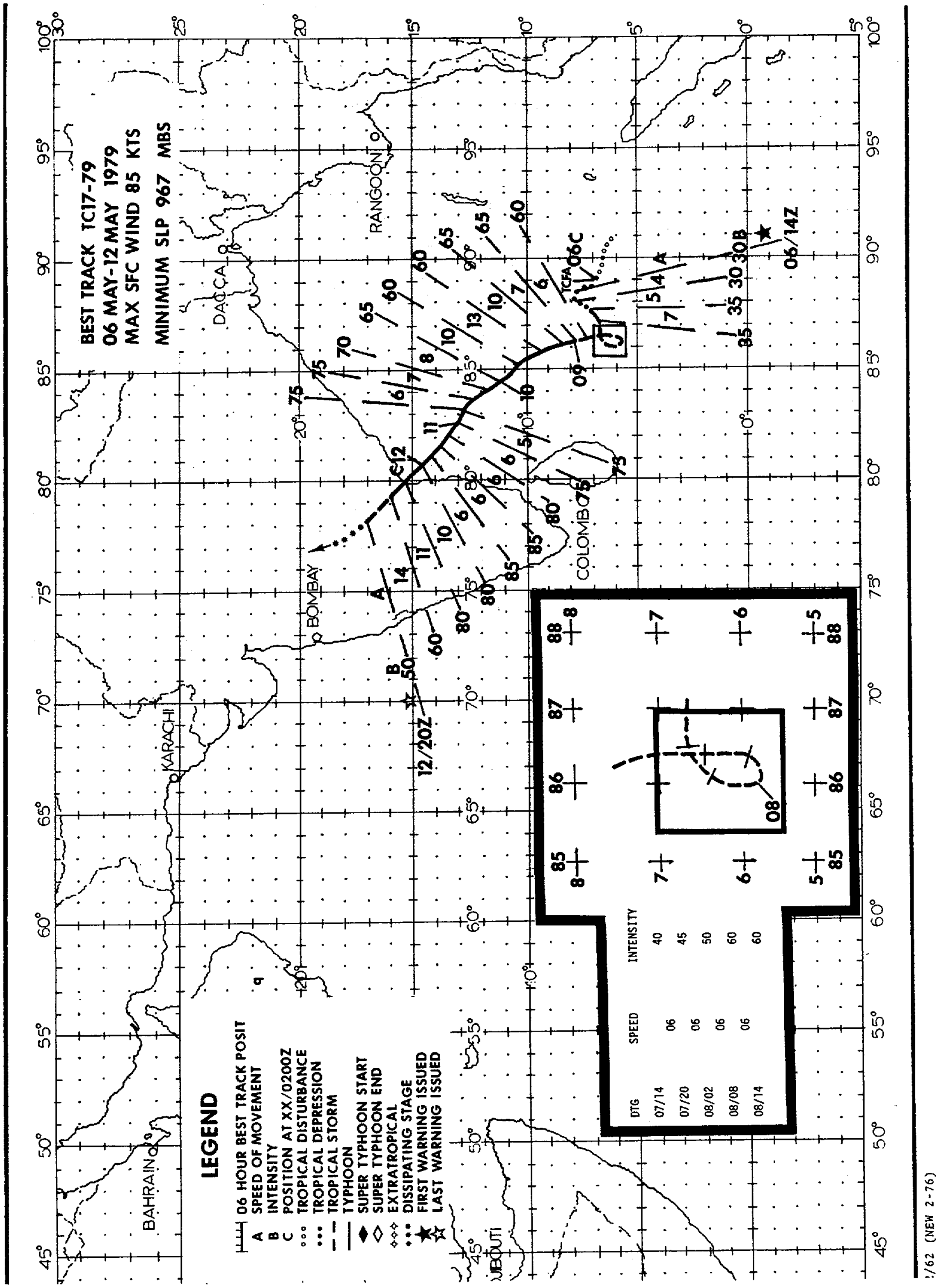
NORTH INDIAN OCEAN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ALL CYCLONES	0	0	0	0	1	1	0	0	2	1	2	0	7
(1971-78) AVERAGE*	0.1	0	0	0.3	0.5	0.3	0	0	0.4	0.8	1.4	0.3	4

FORMATION ALERTS 7 of the 8 (87%) Formation Alert Events developed into numbered cyclones.

WARNINGS
Number of warning days: 25
Number of warning days with 2 cyclones: 3
Number of warning days with 3 or more cyclones: 0

*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.


INDIAN OCEAN
TROPICAL CYCLONES
1979
BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
TC18-79
TC23-79
TC25-79
TC17-79
TC22-79
TC26-79
TC24-79
TC18-79
TC25-79
TC23-79
TC22-79
TC26-79
TC17-79
TC24-79


BEST TRACK TC17-79
06 MAY-12 MAY 1979
MAX SFC WIND 85 KTS
MINIMUM SLP 967 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0200Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
BAHRAIN
KARACHI
BOMBAY
COLOMBO
DACCA
RANGOON
JIBOUTI
06/14Z
12/20Z
DTG
SPEED
INTENSITY
07/14
07/20
08/02
08/08
08/14
06
06
06
06
40
45
50
60
60
08
1/62 (NEW 2-76)

TC 17-79 was the only significant tropical cyclone in the Bay of Bengal during the 1979 spring transition season. Attaining typhoon intensity, TC 17-79 was the most destructive cyclone in India since TC 22-77 (Nov 1977) which, coincidentally, followed a similar track.

A Tropical Cyclone Formation Alert and the first warning were precipitated by synoptic reports received from ships participating in the First GARP Global Experiment (FGGE). At 1200Z on 6 May, these ships' observations defined a cyclonic circulation near 07N-088E with reported surface pressures near 1003 mb and wind speeds of 20-25 kt (10-12 m/sec). The first warning on TC 17-79 was issued at 061507Z.

From 060000Z through 061200Z, a strong mid-tropospheric ridge extended westward along 15N with southeast steering flow dominating TC 17-79's movement. During the same time period, a short-wave trough, evident at both middle and upper levels, was deepening over India. Interaction between this ridging and troughing resulted in a loss of definitive steering flow in the vicinity of TC 17-79, producing an erratic north and then south track. Also during this time, TC 16-79 located in the southern Indian Ocean about 750-800 nm (1389-1481 km) to the southwest, began tracking slowly to the southeast possibly initiating a Fujiwhara type interaction.

By 080000Z, a mid-level anticyclone had formed in the northern Bay of Bengal with east-northeasterly steering flow over TC 17-79 resulting in a west-southwest forecast track. From 080000Z through 090000Z, while TC 17-79 intensified (Fig. 3-29), the dominant steering flow shifted to the south then southeast as the mid-level ridge was replaced by a trough and the upper-level trough dug southward over India. As a result of this shift in steering flow, TC 17-79 executed a tight cyclonic loop from 080000Z to 081800Z. From 7 through 9 May, though satellite fix position accuracies improved due to the formation of a well-defined eye, forecast errors increased appreciably due to the erratic movement.

By 091200Z, southeast steering flow became dominant with TC 17-79 oscillating about a northwest track until making landfall over India (Fig. 3-30). TC 17-79 struck the east central coast of India at 120800Z, 45 nm (83 km) north of Nellore with maximum sustained winds of 80 kt (41 m/sec). Twenty-one deaths occurred and over 800,000 persons were left homeless as a result of TC 17-79's passage over the Nellore district.

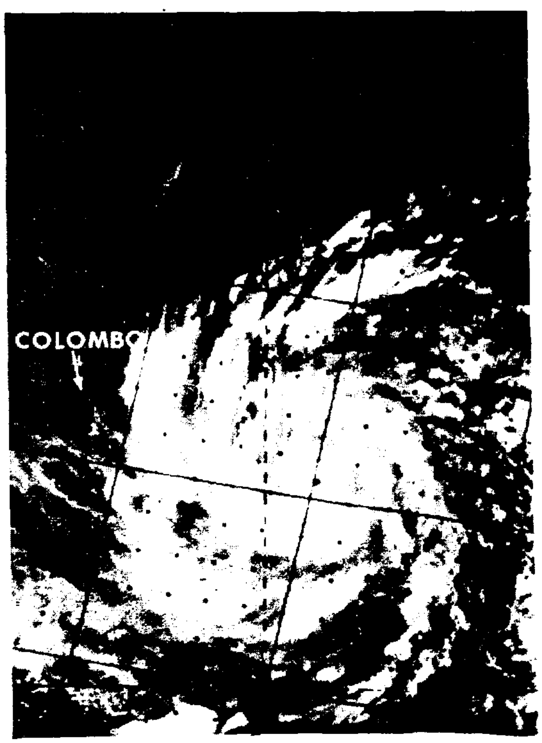


FIGURE 3-29. TC 17-79 with well-defined satellite signature during the erratic cyclonic loop, 8 May 1979, 0528Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)

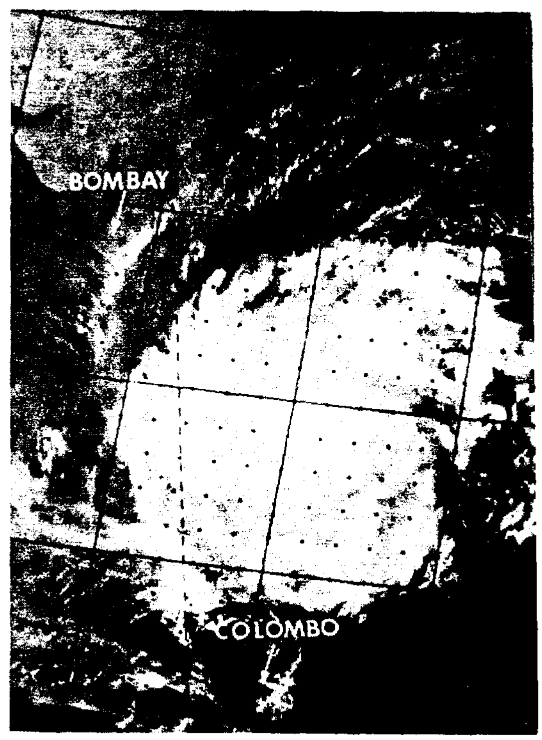
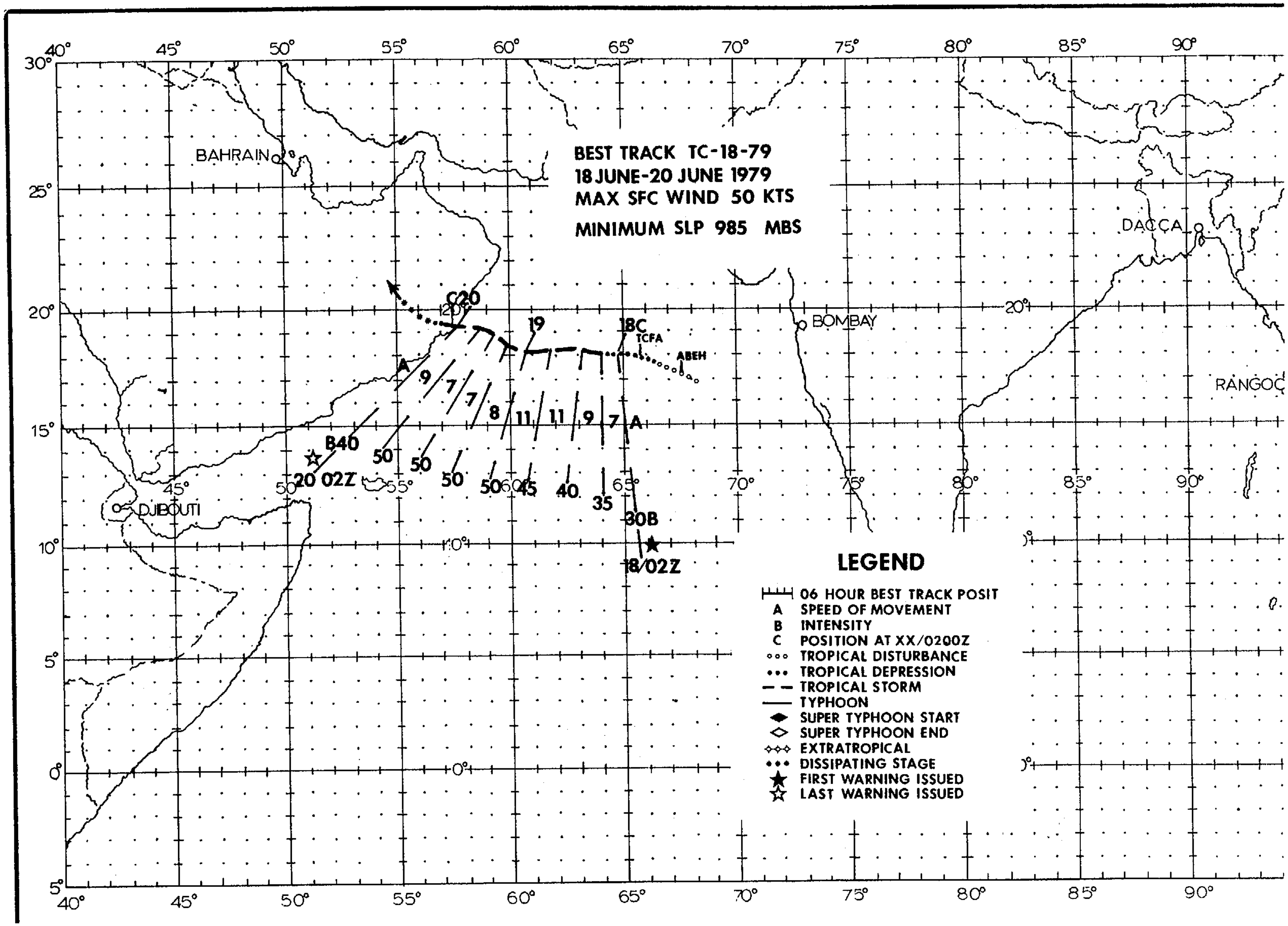


FIGURE 3-30. TC 17-79 just prior to making landfall over east central India with 80 kt (41 m/sec) intensity, 12 May 1979, 0556Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)


BEST TRACK TC-18-79
18 JUNE-20 JUNE 1979
MAX SFC WIND 50 KTS
MINIMUM SLP 985 MBS
BAHRAIN
DJIBOUTI
BOMBAY
DACCA
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0200Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
18/02Z
20 02Z
C20
19
18C
TCFA
ABEH
B40
30B

TC 18-79 began 171400Z June 1979 as a monsoon depression in the Arabian Sea and tracked virtually westward throughout its life, finally dissipating over the Oman coast (Fig. 3-31). Although TC 18-79's movement was confined to a narrow 2-degree latitudinal band, the extent of the meteorological hazard from gale force winds encompassed roughly half of the Arabian Sea. These gale force winds were produced by the interaction of TC 18-79 with the normal southwest monsoonal flow over the Arabian Sea.

During this season, a climatological low-level wind maximum develops off the coast of Somali. Normal wind speeds can reach 35-40 kt (18-21 m/sec), but the gale area is generally localized near the coast. However, beginning 2 days prior to TC 18-79's formation, a surge in the monsoonal flow occurred and a low-level jet could be traced from the Somali coast extending eastward across the entire Arabian Sea. The strength and persistence of this feature aided the formation of TC 18-79 in the cyclonic shear side of the wind maximum. As TC 18-79 intensified and moved westward, the southwesterly flow strengthened to a point where 65 kt (33 m/sec) surface winds were observed 600 nm (1111 km) away from TC 18-79's center. Examination of the visual data of Figure 3-31 shows cloud streets indicative of this strong low-level flow from 05N to 12N between 55E to 62E. The gale area persisted during TC 18-79's dissipation over land, weakening gradually with time. Interestingly, post-analysis reveals the maximum winds in the gale area exceeded the maximum sustained winds estimated in TC 18-79's center.

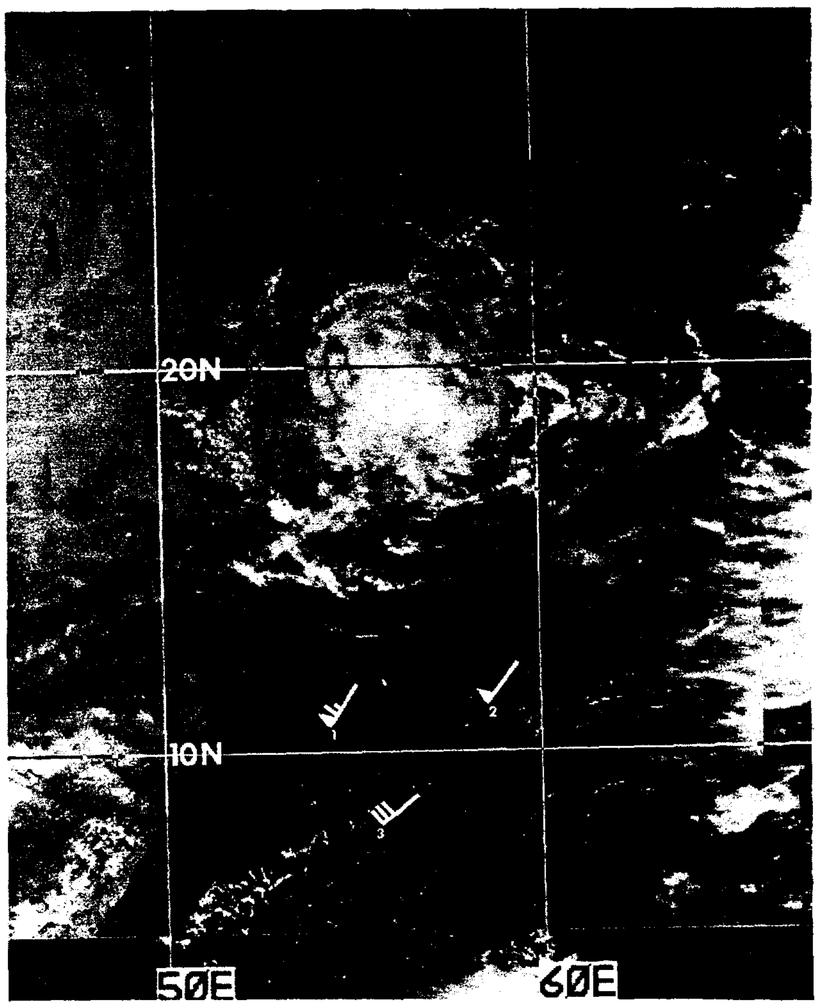
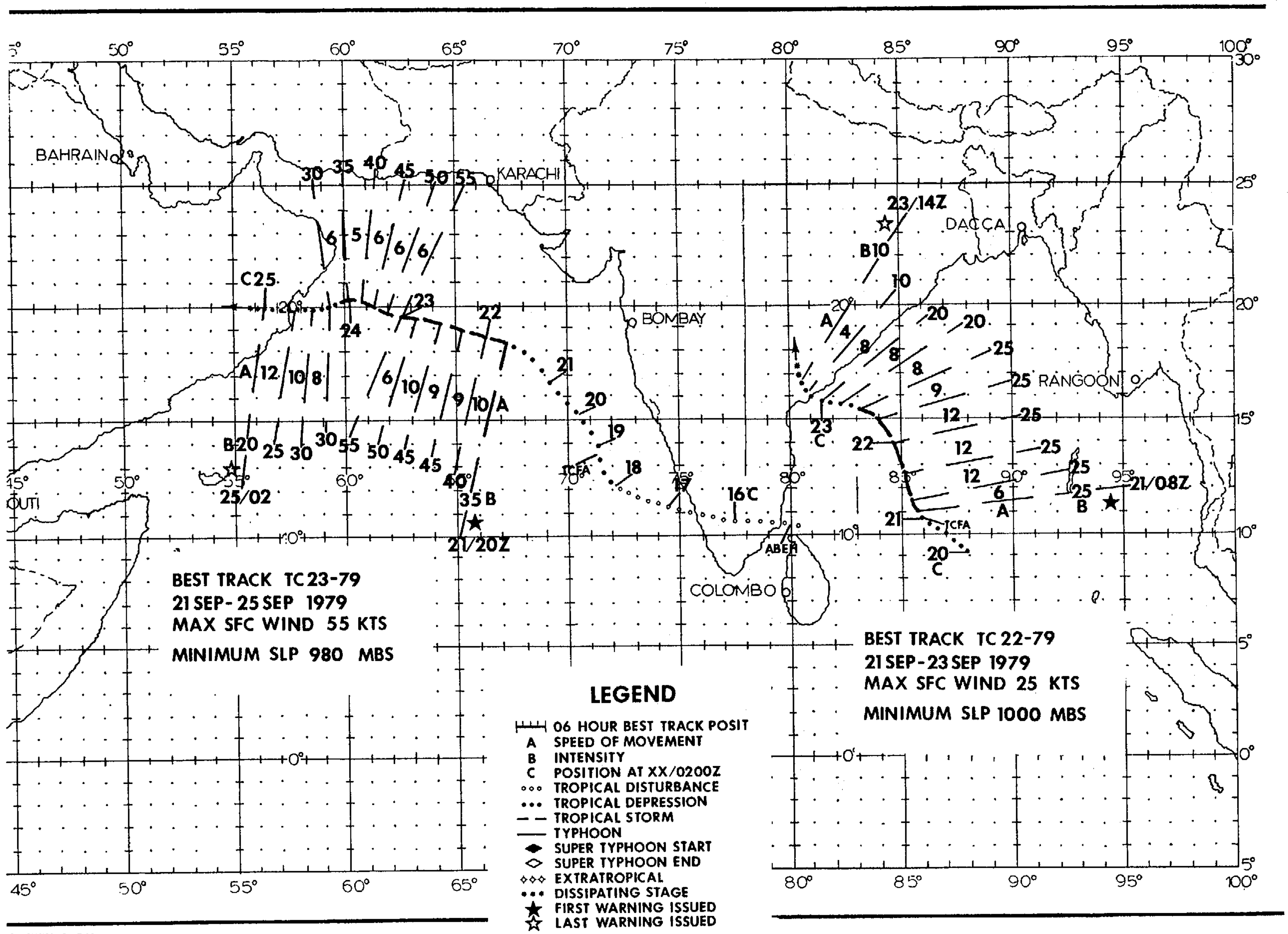
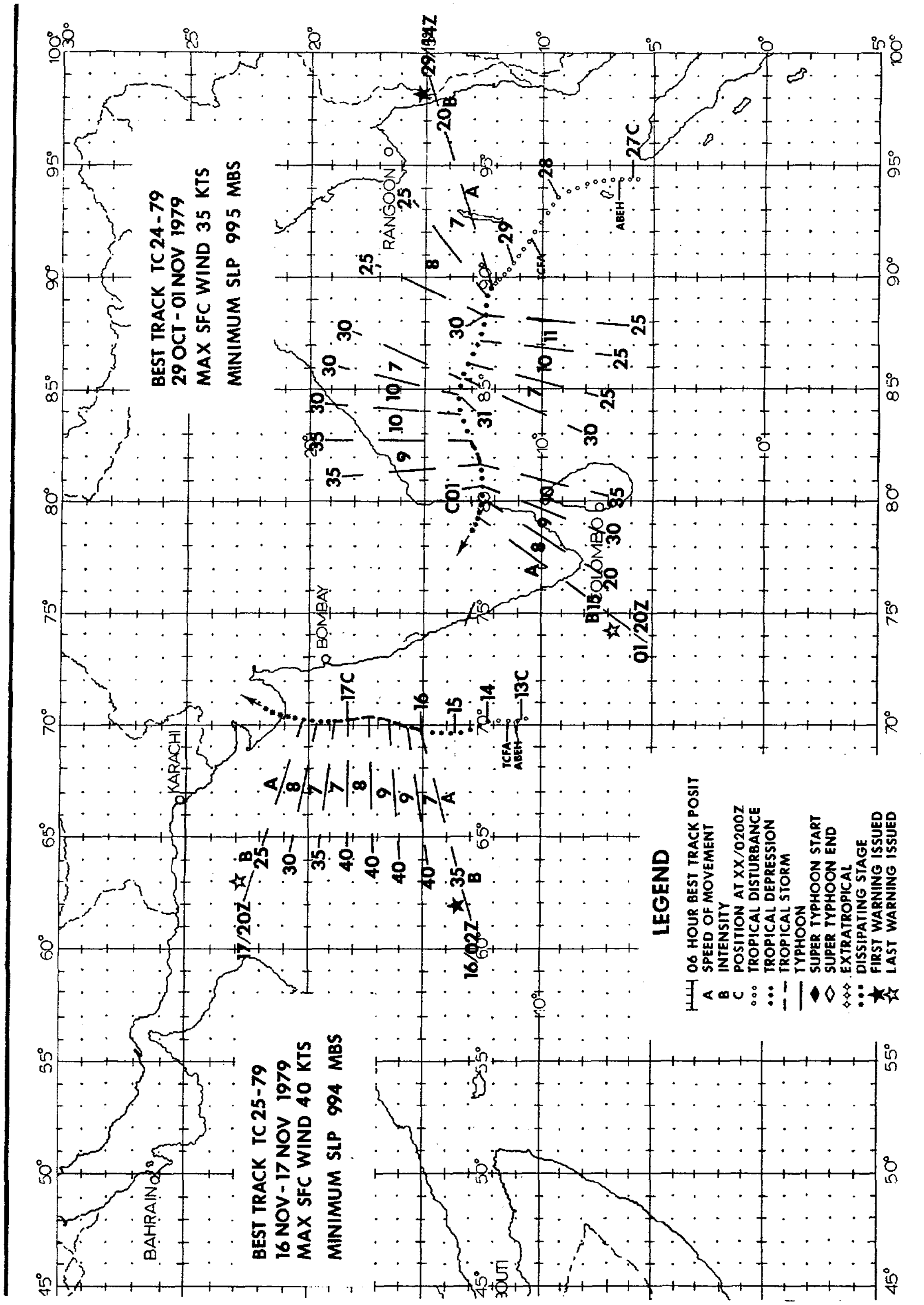
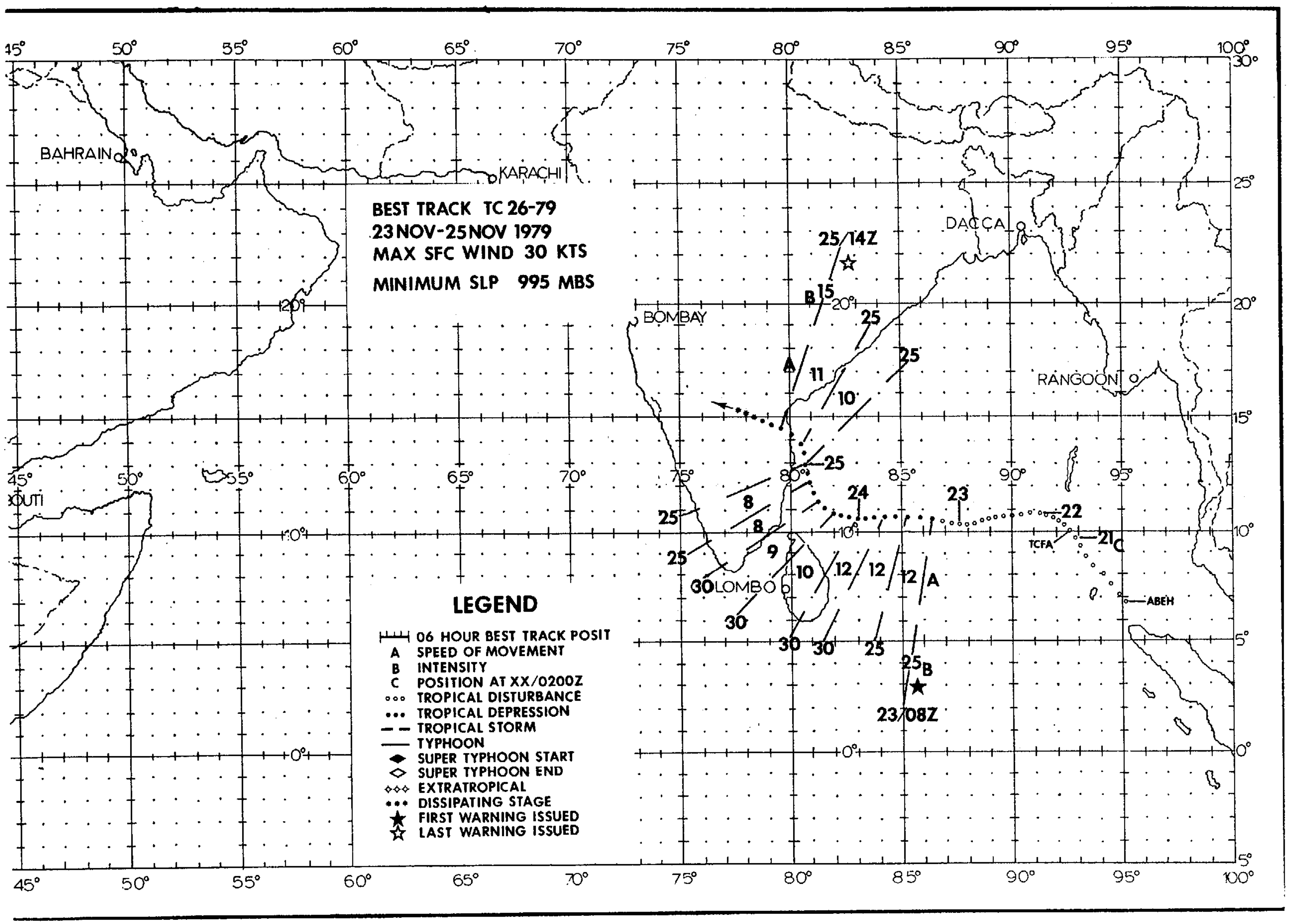


FIGURE 3-31. TC 18-79 located just off the Oman coast with gale force winds to the south, 20 June 1979, 0731Z. Superimposed are ship observations at 200600Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)


BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
ABER
TCFA
23/14Z
21/08Z
21/20Z
25/02
BEST TRACK TC 23-79
21 SEP - 25 SEP 1979
MAX SFC WIND 55 KTS
MINIMUM SLP 980 MBS
BEST TRACK TC 22-79
21 SEP - 23 SEP 1979
MAX SFC WIND 25 KTS
MINIMUM SLP 1000 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0200Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

2 (NEW 2-76)


BEST TRACK TC 24-79
29 OCT - 01 NOV 1979
MAX SFC WIND 35 KTS
MINIMUM SLP 995 MBS
BEST TRACK TC 25-79
16 NOV - 17 NOV 1979
MAX SFC WIND 40 KTS
MINIMUM SLP 994 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0200Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
BAHRAIN
KARACHI
BOMBAY
COLOMBO
RANGOON
TCFA
ABEH
16/02Z
17/20Z
01/20Z
29/14Z
17C
13C
27C
20B
C01



BEST TRACK TC 26-79
23NOV-25NOV 1979
MAX SFC WIND 30 KTS
MINIMUM SLP 995 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0200Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
BAHRAIN
KARACHI
BOMBAY
DACCA
RANGOON
COLOMBO
ABEH
TCFA
25/14Z
23/08Z

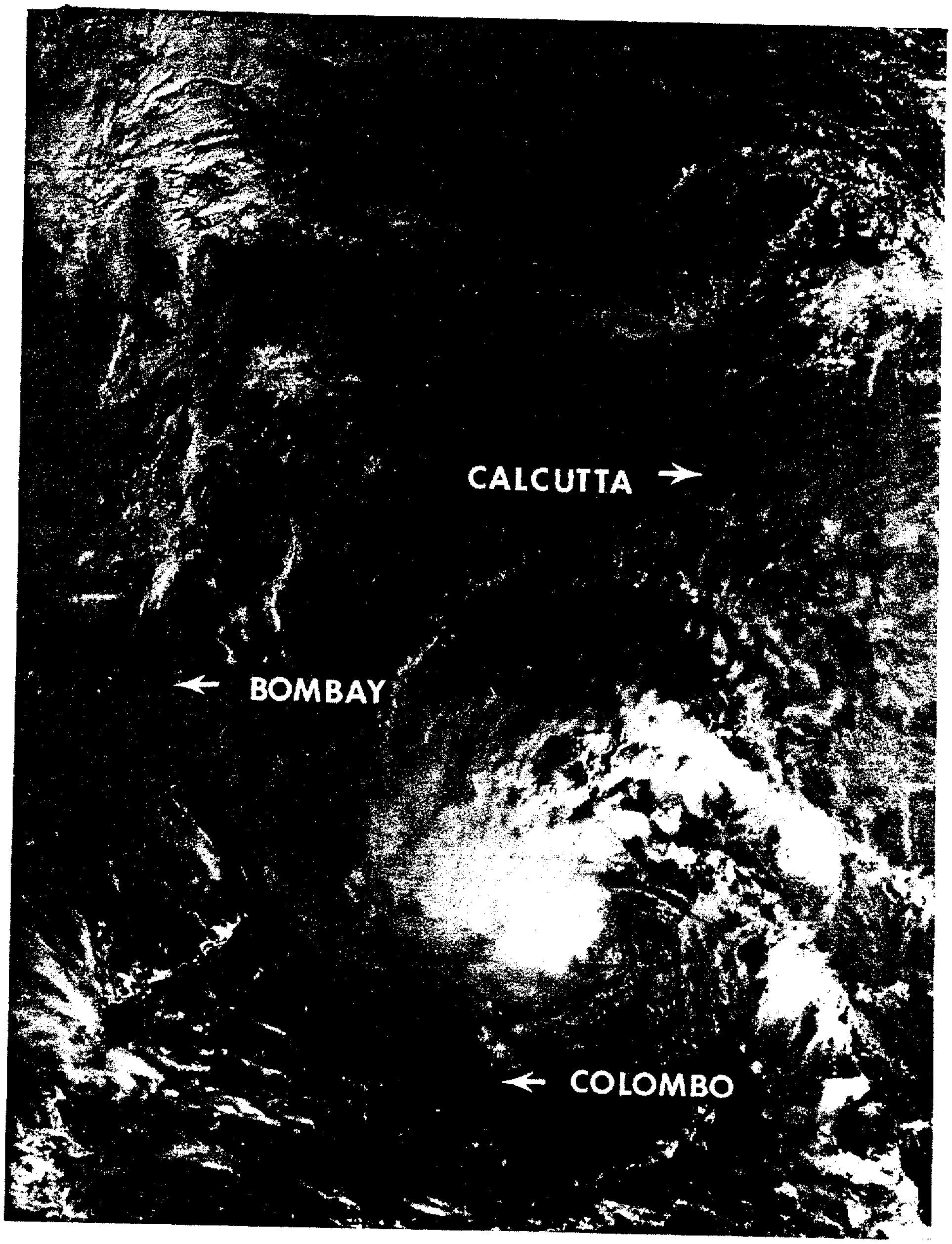


FIGURE 3-32. TC 26-79 as an exposed low-level circulation, 24 November 1979, 0455Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)

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. Vector errors and right angle errors for individual tropical cyclones were calculated and are displayed in Table 4-1. Annual mean errors for all tropical cyclones are listed in Table 4-2 for comparison. Frequency distributions of the vector errors for 24-, 48-, and 72-hour forecasts on all 1979 tropical cyclones are shown in Figure 4-1. Annual mean vector errors are graphed in Figure 4-2.

TABLE 4-1. FORECAST ERROR SUMMARY FOR THE 1979 WESTERN NORTH PACIFIC SIGNIFICANT TROPICAL CYCLONES.

	WARNING			24 HOUR			48 HOUR			72 HR		
CYCLONE	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS
1. TY ALICE	18	11	51	105	83	47	222	175	43	338	271	39
2. TY BESS	19	15	21	114	73	17	265	164	13	348	240	9
3. TY CECIL	15	11	40	87	62	37	191	131	33	320	215	29
4. TS DOT	23	16	24	130	79	23	244	171	20	315	257	16
5. TD-05	12	12	6	158	150	3						
6. TY ELLIS	25	21	22	71	57	18	145	103	14	185	113	10
7. TS FAYE	35	21	20	138	86	17	167	93	14	180	99	10
8. TD-08	43	20	5	195	70	4	396	396	1			
9. TS GORDON	23	12	13	129	90	9	173	121	5	449	278	1
10. TS HOPE	23	16	33	134	75	29	266	140	23	376	188	21
11. TD-11	47	30	14	144	94	10	138	89	6	171	129	2
12. TY IRVING	26	17	38	163	98	34	286	209	30	441	344	26
13. ST JUDY	18	12	39	105	81	36	173	138	27	277	213	23
14. TD-14	33	19	9	157	43	5	296	118	1			
15. TS KEN	29	13	13	116	60	10	278	111	7	415	195	3
16. TY LOLA	16	10	23	88	64	21	172	148	19	287	236	14
17. TY MAC	23	16	35	93	66	27	196	152	19	279	227	19
18. TS NANCY	28	19	14	116	86	9	216	186	4	227	219	1
19. TY OWEN	25	15	37	146	78	33	250	158	29	327	256	25
20. TS PAMELA	28	22	6	254	15	2						
21. TS ROGER	32	19	16	195	93	13	251	108	9	303	178	4
22. TY SARAH	26	16	43	61	40	39	110	86	34	143	107	27
23. ST TIP	24	15	60	135	69	56	259	142	52	345	214	48
24. ST VERA	43	20	23	148	69	19	249	111	15	385	247	11
25. TS WAYNE	27	14	22	170	115	16	362	295	12	443	413	4
26. TY ABBY	31	17	52	164	108	48	286	198	39	338	215	26
27. TD-26	21	16	6	55	28	3						
28. TS BEN	34	18	10	81	89	6	287	16	2			
ALL FORECASTS	25	16	695	124	77	591	226	151	471	316	223	368

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
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
1979	124	77	226	151	316	223

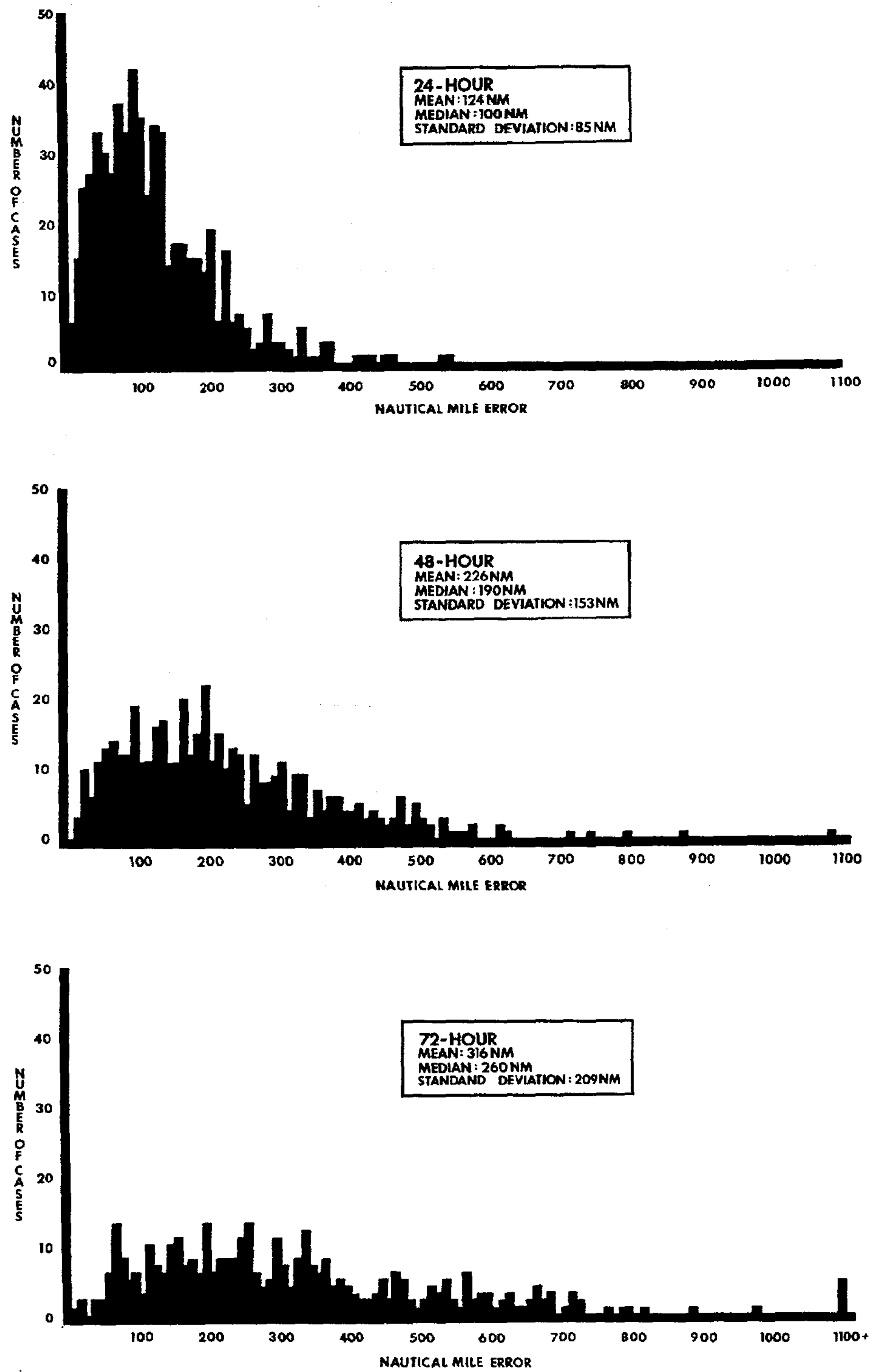


FIGURE 4-1. *Frequency distribution of 1979 24-, 48-, and 72-hour forecast vector errors for all significant tropical cyclones in the western North Pacific.*

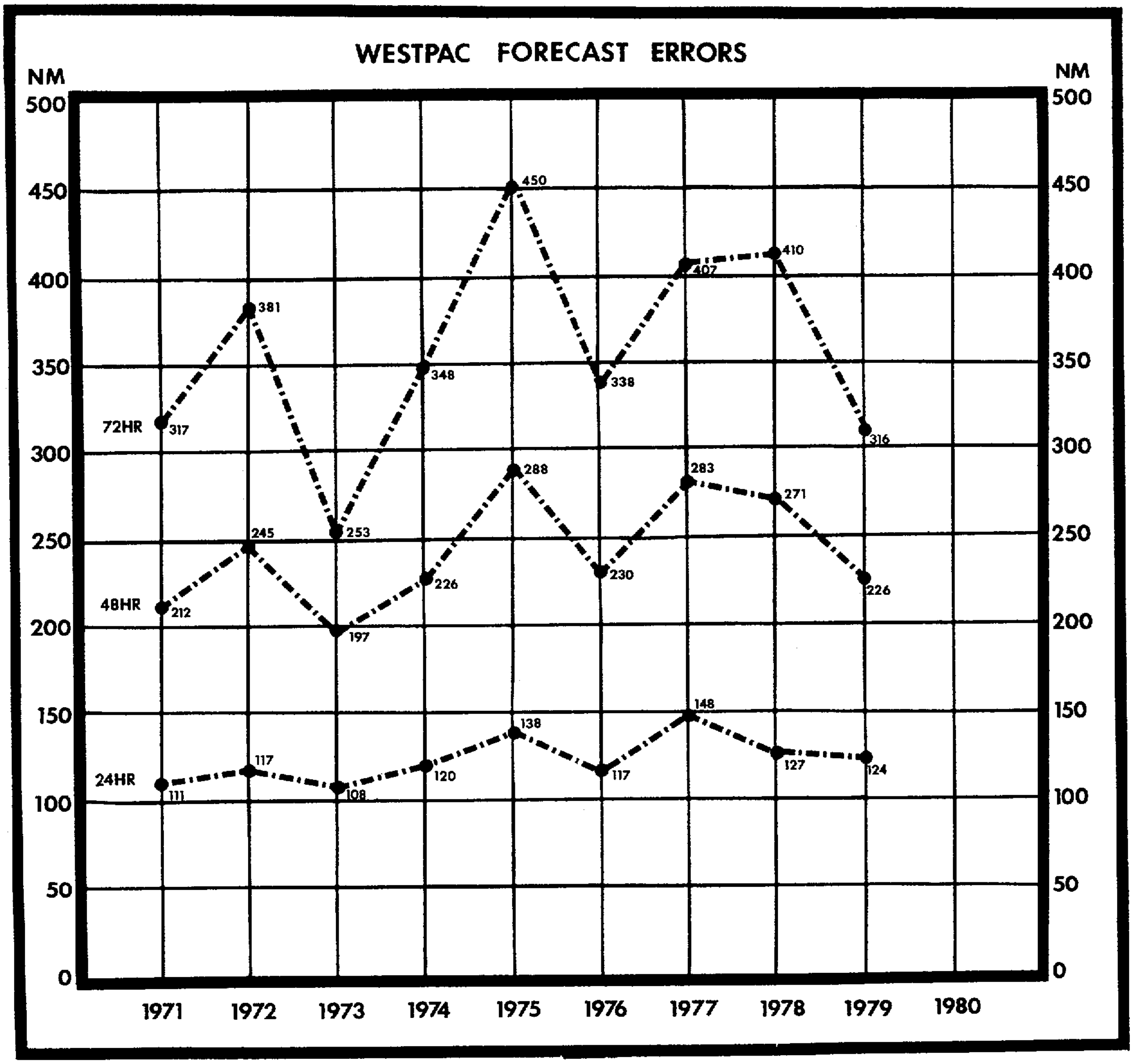


FIGURE 4-2. *Annual vector errors (nm) for all cyclones in the western North Pacific.*

Intensity verification statistics for all significant tropical cyclones in the western North Pacific area are depicted in Figures 4-3 and 4-4. 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 true intensity. In intensifying situations, JTWC underforecasts, while in weakening situations JTWC overforecasts. This causes a large average magnitude error, but a small average bias. Verification of intensity forecasts by objective aids is also depicted in Figures 4-3 and 4-4. (An explanation of the objective forecasting aids is found in this chapter, Section 2- Comparison of Objective Techniques.)

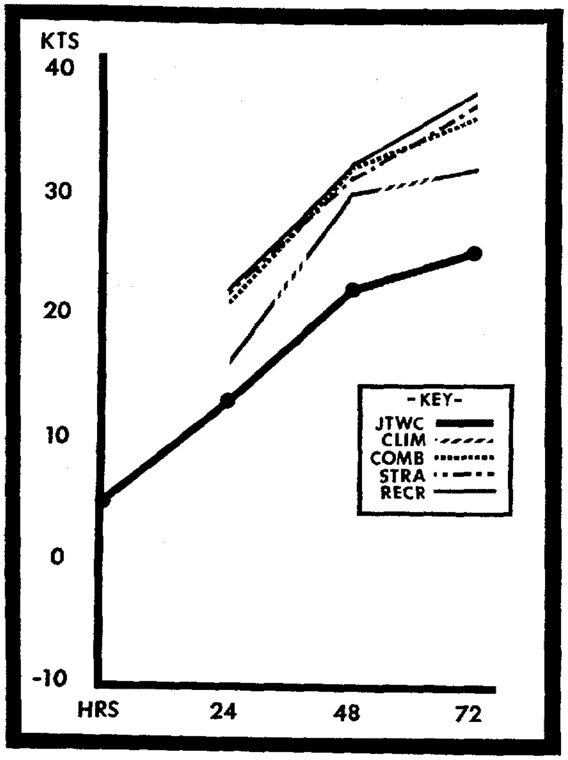


FIGURE 4-3. *Comparison of average intensity errors (magnitude) for all cyclones in the western North Pacific.*

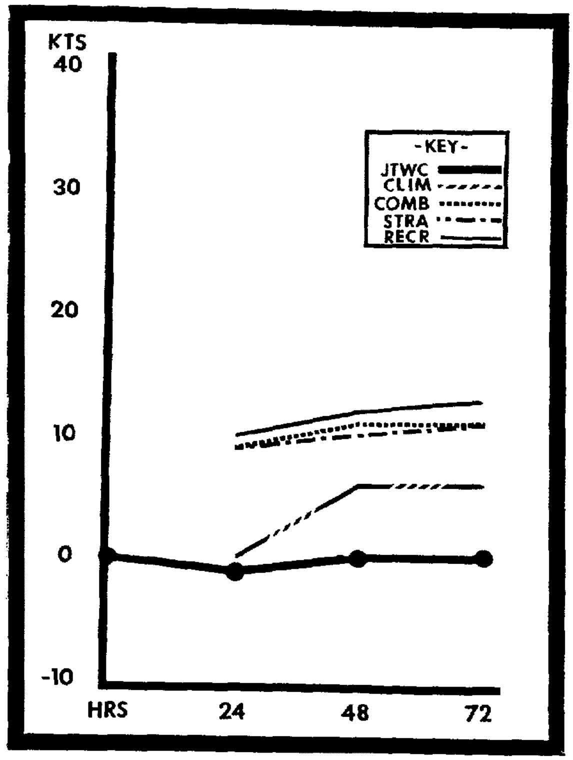


FIGURE 4-4. *Comparison of average intensity errors (biases) for all cyclones in the western North Pacific.*

b. North Indian Ocean Area

Forecast positions at Warning times and 24-, 48-, and 72-hour valid times were verified by the same methods used for the western North Pacific area. Table 4-3 is the forecast error summary for the 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 4-5. Seventy-two hour forecast errors were evaluated for the first time in 1979.

Forecast intensities were not verified.

TABLE 4-3. FORECAST ERROR SUMMARY FOR THE 1979 NORTH INDIAN OCEAN SIGNIFICANT TROPICAL CYCLONES.

	WARNING			24 HOUR			48 HOUR			72 HOUR		
CYCLONE	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS	POSIT ERROR	RT ANGLE ERROR	# WRNGS
TC 17-79	36	17	26	139	95	22	233	192	18	346	296	14
TC 18-79	48	24	12	137	78	7	363	284	4			
TC 22-79	54	34	10	122	90	7	170	122	3			
TC 23-79	48	21	14	160	97	9	253	184	5	773	629	2
TC 24-79	48	26	13	190	142	9	482	332	5	1036	902	1
TC 25-79	50	26	8	189	103	4	121	73	1			
TC 26-79	52	31	10	148	83	5	163	21	2			
ALL FORECASTS	46	24	93	151	99	63	270	202	38	437	371	17

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		72-HR	
YEAR	VECTOR	RIGHT ANGLE	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	-	-
1979	151	99	270	202	437	371

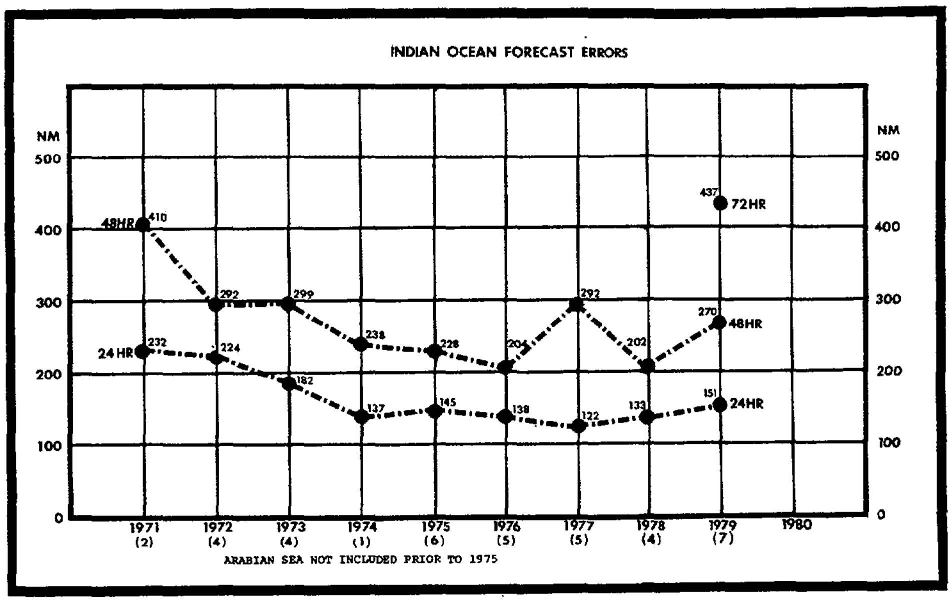


FIGURE 4-5. *Annual mean vector errors (nm) for all cyclones in the North Indian Ocean.*

2. COMPARISON OF OBJECTIVE TECHNIQUES

a. General

Objective techniques used by JTWC are divided into four main categories: (1) climatological and analog techniques; (2) extrapolation; (3) steering techniques; and (4) a dynamic model. The analog technique provides three movement forecasts: one for straight moving cyclones, one for recurving cyclones and one which combines 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 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 (straight, recurve and combined).

(2) MOHATT 700/500 - Steering program which advects a point vortex on a preselected analysis and smoothed prognostic field 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 - The Tropical Cyclone Forecast model is a coarse mesh (220 km) PE Model, with the digitized storm warning position bogused in the 850 mb wind and temperature fields of the FLENUMOCEANCEN Global Band Analysis. Hemispheric forecast data are used on the boundaries.

(4) CLIM - A climatological aid in the form of 24-, 48-, and 72-hour tropical cyclone forecast positions and intensity changes for initial latitude/longitude positions. The data are arranged by months and are based on historical data which includes 1945 to 1973. This detailed climatology replaced the previous JTWC climatology on 1 September 1980.

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

(6) HPAC - The 24- and 48-hour forecast positions are derived by averaging the 24- and 48-hour positions from the 12-hour EXTRAPOLATION track and the CLIM track.

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

(8) TYAN - An updated analog program which combines TYFN75 and INJAH74.

(9) CYCLOPS - An updated version of the 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 North Pacific cyclones and in 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 425 cases available for comparison, the average 24-hour vector error was 134 nm for COMB and 160 nm for MH70. The difference of 26 nm is shown in the lower right. (Differences are not always exact due to computational round off.)

TABLE 4-5.

STATISTICS FOR YEAR 24 HR FCSTS

	JTWC	STRA	RECR	COMB	MH70	MH50	TCMO	CLIM	XTRP	HPAC
JTWC	591 124 124 0									
STRA	525 122 153 31	533 153 153 0								
RECR	516 127 139 12	489 153 136 -16	524 139 139 0							
COMB	543 124 135 10	514 153 133 -19	509 139 135 -3	551 135 135 0						
MH70	435 123 159 36	407 150 158 8	399 136 163 26	425 134 160 26	445 158 158 0					
MH50	425 124 158 35	396 152 157 5	389 136 160 25	413 135 159 24	430 159 157 -1	434 157 157 0				
TCMO	121 122 132 10	111 152 134 -16	104 128 146 18	115 127 141 14	96 148 143 -4	96 138 142 4	124 136 136 0			
CLIM	305 129 150 20	282 165 142 -22	265 152 150 -1	291 145 149 3	245 170 149 -20	245 162 150 -11	93 144 153 9	315 150 150 0		
XTRP	572 124 150 26	521 152 146 -5	511 138 153 15	538 133 150 17	439 159 145 -13	431 158 145 -12	124 136 142 6	309 150 168 18	584 149 149 0	
HPAC	559 124 134 10	514 152 129 -23	501 137 135 -2	527 133 134 1	434 158 133 -24	426 158 132 -25	124 136 129 -6	309 150 138 -11	571 150 134 -15	571 134 134 0

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

STATISTICS FOR YEAR 48 HR FCSTS

	JTWC	STRA	RECR	COMB	MH70	MH50	TCMO	CLIM	XTRP	HPAC
JTWC	471 226 226 0									
STRA	437 224 309 85	462 306 306 0								
RECR	415 232 247 15	422 306 248 -57	440 252 252 0							
COMB	440 225 244 20	449 306 243 -62	430 251 243 -7	466 244 244 0						
MH70	330 222 313 91	340 307 308 1	323 249 318 69	347 243 310 67	359 308 308 0					
MH50	330 220 299 79	339 305 296 -8	320 247 297 50	345 242 297 55	345 310 292 -17	358 295 295 0				
TCMO	98 232 249 18	97 314 255 -57	86 246 273 27	96 254 264 10	76 357 264 -92	76 283 263 -20	102 257 257 0			
CLIM	244 235 246 11	249 330 243 -86	222 276 251 -25	247 265 252 -12	205 337 242 -94	206 294 242 -51	75 272 260 -11	263 250 250 0		
XTRP	457 224 291 67	450 304 290 -13	430 249 298 49	454 241 292 51	351 309 295 -13	353 296 291 -4	101 255 311 56	260 249 325 76	485 291 291 0	
HPAC	445 223 232 9	442 305 231 -74	418 246 235 -10	442 242 233 -7	345 308 231 -75	346 295 228 -66	101 255 245 -9	260 249 235 -13	471 291 233 -57	471 233 233 0

JTWC - OFFICIAL JTWC FORECAST
STRA - STRAIGHT (TYFN 75)
RECR - RECURVE (TYFN 75)
COMB - COMBINED (TYFN 75)
MH70 - MOHATT 700-MB PROG
MH50 - MOHATT 500-MB PROG
TCMO - TROPICAL CYCLONE MODEL (ONE-WAY)
CLIM - CLIMATOLOGY
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIMATOLOGY

STATISTICS FOR YEAR 72 HR FCSTS

	JTWC	STRA	RECR	COMB	MH70	MH50	TCMO	CLIM
JTWC	368 316 316 0							
STRA	338 315 443 129	381 453 453 0						
RECR	319 331 327 -3	345 456 348 -107	360 349 349 0					
COMB	343 316 328 12	370 452 343 -109	352 349 336 -12	385 340 340 0				
MH70	230 325 471 147	260 464 474 10	236 362 488 126	259 352 475 122	267 473 473 0			
MH50	227 329 482 153	258 467 481 14	234 364 488 124	257 355 482 127	259 469 479 10	265 486 486 0		
TCMO	73 314 347 33	78 445 376 -68	69 351 393 41	78 359 380 22	61 543 401 -141	62 484 396 -87	84 372 372 0	
CLIM	184 308 315 7	208 494 333 -160	179 357 338 -18	204 366 334 -31	161 506 329 -176	164 483 331 -151	64 389 353 -34	218 332 332 0

STATISTICS FOR YEAR 24 HR FCSTS

	JTWC		INJA		MH70		MH50		TCMO		XTRP		HPAC	
JTWC	63	151												
	151	0												
INJA	48	134	52	127										
	125	-7	127	0										
MH70	28	159	27	132	30	180								
	173	14	175	44	180	0								
MH50	27	158	26	132	29	175	29	173						
	167	9	164	32	173	-1	173	0						
TCMO	2	43	2	53	2	73	2	64	2	164				
	164	121	164	111	164	91	164	100	164	0				
XTRP	61	147	52	127	30	180	29	173	2	164	65	148		
	146	0	130	3	148	-32	149	-23	14	-150	148	0		
HPAC	40	148	32	134	16	179	15	175	2	164	40	145	40	135
	135	-12	128	-5	146	-31	148	-26	43	-120	135	-9	135	0

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

STATISTICS FOR YEAR 48 HR FCSTS

	JTWC		INJA		MH70		MH50		TCMO		XTRP		HPAC	
JTWC	38	270												
	270	0												
INJA	26	252	26	227										
	227	-24	227	0										
MH70	14	332	9	273	15	340								
	360	28	365	91	340	0								
MH50	13	338	8	298	14	331	14	388						
	407	69	447	149	388	57	388	0						
TCMO	0	0	0	0	1	61	1	141	1	343				
	0	0	0	0	343	282	343	202	343	0				
XTRP	36	272	25	235	15	340	14	388	1	343	37	255		
	259	-12	243	8	243	-96	252	-135	110	-232	255	0		
HPAC	23	270	18	235	8	310	7	424	1	343	24	269	24	225
	231	-38	224	-11	233	-76	249	-174	86	-256	225	-43	225	0

JTWC - OFFICIAL JTWC FORECAST
INJA - ANALOG (INJAH74)
MH70 - MOHATT 700-MB PROG
MH50 - MOHATT 500-MB PROG
XTRP - 12-HOUR EXTRAPOLATION
HPAC - MEAN OF XTRP AND CLIMATOLOGY

STATISTICS FOR YEAR 72 HR FCSTS

	JTWC		INJA		MH70		MH50	
JTWC	17	437						
	437	0						
INJA	12	350	12	292				
	262	-57	292	0				
MH70	2	876	1	361	2	460		
	460	-415	263	-97	460	0		
MH50	2	876	1	361	2	460	2	838
	838	-37	1033	672	838	378	838	0

TABLE 4-6.

CHAPTER V APPLIED TROPICAL CYCLONE RESEARCH SUMMARY

1. JTWC RESEARCH

Part of the mission of the Joint Typhoon Warning Center is to conduct applied tropical cyclone research as time and resources permit. The purpose of this research is to improve the timeliness and accuracy of operational forecasts. During 1979, there was continued effort to convert and update operational programs and to streamline operational procedures for compatibility with the Naval Environmental Display Station. The following abstracts summarize the year's applied research projects which were completed or are still in progress.

ESTABLISHMENT OF THE JTWC TROPICAL CYCLONE DATA BASE

(Curry, W. T. and Matsumoto, C. R., NAVOCEANCOMCEN/JTWC)

A data base of 6-hour best track positions (intensities, direction and speed of movement) and 24-, 48-, and 72-hour objective technique and official JTWC forecasts for each tropical cyclone in the western North Pacific, Arabian Sea and Bay of Bengal from 1966 through 1978 has been established on FLENUMOCEANCEN computer mass storage systems. Tropical cyclone fix data (position, intensities, platform, etc.) for each tropical cyclone from 1966 through 1977 remain to be added. This climatological data base will be maintained on disk and tape files at FLENUMOCEANCEN Monterey, California and updated annually.

NEDS/COMPUTER APPLICATIONS

(Staff, NAVOCEANCOMCEN/JTWC)

JTWC's objective techniques have been converted by contractors to execute on FLENUMOCEANCEN computers. A NEDS graphic capability is being developed to depict forecast tracks from objective techniques. Evaluation and monitoring of program conversion will continue in 1980.

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

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

The pressure-wind relationship developed by Atkinson and Holliday (1977), Tropical Cyclone Minimum Sea Level Pressure - Maximum Sustained Wind Relationship for Western North Pacific, is a primary tool used to determine tropical cyclone intensities for JTWC operations. This relationship was re-evaluated and tested with an independent data set. The study produced no significant differences or changes. Therefore, the current Atkinson and Holliday relationship will continue to be used at JTWC. Other regression equations using case-dependent latitude and environmental pressure (versus 1010 mb) as predictors were also tested. These predictors did not improve the maximum sustained wind-minimum sea-level pressure relationship.

OBJECTIVE TROPICAL CYCLONE INITIAL POSITIONING WITH A WEIGHTED LEAST SQUARES ALGORITHM

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

Recent studies indicate tropical cyclone forecast errors through 72 hours can be reduced by more accurate initial warning positions. This study developed an objective and standardized method of determining initial position based on all available fix information. A least squares algorithm was used on available fix data with a weighting scheme which is inversely proportional to the stated fix accuracies. The results of this objective method showed no significant improvement over the current subjective method. Therefore, this method was not incorporated into operational procedures. This method, however, produces an improved tropical cyclone "best track" and was incorporated into JTWC's post-analysis procedures.

EQUIVALENT POTENTIAL TEMPERATURE/MINIMUM SEA-LEVEL PRESSURE RELATIONSHIPS FOR FORECASTING TROPICAL CYCLONE INTENSIFICATION

(Dunnavan, G. M., NAVOCEANCOMCEN/JTWC)

The relationship between equivalent potential temperature at 700 mb in the center of developing tropical cyclones and associated intensity changes was explored by Sikora (ATR 1975), Milwer (ATR 1976), and Hassebrock (ATR 1977). The Sikora and Milwer studies produced conflicting results, but the Hassebrock study showed some skill in forecasting explosive and rapid deepening when 1977 and 1978 tropical cyclones were evaluated. Evaluation of 1979 tropical cyclones again showed that the Hassebrock technique has some skill. Unfortunately, dewpoint data from aircraft reconnaissance missions from earlier years are not readily available at JTWC, so it has been difficult to increase the data base. The Hassebrock study will be applied to 1980 tropical cyclones and any cyclones prior to 1976 for which data are available. The data base may then be large enough to draw some definite conclusions.

A related study of equivalent potential temperature was also started. A comparison was made of past 12- and 24-hour changes in equivalent potential temperature in the eye of a tropical cyclone with the subsequent 12- and 24-hour changes in 700 mb height. These correlations proved inconclusive, again due to the small initial data base. An attempt will be made to obtain more data for this study also.

BASIC STREAMLINE ANALYSIS AND TROPICAL CYCLONE FORECASTING TECHNIQUE GUIDE

(Guay, G. A., NAVOCEANCOMCEN/JTWC)

A case study, based on an active tropical cyclone period, is being developed. The study will be worked into a training guide for new forecasters and will include basic streamline analysis procedures as well as tropical cyclone forecasting techniques. The case study will also be integrated into STORMEX training (training scenario for DET 4 HQ AWS, 54 WRS, DET 1 1WW, JTWC, and AJTWC personnel).

IMPROVEMENT AND EXTENSION OF THE JTWC CLIMATOLOGY

(Shewchuk, J. D., NAVOCEANCOMCEN/JTWC)

Climatology is an important objective forecast aid for JTWC. A new climatology was developed for the western North Pacific which provides position and intensity forecast information for 24-, 48- and 72-hour intervals. Pertinent statistical information is produced by month for each latitude/longitude of available historical data, which includes 1945 to 1973.

Similar climatological information is being developed for the North and South Indian Oceans and the western South Pacific. The periods of available historical data are 1900-1970, 1900-1969 and 1900-1971, respectively.

2. NEPRF RESEARCH

TROPICAL CYCLONE RESEARCH AT OR UNDER CONTRACT TO THE NAVAL ENVIRONMENTAL PREDICTION RESEARCH FACILITY (NEPRF), MONTEREY, CALIFORNIA

TROPICAL CYCLONE MODELING

(Hodur, R.M., NEPRF and Madala, R., NRL)

A one-way interactive Tropical Cyclone Model (TCM) is being evaluated operationally. This model differs from the original channeled TCM, that has been used for the past three years, in two ways. First, hemispheric forecast data are used on the boundaries as opposed to the channel boundaries used in the original TCM. Second, a new bogus is used to represent the storm based on the observed maximum wind. This latter change has cut the average initial position error by 59% to 15 nm. The one-way interactive TCM average forecast errors at 48, 60 and 72 hr are 8%, 14% and 21% less than the channel model, respectively, for Pacific cyclones through August 1979. Both TCMs have about the same average forecast errors at 12, 24 and 36 hr.

A more sophisticated TCM is being developed jointly by NEPRF and NRL and is expected to become operational in 1981. This TCM includes the effects of surface friction, cumulus clouds and latent and sensible heat transfer from the ocean. Preliminary tests indicate that these improvements may reduce forecast track errors by 15% to 20% when compared to the one-way interactive TCM.

TROPICAL CYCLONE WIND DISTRIBUTION

(Tsui, T., Brody, L.R., and Brand, S., NEPRF)

The wind distribution around tropical cyclones for the warnings issued by the JTWC from 1966 through 1977 have been compiled and edited into a unique data set. An analysis of the wind radii shows the asymmetrical nature of the radii of 30 kt and 50 kt winds around tropical cyclones as a function of the characteristics of the storm. A statistical forecast model to predict the asymmetric wind distribution has been developed.

TROPICAL CYCLONE STRIKE PROBABILITIES

(Brand, S., NEPRF and Jarrell, J.D., Science Applications Inc.)

Tropical cyclone strike probability is a method for determining probabilities up through 72 hours that a tropical cyclone will come within specified distances around geographic points of interest to the user. This program can be used as an aid for operational decisions associated with tropical cyclone evasion, evacuation and base preparedness. Strike probability output is presently being evaluated by a number of Navy and Air Force meteorologists and operational customers in WESTPAC. Other applications of strike probability that are presently being developed include geographic depictions, wind probabilities and strike probabilities for EASTPAC.

A STATISTICALLY DERIVED PREDICTION PROCEDURE FOR TROPICAL CYCLONE GENESIS

(Perrone, T., Lowe, P., Rabe, K., and Brand, S., NEPRF)

A statistical experiment using stepwise discriminant analysis was conducted to determine algorithms to be applied to daily, operationally-available meteorological analyses. Parameters identified as potential predictors of tropical cyclone formation were statistically examined to determine their tropical cyclone genesis prediction capability and were found to possess substantial promise to predict tropical storm formation 24, 48 and 72 hours prior to occurrence.

EXTREME SEA STATES WITHIN A TYPHOON

(Rabe, K., and Brand, S., NEPRF)

Extremely high sea states are known to occur to the right of the direction of movement in typhoons. A well-documented case of such extreme sea heights in the western North Pacific was examined and compared with results from a numerical spectral ocean wave model. The wind and sea state field of the numerical model compared favorably with the observed data. An examination was also made to determine how extreme sea states relate to tropical cyclone intensity, forward speed of movement, and circulation size or wind distribution. The results indicated that all three are important with the intensity being the primary factor, speed of movement being of secondary importance and circulation size or wind distribution being the least important factor.

TROPICAL CYCLONE ORIGIN, MOVEMENT AND INTENSITY CHARACTERISTICS BASED ON DATA COMPOSITING TECHNIQUES

(Gray, W.M., Colorado State University)

Observational studies using large amounts of composited rawinsonde, satellite and aircraft flight data have been performed to analyze global aspects of tropical cyclone occurrences. The data were used to study the physical processes of tropical cyclone genesis, tropical cyclone intensity changes, environmental factors influencing tropical cyclone turning motion 24-36 hours before the turn takes place, tropical cyclone intensity determination from upper-tropospheric reconnaissance, and the diurnal variations of vertical motion in tropical weather systems.

IMPROVED UPPER-LEVEL TROPICAL CYCLONE STEERING TECHNIQUES

(Hamilton, H., Systems and Applied Sciences Corporation)

Current automated objective steering forecast techniques incorporating HATRACK and MOHATT algorithms are operationally termed CYCLOPS and may be run in analysis or prognosis modes at seven different atmospheric levels including 1000 mb, 850 mb, 700 mb, 500 mb, 400 mb, 300 mb and 200 mb. Since tropical cyclones vary greatly in areal and vertical extent and may be representatively steered at varying atmospheric levels dependent on state of development/intensity, continuing research is ongoing which will attempt to identify, given certain tropical cyclone input parameters, a "best" steering level or a "weighted scheme" that takes into account several steering levels.

AIRBORNE EXPENDABLE BATHYTHERMOGRAPH OBSERVATIONS IMMEDIATELY BEFORE AND AFTER PASSAGE OF TYPHOON PHYLLIS (AUG 75)

(Schramm, W.G., NEPRF and NAVPGSCOL)

Ocean thermal response to an intense typhoon was analyzed on the basis of data collected during the passage of Typhoon Phyllis (Aug 75) in the Philippine Sea. A unique data set was collected using calibrated Airborne Expendable Bathythermographs dropped from a Navy P-3 aircraft. There were three flights: the first, 14 hours before storm passage, the second 10 hours after passage, and the third two days later. The results indicate a dramatic upward movement of isotherms, relative to the sea surface, in a narrow band under the storm path, with a reversal toward pre-typhoon conditions within three days.

MESOSCALE EFFECTS OF TOPOGRAPHY ON TROPICAL CYCLONE ASSOCIATED SURFACE WINDS

(Brand, S. and Chambers, R., NEPRF, Woo, H., Cermak, J., and Lou, I., Colorado State University, and Danard, M., University of Waterloo)

An analysis was made of the influence of topography on tropical cyclone associated strong surface wind conditions for Subic Bay, Republic of the Philippines by means of an environmental wind tunnel. Surface flow patterns were deduced by smoke and surface oil films, while isotach and gust values were obtained by hot wire anemometers. The laboratory results show the significant effects of the mountainous regions surrounding the Subic Bay harbor complex and indicate preferred sheltered locations. The results were compared with synoptic observations and a high resolution (0.19 nm) diagnostic, one-level, primitive equation model. Where direct comparison could be made, all techniques appeared to show qualitative agreement.

TYPHOON HAVEN STUDIES

(Stevenson, G.A. and Brand, S., NEPRF)

The Typhoon Havens Research Program, the results of which have been summarized in NEPRF Technical Paper 5-76, has been resumed. COMSEVENTHFLT has identified an additional 12 ports and harbors for evaluation as typhoon havens. Work has commenced on Palau, Saipan and Tinian.

ANNEX A TROPICAL CYCLONE TRACK DATA

WESTERN NORTH PACIFIC CYCLONE TRACK DATA

TYPHOON ALICE

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
010100Z	2.5 170.7	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.
010106Z	3.1 170.1	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.
010112Z	3.9 169.6	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.
010118Z	4.6 169.2	35	4.4 168.7	25.	32.	-10.	6.0 165.6	30.	125.	-25.	7.7 161.3	35.	408.	-15.	8.3 156.9	45.	542.	-10.
010200Z	5.2 168.7	40	5.3 168.5	45.	13.	5.	7.3 164.4	55.	213.	0.	7.9 159.7	60.	496.	5.	8.4 155.2	60.	588.	5.
010206Z	5.7 168.2	45	5.8 167.8	50.	25.	5.	7.3 164.3	55.	240.	5.	7.9 159.5	60.	498.	5.	8.3 154.9	60.	567.	0.
010212Z	6.2 167.8	50	6.5 166.4	50.	85.	0.	7.7 161.9	60.	376.	10.	9.3 157.2	65.	571.	10.	9.2 152.3	65.	667.	0.
010218Z	6.7 167.7	55	6.9 167.7	55.	12.	0.	9.2 165.6	65.	160.	15.	10.7 161.7	65.	263.	10.	11.6 157.0	70.	339.	5.
010300Z	7.2 168.0	55	7.2 167.5	55.	30.	0.	9.3 165.7	65.	136.	10.	10.5 161.6	70.	214.	15.	11.6 156.5	70.	306.	0.
010306Z	8.0 168.3	50	7.9 168.4	55.	8.	5.	10.6 169.5	65.	123.	10.	14.1 169.9	65.	415.	5.	17.6 170.7	60.	695.	-15.
010312Z	8.5 168.2	50	8.9 168.9	55.	48.	5.	12.2 169.0	65.	207.	10.	15.7 169.0	65.	463.	0.	18.9 171.3	50.	799.	-30.
010318Z	8.9 168.1	50	9.6 168.0	55.	42.	5.	12.0 167.7	65.	226.	10.	16.3 168.5	65.	479.	0.	18.8 171.0	50.	815.	-35.
010400Z	9.2 168.0	55	9.3 167.8	50.	13.	-5.	10.9 166.0	55.	99.	0.	12.2 162.6	60.	84.	-10.	13.0 158.6	60.	63.	-30.
010406Z	9.4 167.8	55	9.5 167.6	50.	17.	-5.	10.9 166.1	55.	123.	-5.	12.3 162.7	60.	130.	-15.	13.1 158.8	60.	137.	-35.
010412Z	9.5 166.8	55	9.7 167.0	50.	17.	-5.	10.9 164.7	55.	84.	-10.	12.3 160.9	60.	89.	-20.	13.4 157.1	60.	114.	-40.
010418Z	9.5 166.0	55	9.5 165.9	50.	6.	-5.	10.2 161.9	55.	53.	-10.	10.8 158.0	60.	91.	-25.	11.4 154.0	60.	53.	-45.
010500Z	9.5 165.1	55	9.6 165.0	50.	8.	-5.	10.3 161.1	55.	59.	-15.	11.5 157.2	60.	59.	-30.	11.8 153.1	65.	19.	-45.
010506Z	9.7 164.6	60	9.7 164.1	55.	18.	-5.	10.5 160.1	60.	72.	-15.	11.7 156.2	60.	43.	-35.	12.0 152.2	65.	41.	-35.
010512Z	10.0 163.6	65	10.1 163.2	55.	24.	-10.	10.7 159.2	60.	79.	-20.	11.6 155.3	60.	43.	-40.	12.0 151.3	65.	64.	-25.
010518Z	10.6 162.7	65	10.6 162.7	55.	0.	-10.	11.3 159.3	65.	66.	-20.	11.6 155.6	70.	79.	-35.	11.9 151.6	70.	152.	-15.
010600Z	11.1 161.7	70	11.2 161.7	55.	6.	-15.	12.7 158.0	65.	27.	-25.	12.6 153.7	70.	51.	-40.	12.0 149.0	77.	65.	-3.
010606Z	11.6 160.6	75	11.8 160.4	70.	17.	-5.	13.6 156.7	85.	78.	-10.	13.0 152.8	95.	97.	-5.	12.0 148.6	105.	117.	30.
010612Z	12.0 159.4	80	12.0 159.4	75.	0.	-5.	13.5 154.9	90.	80.	-10.	13.6 150.4	100.	96.	10.	12.9 146.3	105.	71.	35.
010618Z	12.2 158.6	85	12.3 158.3	80.	19.	-5.	13.4 154.2	90.	73.	-15.	13.2 149.8	100.	91.	15.	12.4 145.0	105.	52.	30.
010700Z	12.3 157.8	90	12.3 157.6	85.	12.	-5.	12.0 154.2	95.	70.	-15.	11.6 150.1	105.	130.	25.	11.4 146.1	110.	183.	35.
010706Z	12.3 156.6	95	12.3 156.7	90.	6.	-5.	11.8 152.9	105.	83.	5.	11.5 148.9	110.	139.	35.	11.4 144.8	120.	186.	40.
010712Z	12.3 155.5	100	12.2 155.8	95.	19.	-5.	11.8 151.8	110.	94.	20.	11.5 147.8	115.	145.	45.	11.5 143.8	120.	192.	40.
010718Z	12.2 154.4	105	12.5 154.0	105.	29.	0.	12.2 149.3	115.	25.	30.	12.0 144.0	120.	12.	45.	13.5 139.1	120.	88.	35.
010800Z	12.1 153.0	110	12.2 153.1	110.	8.	0.	12.0 148.2	120.	19.	40.	12.0 143.1	120.	13.	45.	12.0 138.0	115.	58.	25.
010806Z	12.0 151.5	100	12.0 151.7	115.	12.	15.	11.9 146.5	120.	13.	45.	11.9 141.0	115.	43.	35.	12.0 135.5	110.	169.	15.
010812Z	12.0 150.2	90	12.0 150.5	115.	18.	25.	11.8 145.3	120.	19.	50.	11.9 140.0	115.	39.	35.	12.0 134.7	110.	192.	15.
010818Z	11.9 149.0	85	11.9 149.1	105.	6.	20.	11.8 143.9	100.	21.	25.	12.0 138.6	95.	71.	10.	13.5 133.6	95.	232.	-5.
010900Z	11.9 147.9	80	11.8 147.7	100.	13.	20.	11.7 142.5	90.	30.	15.	11.9 137.3	85.	98.	-5.	12.0 131.9	80.	330.	-20.
010906Z	12.1 146.6	75	11.8 146.5	95.	19.	20.	11.7 141.6	85.	25.	5.	11.9 136.4	80.	121.	-15.	12.0 131.3	75.	355.	-25.
010912Z	12.1 145.4	70	12.0 145.2	90.	13.	20.	12.1 139.9	75.	41.	-5.	12.3 134.6	65.	102.	-30.	12.4 129.3	60.	442.	-30.
010918Z	12.0 144.2	75	12.1 144.0	80.	13.	5.	12.2 138.7	70.	64.	-15.	12.2 133.4	60.	255.	-40.	12.4 128.1	55.	512.	-25.
011000Z	11.8 143.0	75	11.9 143.0	80.	6.	5.	11.9 137.9	70.	66.	-20.	12.2 132.7	60.	282.	-40.	12.5 127.4	55.	561.	-15.
011006Z	12.1 141.7	80	12.1 141.5	75.	12.	-5.	12.0 136.2	65.	129.	-30.	12.2 131.0	55.	367.	-45.	12.7 125.9	50.	663.	-5.
011012Z	12.2 140.6	80	12.2 140.1	75.	29.	-5.	12.1 134.6	65.	196.	-30.	12.5 129.4	55.	435.	-35.	12.8 124.5	50.	766.	5.
011018Z	12.2 139.8	85	12.2 139.0	85.	47.	0.	12.2 133.8	85.	233.	-15.	12.4 128.7	75.	478.	-5.	12.9 123.9	60.	791.	20.
011100Z	12.4 138.9	90	12.3 139.0	85.	8.	-5.	12.2 136.8	85.	94.	-15.	12.1 132.8	75.	296.	5.	12.5 128.0	60.	537.	30.
011106Z	12.7 138.3	95	12.5 137.9	90.	26.	-5.	12.2 134.2	80.	198.	-20.	12.2 129.4	70.	485.	15.	12.2 124.8	45.	697.	25.
011112Z	13.1 137.8	95	13.0 137.7	95.	9.	0.	13.5 135.7	80.	79.	-10.	12.8 132.2	80.	355.	35.	0.0 0.0	0.	-0.	0.
011118Z	13.4 137.6	100	13.3 137.1	95.	30.	-5.	13.3 134.7	80.	146.	0.	12.8 132.9	70.	308.	30.	0.0 0.0	0.	-0.	0.
011200Z	13.7 137.3	100	13.8 137.2	90.	8.	-10.	15.8 137.4	80.	52.	10.	18.2 140.0	70.	236.	40.	0.0 0.0	0.	-0.	0.
011206Z	14.1 137.0	100	14.2 136.9	90.	8.	-10.	16.2 137.2	70.	29.	15.	18.5 140.0	60.	273.	40.	0.0 0.0	0.	-0.	0.
011212Z	14.5 136.6	90	15.2 136.4	85.	43.	-5.	17.4 137.8	65.	83.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011218Z	15.0 136.5	80	15.2 136.5	80.	12.	0.	17.4 137.9	60.	93.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011300Z	15.4 136.6	70	15.5 136.5	80.	8.	10.	17.6 138.0	60.	124.	30.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011306Z	15.8 136.9	55	15.9 136.7	70.	13.	15.	18.1 138.6	55.	194.	35.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011312Z	16.1 137.3	45	16.1 137.2	65.	6.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011318Z	16.1 137.0	40	16.4 137.5	55.	34.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011400Z	16.1 136.5	30	16.1 136.5	45.	0.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
011406Z	16.0 136.0	20	16.0 136.0	30.	0.	10.	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.	105.	222.	338.
AVG RIGHT ANGLE ERROR	11.	83.	175.	271.
AVG INTENSITY MAGNITUDE ERROR	8.	17.	23.	23.
AVG INTENSITY BIAS	2.	2.	1.	-3.
NUMBER OF FORECASTS	51	47	43	39
		30	23	20

TYPHOON BESS

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR WIND	72 HOUR DST	72 HOUR WIND
031800Z	7.1	150.0	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.
031806Z	7.8	149.1	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.
031812Z	8.6	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.
031818Z	9.3	146.7	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.
031900Z	9.8	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.
031906Z	10.2	144.6	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.
031912Z	10.4	143.7	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.
031918Z	10.6	142.7	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.
032000Z	10.5	141.7	30	10.9	141.9	25.	27.	-5.	11.6	138.8	30.	13.	0.	11.8	135.3	40.	115.	-15.	11.9	131.7	50.	305.	-25.
032006Z	10.6	140.7	30	10.5	140.5	30.	12.	0.	10.8	136.0	35.	147.	-5.	10.9	131.5	45.	293.	-15.	10.9	127.8	55.	543.	-25.
032012Z	10.7	139.9	30	10.5	139.8	30.	13.	0.	10.9	135.9	35.	128.	-10.	10.9	131.4	45.	309.	-25.	10.9	127.0	55.	644.	-30.
032018Z	11.0	139.2	30	11.0	139.0	30.	12.	0.	11.7	135.5	30.	102.	-20.	12.6	132.4	40.	213.	-35.	14.0	130.4	45.	446.	-45.
032100Z	11.7	138.6	30	11.2	138.3	30.	35.	0.	11.9	135.3	35.	109.	-20.	12.5	132.5	40.	250.	-35.	13.1	130.0	45.	592.	-45.
032106Z	12.3	138.0	40	12.3	138.2	35.	12.	-5.	14.7	137.0	45.	105.	-15.	16.0	137.4	35.	126.	-45.	19.0	139.1	30.	78.	-60.
032112Z	12.8	136.9	45	12.8	137.5	40.	35.	-5.	15.3	136.8	50.	110.	-20.	17.9	138.0	45.	114.	-40.	20.2	140.8	35.	61.	-25.
032118Z	13.3	136.1	50	13.6	136.1	45.	19.	-5.	17.0	134.6	50.	102.	-25.	19.3	138.4	45.	92.	-45.	20.9	142.3	35.	66.	0.
032200Z	13.7	135.6	55	14.1	135.1	55.	38.	0.	17.2	133.0	75.	117.	0.	20.0	134.5	60.	193.	-30.	21.4	138.4	45.	338.	20.
032206Z	14.1	135.3	60	14.0	135.5	60.	13.	0.	16.0	134.0	75.	91.	-5.	17.8	133.1	80.	375.	-10.	0.0	0.0	0.	-0.	0.
032212Z	14.7	135.0	70	14.6	134.9	70.	8.	0.	16.5	133.3	85.	173.	0.	18.5	133.3	90.	441.	30.	0.0	0.0	0.	-0.	0.
032218Z	15.3	134.8	75	15.1	134.6	75.	17.	0.	16.9	133.6	90.	216.	0.	19.3	134.1	80.	485.	45.	0.0	0.0	0.	-0.	0.
032300Z	16.1	134.7	75	15.8	134.7	75.	18.	0.	18.0	134.7	85.	202.	-5.	20.5	136.8	75.	440.	50.	0.0	0.0	0.	-0.	0.
032306Z	17.0	135.2	80	17.0	134.8	80.	23.	0.	20.3	136.5	80.	151.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032312Z	17.8	136.0	85	17.7	136.2	80.	13.	-5.	20.6	140.7	60.	36.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032318Z	18.7	136.9	90	18.3	137.1	80.	25.	-10.	21.5	142.1	50.	32.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032400Z	19.5	137.9	90	19.5	137.8	85.	6.	-5.	22.6	142.6	50.	95.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032406Z	20.3	139.2	90	20.3	139.1	75.	6.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032412Z	21.2	140.6	60	21.3	140.4	75.	13.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032418Z	22.0	142.3	35	22.1	141.9	65.	23.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
032500Z	22.9	144.3	25	23.4	143.8	30.	41.	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.	114.	265.	348.
AVG RIGHT ANGLE ERROR	15.	73.	164.	240.
AVG INTENSITY MAGNITUDE ERROR	5.	10.	32.	31.
AVG INTENSITY BIAS	-0.	-6.	-13.	-26.
NUMBER OF FORECASTS	21	17	13	9

5 5 3

	BEST TRACK			WARNING					24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
							ERRORS					ERRORS					ERRORS						
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
040800Z	3.3	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.
040806Z	3.4	143.4	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.
040812Z	3.6	143.3	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.
040818Z	3.8	143.1	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.
040900Z	4.2	142.8	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.
040906Z	4.6	142.5	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.
040912Z	5.1	142.2	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.
040918Z	5.5	141.9	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.
041000Z	5.7	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.
041006Z	5.9	141.1	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.
041012Z	6.1	140.6	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.
041018Z	6.2	140.2	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.
041100Z	6.4	139.5	30	6.3	139.7	30.	13.	0.	7.0	137.3	35.	0.	0.	8.1	134.2	40.	50.	-5.	9.2	131.2	50.	59.	-5.
041106Z	6.5	139.0	30	6.5	139.0	30.	0.	0.	7.3	136.6	40.	30.	0.	8.4	133.5	45.	59.	0.	9.5	130.6	55.	67.	0.
041112Z	6.7	138.4	30	6.5	138.6	30.	17.	0.	7.3	136.3	40.	25.	0.	8.2	133.7	45.	21.	0.	9.3	130.7	55.	45.	-10.
041118Z	6.9	137.8	30	6.5	138.0	30.	27.	0.	7.1	135.6	40.	8.	-5.	7.8	132.8	50.	27.	0.	8.7	129.7	60.	78.	-10.
041200Z	7.0	137.3	35	7.2	137.2	35.	13.	0.	8.2	134.5	50.	45.	5.	9.2	131.5	60.	54.	5.	9.9	128.5	70.	66.	-5.
041206Z	6.8	136.7	40	7.2	136.5	40.	27.	0.	8.0	133.5	55.	45.	10.	8.9	130.4	65.	30.	10.	9.8	127.4	75.	56.	0.
041212Z	7.0	136.0	40	7.0	136.2	40.	12.	0.	7.6	134.0	55.	43.	10.	8.5	131.4	65.	124.	0.	9.6	128.4	75.	190.	-5.
041218Z	7.2	135.5	45	7.0	135.5	45.	12.	0.	7.7	133.3	55.	51.	5.	8.4	130.6	65.	133.	-5.	9.2	127.5	75.	228.	0.
041300Z	7.5	134.8	45	7.2	134.9	45.	19.	0.	7.8	132.4	55.	56.	0.	8.6	129.7	65.	138.	-10.	9.5	126.5	75.	245.	5.
041306Z	7.7	134.2	45	7.6	134.4	45.	13.	0.	8.3	131.9	55.	89.	0.	9.2	129.2	65.	168.	-10.	10.0	126.0	75.	245.	10.
041312Z	8.0	133.4	45	8.0	133.5	45.	6.	0.	8.9	131.0	55.	103.	-10.	9.4	128.5	65.	201.	-15.	10.0	125.2	60.	238.	0.
041318Z	8.2	132.6	50	8.3	132.0	45.	19.	-5.	9.1	130.0	55.	95.	-15.	9.8	126.8	65.	174.	-10.	11.0	124.0	50.	159.	-10.
041400Z	8.3	131.6	55	8.3	131.6	55.	0.	0.	9.3	128.1	65.	36.	-10.	10.7	124.4	60.	105.	-10.	12.4	120.9	50.	91.	-5.
041406Z	8.4	130.4	55	8.3	130.6	55.	13.	0.	9.5	126.7	65.	36.	-10.	10.6	123.2	55.	113.	-10.	11.7	119.3	55.	205.	0.
041412Z	8.5	129.3	65	8.5	129.2	65.	6.	0.	9.8	125.1	75.	62.	-5.	11.1	121.7	60.	100.	0.	12.1	117.8	65.	294.	15.
041418Z	8.9	128.6	70	8.6	128.2	70.	21.	0.	9.7	124.2	65.	108.	-10.	11.1	120.8	60.	132.	0.	12.4	116.9	65.	361.	15.
041500Z	9.4	127.5	75	9.1	127.5	75.	19.	0.	10.3	124.3	70.	120.	0.	11.4	120.9	65.	123.	10.	12.8	117.2	70.	359.	25.
041506Z	10.1	126.5	75	10.0	126.4	75.	8.	0.	11.0	123.1	60.	42.	-5.	13.0	119.6	65.	160.	10.	13.8	115.6	70.	448.	25.
041512Z	10.8	125.4	80	10.7	125.4	80.	6.	0.	12.3	121.8	60.	33.	0.	13.4	118.1	65.	257.	15.	15.3	114.7	70.	536.	25.
041518Z	11.5	124.4	75	11.5	124.4	75.	0.	0.	12.8	120.5	60.	93.	0.	13.9	116.6	70.	360.	20.	17.2	114.9	75.	546.	30.
041600Z	12.0	123.2	70	11.9	123.2	70.	6.	0.	13.1	119.3	65.	163.	10.	14.8	115.9	70.	415.	25.	18.5	114.5	75.	605.	25.
041606Z	12.4	122.6	65	12.2	122.4	65.	17.	0.	13.5	118.6	65.	215.	10.	15.1	115.4	70.	473.	25.	18.2	115.4	75.	593.	25.
041612Z	12.7	122.2	60	12.8	122.0	60.	13.	0.	14.0	118.6	65.	226.	15.	15.6	115.8	70.	472.	25.	17.9	115.3	75.	665.	25.
041618Z	12.9	122.1	60	13.0	121.5	60.	35.	0.	14.2	118.4	65.	255.	15.	16.0	115.8	70.	494.	25.	18.3	116.2	75.	660.	25.
041700Z	13.1	122.1	55	12.9	122.0	55.	13.	0.	13.7	120.9	50.	138.	5.	15.4	119.3	50.	339.	0.	18.1	120.5	50.	514.	5.
041706Z	13.5	122.3	55	13.3	122.2	55.	13.	0.	13.8	121.5	50.	141.	5.	14.5	120.0	50.	378.	0.	16.5	119.3	50.	719.	10.
041712Z	13.9	122.5	50	13.9	122.4	50.	6.	0.	16.0	122.8	50.	73.	5.	18.1	124.6	55.	136.	5.	19.2	127.7	60.	339.	30.
041718Z	14.3	122.8	50	14.3	122.5	50.	17.	0.	16.4	123.0	50.	80.	5.	18.5	125.3	55.	156.	5.	19.7	129.3	60.	345.	35.
041800Z	14.6	123.1	45	14.6	123.1	45.	0.	0.	16.2	125.4	55.	48.	5.	18.2	129.0	60.	167.	15.	19.6	133.7	60.	259.	35.
041806Z	15.0	123.6	45	15.0	123.4	45.	12.	0.	16.7	126.3	55.	56.	5.	18.8	130.4	60.	197.	20.	0.0	0.0	0.	-0.	0.
041812Z	15.6	124.0	45	15.6	124.1	45.	6.	0.	17.8	127.1	55.	25.	5.	20.4	131.7	60.	149.	30.	0.0	0.0	0.	-0.	0.
041818Z	16.3	124.4	45	15.9	124.8	45.	33.	0.	17.9	127.9	55.	102.	5.	20.1	132.8	50.	195.	25.	0.0	0.0	0.	-0.	0.
041900Z	16.9	125.0	50	16.8	125.1	50.	8.	0.	19.2	128.9	55.	108.	10.	21.1	133.8	50.	192.	25.	0.0	0.0	0.	-0.	0.
041906Z	17.5	125.8	50	17.6	125.9	50.	8.	0.	19.9	130.3	55.	132.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
041912Z	18.2	127.0	50	17.8	126.7	55.	29.	5.	20.0	131.2	50.	180.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
041918Z	19.6	127.8	50	19.6	127.6	50.	11.	0.	23.8	134.7	40.	51.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
042000Z	21.0	129.1	45	21.1	129.1	50.	6	5.	24.6	136.8	35.	96.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
042006Z	22.1	130.6	40	21.8	130.9	50.	24.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
042012Z	22.8	132.4	30	22.9	132.0	45.	22.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
042018Z	23.0	134.4	25	24.0	134.0	30.	64.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
042100Z	23.0	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	15.	87.	191.	320.
AVG RIGHT ANGLE ERROR	11.	62.	131.	215.
AVG INTENSITY MAGNITUDE ERROR	1.	7.	11.	14.
AVG INTENSITY BIAS	1.	3.	7.	11.
NUMBER OF FORECASTS	40	37	33	22
		24	24	16

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		WIND	24 HR ERRORS DST	24 HR ERRORS WIND	48 HOUR FORECAST POSIT		WIND	48 HR ERRORS DST	48 HR ERRORS WIND	72 HOUR FORECAST POSIT		WIND	72 HR DST	72 HR WIND
050600Z	4.0	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.
050606Z	4.0	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.
050612Z	4.1	145.4	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.
050618Z	4.2	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.
050700Z	4.3	143.3	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.
050706Z	4.5	142.1	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.
050712Z	4.9	141.0	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.
050718Z	5.3	139.8	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.
050800Z	5.2	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.
050806Z	4.8	136.8	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.
050812Z	4.4	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.
050818Z	4.5	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.
050900Z	5.0	134.2	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.
050906Z	5.8	133.9	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.
050912Z	6.7	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.
050918Z	7.3	133.2	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.
051000Z	7.7	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.
051006Z	8.2	130.5	30	8.2	130.8	20.	19.	-10.	9.6	127.0	25.	136.	0.	11.4	123.2	20.	162.	-10.	12.5	119.3	25.	6.	-5.
051012Z	8.7	129.0	30	8.8	129.5	25.	30.	-5.	10.5	125.4	30.	123.	5.	11.9	121.6	20.	116.	-10.	13.0	117.7	25.	111.	-10.
051018Z	8.9	127.3	30	9.4	127.9	25.	46.	-5.	11.2	123.6	25.	102.	0.	12.4	119.7	25.	43.	-5.	15.0	116.5	35.	219.	-5.
051100Z	9.3	126.0	30	9.0	125.6	25.	30.	-5.	10.3	120.3	25.	65.	0.	12.1	116.8	30.	152.	0.	14.6	115.9	35.	255.	-5.
051106Z	9.7	124.7	25	9.8	124.9	25.	13.	0.	10.5	119.8	25.	47.	-5.	12.6	116.6	30.	163.	0.	15.2	115.8	35.	298.	0.
051112Z	9.9	123.4	25	9.9	123.4	25.	0.	0.	10.7	118.3	25.	95.	-5.	13.1	115.1	30.	262.	-5.	15.8	113.3	40.	474.	15.
051118Z	10.2	122.2	25	10.2	122.3	25.	6.	0.	11.1	117.3	25.	134.	-5.	13.8	114.4	35.	320.	-5.	16.7	113.0	45.	531.	20.
051200Z	10.4	121.4	25	10.5	121.3	25.	9.	0.	12.1	117.2	30.	129.	0.	14.5	114.4	40.	339.	0.	17.5	114.4	50.	491.	25.
051206Z	10.5	120.6	30	10.5	120.1	25.	29.	-5.	12.6	116.4	35.	175.	5.	15.6	114.5	45.	375.	10.	18.5	116.4	50.	430.	25.
051212Z	10.9	119.9	30	10.7	119.1	25.	48.	-5.	12.9	115.4	35.	245.	0.	16.3	114.3	45.	424.	20.	19.0	116.6	50.	459.	25.
051218Z	11.7	119.5	30	11.8	118.9	30.	36.	0.	15.0	117.0	40.	193.	0.	18.5	118.6	50.	299.	25.	20.6	122.5	50.	260.	25.
051300Z	12.2	119.4	30	12.5	118.7	30.	45.	0.	15.1	117.7	40.	167.	0.	18.3	119.1	50.	277.	25.	21.0	123.2	50.	255.	25.
051306Z	12.5	119.4	30	12.6	118.7	30.	41.	0.	14.3	117.9	40.	169.	5.	17.1	118.1	50.	311.	25.	20.0	121.4	50.	351.	25.
051312Z	13.0	119.6	35	13.1	119.2	35.	24.	0.	15.7	119.5	40.	134.	15.	18.5	120.7	50.	238.	25.	21.1	124.6	40.	255.	15.
051318Z	13.4	119.9	40	13.7	119.3	35.	39.	-5.	16.0	119.7	40.	154.	15.	18.8	121.3	45.	241.	20.	21.5	125.1	35.	329.	10.
051400Z	13.7	120.2	40	13.7	120.2	40.	0.	0.	15.4	121.6	25.	60.	0.	17.2	124.2	40.	119.	15.	19.8	128.0	45.	313.	20.
051406Z	14.0	120.8	35	14.0	120.6	35.	12.	0.	15.5	122.8	30.	29.	5.	17.7	125.7	45.	121.	20.	0.0	0.0	0.	-0.	0.
051412Z	14.4	121.4	25	14.2	120.9	25.	31.	0.	15.5	122.8	30.	86.	5.	17.6	125.5	40.	244.	15.	0.0	0.0	0.	-0.	0.
051418Z	14.7	122.0	25	14.5	121.5	25.	31.	0.	16.0	123.8	30.	95.	5.	18.3	126.5	40.	307.	15.	0.0	0.0	0.	-0.	0.
051500Z	15.1	122.6	25	15.2	122.7	25.	8.	0.	16.8	124.7	30.	104.	5.	18.9	127.5	35.	365.	10.	0.0	0.0	0.	-0.	0.
051506Z	15.6	123.3	25	15.4	123.2	25.	13.	0.	17.1	125.1	30.	170.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051512Z	16.2	124.1	25	16.2	124.0	25.	6.	0.	18.4	126.7	30.	161.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051518Z	17.0	125.1	25	16.7	124.8	25.	25.	0.	18.8	127.9	30.	225.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051600Z	17.8	126.2	25	17.6	125.9	25.	21.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051606Z	18.8	127.5	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.
051612Z	20.0	129.0	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.
051618Z	21.2	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.
051700Z	22.2	133.0	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.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	23.	130.	244.	315.
AVG RIGHT ANGLE ERROR	16.	79.	171.	257.
AVG INTENSITY MAGNITUDE ERROR	2.	4.	13.	16.
AVG INTENSITY BIAS	-2.	3.	10.	13.
NUMBER OF FORECASTS	24	23	20	15
		7	7	8

TROPICAL DEPRESSION 05

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST				
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
051700Z	19.1	115.7	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.
051706Z	18.8	115.0	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.
051712Z	18.6	114.5	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.
051718Z	18.2	114.2	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.
051800Z	17.8	114.0	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.
051806Z	17.3	113.4	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.
051812Z	16.7	113.7	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.
051818Z	16.2	113.4	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.
051900Z	15.8	112.9	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.
051906Z	15.5	112.5	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.
051912Z	15.3	112.2	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.
051918Z	15.1	111.9	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.
052000Z	15.0	111.6	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.
052006Z	15.7	112.2	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.
052012Z	16.5	112.9	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.
052018Z	17.6	113.2	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.
052100Z	18.6	113.8	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.
052106Z	19.3	114.6	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.
052112Z	20.1	115.4	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.
052118Z	20.9	116.4	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.
052200Z	21.4	117.7	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.
052206Z	21.6	119.0	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.
052212Z	21.7	120.6	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.
052218Z	21.8	122.3	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.
052300Z	22.1	124.3	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.
052306Z	22.5	126.3	30	22.5	126.2	30.	6.	0.	25.7	135.3	25.	72.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052312Z	22.8	128.6	30	22.6	128.5	30.	13.	0.	25.4	137.5	25.	181.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052318Z	23.6	130.9	30	23.3	130.7	30.	21.	0.	26.5	139.4	25.	221.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052400Z	24.9	132.9	25	24.6	133.0	30.	19.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052406Z	26.6	134.4	25	25.5	134.4	25.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052412Z	28.2	136.2	25	28.1	136.1	25.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
052418Z	29.8	138.0	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	12.	158.	0.	0.
AVG RIGHT ANGLE ERROR	12.	150.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	0.	0.	0.
AVG INTENSITY BIAS	1.	0.	0.	0.
NUMBER OF FORECASTS	6	3	0	0
		1		

TYPHOON ELLIS

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST				
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
062900Z	11.7	135.4	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.
062906Z	12.2	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.
062912Z	12.6	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.
062918Z	12.9	134.2	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.
063000Z	13.2	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.
063006Z	13.4	133.5	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.
063012Z	13.5	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	0.0	0.	-0.	0.
063018Z	13.6	132.6	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.
070100Z	13.7	131.9	35	13.4	132.0	35.	19.	0.	14.5	129.8	45.	68.	-10.	16.2	127.4	50.	138.	-35.	18.5	125.2	60.	223.	-5.
070106Z	13.7	131.3	40	13.4	131.4	40.	19.	0.	14.6	129.0	45.	69.	-15.	16.2	126.5	50.	137.	-30.	18.4	126.2	60.	235.	0.
070112Z	13.8	130.5	40	13.8	130.9	40.	23.	0.	15.0	128.7	50.	104.	-15.	16.5	126.4	55.	198.	-25.	18.7	124.0	60.	268.	0.
070118Z	13.9	129.5	50	13.8	129.3	50.	13.	0.	14.4	125.4	60.	72.	-15.	15.6	121.6	65.	173.	-5.	16.8	117.8	50.	197.	-10.
070200Z	14.1	128.7	55	14.1	128.6	55.	6.	0.	14.6	125.3	65.	91.	-20.	15.6	121.8	65.	205.	0.	16.8	118.0	50.	225.	-5.
070206Z	14.4	127.8	60	14.2	127.6	55.	17.	-5.	14.9	123.8	65.	116.	-15.	16.3	120.1	45.	191.	-15.	17.0	116.2	55.	205.	0.
070212Z	15.0	126.9	65	14.9	126.9	55.	6.	-10.	16.2	122.2	65.	111.	-15.	17.0	117.9	50.	188.	-10.	18.5	115.0	55.	130.	0.
070218Z	15.5	125.9	75	15.4	125.8	65.	8.	-10.	16.5	121.4	50.	127.	-20.	17.3	117.3	55.	171.	-5.	19.5	113.8	60.	103.	10.
070300Z	16.1	125.0	85	16.0	124.9	85.	8.	0.	17.8	120.8	75.	77.	10.	19.6	117.2	90.	62.	35.	21.5	113.5	85.	111.	40.
070306Z	16.8	124.2	80	16.6	124.0	90.	17.	10.	18.5	120.1	80.	60.	20.	20.4	116.4	85.	67.	30.	22.3	112.8	75.	150.	50.
070312Z	17.8	123.2	80	17.5	123.4	85.	16.	5.	20.1	120.2	75.	48.	15.	21.9	116.5	75.	158.	20.	0.0	0.0	0.	-0.	0.
070318Z	18.4	122.4	70	18.6	122.3	70.	13.	0.	22.2	118.3	80.	127.	20.	24.1	114.2	65.	199.	15.	0.0	0.0	0.	-0.	0.
070400Z	19.0	121.3	65	19.0	121.3	60.	0.	-5.	20.4	116.6	60.	21.	5.	21.7	112.6	50.	61.	5.	0.0	0.0	0.	-0.	0.
070406Z	19.5	120.2	60	19.4	120.0	60.	13.	0.	20.5	115.6	55.	25.	0.	22.1	111.7	40.	89.	15.	0.0	0.0	0.	-0.	0.
070412Z	19.8	119.4	60	19.7	119.0	60.	23.	0.	21.0	114.8	45.	49.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070418Z	20.1	117.9	60	20.1	117.9	60.	0.	0.	21.4	113.7	40.	51.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070500Z	20.2	116.3	55	20.3	116.2	60.	8.	5.	21.5	111.8	50.	18.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070506Z	20.3	115.2	55	20.2	114.8	60.	23.	5.	21.5	109.7	40.	37.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070512Z	20.5	114.1	55	20.5	114.2	60.	6.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070518Z	21.0	112.9	50	20.8	113.1	50.	16.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070600Z	21.6	111.5	45	26.1	111.6	35.	269.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070606Z	22.0	110.1	25	21.7	110.2	25.	19.	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	25.	71.	145.	185.
AVG RIGHT ANGLE ERROR	21.	57.	103.	113.
AVG INTENSITY MAGNITUDE ERROR	3.	13.	18.	12.
AVG INTENSITY BIAS	-0.	-3.	-0.	8.
NUMBER OF FORECASTS	22	18	14	10
		13	13	10

TROPICAL STORM FAYE

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR WIND	72 HOUR ERRORS DST	72 HOUR ERRORS WIND
062818Z	2.8	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.
062900Z	2.5	154.5	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.
062906Z	2.6	153.9	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.
062912Z	2.9	153.5	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.
062918Z	3.2	153.2	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.
063000Z	3.5	152.9	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.
063006Z	3.9	152.5	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.
063012Z	4.4	151.8	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.
063018Z	4.9	151.2	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.
070100Z	5.3	150.6	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.
070106Z	5.7	150.0	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.
070112Z	6.0	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.
070118Z	6.2	147.9	25	6.8	149.2	25.	85.	0.	8.8	146.6	35.	148.	5.	10.7	142.9	55.	130.	15.	12.2	139.2	65.	177.	35.
070200Z	6.5	146.4	25	6.5	145.8	30.	36.	5.	7.3	141.6	40.	139.	10.	9.2	137.5	50.	185.	10.	9.1	133.3	60.	146.	30.
070206Z	7.3	145.5	25	7.0	145.1	30.	30.	5.	7.8	141.2	40.	112.	5.	8.4	136.8	50.	180.	15.	9.4	132.5	60.	203.	35.
070212Z	8.0	144.9	25	7.6	144.8	30.	25.	5.	9.6	141.0	40.	30.	5.	10.8	136.8	50.	60.	15.	12.3	132.6	60.	148.	35.
070218Z	8.6	144.1	30	8.2	143.8	30.	30.	0.	10.0	139.8	40.	59.	0.	11.2	135.5	50.	90.	20.	13.0	131.5	60.	182.	35.
070300Z	9.0	143.2	30	9.1	143.2	35.	5.	5.	11.1	139.7	50.	48.	10.	12.7	135.6	60.	137.	30.	14.1	131.4	70.	147.	45.
070306Z	9.4	142.2	35	9.8	142.3	40.	25.	5.	12.2	138.6	60.	104.	25.	14.4	134.2	75.	211.	50.	16.0	130.0	80.	217.	55.
070312Z	9.7	141.4	35	9.8	141.2	45.	13.	10.	12.2	137.3	65.	100.	30.	15.1	133.5	75.	213.	50.	17.4	129.1	80.	207.	55.
070318Z	10.0	140.8	40	10.2	139.6	50.	72.	10.	12.1	134.7	70.	160.	40.	15.5	130.7	75.	285.	50.	17.7	125.9	80.	240.	60.
070400Z	10.3	139.8	40	10.2	140.1	50.	19.	10.	11.6	137.5	70.	132.	40.	13.6	134.1	75.	25.	50.	16.1	130.3	80.	67.	60.
070406Z	10.5	139.0	35	10.8	138.8	45.	21.	10.	13.2	134.8	65.	132.	40.	15.7	131.0	75.	162.	50.	0.0	0.0	0.	-0.	0.
070412Z	10.6	137.8	35	11.0	137.8	50.	24.	15.	12.7	133.7	65.	95.	40.	14.6	129.8	75.	125.	50.	0.0	0.0	0.	-0.	0.
070418Z	10.4	136.8	30	10.9	136.7	55.	30.	25.	12.3	132.2	65.	141.	40.	14.3	127.7	75.	210.	55.	0.0	0.0	0.	-0.	0.
070500Z	10.4	135.6	30	10.0	135.3	55.	30.	25.	10.6	130.8	65.	238.	40.	12.5	126.6	75.	320.	55.	0.0	0.0	0.	-0.	0.
070506Z	11.1	135.5	25	10.2	134.6	50.	75.	25.	10.9	130.5	55.	226.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070512Z	11.9	135.1	25	11.1	135.3	35.	49.	10.	11.5	133.9	25.	250.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070518Z	12.6	134.6	25	11.5	135.0	35.	70.	10.	12.8	132.9	25.	235.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070600Z	13.3	133.8	25	13.2	133.8	25.	5.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070606Z	13.8	133.0	25	13.9	132.7	25.	19.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070612Z	15.2	131.9	25	14.5	132.[illegible]	25.	42.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
070618Z	16.1	130.7	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.
070700Z	17.0	129.6	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.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35.	138.	167.	180.
AVG RIGHT ANGLE ERROR	21.	86.	93.	94.
AVG INTENSITY MAGNITUDE ERROR	9.	21.	37.	45.
AVG INTENSITY BIAS	9.	21.	37.	45.
NUMBER OF FORECASTS	20	17	14	11
		5	9	10

TROPICAL DEPRESSION 08

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR WIND	72 HOUR ERRORS DST	72 HOUR ERRORS WIND
072306Z	19.5	140.8	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.
072312Z	20.3	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.
072318Z	21.2	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.
072400Z	22.0	135.8	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.
072406Z	22.7	134.4	20	24.3	133.6	20.	105.	0.	28.0	126.2	20.	183.	0.	29.0	119.0	15.	396.	-5.	0.0	0.0	0.	-0.	0.
072412Z	23.4	133.0	20	23.3	133.0	20.	6.	0.	25.8	127.2	20.	96.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072418Z	24.0	131.5	20	23.9	131.8	20.	17.	0.	26.0	127.0	20.	203.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072500Z	25.0	130.2	20	24.4	130.6	20.	42.	0.	26.5	125.9	15.	299.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072506Z	26.0	128.8	20	25.5	129.5	20.	45.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072512Z	27.4	127.4	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.
072518Z	29.4	127.0	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.
072600Z	31.5	126.3	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.
072606Z	33.3	124.9	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.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	43.	195.	395.	0.
AVG RIGHT ANGLE ERROR	20.	70.	395.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	4.	5.	0.
AVG INTENSITY BIAS	0.	1.	-5.	0.
NUMBER OF FORECASTS	5	4	1	1
		1	0	

SUPER TYPHOON HOPE

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR FORECAST WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR FORECAST WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR FORECAST WIND	72 HOUR ERRORS DST	72 HOUR ERRORS WIND
72406Z	10.2	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.
72412Z	10.3	146.9	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.
72418Z	10.3	146.2	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.
72500Z	10.4	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.
72506Z	10.7	144.8	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.
72512Z	10.9	144.0	25	11.0	144.1	25.	8.	0.	12.5	140.8	30.	42.	10.	13.8	137.0	35.	167.	15.	15.1	133.2	45.	247.	10.
72518Z	11.1	143.3	25	11.1	143.0	25.	18.	0.	12.3	138.8	30.	58.	15.	13.6	134.4	35.	266.	10.	15.0	130.3	45.	361.	10.
72600Z	11.2	142.4	20	11.1	142.7	20.	19.	0.	12.2	139.1	30.	92.	15.	13.6	134.8	35.	229.	5.	14.8	130.4	45.	325.	5.
72606Z	11.5	141.6	20	11.4	141.5	20.	8.	0.	12.7	137.8	30.	171.	15.	13.8	133.4	35.	295.	0.	15.2	129.2	45.	360.	-5.
72612Z	11.8	140.7	20	11.8	140.8	20.	6.	0.	13.0	137.0	30.	192.	10.	14.1	132.7	35.	304.	0.	15.7	128.5	40.	365.	-25.
72618Z	12.3	139.8	15	12.0	139.7	20.	19.	5.	13.6	135.7	30.	199.	5.	14.9	131.4	35.	305.	0.	15.7	127.0	45.	417.	-25.
72700Z	13.2	140.3	15	12.7	139.7	20.	46.	5.	14.4	135.4	25.	172.	-5.	16.0	131.4	30.	250.	-10.	17.8	127.5	35.	347.	-40.
72706Z	14.2	140.3	15	13.7	140.7	20.	38.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
72712Z	15.0	139.6	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.
72718Z	15.4	138.6	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.
72800Z	16.1	137.8	30	16.2	137.8	25.	6.	-5.	18.4	133.6	40.	166.	0.	19.7	129.4	50.	290.	-25.	20.3	125.2	60.	257.	-40.
72806Z	16.8	137.5	35	17.5	138.8	25.	85.	-10.	20.7	136.9	40.	259.	-10.	23.1	133.1	50.	359.	-30.	24.9	129.6	60.	349.	-55.
72812Z	17.2	136.9	35	18.2	137.2	25.	62.	-10.	21.6	135.0	35.	305.	-30.	24.0	131.3	45.	395.	-40.	25.8	127.2	55.	374.	-75.
72818Z	17.1	136.2	35	19.0	136.4	25.	114.	-10.	22.2	133.5	35.	331.	-35.	24.6	129.8	45.	397.	-45.	26.8	125.3	55.	402.	-75.
72900Z	16.7	135.7	40	16.8	135.2	35.	29.	-5.	17.5	132.2	50.	85.	-25.	18.5	128.6	60.	45.	-40.	19.4	124.3	65.	95.	-65.
72906Z	16.6	135.4	50	16.2	135.1	40.	29.	-10.	16.2	132.8	50.	54.	-30.	17.1	130.1	60.	185.	-55.	18.6	127.2	65.	341.	-50.
72912Z	16.5	134.8	65	16.6	134.9	65.	8.	0.	17.1	132.4	75.	39.	-10.	18.3	129.3	85.	192.	-45.	20.3	125.7	95.	321.	-25.
72918Z	16.7	134.2	70	16.8	134.5	70.	18.	0.	17.3	131.8	80.	80.	-10.	18.7	128.7	85.	240.	-45.	20.6	125.1	95.	390.	-20.
73000Z	16.8	133.5	75	16.9	133.4	75.	8.	0.	18.0	130.2	90.	58.	-10.	19.7	126.9	100.	214.	-30.	20.9	122.9	100.	364.	-5.
73006Z	17.1	132.7	80	17.0	132.6	80.	8.	0.	18.2	129.6	90.	121.	-25.	19.9	126.3	100.	269.	-25.	21.0	122.3	100.	474.	15.
73012Z	17.4	131.8	85	17.2	132.0	90.	17.	5.	18.1	129.3	110.	197.	-20.	19.8	125.8	120.	334.	0.	21.0	121.8	115.	569.	45.
73018Z	18.0	130.6	90	17.5	131.1	95.	41.	5.	19.0	128.0	110.	197.	-20.	20.2	124.9	120.	384.	5.	21.3	120.8	110.	625.	60.
73100Z	18.6	129.4	100	18.5	129.3	100.	8.	0.	20.5	124.8	110.	90.	-20.	22.0	120.0	100.	200.	-5.	23.0	115.2	75.	427.	40.
73106Z	19.3	127.8	115	19.2	128.0	105.	13.	-10.	21.7	123.2	110.	104.	-15.	22.9	117.9	80.	222.	-5.	23.8	113.8	25.	479.	-5.
73112Z	19.6	126.2	130	19.7	126.0	130.	13.	0.	21.5	120.1	120.	0.	0.	24.0	115.7	35.	233.	-35.	0.0	0.0	0.	-0.	0.
73118Z	20.1	124.7	130	20.1	124.6	130.	6.	0.	22.0	118.6	120.	29.	5.	25.0	115.1	25.	333.	-25.	0.0	0.0	0.	-0.	0.
80100Z	20.6	123.2	130	20.7	123.2	130.	6.	0.	22.6	117.2	90.	50.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80106Z	20.8	121.6	125	20.8	121.5	125.	6.	0.	22.7	116.0	75.	116.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80112Z	21.5	120.1	120	21.4	120.0	120.	8.	0.	23.0	114.5	50.	155.	-20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80118Z	21.7	118.2	115	21.9	118.4	115.	16.	0.	23.4	113.6	25.	225.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80200Z	22.2	116.4	105	22.0	116.5	105.	13.	0.	22.4	110.8	45.	183.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80206Z	22.5	113.9	85	22.4	114.0	90.	8.	5.	23.1	106.5	30.	103.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80212Z	22.7	111.7	70	22.6	112.1	70.	23.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80218Z	22.6	109.6	50	22.7	110.1	60.	28.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80300Z	22.2	107.5	35	22.5	108.0	35.	33.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
80306Z	21.7	105.4	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.
80312Z	21.1	103.1	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.
80318Z	20.8	101.7	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.
80400Z	20.7	100.4	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.
80406Z	20.7	99.2	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.
80412Z	20.7	97.9	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.
80418Z	20.9	96.7	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.
80500Z	21.2	95.4	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.
80506Z	21.5	94.5	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.
80512Z	21.7	93.5	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.
80518Z	22.2	92.7	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.
80600Z	22.3	92.0	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.
80606Z	22.3	91.4	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.
80612Z	22.2	90.8	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.
80618Z	21.8	90.3	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.
80700Z	21.7	89.7	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.
80706Z	21.7	89.0	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.
80712Z	21.8	88.3	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.
80718Z	22.2	87.2	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.
80800Z	22.4	86.4	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.
80806Z	22.5	85.5	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.
80812Z	22.5	84.6	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.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	23.	134.	265.	376.
AVG RIGHT ANGLE ERROR	16.	75.	140.	188.
AVG INTENSITY MAGNITUDE ERROR	3.	14.	22.	34.
AVG INTENSITY BIAS	-1.	-9.	-13.	-16.
NUMBER OF FORECASTS	33	29	23	21
		12	4	3

TROPICAL STORM GORDON

	BEST TRACK			WARNING					24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
							ERRORS					ERRORS					ERRORS						
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
072512Z	18.8	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.
072518Z	19.0	131.5	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.
072600Z	19.5	130.6	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.
072606Z	19.9	129.7	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.
072612Z	20.2	128.7	35	20.2	129.5	30.	45.	-5.	21.8	127.7	45.	204.	-5.	24.0	125.2	50.	305.	-5.	25.8	122.4	60.	449.	40.
072618Z	20.4	127.5	40	20.5	129.0	30.	85.	-10.	22.5	126.8	45.	244.	-10.	24.7	124.3	50.	328.	0.	0.0	0.0	0.	-0.	0.
072700Z	20.5	126.2	40	20.6	126.2	35.	6.	-5.	21.6	121.9	45.	43.	-15.	23.0	118.5	50.	63.	0.	0.0	0.0	0.	-0.	0.
072706Z	20.6	125.3	45	20.7	125.4	40.	8.	-5.	21.7	121.6	50.	50.	-10.	23.4	117.8	50.	100.	5.	0.0	0.0	0.	-0.	0.
072712Z	20.8	124.2	50	20.7	124.2	40.	6.	-10.	21.2	119.2	50.	69.	-5.	22.6	115.8	50.	68.	30.	0.0	0.0	0.	-0.	0.
072718Z	20.8	122.8	55	20.9	123.1	45.	17.	-10.	21.4	118.1	55.	76.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072800Z	20.9	121.7	60	20.8	121.5	50.	13.	-10.	20.9	116.2	65.	126.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072806Z	21.3	120.8	60	20.9	120.5	55.	29.	-5.	20.9	115.8	70.	132.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072812Z	22.0	120.1	55	22.0	120.2	55.	6.	0.	24.6	118.2	25.	211.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072818Z	22.5	118.8	50	22.9	119.3	55.	33.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072900Z	22.7	117.4	50	22.6	117.3	50.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072906Z	23.1	116.0	45	23.1	116.2	45.	11.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
072912Z	23.1	114.7	20	23.3	115.2	30.	30.	10.	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	23.	129.	173.	449.
AVG RIGHT ANGLE ERROR	12.	90.	121.	278.
AVG INTENSITY MAGNITUDE ERROR	6.	11.	9.	40.
AVG INTENSITY BIAS	-3.	1.	5.	40.
NUMBER OF FORECASTS	13	9	5	1
		4	3	0

TROPICAL DEPRESSION 11

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	ERRORS DST	ERRORS WIND	24 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	48 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	72 HOUR FORECAST POSIT		WIND	DST	WIND
080206Z	11.7	135.9	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.
080212Z	12.3	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.
080218Z	12.8	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.
080300Z	13.4	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.
080306Z	13.9	132.1	15	14.0	131.7	15.	24.	0.	15.6	128.0	25.	66.	5.	17.9	123.7	35.	164.	10.	20.4	118.6	50.	185.	35.
080312Z	14.2	131.3	15	14.4	130.7	20.	37.	5.	16.2	127.0	30.	87.	10.	18.4	122.7	35.	158.	10.	20.9	117.5	50.	156.	35.
080318Z	14.5	130.5	20	14.9	129.8	20.	47.	0.	16.7	126.2	35.	103.	15.	18.5	122.5	45.	100.	25.	0.0	0.0	0.	-0.	0.
080400Z	14.9	129.8	20	14.9	129.7	20.	6.	0.	16.8	126.0	30.	96.	10.	18.7	122.0	40.	74.	20.	0.0	0.0	0.	-0.	0.
080406Z	15.3	129.1	20	15.7	128.5	20.	42.	0.	18.5	122.6	30.	221.	5.	20.3	118.4	40.	197.	25.	0.0	0.0	0.	-0.	0.
080412Z	16.0	128.5	20	16.0	126.4	20.	121.	0.	18.0	122.2	25.	193.	0.	20.2	118.0	35.	137.	20.	0.0	0.0	0.	-0.	0.
080418Z	16.7	128.0	20	15.7	125.4	20.	149.	0.	19.0	121.3	25.	158.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080500Z	17.7	127.4	20	17.6	127.4	25.	6.	5.	20.6	124.2	30.	94.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080506Z	18.6	126.5	25	18.5	128.2	25.	95.	0.	22.0	126.8	30.	285.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080512Z	19.1	125.4	25	19.5	125.4	25.	30.	0.	23.0	121.3	30.	132.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080518Z	19.2	124.1	20	19.6	124.4	25.	29.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080600Z	19.5	123.0	20	19.7	123.1	25.	13.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080606Z	20.6	121.9	15	20.0	122.2	20.	40.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
080612Z	21.0	120.3	15	20.9	120.6	20.	13.	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	47.	144.	139.	171.
AVG RIGHT ANGLE ERROR	30.	94.	89.	129.
AVG INTENSITY MAGNITUDE ERROR	2.	9.	19.	35.
AVG INTENSITY BIAS	2.	9.	19.	35.
NUMBER OF FORECASTS	14	10	6	2
		4	6	2

TYPHOON IRVING

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	ERRORS DST	ERRORS WIND	24 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	48 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	72 HOUR FORECAST POSIT		WIND	DST	WIND
080712Z	14.0	137.7	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.
080718Z	15.0	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.
080800Z	15.6	138.1	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.
080806Z	16.4	138.0	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.
080812Z	16.8	137.5	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.
080818Z	17.4	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.
080900Z	17.7	136.0	30	17.9	136.0	30.	6.	0.	19.9	132.4	35.	103.	5.	21.0	129.2	45.	279.	15.	21.5	126.0	55.	239.	5.
080906Z	18.0	135.5	30	18.3	135.1	30.	29.	0.	21.0	130.3	40.	188.	10.	21.7	124.5	50.	384.	15.	22.0	118.5	60.	528.	5.
080912Z	18.2	134.8	30	18.3	135.2	30.	23.	0.	19.7	133.3	40.	150.	10.	21.3	129.5	50.	264.	10.	21.8	123.5	60.	266.	5.
080918Z	18.3	134.2	30	18.0	135.0	30.	49.	0.	19.8	134.4	40.	287.	10.	21.7	130.8	55.	285.	10.	22.3	125.0	60.	211.	0.
081000Z	18.4	133.3	30	18.5	133.5	25.	13.	-5.	19.6	130.6	35.	183.	5.	20.4	126.8	40.	162.	-10.	21.0	122.5	45.	242.	-20.
081006Z	18.4	132.2	30	18.8	132.7	25.	37.	-5.	20.1	129.6	35.	224.	0.	21.2	126.0	40.	178.	-15.	22.2	121.3	45.	301.	-25.
081012Z	18.3	131.1	30	18.7	131.4	30.	29.	0.	19.8	127.3	40.	198.	0.	21.1	123.4	45.	243.	-10.	21.8	118.8	50.	399.	-20.
081018Z	18.0	129.7	30	18.7	130.1	30.	48.	0.	19.6	125.7	40.	198.	-5.	21.0	121.4	45.	321.	-15.	21.8	116.9	50.	462.	-20.
081100Z	17.2	128.6	30	17.3	128.7	30.	8.	0.	17.1	124.4	45.	187.	-5.	18.6	120.4	40.	365.	-25.	19.8	115.5	50.	572.	-25.
081106Z	16.5	128.5	35	17.0	127.8	30.	50.	-5.	17.2	123.7	45.	206.	-10.	19.0	119.4	40.	423.	-30.	20.2	114.5	50.	613.	-25.
081112Z	16.9	129.0	40	17.2	129.2	35.	21.	-5.	18.3	125.4	45.	88.	-10.	18.5	121.2	50.	341.	-20.	19.7	116.7	55.	521.	-25.
081118Z	17.5	128.4	45	17.9	128.8	40.	33.	-5.	19.0	124.9	50.	108.	-10.	19.0	120.8	55.	330.	-15.	19.7	116.7	65.	537.	-20.
081200Z	17.8	127.6	50	17.5	128.2	55.	39.	5.	18.7	125.5	65.	103.	0.	19.1	121.7	70.	321.	-5.	19.5	117.5	70.	535.	-20.
081206Z	18.4	127.1	55	17.9	127.5	55.	38.	0.	19.0	124.6	65.	168.	-5.	19.1	120.9	70.	364.	-5.	19.8	116.7	70.	587.	-20.
081212Z	18.7	126.9	55	18.5	126.5	55.	26.	0.	19.4	123.4	65.	213.	-5.	19.6	119.6	70.	403.	-10.	18.9	115.5	75.	683.	-15.
081218Z	19.2	126.8	60	18.8	125.8	55.	61.	-5.	19.8	122.6	65.	226.	-5.	20.0	118.8	75.	439.	-10.	19.2	115.5	80.	713.	-10.
081300Z	20.0	126.7	65	20.1	126.8	65.	8.	0.	23.8	126.0	75.	58.	0.	27.4	127.5	80.	193.	-10.	29.9	131.0	80.	379.	-10.
081306Z	21.1	126.6	70	21.1	126.8	70.	11.	0.	25.0	120.6	75.	236.	0.	28.4	128.5	80.	249.	-10.	30.5	132.9	80.	473.	-10.
081312Z	22.0	126.0	70	22.0	126.6	70.	33.	0.	25.9	127.0	75.	156.	-5.	29.5	129.0	80.	303.	-10.	31.7	132.9	80.	467.	-5.
081318Z	22.7	125.2	70	23.2	125.7	70.	41.	0.	27.6	127.1	80.	203.	-5.	31.0	131.2	85.	416.	-5.	32.6	137.0	85.	653.	5.
081400Z	23.5	125.0	75	23.7	125.1	70.	13.	-5.	27.8	125.4	80.	128.	-10.	31.8	127.2	80.	273.	-10.	35.0	130.6	70.	282.	0.
081406Z	24.0	124.8	75	24.1	124.9	75.	8.	0.	27.4	125.2	85.	66.	-5.	31.2	126.8	80.	163.	-10.	34.5	130.0	70.	174.	15.
081412Z	24.6	124.5	80	24.6	124.8	80.	16.	0.	30.8	126.7	100.	252.	10.	30.8	126.7	110.	162.	25.	34.4	129.8	85.	167.	55.
081418Z	25.2	124.4	85	25.3	124.5	85.	8.	0.	28.2	124.6	105.	51.	15.	31.5	126.2	110.	136.	30.	34.7	129.5	80.	301.	55.
081500Z	25.9	124.3	90	25.7	124.4	90.	13.	0.	28.5	124.0	100.	68.	10.	31.6	124.7	100.	144.	30.	34.6	127.5	80.	524.	55.
081506Z	26.9	124.1	90	26.5	124.4	90.	29.	0.	29.3	124.2	95.	82.	5.	32.5	125.1	90.	201.	35.	35.2	128.3	75.	626.	50.
081512Z	27.5	123.7	90	27.5	123.9	90.	11.	0.	30.5	123.6	95.	72.	10.	33.8	125.1	90.	270.	60.	0.0	0.0	0.	-0.	0.
081518Z	28.5	123.7	90	28.3	123.8	90.	13.	0.	31.5	123.8	95.	78.	15.	34.7	126.0	60.	385.	35.	0.0	0.0	0.	-0.	0.
081600Z	29.6	123.7	90	29.5	123.7	95.	6.	5.	33.5	124.5	85.	39.	15.	37.3	127.7	60.	387.	35.	0.0	0.0	0.	-0.	0.
081606Z	30.6	123.7	90	31.1	123.8	90.	30.	0.	36.3	125.6	80.	68.	25.	40.4	131.5	45.	282.	20.	0.0	0.0	0.	-0.	0.
081612Z	31.7	123.7	85	31.6	123.7	90.	6.	5.	36.1	124.5	80.	219.	50.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081618Z	32.8	124.0	80	32.8	123.8	80.	10.	0.	37.3	126.0	75.	285.	50.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081700Z	34.0	125.0	70	34.1	124.9	70.	8.	0.	38.7	128.8	50.	291.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081706Z	35.6	126.7	55	35.2	126.2	60.	34.	5.	39.1	130.9	35.	362.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081712Z	37.1	128.9	30	36.6	128.6	30.	33.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081718Z	39.5	131.4	25	38.9	131.4	30.	36.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081800Z	42.0	133.5	25	42.1	134.3	25.	36.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081806Z	44.2	135.3	25	44.8	137.0	25.	81.	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	26.	163.	285.	441.
AVG RIGHT ANGLE ERROR	17.	98.	209.	344.
AVG INTENSITY MAGNITUDE ERROR	2.	11.	18.	20.
AVG INTENSITY BIAS	-0.	6.	3.	-1.
NUMBER OF FORECASTS	38	34	30	25
		10	7	7

SUPER TYPHOON JUDY

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
081512Z	10.5	151.0	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.
081518Z	11.3	150.1	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.
081600Z	11.8	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.
081606Z	12.3	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.
081612Z	12.8	146.1	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.
081618Z	13.3	144.7	30	13.6	144.5	35.	21.	5.	16.8	140.3	60.	109.	10.	20.8	136.8	70.	192.	-20.	24.1	132.9	85.	230.	-40.
081700Z	13.8	143.6	35	13.9	143.2	80.	13.	45.	16.5	138.3	60.	62.	5.	19.3	134.5	70.	99.	-40.	22.9	131.6	85.	164.	-45.
081706Z	14.2	142.2	35	14.2	142.0	40.	12.	5.	16.3	137.3	60.	52.	-15.	18.6	133.0	70.	121.	-45.	20.8	129.0	85.	248.	-50.
081712Z	14.5	141.1	40	14.6	140.6	45.	30.	5.	16.7	135.6	65.	111.	-15.	18.8	130.9	75.	221.	-45.	21.1	127.0	85.	325.	-50.
081718Z	15.0	140.0	50	15.0	139.4	50.	35.	0.	17.1	134.5	65.	112.	-25.	19.3	130.0	75.	257.	-50.	21.9	126.4	85.	312.	-60.
081800Z	15.7	139.0	55	15.4	138.9	55.	19.	0.	17.3	134.3	75.	101.	-35.	19.3	130.1	85.	239.	-45.	21.6	126.7	90.	266.	-30.
081806Z	16.4	138.2	75	16.0	137.6	60.	42.	-15.	18.1	133.1	75.	125.	-40.	20.0	129.0	85.	268.	-50.	22.5	125.7	90.	287.	-20.
081812Z	17.1	137.3	80	16.8	137.3	70.	18.	-10.	18.7	133.4	85.	95.	-35.	20.2	129.1	90.	245.	-45.	22.9	125.8	95.	224.	-5.
081818Z	17.6	136.4	90	17.4	136.4	75.	12.	-15.	19.4	132.6	85.	121.	-40.	21.1	128.2	90.	237.	-35.	24.0	125.3	95.	198.	-5.
081900Z	18.2	135.8	110	18.2	135.7	110.	6.	0.	20.4	132.3	130.	99.	0.	22.4	129.5	135.	106.	15.	25.3	128.5	135.	60.	40.
081906Z	19.0	135.1	115	18.9	135.0	115.	8.	0.	21.3	131.5	130.	109.	-5.	23.5	129.0	135.	97.	25.	26.2	128.9	135.	131.	45.
081912Z	19.7	134.7	120	19.7	134.5	125.	11.	5.	22.3	131.2	135.	81.	0.	25.0	129.5	135.	42.	35.	27.7	129.7	125.	240.	35.
081918Z	20.5	134.4	125	20.2	134.2	130.	21.	5.	22.3	132.3	135.	53.	10.	24.6	130.5	135.	88.	35.	27.3	130.3	125.	251.	40.
082000Z	21.3	133.8	130	21.3	133.8	135.	0.	5.	24.5	132.2	135.	89.	15.	27.3	133.2	135.	329.	40.	29.6	137.1	125.	649.	40.
082006Z	22.2	133.2	135	22.2	133.2	135.	0.	0.	25.6	131.5	135.	97.	25.	28.3	133.0	135.	375.	45.	30.6	137.2	115.	700.	30.
082012Z	22.7	132.6	135	23.1	132.8	135.	26.	0.	26.6	130.7	120.	139.	20.	29.2	130.6	110.	340.	20.	31.8	134.5	95.	616.	10.
082018Z	23.1	131.9	125	23.3	131.2	130.	40.	5.	25.1	126.8	115.	121.	15.	27.8	125.3	105.	170.	20.	31.3	126.5	90.	252.	10.
082100Z	23.4	131.1	120	23.4	131.0	120.	5.	0.	24.5	128.0	110.	6.	15.	26.2	125.7	100.	24.	15.	30.0	125.8	85.	170.	5.
082106Z	24.2	130.6	110	24.0	130.4	115.	16.	5.	24.0	130.4	105.	160.	15.	26.2	127.7	90.	176.	5.	32.5	127.5	85.	316.	15.
082112Z	24.3	129.6	100	24.5	129.6	115.	12.	15.	26.6	127.0	100.	125.	10.	28.7	125.7	90.	127.	5.	31.2	126.1	80.	109.	20.
082118Z	24.4	128.9	100	24.7	128.7	115.	21.	15.	27.0	125.7	100.	118.	15.	29.2	124.5	90.	91.	10.	31.6	125.1	75.	142.	20.
082200Z	24.4	128.0	95	24.4	127.8	90.	11.	-5.	25.8	124.8	65.	43.	-20.	27.7	122.1	50.	73.	-30.	29.9	119.9	25.	175.	-30.
082206Z	24.4	127.5	90	24.4	127.2	85.	16.	-5.	25.6	124.4	60.	78.	-25.	27.7	121.8	50.	104.	-20.	30.1	119.7	25.	215.	-25.
082212Z	24.5	127.0	90	24.3	126.8	85.	16.	-5.	25.0	124.1	60.	151.	-25.	27.0	121.5	50.	177.	-10.	0.0	0.0	0.	-0.	0.
082218Z	25.1	126.3	85	24.9	126.1	80.	21.	-5.	26.8	123.3	55.	84.	-25.	29.2	121.0	30.	114.	-25.	0.0	0.0	0.	-0.	0.
082300Z	25.8	125.6	85	25.8	125.7	85.	5.	0.	27.9	123.1	70.	49.	-10.	30.2	120.6	40.	135.	-15.	0.0	0.0	0.	-0.	0.
082306Z	26.9	124.5	85	26.7	124.8	80.	20.	-5.	29.2	121.5	50.	58.	-20.	31.7	119.4	25.	215.	-25.	0.0	0.0	0.	-0.	0.
082312Z	27.5	123.7	85	27.5	123.7	80.	0.	-5.	30.1	120.7	45.	100.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082318Z	28.2	123.2	80	28.0	123.0	80.	16.	0.	30.6	120.1	40.	134.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082400Z	28.7	122.9	80	28.8	122.7	70.	12.	-10.	31.2	120.3	30.	144.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082406Z	29.3	122.6	70	29.5	122.2	65.	24.	-5.	32.3	120.2	30.	181.	-20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082412Z	29.8	122.6	60	29.9	122.3	55.	17.	-5.	32.5	120.6	30.	187.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082418Z	30.4	122.7	55	30.6	122.2	55.	28.	0.	32.8	120.2	25.	247.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082500Z	30.9	123.1	55	30.9	122.7	50.	21.	-5.	32.8	123.2	25.	167.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082506Z	31.4	123.6	50	31.4	123.5	45.	5.	-5.	34.1	126.3	25.	41.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082512Z	31.8	124.2	40	32.0	124.1	40.	13.	0.	34.7	127.2	25.	66.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082518Z	32.5	125.1	30	32.3	125.3	35.	16.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082600Z	33.2	126.1	25	33.6	126.7	30.	38.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082606Z	33.9	127.1	25	34.4	127.6	25.	33.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082612Z	34.4	128.5	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	18.	105.	173.	277.
AVG RIGHT ANGLE ERROR	12.	81.	139.	213.
AVG INTENSITY MAGNITUDE ERROR	6.	16.	23.	28.
AVG INTENSITY BIAS	1.	-7.	-3.	-1.
NUMBER OF FORECASTS	39	36	27	23
		17	17	17

TROPICAL DEPRESSION 14

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
081800Z	13.5	166.6	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.
081806Z	13.9	166.2	20	13.8	166.3	20.	8.	0.	15.1	164.8	30.	130.	10.	16.5	161.8	40.	296.	30.	0.0	0.0	0.	-0.	0.
081812Z	14.5	165.6	20	14.6	166.2	20.	35.	0.	16.0	164.8	30.	162.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081818Z	15.3	165.2	20	14.8	165.6	20.	38.	0.	16.1	163.7	30.	209.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081900Z	16.1	164.6	20	15.7	164.7	20.	25.	0.	17.6	161.9	30.	165.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081906Z	17.1	163.9	20	17.0	163.8	20.	8.	0.	19.1	160.3	15.	120.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081912Z	18.1	163.0	20	17.9	163.1	20.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
081918Z	19.2	162.0	15	19.4	162.2	20.	43.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082000Z	20.0	160.9	10	19.5	160.4	20.	41.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
082006Z	21.0	159.6	10	19.8	160.1	20.	77.	10.	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	33.	157.	295.	0.
AVG RIGHT ANGLE ERROR	19.	43.	118.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	12.	30.	0.
AVG INTENSITY BIAS	3.	12.	30.	0.
NUMBER OF FORECASTS	9	5	1	0
		0	0	

TROPICAL STORM KEN

	BEST TRACK			WARNING					24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
							ERRORS					ERRORS					ERRORS						
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
083000Z	22.3	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.
083006Z	22.5	141.5	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.
083012Z	22.9	140.1	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.
083018Z	23.3	138.9	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.
083100Z	23.7	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.
083106Z	24.0	136.6	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.
083112Z	24.4	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.
083118Z	24.6	134.9	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.
090100Z	24.8	134.1	25	25.8	132.5	25.	105.	0.	27.4	128.5	35.	200.	5.	29.8	126.2	35.	217.	-10.	33.6	129.5	30.	200.	0.
090106Z	24.9	133.5	25	25.2	132.9	25.	37.	0.	25.9	130.3	35.	64.	0.	27.4	128.3	35.	190.	-25.	30.0	127.4	30.	485.	5.
090112Z	25.1	133.0	25	25.3	132.6	25.	25.	0.	25.9	130.1	35.	86.	-5.	27.6	128.3	35.	265.	-20.	30.7	127.6	30.	562.	5.
090118Z	25.3	132.4	25	25.3	131.6	25.	43.	0.	26.5	129.0	35.	111.	-5.	29.2	128.2	35.	274.	-10.	0.0	0.0	0.	-0.	0.
090200Z	25.8	131.8	30	25.5	131.7	30.	19.	0.	26.4	129.3	40.	151.	-5.	28.4	127.6	40.	450.	10.	0.0	0.0	0.	-0.	0.
090206Z	26.5	131.2	35	26.2	131.9	30.	42.	-5.	28.4	130.8	40.	98.	-20.	30.8	130.4	35.	343.	10.	0.0	0.0	0.	-0.	0.
090212Z	27.2	130.8	40	27.2	130.8	45.	0.	5.	30.9	130.0	50.	61.	-5.	34.1	133.5	35.	205.	10.	0.0	0.0	0.	-0.	0.
090218Z	27.8	130.5	40	28.1	130.3	45.	21.	5.	31.9	130.5	50.	79.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090300Z	28.8	130.2	45	28.6	130.3	40.	13.	-5.	32.0	131.0	35.	173.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090306Z	30.0	130.4	60	29.9	130.2	40.	16.	-20.	33.9	132.6	30.	137.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090312Z	31.3	131.1	55	31.5	131.2	40.	13.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090318Z	32.5	131.9	45	32.7	132.0	35.	13.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090400Z	34.0	133.5	30	34.0	133.0	30.	25.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090406Z	35.2	134.8	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.
090412Z	36.5	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	29.	116.	273.	415.
AVG RIGHT ANGLE ERROR	13.	60.	111.	105.
AVG INTENSITY MAGNITUDE ERROR	5.	6.	14.	3.
AVG INTENSITY BIAS	-3.	-2.	-5.	3.
NUMBER OF FORECASTS	13	10	7	3
		5	1	1

TYPHOON LOLA

	BEST TRACK			WARNING					24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
							ERRORS					ERRORS					ERRORS						
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
090200Z	21.3	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.
090206Z	21.5	151.5	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.
090212Z	21.8	151.4	30	21.8	151.2	30.	11.	0.	24.5	150.5	45.	84.	15.	26.5	150.5	45.	200.	-20.	29.1	152.7	45.	368.	-30.
090218Z	22.1	151.3	30	22.6	150.7	30.	45.	0.	25.2	149.8	45.	108.	10.	27.8	151.0	45.	279.	-25.	30.0	154.2	45.	467.	-35.
090300Z	22.4	151.1	30	22.6	150.0	30.	62.	0.	23.9	147.9	40.	61.	-5.	25.4	145.4	50.	70.	-25.	26.5	142.0	55.	246.	-30.
090306Z	22.8	150.7	30	22.5	150.5	30.	21.	0.	23.2	149.6	45.	81.	-5.	24.4	147.3	50.	81.	-25.	25.6	144.6	55.	163.	-35.
090312Z	23.1	150.3	30	22.5	150.5	30.	37.	0.	23.2	149.6	30.	131.	-35.	24.4	147.3	40.	121.	-35.	25.6	144.6	45.	195.	-45.
090318Z	23.4	149.7	35	23.1	150.2	30.	33.	-5.	24.5	148.9	35.	98.	-35.	25.8	146.8	40.	62.	-40.	26.6	143.9	45.	205.	-35.
090400Z	23.7	149.0	45	23.6	149.1	45.	8.	0.	25.2	146.8	60.	8.	-15.	26.7	144.0	70.	139.	-15.	28.4	141.7	75.	265.	10.
090406Z	24.0	148.4	50	24.0	148.4	50.	0.	0.	25.6	146.0	65.	32.	-10.	27.2	143.6	70.	153.	-20.	29.0	141.8	75.	271.	15.
090412Z	24.4	147.6	65	24.3	147.7	65.	8.	0.	26.0	145.2	75.	72.	0.	27.9	143.0	80.	177.	-10.	30.3	141.5	85.	294.	30.
090418Z	24.7	147.1	70	24.7	146.9	70.	11.	0.	26.8	144.2	75.	123.	-5.	28.9	142.1	80.	220.	0.	31.6	141.5	90.	324.	45.
090500Z	25.3	146.7	75	25.2	146.5	75.	12.	0.	27.3	144.0	85.	133.	0.	29.9	141.8	85.	238.	20.	33.1	142.0	85.	346.	45.
090506Z	25.6	146.6	75	25.8	146.0	75.	34.	0.	27.9	143.8	85.	137.	-5.	30.2	141.9	85.	245.	25.	33.6	142.7	85.	385.	50.
090512Z	26.3	146.5	75	26.4	146.3	75.	12.	0.	29.3	146.5	80.	49.	-10.	32.3	150.0	65.	156.	10.	33.9	156.4	50.	255.	20.
090518Z	26.8	146.5	80	27.0	146.4	80.	13.	0.	29.9	147.2	75.	59.	-5.	32.7	151.0	60.	167.	15.	33.9	157.5	45.	257.	15.
090600Z	27.4	146.5	85	27.3	146.5	80.	6.	-5.	29.8	147.4	75.	55.	10.	32.3	150.9	60.	163.	20.	0.0	0.0	0.	-0.	0.
090606Z	27.8	146.4	90	27.9	146.5	90.	9.	0.	30.3	147.8	80.	69.	20.	32.5	151.7	60.	170.	25.	0.0	0.0	0.	-0.	0.
090612Z	28.5	146.3	90	28.5	146.4	90.	5.	0.	31.1	148.0	75.	62.	20.	32.9	152.2	55.	180.	25.	0.0	0.0	0.	-0.	0.
090618Z	29.3	146.3	80	29.3	146.3	85.	0.	5.	31.8	148.3	65.	78.	20.	33.0	152.9	50.	216.	20.	0.0	0.0	0.	-0.	0.
090700Z	30.1	146.4	65	30.2	146.3	65.	8.	0.	32.4	148.8	45.	119.	5.	33.5	154.1	40.	220.	10.	0.0	0.0	0.	-0.	0.
090706Z	30.8	146.6	60	30.8	146.4	60.	10.	0.	33.0	149.6	45.	130.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090712Z	31.7	147.0	55	31.7	147.2	55.	10.	0.	33.4	152.6	40.	154.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090718Z	33.0	147.7	45	33.0	147.7	45.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090800Z	34.4	148.8	40	34.2	148.4	40.	23.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
090806Z	35.1	150.3	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.
090812Z	35.9	151.8	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.
090818Z	36.6	153.4	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.
090900Z	37.1	155.1	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			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	16.	88.	172.	287.
AVG RIGHT ANGLE ERROR	10.	64.	143.	236.
AVG INTENSITY MAGNITUDE ERROR	1.	12.	20.	31.
AVG INTENSITY BIAS	-0.	-0.	-2.	1.
NUMBER OF FORECASTS	23	21	19	14
		13	13	9

TYPHOON MAC

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	ERRORS DST	ERRORS WIND	24 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	48 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	72 HOUR FORECAST POSIT		WIND	DST	WIND
091300Z	12.0	139.0	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.
091306Z	12.0	138.8	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.
091312Z	11.9	137.8	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.
091318Z	11.9	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.
091400Z	11.8	136.6	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.
091406Z	11.8	135.7	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.
091412Z	11.8	134.8	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.
091418Z	12.0	133.8	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.
091500Z	12.3	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.
091506Z	12.7	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.
091512Z	12.9	131.0	20	13.0	131.0	20.	5.	0.	14.8	127.7	30.	70.	-30.	16.8	124.3	40.	187.	-25.	18.6	120.5	50.	322.	0.
091518Z	13.2	130.0	30	13.3	130.1	20.	8.	-10.	15.1	126.6	30.	84.	-35.	17.0	123.0	40.	210.	-15.	18.8	119.5	40.	339.	-5.
091600Z	13.5	129.0	40	13.5	129.2	25.	12.	-15.	15.3	124.9	30.	97.	-40.	17.4	122.4	40.	232.	-10.	19.2	118.7	45.	352.	5.
091606Z	13.7	127.9	55	13.8	127.8	50.	8.	-5.	15.4	123.6	60.	158.	-10.	16.9	119.5	60.	295.	10.	17.8	115.1	65.	379.	30.
091612Z	13.7	127.3	60	14.1	126.8	50.	38.	-10.	15.7	122.7	60.	184.	-5.	17.2	118.5	60.	324.	10.	18.4	114.4	65.	395.	30.
091618Z	13.7	126.7	65	14.3	125.9	55.	63.	-10.	16.1	121.9	55.	203.	0.	17.8	118.0	60.	340.	15.	19.4	114.3	65.	390.	30.
091700Z	13.7	126.2	70	14.5	124.8	55.	94.	-15.	15.3	120.7	55.	206.	5.	15.5	117.4	50.	250.	10.	15.5	113.3	60.	335.	20.
091706Z	13.7	125.7	70	14.0	124.8	55.	55.	-15.	14.9	121.3	45.	136.	-5.	15.4	118.0	55.	164.	20.	15.8	114.3	65.	269.	25.
091712Z	13.8	125.2	65	13.8	125.2	55.	0.	-10.	14.6	122.9	55.	49.	5.	14.9	120.8	35.	35.	0.	15.3	118.2	55.	139.	20.
091718Z	13.8	124.5	55	13.9	124.7	55.	13.	0.	14.5	122.5	50.	53.	5.	15.0	120.3	35.	41.	0.	15.5	117.6	60.	149.	30.
091800Z	13.8	123.9	50	14.0	124.0	55.	13.	5.	14.7	121.3	40.	48.	0.	15.3	118.6	50.	56.	10.	16.4	115.5	60.	190.	30.
091806Z	13.6	123.3	50	14.0	123.0	55.	30.	5.	14.8	120.5	35.	30.	0.	15.4	117.6	50.	123.	10.	16.5	114.4	60.	249.	25.
091812Z	13.6	122.7	50	13.2	122.7	55.	24.	5.	14.0	120.3	55.	48.	20.	15.0	118.0	60.	159.	25.	16.4	115.5	65.	217.	25.
091818Z	13.7	122.1	45	13.7	122.0	50.	6.	5.	14.2	119.8	55.	78.	20.	15.1	117.5	60.	173.	30.	16.7	115.2	65.	225.	25.
091900Z	13.9	121.4	40	13.9	121.3	40.	9.	0.	14.4	119.0	50.	102.	10.	15.3	116.7	55.	202.	25.	16.7	114.2	65.	259.	25.
091906Z	14.3	120.6	35	13.8	120.5	40.	30.	5.	14.6	118.2	45.	153.	5.	15.9	115.6	55.	227.	20.	17.8	113.6	65.	225.	30.
091912Z	14.8	120.2	35	14.4	119.8	35.	33.	0.	15.5	117.1	40.	152.	5.	16.8	114.6	45.	230.	5.	17.6	111.9	55.	297.	20.
091918Z	15.5	119.8	35	14.6	119.1	35.	67.	0.	15.7	116.3	40.	174.	10.	16.6	113.1	45.	300.	5.	17.4	109.9	55.	371.	20.
092000Z	16.1	119.1	40	16.0	118.7	35.	24.	-5.	17.6	116.5	35.	103.	5.	18.3	114.1	40.	185.	0.	19.1	111.6	45.	212.	5.
092006Z	17.1	118.8	40	17.2	118.5	30.	19.	-10.	18.9	115.8	20.	119.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092012Z	17.6	118.6	35	17.8	118.5	30.	13.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092018Z	17.9	118.3	30	18.3	118.0	30.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092100Z	18.4	118.1	30	18.3	118.1	30.	6.	0.	20.0	116.5	25.	30.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092106Z	19.0	117.9	35	18.8	117.5	30.	26.	-5.	20.5	115.6	25.	29.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092112Z	19.5	117.5	40	19.2	117.1	30.	29.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092118Z	20.1	116.9	40	19.5	116.5	30.	42.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092200Z	20.5	116.4	40	20.5	116.5	30.	6.	-10.	22.0	113.9	25.	41.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092206Z	20.8	116.0	35	21.0	116.0	30.	12.	-5.	22.5	113.0	0.	69.	-40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092212Z	20.9	115.6	35	21.3	115.7	30.	25.	-5.	22.5	113.4	35.	37.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092218Z	21.2	115.0	35	21.2	115.2	35.	11	0.	22.1	113.5	35.	12.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092300Z	21.5	114.4	40	21.5	114.6	35.	11.	-5.	22.7	112.3	25.	35.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092306Z	21.8	114.0	40	21.8	113.9	45.	5.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092312Z	22.0	113.0	35	22.0	113.8	35.	44.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092318Z	22.3	113.5	30	22.3	113.4	30.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092400Z	22.5	112.9	25	22.5	113.0	25.	6.	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	23.	93.	195.	279.
AVG RIGHT ANGLE ERROR	16.	66.	152.	227.
AVG INTENSITY MAGNITUDE ERROR	5.	12.	13.	21.
AVG INTENSITY BIAS	-4.	-5.	8.	21.
NUMBER OF FORECASTS	35	27	19	12
		16	9	11

TROPICAL STORM NANCY

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	ERRORS DST	ERRORS WIND	24 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	48 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	72 HOUR FORECAST POSIT		WIND	DST	WIND
091712Z	16.0	113.0	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.
091718Z	16.8	112.2	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.
091800Z	17.3	111.5	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.
091806Z	17.7	111.5	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.
091812Z	18.1	111.5	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.
091818Z	18.6	111.7	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.
091900Z	18.8	111.6	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.
091906Z	18.6	111.2	35	18.5	111.7	30.	28.	-5.	20.4	112.4	45.	207.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
091912Z	18.6	110.7	35	18.8	110.8	45.	13.	10.	19.3	110.6	45.	90.	10.	22.2	110.6	35.	304.	0.	0.0	0.0	0.	-0.	0.
091918Z	18.7	110.3	45	19.3	110.4	50.	36.	5.	20.1	109.2	45.	132.	10.	20.3	108.7	50.	179.	15.	20.6	105.8	35.	227.	15.
092000Z	18.7	109.7	35	18.7	109.3	40.	23.	5.	18.5	106.4	30.	139.	-5.	20.6	107.1	50.	199.	20.	0.0	0.0	0.	-0.	0.
092006Z	18.4	109.4	35	18.8	109.2	40.	26.	5.	19.3	106.8	35.	132.	0.	18.2	104.3	25.	181.	-5.	0.0	0.0	0.	-0.	0.
092012Z	18.2	109.3	35	18.4	108.9	35.	26.	0.	18.3	106.9	30.	78.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092018Z	17.9	109.0	35	19.3	108.1	35.	56.	0.	18.2	105.6	25.	126.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092100Z	17.7	108.7	35	17.5	108.1	35.	36.	0.	15.8	106.2	20.	105.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092106Z	17.6	108.3	35	17.4	107.8	35.	31.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092112Z	17.4	107.9	35	18.0	108.0	35.	36.	0.	17.5	106.5	25.	38.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092118Z	17.3	107.6	30	17.7	107.3	30.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092200Z	17.2	107.3	30	17.3	107.1	25.	13.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092206Z	17.1	107.0	30	17.3	106.8	25.	17.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092212Z	16.9	106.7	20	16.5	106.5	20.	26.	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	28.	116.	215.	227.
AVG RIGHT ANGLE ERROR	19.	86.	185.	219.
AVG INTENSITY MAGNITUDE ERROR	3.	7.	10.	15.
AVG INTENSITY BIAS	1.	1.	8.	15.
NUMBER OF FORECASTS	14	9	4	1
		3	3	1

TYPHOON OWEN

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST				
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
092200Z	12.6	138.9	20	13.0	138.0	20.	58.	0.	13.5	135.0	40.	123.	15.	14.3	131.8	60.	229.	15.	14.9	128.6	70.	383.	0.
092206Z	12.5	138.3	25	12.8	138.0	25.	25.	0.	13.4	134.9	45.	99.	15.	16.6	131.7	60.	233.	5.	15.9	128.6	70.	347.	-5.
092212Z	12.1	137.7	25	12.5	137.3	25.	33.	0.	12.9	134.0	35.	141.	0.	13.8	130.9	45.	337.	-15.	15.5	128.2	55.	369.	-25.
092218Z	12.1	137.2	25	12.3	136.3	25.	54.	0.	12.7	132.7	35.	226.	-10.	13.6	129.1	50.	424.	-10.	15.3	126.0	60.	479.	-40.
092300Z	12.6	136.9	25	12.3	136.7	25.	21.	0.	12.4	134.5	30.	226.	-15.	12.7	131.2	35.	497.	-35.	13.2	128.0	45.	545.	-55.
092306Z	13.3	136.6	30	12.3	136.1	30.	66.	0.	12.5	133.6	45.	313.	-10.	12.8	130.3	55.	508.	-20.	13.3	127.1	60.	621.	-50.
092312Z	13.9	136.2	35	13.3	136.1	45.	36.	10.	13.9	134.1	50.	309.	-10.	14.7	131.4	60.	445.	-20.	15.4	128.2	70.	586.	-40.
092318Z	15.0	135.8	45	13.7	135.6	45.	79.	0.	14.6	133.1	55.	333.	-5.	15.4	129.9	65.	431.	-35.	16.3	126.2	75.	516.	-30.
092400Z	16.1	135.3	45	16.4	135.2	45.	19.	0.	21.0	132.4	60.	95.	-10.	24.8	131.1	65.	149.	-45.	24.4	132.3	70.	254.	-30.
092406Z	17.7	134.3	55	17.8	134.5	55.	13.	0.	22.1	131.8	65.	96.	-10.	26.0	131.3	70.	188.	-40.	29.4	133.2	75.	298.	-20.
092412Z	19.0	133.2	60	19.2	133.4	60.	16.	0.	24.9	130.6	75.	179.	-5.	27.9	130.2	85.	250.	-25.	30.4	132.0	70.	247.	-20.
092418Z	20.1	132.1	60	20.7	132.3	60.	38.	0.	25.6	130.3	75.	184.	-25.	28.7	130.5	85.	263.	-20.	31.0	132.9	70.	314.	-15.
092500Z	21.0	130.7	70	20.9	130.8	70.	8.	0.	23.8	127.0	85.	122.	-25.	26.2	125.4	95.	239.	-5.	28.6	125.6	80.	242.	-5.
092506Z	21.3	130.3	75	21.7	130.0	75.	29.	0.	24.1	127.1	85.	120.	-25.	26.2	125.8	95.	214.	0.	29.3	127.0	75.	100.	-5.
092512Z	22.0	129.8	80	21.9	129.4	80.	23.	0.	24.7	127.0	95.	136.	-15.	27.1	126.5	95.	183.	5.	30.7	128.8	75.	192.	0.
092518Z	22.6	129.5	100	22.5	129.0	90.	28.	-10.	24.9	127.4	100.	113.	-5.	27.5	127.0	95.	161.	10.	30.3	130.0	70.	150.	-5.
092600Z	23.1	129.1	110	23.3	129.2	95.	13.	-15.	25.5	128.7	110.	60.	10.	27.8	130.0	90.	49.	5.	30.3	134.0	70.	251.	-5.
092606Z	23.5	129.2	110	23.7	129.0	100.	16.	-10.	26.0	128.5	110.	71.	15.	28.7	131.1	85.	109.	5.	31.2	135.3	65.	359.	-10.
092612Z	23.8	129.3	110	24.0	129.1	100.	16.	-10.	26.0	129.0	110.	43.	20.	28.4	130.6	85.	64.	10.	30.9	135.5	65.	240.	-10.
092618Z	24.4	129.4	105	24.4	129.5	105.	5.	0.	29.0	130.8	75.	158.	-10.	28.8	132.1	75.	135.	0.	31.1	137.0	55.	339.	-20.
092700Z	24.9	129.6	100	24.8	129.4	100.	12.	0.	26.4	129.8	95.	36.	10.	28.6	131.7	70.	99.	-5.	31.6	137.7	50.	320.	-20.
092706Z	25.5	129.7	95	25.3	129.7	95.	12.	0.	27.3	130.4	90.	32.	10.	29.2	132.7	65.	142.	-10.	32.3	138.0	45.	247.	-20.
092712Z	26.0	129.8	90	25.9	129.9	90.	8.	0.	28.3	131.1	85.	80.	10.	30.8	133.9	65.	212.	-10.	33.3	138.5	45.	176.	-10.
092718Z	26.5	129.8	85	26.6	129.7	85.	8.	0.	29.0	130.8	75.	89.	0.	31.5	133.7	60.	189.	-15.	34.0	138.5	45.	133.	0.
092800Z	27.0	129.8	85	27.1	129.9	85.	8.	0.	29.5	130.7	75.	94.	0.	32.2	133.8	60.	144.	-10.	35.0	140.3	40.	297.	5.
092806Z	27.3	129.8	80	27.5	129.8	80.	12.	0.	30.3	131.3	75.	124.	0.	32.8	135.1	55.	103.	-10.	0.0	0.0	0.	-0.	0.
092812Z	27.6	129.8	75	27.7	129.8	75.	6.	0.	29.5	130.0	70.	29.	-5.	32.3	132.0	60.	189.	5.	0.0	0.0	0.	-0.	0.
092818Z	27.8	129.8	75	27.7	129.8	75.	6.	0.	28.5	129.9	70.	86.	-5.	31.2	131.2	60.	454.	15.	0.0	0.0	0.	-0.	0.
092900Z	28.1	129.9	75	28.0	129.8	75.	8.	0.	29.8	130.4	70.	82.	0.	32.9	132.5	60.	611.	25.	0.0	0.0	0.	-0.	0.
092906Z	28.5	130.1	75	28.7	129.8	75.	20.	0.	32.8	131.5	40.	84.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092912Z	29.1	130.3	75	29.1	130.2	75.	5.	0.	32.3	131.8	55.	197.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092918Z	29.8	130.6	75	29.7	130.6	75.	6.	0.	32.8	132.8	50.	331.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
093000Z	30.8	131.5	70	31.0	131.5	70.	12.	0.	35.0	134.5	30.	417.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
093006Z	32.4	133.1	65	32.0	132.5	70.	39.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
093012Z	34.1	135.1	55	33.9	134.5	70.	35.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
093018Z	36.2	138.1	45	35.4	137.0	50.	72.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100100Z	39.8	141.9	35	39.0	141.3	35.	55.	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	25.	146.	250.	327.
AVG RIGHT ANGLE ERROR	15.	78.	158.	256.
AVG INTENSITY MAGNITUDE ERROR	2.	10.	15.	18.
AVG INTENSITY BIAS	-0.	-3.	-8.	-18.
NUMBER OF FORECASTS	37	33	29	25
		15	14	13

TROPICAL STORM PAMELA

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST				
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
092300Z	18.0	150.0	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.
092306Z	18.2	148.8	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.
092312Z	18.3	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.
092318Z	18.5	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.
092400Z	18.6	145.6	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.
092406Z	18.7	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.
092412Z	18.8	144.6	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.
092418Z	19.0	144.1	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.
092500Z	19.2	143.6	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.
092506Z	19.4	143.0	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.
092512Z	19.7	142.1	40	19.5	142.0	35.	13.	-5.	21.0	139.0	0.	201.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092518Z	20.3	140.9	35	19.7	141.1	35.	38.	0.	21.0	138.1	45.	307.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092600Z	20.8	139.4	35	20.6	139.8	35.	25.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092606Z	22.0	137.9	30	21.6	137.8	30.	25.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092612Z	24.1	137.6	25	23.6	136.5	30.	67.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092618Z	26.0	136.8	20	26.0	136.8	25.	0.	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	28.	254.	0.	0.
AVG RIGHT ANGLE ERROR	22.	15.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	25.	0.	0.
AVG INTENSITY BIAS	1.	0.	0.	0.
NUMBER OF FORECASTS	6	2	0	0
		0		

TROPICAL STORM ROGER

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		WIND	24 HR ERRORS DST	24 HR ERRORS WIND	48 HOUR FORECAST POSIT		WIND	48 HR ERRORS DST	48 HR ERRORS WIND	72 HOUR FORECAST POSIT		WIND	72 HR DST	72 HR WIND
100200Z	11.7	142.7	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.
100206Z	12.0	142.1	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.
100212Z	12.4	141.4	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.
100218Z	13.2	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.
100300Z	14.2	140.2	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.
100306Z	16.1	139.6	30	15.7	139.8	25.	27.	-5.	18.4	137.3	35.	201.	-5.	20.3	136.0	45.	45.	0.	22.6	145.0	55.	159.	10.
100312Z	18.0	138.8	30	16.6	139.1	25.	85.	-5.	20.2	137.1	35.	170.	-5.	23.5	136.4	45.	129.	0.	27.2	137.4	55.	114.	10.
100318Z	19.4	137.6	30	19.5	138.1	30.	29.	0.	24.8	136.0	35.	265.	-10.	29.0	137.4	45.	387.	0.	32.0	142.2	35.	354.	-5.
100400Z	20.5	136.3	35	21.0	136.3	30.	24.	-5.	26.0	134.5	35.	365.	-10.	31.4	139.3	25.	515.	-20.	35.0	148.6	15.	586.	-20.
100406Z	21.2	135.3	40	21.7	135.2	35.	30.	-5.	26.6	134.4	50.	379.	5.	31.5	139.5	30.	462.	-15.	0.0	0.0	0.	-0.	0.
100412Z	21.5	134.4	40	21.5	134.7	40.	17.	0.	23.7	132.8	50.	199.	5.	27.0	133.0	55.	123.	10.	0.0	0.0	0.	-0.	0.
100418Z	21.0	133.5	45	22.5	133.6	45.	90.	0.	25.6	131.8	55.	254.	10.	29.1	134.5	45.	89.	5.	0.0	0.0	0.	-0.	0.
100500Z	19.9	134.2	45	20.2	133.9	40.	25.	-5.	23.4	134.7	50.	24.	5.	29.0	137.8	40.	180.	5.	0.0	0.0	0.	-0.	0.
100506Z	20.3	135.2	45	20.2	134.7	40.	29.	-5.	23.5	135.3	50.	113.	5.	29.3	137.9	40.	324.	10.	0.0	0.0	0.	-0.	0.
100512Z	21.5	135.5	45	21.4	135.1	40.	23.	-5.	27.2	136.1	45.	49.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100518Z	22.8	135.3	45	22.4	135.8	40.	36.	-5.	26.7	138.0	40.	172.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100600Z	23.8	134.7	45	23.9	134.7	40.	6.	-5.	29.9	136.4	35.	135.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100606Z	25.2	134.4	45	25.1	134.7	40.	17.	-5.	31.5	137.9	35.	205.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100612Z	26.8	135.3	45	26.4	135.3	40.	24.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100618Z	29.1	136.2	40	29.4	136.2	40.	42.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100700Z	32.0	137.4	35	31.8	137.6	35.	16.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100706Z	34.4	140.1	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

	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	32.	195.	251.	303.
AVG RIGHT ANGLE ERROR	19.	93.	109.	178.
AVG INTENSITY MAGNITUDE ERROR	3.	5.	7.	11.
AVG INTENSITY BIAS	-3.	0.	-1.	-1.
NUMBER OF FORECASTS	16	13	9	4
		2	5	2

TYPHOON SARAH

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
093012Z	14.6	119.0	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.
093018Z	14.6	119.4	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.
100100Z	14.5	119.8	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.
100106Z	14.5	120.2	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.
100112Z	14.5	120.6	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.
100118Z	14.5	120.8	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.
100200Z	14.7	121.0	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.
100206Z	14.8	121.1	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.
100212Z	14.9	121.2	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.
100218Z	15.2	121.2	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.
100300Z	15.2	120.8	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.
100306Z	15.0	120.6	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.
100312Z	14.8	120.3	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.
100318Z	14.6	120.0	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.
100400Z	14.4	119.7	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.
100406Z	14.2	119.5	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.
100412Z	13.8	119.1	30	14.0	119.7	30.	37.	0.	13.5	118.2	35.	88.	-5.	13.0	110.1	45.	555.	0.	12.5	113.3	40.	346.	-35.
100418Z	13.5	118.8	35	13.9	119.3	35.	38.	0.	13.5	117.7	50.	121.	10.	12.9	115.8	50.	220.	0.	12.4	113.0	40.	365.	-35.
100500Z	13.0	118.8	40	13.7	118.9	40.	42.	0.	13.2	116.9	50.	168.	10.	12.7	114.6	50.	282.	-10.	12.2	111.8	40.	436.	-35.
100506Z	12.7	119.0	40	12.5	118.5	40.	31.	0.	12.6	118.5	40.	70.	0.	11.5	118.0	40.	79.	-35.	10.7	117.0	40.	130.	-35.
100512Z	12.5	119.3	40	12.5	119.3	40.	0.	0.	12.0	118.9	40.	45.	-5.	11.3	117.9	40.	84.	-35.	10.6	116.4	35.	159.	-40.
100518Z	12.5	119.5	40	12.1	119.0	40.	38.	0.	11.0	118.4	40.	96.	-10.	10.3	117.3	35.	136.	-40.	9.9	116.3	30.	161.	-45.
100600Z	12.5	119.7	40	12.3	119.0	40.	43.	0.	12.1	118.7	40.	41.	-20.	11.5	118.0	35.	71.	-40.	10.8	117.0	30.	84.	-55.
100606Z	12.4	119.7	40	12.4	119.0	40.	12.	0.	12.4	120.8	35.	95.	-40.	12.3	121.6	30.	160.	-45.	12.4	122.4	25.	277.	-65.
100612Z	12.3	119.6	45	12.4	120.1	35.	30.	-10.	12.5	120.8	35.	100.	-40.	12.5	121.6	30.	178.	-45.	0.0	0.0	0.	-0.	0.
100618Z	12.2	119.5	50	12.4	119.8	35.	21.	-15.	12.6	120.3	30.	80.	-45.	12.5	121.2	20.	167.	-55.	0.0	0.0	0.	-0.	0.
100700Z	12.2	119.4	60	12.2	119.4	45.	0.	-15.	12.2	119.4	35.	55.	-40.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
100706Z	12.1	119.2	75	12.2	119.2	65.	6.	-10.	11.9	118.4	60.	71.	-15.	11.5	116.4	50.	83.	-40.	11.3	114.3	40.	118.	-70.
100712Z	11.9	119.2	75	12.1	119.2	65.	12.	-10.	11.8	118.1	60.	84.	-15.	11.6	116.5	50.	56.	-40.	11.2	114.5	40.	93.	-60.
100718Z	11.6	119.2	75	12.0	119.1	65.	25.	-10.	11.8	118.4	55.	53.	-20.	11.2	116.9	50.	17.	-45.	10.7	114.9	40.	84.	-60.
100800Z	11.3	119.2	75	11.3	119.1	65.	5.	-10.	11.2	118.2	55.	13.	-30.	11.1	117.3	50.	42.	-60.	11.1	116.5	40.	76.	-60.
100806Z	11.0	119.2	75	11.1	119.2	65.	6.	-10.	10.6	118.0	60.	43.	-30.	10.7	116.6	55.	57.	-55.	10.8	115.2	50.	78.	-40.
100812Z	10.8	119.1	75	10.8	119.1	65.	0.	-10.	10.1	118.0	60.	80.	-30.	10.1	116.4	55.	98.	-45.	10.2	114.8	50.	119.	-35.
100818Z	11.0	118.8	75	10.6	119.1	65.	30.	-10.	10.2	118.2	65.	96.	-30.	10.0	116.6	55.	117.	-45.	10.3	115.0	50.	129.	-25.
100900Z	11.1	118.4	85	10.6	118.2	65.	32.	-20.	10.4	116.2	70.	72.	-40.	10.8	114.3	65.	96.	-35.	11.6	112.3	65.	127.	-10.
100906Z	11.3	117.8	90	11.3	117.8	90.	0.	0.	11.4	116.6	85.	21.	-25.	11.6	115.4	80.	35.	-10.	11.8	114.2	80.	70.	10.
100912Z	11.3	117.4	90	11.5	117.4	90.	12.	0.	11.8	115.8	85.	13.	-15.	12.2	114.3	80.	29.	-5.	12.8	112.7	80.	39.	15.
100918Z	11.4	117.1	95	11.7	116.9	90.	21.	-5.	12.3	115.0	85.	55.	-15.	12.9	113.0	80.	92.	5.	13.0	111.0	80.	111.	15.
101000Z	11.5	116.7	110	11.4	116.3	90.	24.	-20.	11.4	113.8	85.	104.	-15.	11.5	111.4	80.	176.	5.	11.5	108.9	80.	241.	20.
101006Z	11.6	116.3	110	11.6	116.4	100.	6.	-10.	11.9	114.5	100.	37.	10.	12.0	112.5	90.	93.	20.	12.1	110.4	90.	126.	30.
101012Z	11.7	116.0	100	11.6	115.9	100.	8.	0.	11.8	114.0	100.	52.	15.	12.0	112.0	90.	100.	25.	12.1	110.0	80.	126.	20.
101018Z	11.8	115.8	100	11.9	115.3	100.	30.	0.	12.2	113.7	100.	48.	25.	12.5	111.7	90.	81.	25.	12.6	109.6	75.	100.	15.
101100Z	11.9	115.5	100	12.0	115.4	90.	8.	-10.	12.5	114.4	75.	25.	0.	13.0	112.9	70.	25.	10.	13.3	111.3	60.	41.	5.
101106Z	12.1	115.1	90	12.0	114.9	90.	13.	0.	12.4	113.0	75.	55.	5.	12.6	110.9	70.	85.	10.	12.6	108.9	60.	76.	10.
101112Z	12.2	114.8	85	12.1	114.3	90.	30.	5.	12.3	111.9	75.	95.	10.	12.4	109.8	60.	126.	0.	12.4	107.7	20.	123.	-30.
101118Z	12.4	114.5	75	12.5	113.9	85.	36.	10.	13.0	111.3	65.	94.	0.	13.2	109.3	850.	105.	790.	0.0	0.0	0.	-0.	0.
101200Z	12.8	114.1	75	12.4	114.2	80.	25.	5.	12.5	112.5	65.	48.	5.	12.9	111.0	50.	38.	-5.	13.2	109.3	40.	35.	20.
101206Z	12.9	113.8	70	13.0	113.6	80.	13.	10.	13.5	112.1	65.	6.	5.	13.8	110.5	50.	42.	0.	0.0	0.0	0.	-0.	0.
101212Z	13.1	113.3	65	13.3	113.2	80.	13.	15.	14.0	111.5	65.	38.	5.	14.6	109.9	65.	80.	15.	0.0	0.0	0.	-0.	0.
101218Z	13.2	112.9	65	13.5	112.5	75.	29.	10.	14.4	110.3	65.	76.	5.	14.7	108.3	30.	101.	-5.	0.0	0.0	0.	-0.	0.
101300Z	13.3	112.6	60	13.3	112.1	75.	29.	15.	13.2	110.2	55.	26.	0.	13.1	108.2	30.	29.	10.	0.0	0.0	0.	-0.	0.
101306Z	13.4	112.1	60	13.2	112.0	75.	13.	15.	13.1	110.1	55.	13.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101312Z	13.4	111.7	60	13.5	111.5	70.	13.	10.	13.8	109.5	55.	38.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101318Z	13.4	111.1	60	18.5	111.0	60.	305.	0.	13.3	108.3	35.	47.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101400Z	13.4	110.6	55	13.5	110.9	55.	18.	0.	13.4	108.9	30.	21.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101406Z	13.3	110.0	50	13.4	110.4	50.	24.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101412Z	13.3	109.6	50	13.3	109.6	50.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101418Z	13.2	109.1	35	13.3	109.0	35.	8.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101500Z	13.1	108.7	20	13.1	108.5	20.	12.	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	26.	61.	110.	143.
AVG RIGHT ANGLE ERROR	16.	40.	85.	107.
AVG INTENSITY MAGNITUDE ERROR	6.	16.	47.	33.
AVG INTENSITY BIAS	-2.	-9.	5.	-21.
NUMBER OF FORECASTS	43	39	34	27
		36	31	24

SUPER TYPHOON TIP

MO/DA/HR	BEST TRACK POSIT		WIND	WARNING POSIT		WIND	ERRORS DST	ERRORS WIND	24 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	48 HOUR FORECAST POSIT		WIND	ERRORS DST	ERRORS WIND	72 HOUR FORECAST POSIT		WIND	DST	WIND
100400Z	6.3	154.1	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.
100406Z	6.3	153.0	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.
100412Z	5.7	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.
100418Z	5.4	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.
100500Z	5.4	154.5	25	5.4	154.5	25.	0.	0.	6.6	152.4	30.	68.	-5.	8.0	150.0	35.	137.	-5.	9.3	147.1	45.	297.	5.
100506Z	5.7	155.2	25	5.9	155.2	25.	6.	0.	7.9	153.7	30.	40.	-5.	9.1	150.9	35.	154.	-5.	10.4	148.0	45.	219.	5.
100512Z	6.5	154.6	30	6.1	155.3	25.	48.	-5.	7.9	153.7	35.	48.	0.	9.1	150.9	45.	161.	5.	10.5	148.0	50.	158.	5.
100518Z	7.1	153.6	30	6.6	155.2	25.	99.	-5.	8.1	153.0	35.	27.	-5.	9.4	150.0	45.	199.	5.	10.5	147.0	50.	150.	0.
100600Z	7.3	153.3	35	7.3	153.1	35.	12.	0.	8.7	150.2	45.	138.	5.	9.8	147.6	55.	281.	15.	11.0	145.1	65.	173.	15.
100606Z	7.5	153.1	35	7.7	152.4	35.	43.	0.	8.9	149.6	45.	201.	5.	10.1	147.0	55.	269.	15.	11.3	144.4	65.	117.	10.
100612Z	7.7	152.9	35	7.7	152.5	35.	24.	0.	9.1	150.0	45.	187.	5.	10.4	147.4	55.	192.	10.	11.8	144.9	65.	49.	5.
100618Z	7.9	152.6	40	8.1	151.9	40.	43.	0.	9.4	149.4	50.	223.	10.	10.7	146.9	60.	154.	10.	12.0	144.4	70.	79.	-5.
100700Z	7.7	152.3	40	8.0	152.3	40.	18.	0.	9.3	150.5	50.	122.	10.	10.7	148.0	60.	90.	10.	12.0	145.0	70.	160.	-10.
100706Z	7.0	152.4	40	7.3	152.5	40.	19.	0.	8.7	151.5	45.	13.	5.	9.9	149.4	55.	269.	0.	11.5	146.6	70.	310.	-15.
100712Z	6.6	151.9	40	6.9	151.7	40.	21.	0.	8.2	149.6	45.	112.	0.	9.8	147.3	55.	251.	-5.	11.4	144.5	70.	241.	-20.
100718Z	6.8	152.1	40	6.7	151.5	40.	35.	0.	7.5	149.3	50.	209.	0.	9.4	147.2	60.	305.	-15.	11.0	144.4	75.	295.	-40.
100800Z	7.8	151.9	40	6.8	152.1	40.	61.	0.	7.7	151.3	65.	339.	15.	9.0	149.3	75.	468.	-5.	10.5	146.4	75.	459.	-55.
100806Z	8.9	151.4	40	8.6	151.5	45.	19.	5.	11.4	147.2	60.	113.	5.	14.0	142.6	70.	60.	-15.	16.6	138.0	75.	149.	-65.
100812Z	9.8	150.6	45	9.7	150.3	45.	19.	0.	12.2	146.0	60.	105.	0.	14.5	141.6	70.	56.	-20.	16.8	137.5	75.	141.	-65.
100818Z	11.0	149.5	50	10.7	149.5	50.	18.	0.	13.4	145.4	65.	120.	-10.	15.7	141.2	70.	119.	-45.	17.7	136.9	75.	149.	-75.
100900Z	12.2	147.8	50	12.3	147.8	50.	6.	0.	16.0	141.9	65.	177.	-15.	19.0	137.2	75.	315.	-55.	21.5	132.8	85.	639.	-75.
100906Z	12.7	145.8	55	13.0	146.0	55.	21.	0.	15.0	142.6	65.	104.	-20.	18.5	136.6	80.	288.	-60.	21.6	131.2	85.	665.	-80.
100912Z	12.8	144.3	60	12.8	144.3	60.	0.	0.	14.1	138.7	65.	141.	-25.	14.5	133.7	80.	320.	-60.	21.6	131.2	85.	665.	-80.
100918Z	12.9	143.4	75	12.8	143.2	65.	13.	-10.	13.2	138.5	75.	113.	-40.	14.2	133.3	85.	335.	-65.	15.2	129.6	85.	448.	-80.
101000Z	13.1	142.5	80	13.0	142.4	80.	8.	0.	13.7	138.4	100.	76.	-30.	14.6	134.0	115.	268.	-45.	15.0	128.2	90.	511.	-65.
101006Z	13.5	141.7	85	13.1	141.6	85.	25.	0.	13.9	137.3	105.	127.	-35.	14.7	132.9	120.	303.	-45.	15.7	129.3	130.	400.	-15.
101012Z	13.7	141.1	90	13.7	140.9	95.	12.	5.	14.3	138.1	110.	80.	-30.	15.1	134.1	125.	208.	-40.	15.8	128.6	130.	411.	0.
101018Z	13.9	140.3	115	14.3	140.0	100.	30.	-15.	15.5	137.0	115.	110.	-35.	16.4	133.5	125.	196.	-30.	16.2	131.3	130.	231.	5.
101100Z	14.2	139.5	130	14.3	139.4	100.	8.	-30.	15.2	136.3	145.	132.	-15.	16.3	132.8	150.	196.	5.	17.1	129.0	130.	332.	5.
101106Z	14.5	139.4	140	14.4	139.2	130.	13.	-10.	15.2	136.4	150.	121.	-15.	16.1	133.2	155.	148.	25.	17.4	128.8	160.	208.	35.
101112Z	15.1	139.2	140	14.9	139.2	135.	12.	-5.	16.1	137.6	150.	53.	-15.	17.4	136.1	155.	62.	30.	17.0	130.0	160.	200.	35.
101118Z	15.7	138.9	150	15.8	138.9	135.	6.	-15.	17.2	136.8	150.	25.	-5.	18.8	134.8	155.	119.	30.	18.8	134.7	160.	154.	35.
101200Z	16.3	138.3	160	16.4	138.3	135.	6.	-25.	18.6	136.1	140.	114.	-5.	20.2	134.2	135.	191.	10.	20.3	133.6	160.	191.	35.
101206Z	16.8	137.7	165	16.9	137.6	145.	8.	-20.	19.4	134.8	140.	169.	10.	23.0	133.2	135.	353.	10.	22.1	133.4	130.	277.	5.
101212Z	16.9	137.2	165	17.1	137.2	155.	12.	-10.	18.9	134.8	140.	134.	15.	21.3	133.3	130.	243.	5.	26.9	134.8	130.	563.	5.
101218Z	16.8	136.9	155	17.3	136.7	155.	32.	0.	18.7	135.0	135.	114.	10.	20.7	133.6	125.	211.	0.	24.0	133.0	130.	368.	5.
101300Z	16.7	136.2	145	16.5	136.4	140.	17.	-5.	16.9	137.5	130.	200.	5.	18.8	136.0	120.	292.	-5.	23.0	132.8	120.	306.	0.
101306Z	16.7	135.7	130	16.1	136.4	140.	54.	10.	16.8	137.5	130.	229.	5.	18.8	136.1	120.	324.	-5.	20.9	134.9	110.	337.	-10.
101312Z	16.7	135.3	125	16.7	135.3	135.	0.	10.	16.9	133.0	130.	37.	5.	17.3	130.0	120.	78.	-5.	20.9	134.9	110.	341.	0.
101318Z	16.8	134.8	125	16.7	134.9	130.	8.	5.	17.1	132.2	120.	38.	-5.	17.9	129.3	120.	61.	0.	18.0	127.1	110.	172.	0.
101400Z	17.0	134.0	125	16.8	134.2	120.	17.	-5.	17.3	131.7	110.	66.	-15.	18.1	128.9	105.	78.	-15.	19.0	126.6	110.	168.	5.
101406Z	17.1	133.5	125	17.2	133.3	120.	13.	-5.	18.0	130.6	100.	26.	-25.	18.2	127.4	90.	94.	-20.	19.1	126.2	100.	179.	0.
101412Z	17.3	132.5	125	17.1	132.6	120.	13.	-5.	17.5	129.0	100.	80.	-25.	18.4	125.5	100.	215.	-10.	20.5	124.3	80.	230.	-15.
101418Z	17.6	131.8	125	17.5	131.5	120.	18.	-5.	18.3	128.1	100.	87.	-20.	19.5	124.5	100.	232.	-5.	19.5	122.0	90.	345.	-5.
101500Z	18.1	130.9	125	18.0	131.0	120.	9.	-5.	19.3	128.3	100.	45.	-20.	20.5	125.7	100.	147.	0.	21.0	121.0	90.	406.	0.
101506Z	18.4	130.4	125	18.5	130.0	115.	23.	-10.	20.0	126.9	100.	112.	-10.	21.5	124.5	100.	196.	5.	22.0	123.0	100.	321.	10.
101512Z	18.6	129.8	125	18.7	129.8	115.	6.	-10.	20.0	127.2	100.	84.	-10.	21.3	124.6	100.	204.	5.	24.0	123.0	95.	337.	10.
101518Z	18.9	129.5	120	19.0	129.0	110.	29.	-10.	20.3	126.5	100.	110.	-5.	21.8	124.0	95.	238.	5.	23.5	123.0	95.	481.	20.
101600Z	19.4	129.1	120	19.5	129.4	110.	18.	-10.	21.5	127.8	100.	17.	0.	23.5	126.4	95.	122.	5.	24.3	123.0	90.	580.	15.
101606Z	19.9	128.9	110	19.4	129.3	110.	37.	0.	21.0	128.5	100.	90.	5.	23.2	127.3	95.	209.	10.	25.4	125.7	90.	638.	20.
101612Z	20.5	128.6	110	20.6	128.7	105.	8.	-5.	22.8	127.8	95.	12.	0.	25.4	127.0	90.	244.	15.	25.4	126.4	90.	867.	30.
101618Z	20.8	128.4	105	21.1	128.5	100.	19.	-5.	23.3	127.4	90.	43.	0.	26.0	127.0	85.	353.	10.	28.1	128.4	80.	1145.	30.
101700Z	21.5	128.1	100	21.5	128.2	95.	6.	-5.	23.8	127.2	90.	84.	0.	26.5	127.3	85.	531.	15.	28.6	128.9	80.	1147.	30.
101706Z	22.4	127.9	95	22.0	127.8	95.	25.	0.	24.6	127.0	85.	143.	0.	27.7	127.8	80.	746.	20.	0.0	0.0	0.	-0.	0.
101712Z	23.0	127.8	95	23.2	127.7	90.	13.	-5.	26.0	127.3	75.	207.	0.	28.8	129.1	65.	1089.	15.	0.0	0.0	0.	-0.	0.
101718Z	24.0	127.6	90	23.8	127.6	90.	12.	0.	26.8	127.8	75.	289.	0.	29.8	129.9	65.	1108.	15.	0.0	0.0	0.	-0.	0.
101800Z	25.1	127.8	90	25.1	127.8	85.	0.	-5.	29.2	129.4	70.	338.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101806Z	26.5	128.6	85	26.4	128.4	80.	12.	-5.	31.7	131.8	55.	431.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101812Z	28.4	130.1	75	28.1	130.0	75.	19.	0.	34.6	137.8	50.	539.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101818Z	30.3	131.6	75	29.9	131.7	75.	24.	0.	36.8	141.9	50.	422.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101900Z	33.0	134.3	70	32.9	134.0	70.	16.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101906Z	36.2	138.6	60	35.4	138.3	60.	50.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101912Z	41.5	145.2	50	41.0	144.2	60.	54.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
101918Z	43.1	146.1	50	42.8	151.0	55.	215.	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	24.	135.	259.	345.
AVG RIGHT ANGLE ERROR	15.	69.	142.	214.
AVG INTENSITY MAGNITUDE ERROR	5.	10.	17.	22.
AVG INTENSITY BIAS	-3.	-6.	-5.	-7.
NUMBER OF FORECASTS	60	56	52	43
		22	23	24

SUPER TYPHOON VERA

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
110200Z	7.0 145.8	25	6.5 145.6	20.	32.	-5.	7.0 142.5	30.	112.	-35.	7.6 139.4	40.	415.	-95.	8.3 136.4	50.	670.	-85.
110206Z	7.4 144.7	55	7.3 145.6	50.	54.	-5.	8.7 143.2	70.	248.	0.	9.7 140.1	80.	541.	-60.	10.9 137.0	85.	722.	-50.
110212Z	7.2 143.5	60	7.6 144.8	55.	81.	-5.	8.7 141.8	75.	279.	-20.	9.9 138.9	85.	578.	-55.	11.2 135.9	95.	712.	-20.
110218Z	7.6 142.2	60	7.3 143.8	55.	96.	-5.	7.8 140.7	75.	356.	-55.	8.5 137.6	85.	618.	-50.	9.1 134.4	95.	722.	0.
110300Z	8.0 140.9	65	7.3 141.8	55.	69.	-10.	8.4 136.1	75.	222.	-60.	10.2 130.3	85.	298.	-50.	12.6 124.8	95.	212.	0.
110306Z	8.6 139.0	70	8.3 139.0	65.	19.	-5.	11.2 131.7	75.	41.	-65.	13.2 125.9	75.	59.	-60.	17.6 122.3	75.	78.	-15.
110312Z	9.2 137.1	95	9.2 137.0	70.	6.	-25.	11.7 129.8	85.	30.	-55.	14.7 124.5	80.	33.	-35.	18.7 122.6	75.	104.	-5.
110318Z	10.0 135.1	130	9.8 135.2	85.	13.	-45.	12.5 128.5	110.	55.	-25.	15.7 123.9	100.	53.	5.	19.8 122.4	80.	137.	35.
110400Z	10.5 133.0	135	10.5 133.5	125.	29.	-10.	12.4 127.5	130.	95.	-5.	15.3 123.9	120.	70.	25.	19.0 122.2	110.	91.	70.
110406Z	11.1 131.0	140	10.9 131.4	125.	26.	-15.	13.0 124.9	130.	24.	-5.	15.3 122.7	120.	66.	30.	17.8 122.1	110.	112.	75.
110412Z	11.6 129.2	140	11.8 129.1	130.	13.	-10.	14.6 121.5	100.	151.	-15.	19.1 121.1	60.	140.	-20.	23.0 128.0	50.	670.	20.
110418Z	12.0 127.7	135	12.4 127.1	130.	42.	-5.	15.7 120.7	100.	170.	5.	19.6 121.8	60.	120.	15.	0.0 0.0	0.	-0.	0.
110500Z	12.7 125.9	135	12.7 125.8	125.	6.	-10.	16.0 120.3	85.	141.	-10.	19.3 121.3	60.	90.	20.	0.0 0.0	0.	-0.	0.
110506Z	13.4 124.9	135	13.6 124.7	120.	17.	-15.	16.3 120.4	80.	109.	-10.	19.6 122.3	60.	142.	25.	0.0 0.0	0.	-0.	0.
110512Z	14.3 124.1	115	14.2 124.1	120.	6.	5.	17.5 122.5	100.	34.	20.	20.7 126.0	70.	508.	40.	0.0 0.0	0.	-0.	0.
110518Z	14.8 123.5	95	15.0 123.1	120.	26.	25.	18.6 123.4	100.	114.	55.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110600Z	15.5 122.7	95	15.3 122.6	95.	13.	0.	18.7 122.2	60.	78.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110606Z	16.3 122.3	90	16.4 122.5	90.	13.	0.	19.8 123.4	70.	202.	35.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110612Z	17.0 122.2	80	17.1 122.2	90.	6.	10.	20.3 122.8	70.	340.	40.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110618Z	17.6 121.7	65	17.8 121.9	85.	16.	40.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110700Z	17.8 121.2	40	18.3 121.7	60.	41.	20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110706Z	18.3 120.2	35	19.2 121.8	35.	105.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110712Z	17.0 117.9	30	19.2 121.8	25.	257.	-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	43.	148.	249.	385.
AVG RIGHT ANGLE ERROR	20.	69.	111.	247.
AVG INTENSITY MAGNITUDE ERROR	12.	28.	39.	74.
AVG INTENSITY BIAS	-3.	-10.	-18.	2.
NUMBER OF FORECASTS	23	19	15	11
		7	9	6

TROPICAL STORM WAYNE

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		ERRORS		48 HOUR FORECAST		ERRORS		72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
110700Z	9.9 141.5	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.
110706Z	12.4 141.0	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.
110712Z	14.4 139.9	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.
110718Z	14.8 137.7	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.
110800Z	15.0 135.7	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.
110806Z	15.4 133.6	25	15.3 134.5	25.	52.	0.	18.1 130.3	50.	139.	10.	21.5 130.3	55.	235.	5.	24.8 134.9	45.	504.	10.
110812Z	16.4 132.1	30	16.3 132.3	30.	13.	0.	19.6 127.4	65.	232.	20.	21.0 126.4	65.	221.	15.	24.5 128.4	40.	335.	15.
110818Z	16.0 130.5	30	17.1 130.5	30.	66.	0.	19.5 125.8	45.	252.	0.	21.5 124.1	55.	321.	5.	24.8 125.8	35.	391.	10.
110900Z	15.8 129.9	35	16.0 129.0	35.	53.	0.	18.9 124.1	45.	290.	-5.	22.8 123.5	30.	375.	-10.	0.0 0.0	0.	-0.	0.
110906Z	15.8 129.9	40	15.8 128.9	35.	57.	-5.	16.3 124.4	25.	272.	-25.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
110912Z	16.2 129.7	45	15.8 129.7	45.	24.	0.	16.7 127.9	55.	90.	5.	17.6 123.6	45.	272.	20.	0.0 0.0	0.	-0.	0.
110918Z	16.9 129.3	45	16.5 129.7	50.	33.	5.	17.6 129.2	60.	49.	10.	19.5 129.5	50.	107.	25.	23.0 133.3	30.	550.	0.
111000Z	17.5 129.0	50	17.7 129.3	50.	21.	0.	21.2 129.9	60.	174.	20.	24.7 134.9	45.	569.	20.	0.0 0.0	0.	-0.	0.
111006Z	17.8 128.9	50	18.3 129.2	50.	34.	0.	21.6 129.9	55.	185.	20.	25.3 135.1	45.	630.	15.	0.0 0.0	0.	-0.	0.
111012Z	18.0 128.7	50	18.6 128.3	50.	42.	0.	20.5 126.4	55.	139.	30.	23.6 127.2	40.	351.	10.	0.0 0.0	0.	-0.	0.
111018Z	18.2 128.6	50	18.2 128.7	50.	6.	0.	19.5 127.1	55.	62.	30.	22.3 126.2	40.	295.	10.	0.0 0.0	0.	-0.	0.
111100Z	18.6 128.5	40	18.7 128.5	40.	6.	0.	20.8 128.4	35.	162.	10.	23.9 128.9	30.	477.	5.	0.0 0.0	0.	-0.	0.
111106Z	18.8 128.5	35	19.0 128.4	35.	13.	0.	20.7 128.3	30.	177.	0.	23.0 128.6	30.	491.	5.	0.0 0.0	0.	-0.	0.
111112Z	18.9 128.2	25	18.8 128.5	25.	18.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111118Z	18.7 127.8	25	18.8 128.5	25.	40.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111200Z	18.3 127.3	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.
111206Z	18.1 126.8	30	18.1 126.8	30.	0.	0.	17.5 125.2	35.	116.	10.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111212Z	17.8 126.2	30	18.0 126.5	30.	21.	0.	17.3 124.9	35.	163.	10.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111218Z	17.4 125.5	30	17.9 126.2	30.	50.	0.	17.5 124.5	30.	225.	10.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111300Z	16.9 124.8	25	17.2 125.0	25.	21.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111306Z	16.2 123.7	25	16.6 123.8	25.	25.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111312Z	15.7 122.6	25	15.7 122.6	25.	0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
111318Z	15.2 121.4	20	15.2 121.5	20.	6.	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	27.	170.	362.	443.
AVG RIGHT ANGLE ERROR	14.	115.	295.	413.
AVG INTENSITY MAGNITUDE ERROR	0.	13.	12.	9.
AVG INTENSITY BIAS	0.	10.	10.	9.
NUMBER OF FORECASTS	22	16	12	4
		3	1	0

TROPICAL DEPRESSION 26

	BEST TRACK		WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
					ERRORS				ERRORS				ERRORS					
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
112918Z	12.2 154.5	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.
113000Z	13.6 154.6	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.
113006Z	14.9 154.6	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.
113012Z	16.2 154.2	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.
113018Z	17.4 153.3	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.
120100Z	18.5 152.3	25	18.7 152.2	25.	13.	0.	24.5 149.7	30.	19.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120106Z	19.7 151.6	30	19.5 151.6	30.	6.	0.	25.8 150.0	30.	60.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120112Z	20.9 150.7	30	20.9 151.3	30.	33.	0.	26.8 151.7	30.	86.	15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120118Z	22.5 150.0	30	22.2 150.5	30.	33.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120200Z	24.2 149.8	30	24.5 150.0	30.	21.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120206Z	26.7 150.5	30	25.4 150.4	30.	19.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120212Z	28.2 152.1	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	21.	55.	0.	0.
AVG RIGHT ANGLE ERROR	16.	28.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	5.	0.	0.
AVG INTENSITY BIAS	0.	5.	0.	0.
NUMBER OF FORECASTS	6	3	0	0

3

TYPHOON ABBY

	BEST TRACK		WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
					ERRORS				ERRORS				ERRORS					
MO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
112900Z	6.8 169.0	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.
112906Z	6.8 168.3	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.
112912Z	6.8 167.7	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.
112918Z	6.7 166.9	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.
113000Z	6.7 166.3	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.
113006Z	6.6 165.5	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.
113012Z	6.5 164.9	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.
113018Z	6.3 164.2	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.
120100Z	6.2 163.4	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.
120106Z	5.9 162.8	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.
120112Z	5.8 161.9	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.
120118Z	5.7 160.9	30	6.0 161.1	25.	22.	-5.	6.6 158.1	30.	77.	-15.	7.6 154.4	35.	261.	-5.	8.7 150.8	35.	297.	-25.
120200Z	5.8 160.3	40	5.7 160.1	35.	13.	-5.	7.0 156.0	45.	189.	0.	9.1 151.6	60.	400.	15.	10.5 147.9	80.	446.	20.
120206Z	5.9 159.8	40	5.8 159.1	35.	42.	-5.	7.5 153.0	50.	361.	10.	9.5 150.6	65.	409.	10.	11.0 146.8	80.	469.	20.
120212Z	6.0 159.6	45	5.9 159.1	35.	30.	-10.	6.7 156.4	50.	148.	10.	8.1 153.6	60.	166.	0.	9.9 150.0	80.	225.	20.
120218Z	6.1 159.3	45	6.0 158.9	35.	24.	-10.	6.9 156.2	50.	156.	10.	8.5 152.7	60.	184.	0.	10.7 148.5	85.	276.	35.
120300Z	6.3 159.1	45	6.3 159.0	55.	6.	10.	7.0 157.6	65.	78.	20.	8.6 154.8	80.	30.	20.	10.5 150.6	90.	127.	55.
120306Z	6.5 159.0	40	6.3 159.0	60.	12.	20.	6.7 158.1	75.	99.	20.	8.3 155.3	80.	66.	20.	10.2 151.4	90.	64.	60.
120312Z	6.8 158.9	40	6.4 159.0	45.	25.	5.	7.5 157.8	65.	93.	5.	8.8 154.9	80.	106.	20.	10.2 151.2	90.	92.	60.
120318Z	7.3 158.8	40	6.7 158.6	45.	38.	5.	8.0 157.1	60.	78.	0.	9.2 154.2	75.	114.	25.	10.5 150.4	90.	142.	60.
120400Z	8.1 158.3	45	8.1 158.5	55.	12.	10.	10.0 155.1	65.	108.	5.	11.3 150.8	75.	163.	40.	12.5 146.0	90.	155.	60.
120406Z	8.2 157.4	55	8.8 157.7	55.	40.	0.	10.8 153.3	65.	170.	5.	11.9 148.7	75.	210.	45.	12.6 143.9	90.	185.	55.
120412Z	8.2 156.4	60	8.2 156.1	55.	18.	-5.	9.9 151.5	65.	155.	5.	11.6 147.1	75.	202.	45.	12.8 143.2	90.	180.	55.
120418Z	8.2 155.8	60	8.3 154.8	60.	59.	0.	9.9 150.3	70.	161.	20.	11.8 145.8	85.	180.	55.	13.2 142.0	95.	210.	60.
120500Z	8.2 155.1	60	8.5 153.8	60.	79.	0.	10.0 149.2	70.	175.	35.	11.8 144.8	85.	155.	55.	13.7 140.3	95.	252.	60.
120506Z	8.1 154.2	60	8.3 154.4	60.	17.	0.	9.5 150.7	70.	25.	40.	11.2 146.2	85.	62.	50.	13.0 141.7	95.	108.	65.
120512Z	8.0 153.3	60	7.8 153.2	60.	13.	0.	8.7 149.4	70.	53.	40.	10.8 145.6	85.	21.	50.	13.0 141.3	95.	67.	65.
120518Z	8.3 152.5	50	7.8 152.0	55.	42.	5.	9.2 147.8	65.	40.	35.	10.8 143.8	80.	60.	45.	11.8 139.2	90.	92.	60.
120600Z	8.8 151.9	35	8.3 151.4	55.	42.	20.	9.2 147.6	60.	71.	30.	10.5 143.4	60.	83.	25.	11.5 138.7	55.	13.	20.
120606Z	9.2 151.0	30	8.9 150.9	55.	19.	25.	10.0 147.2	50.	77.	15.	10.9 142.9	40.	75.	10.	11.6 138.1	30.	54.	-5.
120612Z	9.5 149.8	30	9.4 150.3	55.	30.	25.	11.0 147.0	50.	103.	15.	11.5 142.9	45.	63.	15.	12.0 138.8	35.	193.	-5.
120618Z	9.8 148.1	30	9.9 149.1	50.	59.	20.	11.3 144.9	50.	19.	15.	12.3 141.0	45.	38.	15.	14.5 137.6	30.	293.	-15.
120700Z	10.0 146.7	30	10.1 145.5	50.	71.	20.	11.8 136.1	40.	468.	5.	15.1 132.4	30.	438.	-5.	18.0 131.0	20.	422.	-30.
120706Z	10.2 145.9	35	10.2 143.2	50.	159.	15.	12.0 135.5	40.	456.	10.	15.0 132.3	30.	381.	-5.	0.0 0.0	0.	-0.	0.
120712Z	10.6 145.3	35	10.8 143.0	50.	136.	15.	12.9 137.3	45.	283.	15.	15.7 133.3	30.	359.	-10.	0.0 0.0	0.	-0.	0.
120718Z	11.0 144.8	35	11.0 145.0	45.	12.	10.	12.0 142.9	40.	135.	10.	13.0 141.0	30.	397.	-15.	0.0 0.0	0.	-0.	0.
120800Z	11.7 144.1	35	11.4 144.5	40.	29.	5.	13.5 142.3	35.	235.	0.	16.2 140.3	20.	500.	-30.	0.0 0.0	0.	-0.	0.
120806Z	12.1 143.3	30	11.9 143.9	35.	37.	5.	14.3 141.6	30.	314.	-5.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120812Z	12.2 142.1	30	12.2 142.1	35.	0.	5.	15.2 128.1	20.	545.	-20.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120818Z	11.8 140.6	30	12.5 140.9	35.	45.	5.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
120900Z	11.4 138.9	35	11.4 139.3	30.	23.	-5.	11.0 133.3	25.	18.	-25.	10.4 127.2	20.	280.	-60.	0.0 0.0	0.	-0.	0.
120906Z	11.0 137.4	35	11.3 137.8	30.	30.	-5.	10.9 131.7	35.	85.	-25.	10.3 125.7	30.	347.	-55.	0.0 0.0	0.	-0.	0.
120912Z	10.3 136.0	40	10.4 135.1	45.	53.	5.	10.0 129.1	60.	223.	-10.	10.1 123.6	30.	479.	-60.	0.0 0.0	0.	-0.	0.
120918Z	10.5 134.7	45	10.0 133.7	45.	66.	0.	9.8 127.7	60.	284.	-15.	0.0 0.0	0.	-0.	0.	0.0 0.0	0.	-0.	0.
121000Z	11.3 133.3	50	11.3 133.8	60.	29.	10.	12.6 128.7	70.	129.	-10.	14.0 123.6	75.	412.	-25.	15.3 117.6	50.	999.	-60.
121006Z	11.7 132.9	60	11.7 132.4	60.	29.	0.	13.2 127.5	75.	162.	-10.	14.2 122.2	55.	535.	-45.	15.5 117.5	50.	1103.	-60.
121012Z	12.3 132.1	70	12.1 132.2	60.	13.	-10.	13.7 128.8	75.	108.	-15.	14.2 124.0	75.	512.	-25.	15.0 119.0	50.	1145.	-40.
121018Z	13.1 131.2	75	12.9 131.5	60.	21.	-15.	14.4 128.1	75.	144.	-25.	14.6 124.9	75.	535.	-25.	14.5 120.7	50.	1183.	-30.
121100Z	13.7 130.6	80	13.7 130.7	80.	6.	0.	16.0 127.3	60.	174.	-40.	16.4 122.5	45.	711.	-65.	0.0 0.0	0.	-0.	0.
121106Z	14.2 130.1	85	14.2 130.0	80.	6.	-5.	16.6 126.8	60.	242.	-40.	16.6 122.7	45.	799.	-65.	0.0 0.0	0.	-0.	0.
121112Z	15.0 130.1	90	14.7 129.7	80.	29.	-10.	16.7 127.3	60.	279.	-40.	16.7 123.3	45.	878.	-45.	0.0 0.0	0.	-0.	0.
121118Z	15.7 130.2	100	15.8 130.2	75.	6.	-25.	20.1 132.0	50.	95.	-50.	24.0 139.3	40.	139.	-40.	0.0 0.0	0.	-0.	0.
121200Z	16.4 130.3	100	16.3 130.2	90.	8.	-10.	20.8 132.5	60.	127.	-50.	24.6 141.6	45.	150.	-15.	0.0 0.0	0.	-0.	0.

121206Z	17.1	131.0	100	17.4	130.9	100.	19.	0.	21.9	134.3	60.	135.	-50.	26.8	147.0	35.	276.	-5.	0.0	0.0	0.	-0.	0.
121212Z	18.0	132.0	100	17.9	131.8	95.	13.	-5.	21.8	138.1	60.	36.	-30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121218Z	18.9	133.1	100	18.9	133.2	85.	6.	-15.	23.0	140.1	45.	72.	-35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121300Z	19.8	134.5	110	20.0	134.9	85.	25.	-25.	24.0	143.9	45.	135.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121306Z	20.5	136.2	110	21.1	136.9	80.	53.	-30.	25.0	148.9	35.	261.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121312Z	21.2	138.1	90	21.4	138.2	100.	13.	10.	24.7	147.2	55.	123.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121318Z	21.8	140.1	80	22.0	140.2	85.	13.	5.	25.6	150.5	45.	168.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121400Z	22.2	142.4	60	22.3	142.6	70.	13.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121406Z	22.6	144.9	40	22.5	145.0	60.	8.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121412Z	22.7	147.7	30	22.8	147.6	40.	8.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
121418Z	22.8	150.3	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.	0.
121500Z	23.0	153.0	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	31.	164.	285.	338.
AVG RIGHT ANGLE ERROR	17.	108.	193.	215.
AVG INTENSITY MAGNITUDE ERROR	10.	20.	30.	42.
AVG INTENSITY BIAS	2.	-2.	-1.	22.
NUMBER OF FORECASTS	52	48	39	25
		16	18	19

TROPICAL STORM BEN

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST				
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
121700Z	7.0	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.
121706Z	7.3	148.0	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.
121712Z	7.5	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.
121718Z	7.7	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.
121800Z	8.0	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.
121806Z	8.2	143.9	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.
121812Z	8.5	142.7	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.
121818Z	8.7	141.4	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.
121900Z	9.0	140.0	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.
121906Z	9.4	138.6	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.
121912Z	9.9	137.0	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.
121918Z	10.4	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.
122000Z	10.9	134.0	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.
122006Z	11.3	132.5	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.
122012Z	11.6	130.8	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.
122018Z	11.6	129.2	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.
122100Z	11.5	127.6	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.
122106Z	11.4	126.0	50	11.5	125.9	50.	8.	0.	12.9	122.1	35.	93.	-15.	14.7	119.3	35.	199.	0.	0.0	0.0	0.	-0.	0.
122112Z	11.8	124.3	40	11.6	124.6	45.	21.	5.	13.0	121.2	35.	115.	-20.	15.1	118.8	35.	375.	10.	0.0	0.0	0.	-0.	0.
122118Z	12.2	123.0	40	11.8	122.7	40.	30.	0.	13.7	118.0	35.	88.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122200Z	12.7	121.8	45	12.7	121.9	50.	6.	5.	14.3	117.7	40.	130.	-15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122206Z	13.0	120.5	50	13.0	120.4	40.	6.	-10.	15.5	116.6	35.	281.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122212Z	13.8	119.4	55	13.7	119.0	50.	24.	-5.	17.7	117.0	35.	380.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122218Z	14.6	119.2	60	14.3	118.2	50.	61.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122300Z	15.6	119.5	55	15.6	119.4	55.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122306Z	17.6	121.0	35	16.9	119.9	45.	75.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
122312Z	19.6	123.4	25	19.4	122.1	25.	103.	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	34.	181.	287.	0.
AVG RIGHT ANGLE ERROR	18.	89.	15.	0.
AVG INTENSITY MAGNITUDE ERROR	5.	14.	5.	0.
AVG INTENSITY BIAS	-1.	-11.	5.	0.
NUMBER OF FORECASTS	10	6	2	0
		2	1	

2. NORTH INDIAN OCEAN CYCLONE TRACK DATA

TC 17-79

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR FORECAST WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR FORECAST WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR FORECAST WIND	72 HOUR DST	72 HOUR WIND
050508Z	6.3	90.9	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.
050514Z	6.4	90.4	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.
050520Z	6.5	89.7	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.
050602Z	6.6	89.1	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.
050608Z	7.0	88.6	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.
050614Z	7.5	88.4	30	7.2	87.7	30.	45.	0.	8.7	85.8	35.	129.	-5.	10.1	84.5	45.	243.	-15.	12.0	84.0	55.	201.	-5.
050620Z	7.6	88.0	30	7.4	87.5	30.	32.	0.	8.8	85.5	35.	148.	-10.	10.8	84.1	45.	259.	-15.	12.7	84.3	55.	155.	-5.
050702Z	7.1	87.8	35	7.9	88.0	35.	49.	0.	9.6	88.2	45.	262.	-5.	11.2	88.7	55.	257.	-10.	13.3	89.7	65.	323.	0.
050708Z	6.7	87.2	35	7.2	87.7	35.	42.	0.	8.7	87.5	45.	179.	-15.	10.5	88.2	55.	185.	-10.	12.6	89.4	65.	308.	-5.
050714Z	6.7	86.6	40	7.6	87.1	40.	61.	0.	9.9	87.9	50.	222.	-10.	12.0	89.0	65.	247.	5.	14.0	90.7	70.	420.	-5.
050720Z	6.4	86.1	45	7.5	86.6	45.	72.	0.	9.5	85.8	60.	148.	0.	11.6	86.7	70.	113.	10.	13.0	89.8	75.	327.	0.
050802Z	5.8	86.0	50	6.9	86.0	50.	66.	0.	7.6	83.2	60.	184.	-5.	8.5	80.0	55.	315.	-10.	9.6	76.7	50.	412.	-25.
050808Z	5.9	86.4	60	5.6	86.0	60.	30.	0.	4.9	83.4	65.	254.	0.	4.9	80.2	70.	470.	0.	5.3	77.1	70.	573.	-10.
050814Z	6.5	86.4	60	5.2	85.4	60.	98.	0.	4.9	82.4	65.	330.	5.	5.0	79.2	70.	511.	-5.	5.5	76.1	70.	590.	-15.
050820Z	7.1	86.4	60	5.9	86.2	60.	73.	0.	5.7	85.3	65.	275.	5.	5.4	84.0	70.	439.	-5.	5.4	80.5	70.	521.	-15.
050902Z	7.6	86.3	65	7.3	86.2	65.	19.	0.	8.2	84.2	70.	181.	5.	9.0	81.5	65.	249.	-10.	9.4	78.7	60.	328.	-20.
050908Z	8.2	86.1	65	7.8	85.8	65.	30.	0.	9.0	84.1	70.	161.	0.	10.3	81.5	65.	191.	-15.	11.0	78.7	50.	264.	-30.
050914Z	9.2	85.9	60	8.8	85.6	60.	30.	0.	10.6	83.5	55.	114.	-20.	11.9	81.2	50.	111.	-35.	12.7	78.9	45.	198.	-15.
050920Z	10.3	85.3	60	10.4	85.2	60.	8.	0.	12.2	82.7	60.	42.	-15.	13.0	80.8	55.	70.	-30.	13.3	78.9	30.	226.	-20.
051002Z	11.2	84.6	65	10.9	84.3	65.	25.	0.	12.3	81.8	60.	67.	-15.	13.0	80.0	60.	101.	-20.	0.0	0.0	0.	-0.	0.
051008Z	11.7	84.2	70	11.6	83.9	75.	19.	5.	12.5	81.4	85.	75.	5.	13.1	79.4	55.	132.	-25.	0.0	0.0	0.	-0.	0.
051014Z	12.3	83.7	75	12.1	83.4	75.	21.	0.	13.2	81.2	85.	42.	0.	14.0	79.4	50.	120.	-10.	0.0	0.0	0.	-0.	0.
051020Z	12.7	83.2	75	12.7	83.4	75.	12.	0.	13.7	81.6	85.	33.	0.	14.5	79.8	50.	178.	0.	0.0	0.0	0.	-0.	0.
051102Z	13.0	82.7	75	13.1	82.6	80.	8.	5.	14.1	80.9	85.	25.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051108Z	13.4	82.3	80	13.2	82.3	90.	12.	10.	14.2	80.5	105.	64.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051114Z	13.7	81.7	85	14.2	80.9	95.	55.	10.	16.5	78.2	30.	70.	-30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051120Z	14.1	81.2	85	14.1	80.8	95.	23.	10.	16.0	78.5	30.	64.	-20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051202Z	14.5	80.8	80	14.4	80.5	90.	18.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051208Z	15.2	80.1	80	14.8	80.5	85.	33.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051214Z	16.0	79.3	60	15.2	79.9	60.	59.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
051220Z	17.0	78.1	50	17.0	78.1	50.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	36.	139.	233.	346.
AVG RIGHT ANGLE ERROR	17.	95.	192.	206.
AVG INTENSITY MAGNITUDE ERROR	2.	9.	13.	12.
AVG INTENSITY BIAS	2.	-5.	-11.	-12.
NUMBER OF FORECASTS	25	22	18	14

TC 18-79

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR FORECAST WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR FORECAST WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR FORECAST WIND	72 HOUR DST	72 HOUR WIND
061714Z	17.7	66.4	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.
061720Z	17.9	65.5	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.
061802Z	18.0	64.8	30	18.3	65.3	40.	34.	10.	19.5	64.6	50.	238.	0.	21.5	65.0	60.	476.	20.	0.0	0.0	0.	-0.	0.
061808Z	18.0	64.0	35	18.4	64.9	40.	56.	5.	19.6	64.1	55.	248.	5.	22.0	64.8	60.	482.	35.	0.0	0.0	0.	-0.	0.
061814Z	18.2	63.1	40	18.2	63.8	45.	40.	5.	19.6	62.3	55.	170.	5.	22.6	63.5	60.	445.	40.	0.0	0.0	0.	-0.	0.
061820Z	18.2	61.8	45	18.5	62.4	45.	38.	0.	19.7	59.3	55.	46.	5.	21.6	56.5	40.	100.	25.	0.0	0.0	0.	-0.	0.
061902Z	18.0	60.7	50	18.7	61.7	50.	70.	0.	20.0	58.6	50.	66.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
061908Z	18.4	59.9	50	18.7	59.9	50.	18.	0.	20.7	57.1	30.	77.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
061914Z	18.8	59.4	50	18.5	58.4	50.	59.	0.	20.2	54.1	25.	115.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
061920Z	19.1	58.8	50	19.0	58.3	50.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
062002Z	19.2	57.8	40	19.4	59.0	50.	69.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
062008Z	19.5	56.6	25	19.8	58.2	45.	92.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
062014Z	19.8	56.1	20	20.0	56.8	35.	41.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
062020Z	20.1	55.7	15	20.5	55.6	25.	25.	10.	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	48.	137.	363.	0.
AVG RIGHT ANGLE ERROR	24.	78.	284.	0.
AVG INTENSITY MAGNITUDE ERROR	6.	5.	30.	0.
AVG INTENSITY BIAS	6.	5.	30.	0.
NUMBER OF FORECASTS	12	7	4	0

TC 22-79

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
092002Z	9.1	87.9	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.
092008Z	9.7	87.6	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.
092014Z	10.1	86.8	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.
092020Z	10.4	86.4	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.
092102Z	10.7	86.0	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.
092108Z	11.1	85.6	25	11.0	85.5	25.	8.	0.	12.5	83.4	35.	146.	10.	14.2	80.9	40.	137.	30.	0.0	0.0	0.	-0.	0.
092114Z	11.6	85.2	25	11.0	84.0	25.	79.	0.	12.2	82.3	35.	191.	10.	13.1	80.5	40.	209.	30.	0.0	0.0	0.	-0.	0.
092120Z	12.8	85.0	25	12.1	84.9	25.	42.	0.	13.4	83.0	35.	134.	15.	14.4	80.9	40.	165.	30.	0.0	0.0	0.	-0.	0.
092202Z	14.0	84.7	25	12.5	84.4	30.	91.	5.	13.7	82.5	35.	146.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092208Z	14.9	83.9	25	13.5	82.8	35.	105.	10.	14.5	81.1	40.	121.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092214Z	15.3	83.1	25	15.0	84.0	30.	55.	5.	16.7	81.6	40.	63.	30.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092220Z	15.5	82.2	20	15.6	83.0	30.	46.	10.	18.0	80.2	10.	54.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092302Z	15.9	81.4	20	16.0	82.2	30.	46.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092308Z	16.5	80.8	10	16.5	81.4	25.	34.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092314Z	16.6	80.5	10	17.0	80.8	15.	29.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092320Z	17.1	80.3	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.

	ALL FORECASTS			
	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	54.	122.	170.	0.
AVG RIGHT ANGLE ERROR	34.	90.	122.	0.
AVG INTENSITY MAGNITUDE ERROR	6.	16.	30.	0.
AVG INTENSITY BIAS	6.	16.	30.	0.
NUMBER OF FORECASTS	10	7	3	0

TC 23-79

	BEST TRACK			WARNING			ERRORS		24 HOUR FORECAST			ERRORS		48 HOUR FORECAST			ERRORS		72 HOUR FORECAST			ERRORS	
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
091802Z	12.2	72.0	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.
091808Z	12.5	71.6	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.
091814Z	13.0	71.5	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.
091820Z	13.4	71.4	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.
091902Z	13.8	71.4	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.
091908Z	14.3	71.3	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.
091914Z	14.6	71.0	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.
091920Z	15.0	70.8	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.
092002Z	15.3	70.5	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.
092008Z	15.6	70.2	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.
092014Z	16.0	69.9	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.
092020Z	16.4	69.6	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.
092102Z	16.8	69.2	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.
092108Z	17.4	68.8	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.
092114Z	18.0	68.1	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.
092120Z	18.4	67.2	35	18.2	68.9	30.	97.	-5.	20.1	68.5	40.	294.	-10.	22.0	68.6	45.	459.	5.	24.0	70.0	20.	716.	-5.
092202Z	18.6	66.2	40	18.7	68.7	30.	142.	-10.	20.7	68.5	40.	331.	-15.	22.7	68.9	45.	510.	10.	24.5	70.7	20.	829.	0.
092208Z	19.0	65.3	45	19.2	65.7	40.	26.	-5.	20.2	63.5	45.	86.	-5.	20.8	61.6	45.	119.	15.	0.0	0.0	0.	-0.	0.
092214Z	19.3	64.3	45	19.0	64.6	40.	25.	-5.	19.8	61.3	50.	13.	5.	20.5	58.0	0.	57.	-30.	0.0	0.0	0.	-0.	0.
092220Z	19.6	63.3	50	19.4	63.7	60.	25.	10.	20.1	59.7	70.	51.	30.	20.9	55.9	20.	119.	-5.	0.0	0.0	0.	-0.	0.
092302Z	19.7	62.7	55	19.6	62.7	65.	6.	10.	20.4	58.8	60.	73.	25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092308Z	19.9	62.0	50	19.8	61.7	65.	18.	15.	20.7	57.8	65.	107.	35.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092314Z	20.0	61.4	45	20.0	63.5	35.	118.	-10.	21.3	65.1	20.	362.	-10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092320Z	20.2	60.6	40	20.3	60.3	35.	18.	-5.	22.1	57.7	20.	126.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092402Z	20.3	60.1	35	20.6	59.6	35.	33.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092408Z	20.1	59.6	30	20.8	58.8	30.	61.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092414Z	19.9	58.8	30	20.3	58.3	25.	37.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092420Z	20.0	57.8	25	19.8	58.0	25.	16.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
092502Z	20.0	56.5	20	20.0	57.3	15.	45.	-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	48.	160.	253.	773.
AVG RIGHT ANGLE ERROR	21.	97.	184.	629.
AVG INTENSITY MAGNITUDE ERROR	6.	16.	13.	3.
AVG INTENSITY BIAS	-1.	6.	-1.	-3.
NUMBER OF FORECASTS	14	9	5	2

TC 24-79

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR FORECAST WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR FORECAST WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR FORECAST WIND	72 HOUR ERRORS DST	72 HOUR ERRORS WIND
102902Z	11.1	90.8	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.
102908Z	11.7	90.1	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.
102914Z	12.2	89.6	20	12.5	89.4	20.	21.	0.	16.3	89.0	40.	250.	15.	19.0	91.9	30.	633.	-5.	19.8	95.8	15.	1036.	0.
102920Z	12.4	89.0	25	13.5	89.0	25.	66.	0.	16.9	88.2	40.	257.	10.	19.6	90.2	30.	629.	-5.	0.0	0.0	0.	-0.	0.
103002Z	12.4	88.2	25	13.6	88.7	25.	77.	0.	15.5	87.5	35.	192.	5.	17.9	87.5	40.	499.	10.	0.0	0.0	0.	-0.	0.
103008Z	12.8	87.1	25	12.6	88.2	25.	65.	0.	13.2	86.7	30.	163.	0.	14.1	84.9	35.	295.	15.	0.0	0.0	0.	-0.	0.
103014Z	13.1	86.2	25	12.5	87.9	25.	105.	0.	12.9	86.5	30.	215.	-5.	14.6	85.1	35.	355.	20.	0.0	0.0	0.	-0.	0.
103020Z	13.4	85.6	30	13.0	86.5	25.	58.	-5.	14.0	83.5	35.	121.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
103102Z	13.5	84.9	30	13.4	84.4	25.	30.	-5.	15.3	80.8	35.	167.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
103108Z	13.4	83.9	30	13.8	83.5	30.	33.	0.	15.8	80.1	25.	197.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
103114Z	13.0	82.8	35	13.9	82.8	30.	54.	-5.	15.1	79.3	20.	143.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
103120Z	12.7	81.9	35	13.8	82.4	30.	72.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
110102Z	12.5	80.9	30	12.7	81.0	30.	13.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
110108Z	12.5	80.1	20	12.7	79.9	20.	17.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
110114Z	12.7	79.3	15	12.7	79.6	15.	17.	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	48.	190.	482.	1036.
AVG RIGHT ANGLE ERROR	26.	142.	332.	902.
AVG INTENSITY MAGNITUDE ERROR	2.	6.	11.	0.
AVG INTENSITY BIAS	-2.	4.	7.	0.
NUMBER OF FORECASTS	13	9	5	1

TC 25-79

MO/DA/HR	BEST TRACK POSIT		BEST TRACK WIND	WARNING POSIT		WARNING WIND	WARNING ERRORS DST	WARNING ERRORS WIND	24 HOUR FORECAST POSIT		24 HOUR FORECAST WIND	24 HOUR ERRORS DST	24 HOUR ERRORS WIND	48 HOUR FORECAST POSIT		48 HOUR FORECAST WIND	48 HOUR ERRORS DST	48 HOUR ERRORS WIND	72 HOUR FORECAST POSIT		72 HOUR FORECAST WIND	72 HOUR ERRORS DST	72 HOUR ERRORS WIND
111402Z	12.3	70.1	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.
111408Z	12.8	70.0	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.
111414Z	13.0	69.9	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.
111420Z	13.3	69.8	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.
111502Z	13.6	69.8	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.
111508Z	13.9	69.8	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.
111514Z	14.2	69.8	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.
111520Z	14.6	69.8	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.
111602Z	15.0	69.9	35	15.0	70.0	40.	6.	5.	17.0	70.3	45.	72.	5.	19.5	71.4	60.	121.	45.	0.0	0.0	0.	-0.	0.
111608Z	15.6	70.0	40	14.6	69.7	40.	62.	0.	15.6	69.9	45.	191.	10.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111614Z	16.4	70.2	40	14.6	69.7	40.	111.	0.	15.6	69.9	45.	239.	15.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111620Z	17.3	70.4	40	17.3	70.8	40.	23.	0.	20.2	74.7	0.	252.	-25.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111702Z	18.2	70.2	40	18.1	71.5	40.	74.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111708Z	18.8	70.1	35	17.9	71.9	35.	115.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111714Z	19.6	70.1	30	19.7	70.1	30.	6.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111720Z	20.3	70.2	25	20.3	70.2	25.	0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
111802Z	21.3	70.4	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.

ALL FORECASTS	WRNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	50.	189.	121.	0.
AVG RIGHT ANGLE ERROR	26.	103.	73.	0.
AVG INTENSITY MAGNITUDE ERROR	1.	14.	45.	0.
AVG INTENSITY BIAS	1.	1.	45.	0.
NUMBER OF FORECASTS	8	4	1	0

	BEST TRACK			WARNING					24 HOUR FORECAST					48 HOUR FORECAST					72 HOUR FORECAST				
							ERRORS					ERRORS					ERRORS						
MO/DA/HR	POSIT		WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND	POSIT		WIND	DST	WIND
112014Z	8.0	94.2	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.
112020Z	8.8	93.4	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.
112102Z	9.7	92.8	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.
112108Z	10.4	92.4	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.
112114Z	10.7	91.9	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.
112120Z	10.8	91.7	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.
112202Z	10.9	91.4	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.
112208Z	10.8	90.9	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.
112214Z	10.7	90.0	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.
112220Z	10.5	88.7	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.
112302Z	10.4	87.6	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.
112308Z	10.6	86.5	25	10.0	88.0	25.	95.	0.	10.7	84.9	30.	170.	0.	11.4	81.8	35.	162.	10.	0.0	0.0	0.	-0.	0.
112314Z	10.7	85.4	25	10.3	87.1	30.	103.	5.	11.2	84.0	35.	159.	5.	12.0	80.9	35.	165.	20.	0.0	0.0	0.	-0.	0.
112320Z	10.7	84.3	30	10.6	84.0	35.	19.	5.	11.8	80.6	45.	30.	20.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112402Z	10.6	83.0	30	11.0	82.5	35.	38.	5.	12.2	78.8	25.	124.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112408Z	10.8	82.0	30	10.6	81.8	35.	17.	5.	11.2	77.0	20.	256.	-5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112414Z	11.4	81.3	30	11.0	80.6	35.	47.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112420Z	12.2	80.9	25	11.9	79.6	30.	78.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112502Z	12.9	80.8	25	11.9	79.6	30.	92.	5.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112508Z	13.8	80.5	25	13.8	80.0	25.	29.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	0.
112514Z	14.5	79.7	15	14.5	79.6	20.	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	52.	148.	163.	0.
AVG RIGHT ANGLE ERROR	31.	83.	21.	0.
AVG INTENSITY MAGNITUDE ERROR	4.	6.	15.	0.
AVG INTENSITY BIAS	4.	4.	15.	0.
NUMBER OF FORECASTS	10	5	2	0

ANNEX B TROPICAL CYCLONE FIX DATA

1. WESTERN NORTH PACIFIC CYCLONE FIX DATA

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON ALICE

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
*	1	310900	3.9N 172.2E	PCN 6		DMSP36		PGTW
	2	011236	3.8N 169.5E	PCN 6		DMSP35		PGTW
	3	011919	5.0N 167.3E	PCN 6	T2.5/2.5	DMSP37	INIT OBS	KGWC
	4	012151	4.8N 166.0E	PCN 6	T2.0/2.0	DMSP36	INIT OBS	PGTW
*	5	012336	5.4N 165.5E	PCN 6		DMSP35		KGWC
	6	020351	5.5N 167.5E			GOES3		PHIK
	7	020801	6.0N 167.0E	PCN 6		DMSP37		PGTW
	8	021218	5.9N 167.0E	PCN 6		DMSP35		PGTW
	9	021900	6.8N 167.4E	PCN 6		DMSP37		KGWC
	10	022133	7.0N 167.7E	PCN 6	T2.0/2.0 /S0.0/24HRS	DMSP36		PGTW
	11	022318	6.5N 167.3E	PCN 2		DMSP35		KGWC
	12	030741	8.6N 168.0E	PCN 6		DMSP37		PGTW
	13	031200	8.9N 168.3E	PCN 6	T3.5/3.5 /D1.0/29HRS	DMSP35		KGWC
	14	031940	9.5N 168.1E	PCN 6		DMSP37		PHIK
	15	032115	9.2N 168.0E	PCN 6	T3.0/3.0 /D1.0/24HRS	DMSP36		PGTW
	16	032150	9.5N 168.0E			GOES3		PHIK
	17	040042	9.3N 167.6E	PCN 5		DMSP35		PGTW
	18	040350	9.8N 167.1E			GOES3		PHIK
	19	040957	9.6N 167.4E	PCN 6		DMSP36		PGTW
	20	042002	9.6N 165.6E	PCN 4		DMSP37		PGTW
	21	042058	9.6N 165.5E	PCN 4	T3.5/3.5 /D0.5/24HRS	DMSP36		PGTW
	22	050024	9.6N 165.0E	PCN 3		DMSP35		PGTW
	23	050350	9.8N 164.5E			GOES3		PHIK
	24	050939	10.1N 163.7E	PCN 6		DMSP36		PGTW
	25	051305	10.4N 163.6E	PCN 6		DMSP35		PGTW
	26	051943	11.0N 162.4E	PCN 4	T4.0/4.0 /D0.5/23HRS	DMSP37		PGTW
	27	060006	11.1N 161.7E	PCN 1		DMSP35		PGTW
	28	060823	11.8N 160.0E	PCN 2		DMSP37		PGTW
	29	060922	11.9N 159.7E	PCN 2		DMSP36		PGTW
	30	061247	12.2N 159.2E	PCN 2		DMSP35		PGTW
	31	061923	12.6N 158.1E	PCN 1		DMSP37		PGTW
	32	062205	12.5N 157.9E	PCN 1	T5.0/5.0 /D1.0/26HRS	DMSP36		PGTW
	33	062348	12.4N 157.4E	PCN 2		DMSP35		PGTW
	34	070350	12.6N 157.0E			GOES3		PHIK
	35	070804	12.3N 156.3E	PCN 2		DMSP37	CI UP	PGTW
	36	071019	12.5N 155.8E			GOES3		PHIK
	37	071047	12.4N 155.7E	PCN 2		DMSP36		PGTW
	38	071230	12.4N 155.3E	PCN 2		DMSP35		PGTW
	39	072147	12.2N 153.2E	PCN 1	T6.0/6.0 /D1.0/24HRS	DMSP36		PGTW
	40	080112	12.2N 152.5E	PCN 1		DMSP35		PGTW
	41	080926	12.0N 151.2E	PCN 5		DMSP37		PGTW
	42	080926	12.0N 152.1E	PCN 6		DMSP37	INIT OBS	RODN
	43	081029	12.0N 151.0E	PCN 5		DMSP36		PGTW
	44	081353	11.9N 150.1E	PCN 2		DMSP35		PGTW
	45	082025	11.9N 148.6E	PCN 5		DMSP37		PGTW
	46	090054	11.9N 147.5E	PCN 4	T4.5/5.5 /W1.5/27HRS	DMSP35		PGTW
	47	090906	12.3N 145.7E	PCN 6		DMSP37		PGTW
	48	091011	12.3N 145.7E	PCN 6		DMSP36		PGTW
	49	091335	12.0N 145.2E	PCN 6		DMSP35		PGTW
	50	092254	11.9N 143.3E	PCN 1	T3.5/4.5 /W1.0/23HRS	DMSP36		PGTW
	51	100217	12.0N 142.6E	PCN 1		DMSP35		PGTW
	52	100846	12.4N 140.2E	PCN 6		DMSP37		RODN
	53	100846	12.2N 140.9E	PCN 6		DMSP37		PGTW
	54	101136	12.2N 140.4E	PCN 1		DMSP36		PGTW
	55	101317	12.2N 140.1E	PCN 2		DMSP35		PGTW
	56	102127	12.3N 139.3E	PCN 1	T4.0/4.5 /W0.5/19HRS	DMSP37		RPMK
	57	102127	12.3N 139.3E	PCN 2	T3.5/3.5 /S0.0/23HRS	DMSP37		PGTW
	58	102236	12.3N 139.1E	PCN 2		DMSP36		PGTW
	59	110159	12.7N 138.7E	PCN 1		DMSP35		PGTW
	60	111008	12.9N 138.0E	PCN 1		DMSP37		RODN
	61	111008	13.0N 138.0E	PCN 1		DMSP37	CI UP	PGTW
	62	111118	13.0N 137.8E	PCN 2		DMSP36		PGTW
	63	111441	13.3N 137.7E	PCN 1		DMSP35		PGTW
	64	112107	13.6N 137.5E	PCN 2		DMSP37		PGTW
	65	112108	13.7N 137.4E	PCN 2		DMSP37		RODN
	66	112218	13.6N 137.1E	PCN 2	T3.5/3.5 /S0.0/25HRS	DMSP36		PGTW
	67	120141	14.0N 137.1E	PCN 1	T4.0/4.0 /S0.0/28HRS	DMSP35		RPMK
	68	120141	13.9N 137.1E	PCN 1		DMSP35		PGTW
	69	120948	15.2N 136.6E	PCN 6		DMSP37		RPMK
	70	120949	14.9N 136.3E	PCN 6		DMSP37		PGTW
	71	121100	15.0N 136.2E	PCN 6		DMSP36		PGTW
	72	121423	15.1N 136.4E	PCN 4		DMSP35		PGTW
	73	122048	15.4N 136.6E	PCN 5		DMSP37		PGTW
	74	122343	15.4N 136.7E	PCN 3	T3.5/3.5 /S0.0/26HRS	DMSP36		PGTW
*	75	130928	16.7N 137.5E	PCN 4		DMSP37		PGTW
*	76	130929	16.7N 137.6E	PCN 2		DMSP37		RODN
*	77	131042	16.8N 137.7E	PCN 6		DMSP36		PGTW
	78	131405	16.3N 137.4E	PCN 6		DMSP35		PGTW

* 79	132028	18.2N 140.1E	PCN 6		DMSP37	RODN
80	132028	16.1N 136.1E	PCN 5		DMSP37	PGTW
81	132325	16.1N 136.6E	PCN 5	T2.0/3.0 /W1.5/24HRS	DMSP36	PGTW
82	140105	16.0N 136.4E	PCN 3		DMSP35	PGTW
* 83	140909	17.4N 140.7E	PCN 6		DMSP37	RODN
84	140909	16.2N 135.4E	PCN 6		DMSP37	PGTW
85	142307	17.1N 133.1E	PCN 3	T1.0/2.0 /W1.0/24HRS	DMSP36	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	020115	5.3N 168.5E	1500FT		986	65 180 35	220 72 180 35	5 2			+25 +25 +25	1
2	021520	6.5N 167.6E	700MB	2948	984		040 60 290 30	12 5			+12 +15 +11	2
3	030053	7.2N 168.0E	700MB	2973		55 120 15	210 60 120 24				+16 + 8	3
4	030310	7.7N 168.3E	700MB	2934	982	45 060 40	160 52 060 35	2 2			+13 +15 +10	3
5	040210	9.3N 167.8E	700MB	2942	983	55 310 45	050 53 310 45	2 4			+13 +17 + 8	6
6	041523	9.5N 166.2E	700MB	2931	983		310 54 200 40	4 5			+11 +11 +11	7
7	051302	10.3N 163.3E	700MB	2847	972		130 74 040 30				+15 +14	10
8	051423	10.4N 163.1E	700MB	2825	969		190 79 100 20	10 3	CIRCULAR	35	+13 +15 +13	10
9	060259	11.5N 161.0E	700MB	2807	968	95 340 18	100 70 340 20	4 4	ELLIPTICAL	30 20 010	+10 +14 +10	11
10	061213	12.1N 159.2E	700MB	2763	963		120 87 030 23				+17 +11	12
11	061427	12.2N 159.0E	700MB	2762	961		040 88 300 10	4 5	ELLIPTICAL	25 15 030	+12 +16 +13	12
12	070008	12.3N 157.6E	700MB	2674				4 6				13
13	070256	12.4N 157.0E	700MB	2646	949	80 010 20	170 102 040 20	4 4	CIRCULAR	27	+12 +19 +13	13
14	071407	12.5N 154.7E	700MB	2541	937		170 96 090 24	15 4	CIRCULAR	17	+13 +19 +11	14
15	071820	12.2N 154.2E	700MB	2479	930		070 126 010 14				+21 +10	14
16	072040	12.2N 153.5E	700MB	2477	928	100 330 5	080 105 360 15	15 2	CIRCULAR	15	+15 +24 +10	14
17	080010	12.2N 152.8E	700MB	2544	938	100 170	170 115 140 10				+22 +12	15
18	080247	12.1N 152.4E	700MB	2537	935	130 060 20	140 115 060 10	5 4	CIRCULAR	15	+13 +20 +12	15
19	081302	12.2N 149.8E	700MB	2690	954		120 60 090 30				+24 + 8	16
20	081508	11.9N 149.6E	700MB	2743	957		040 80 360 21	3 5	ELLIPTICAL	25 15 020	+ 9 +25 + 8	16
21	082219	11.9N 148.1E	700MB	2773	964	110 250 10	330 70 270 60	4 5	CIRCULAR	30	+12 +23 +13	17
22	090202	11.9N 147.4E	700MB	2771	964	80 180 10	030 75 300 10	4 4	CIRCULAR	30	+11 +23 +10	17
23	090601	12.1N 146.6E	700MB	2845		85 210	130 107 050 16				+29 + 9	18
24	090840	12.1N 146.1E	700MB	2857	974		090 94 230 20	5 4			+18 +22 +10	18
25	091434	12.1N 144.8E	700MB	2849	973		140 90 040 18	2 4	CIRCULAR	35	+12 +19 +11	19
26	092054	11.7N 143.6E	700MB	2842	970	60 030 50	110 87 030 30	5 5	ELLIPTICAL	25 18 040	+12 +15 +10	20
27	100445	12.2N 141.8E	700MB	2804	965	65 090 20	150 99 090 10	4 2	CIRCULAR	20	+13 +18	21
28	101742	12.3N 139.2E	700MB	2689	953		350 86 280 16	5 4	CIRCULAR	17	+12 +19 +14	23
29	102105	12.3N 139.2E	700MB	2646	949		060 90 330 30				+20 +13	23
30	110210	12.5N 138.5E	700MB	2608	943	85 360 15	100 105 070 30	5 5	CIRCULAR	13	+12 +21 +12	23
31	111245	13.3N 137.6E	700MB	2597			180 80 100 15		CIRCULAR		+15 + 5	24
32	111530	13.3N 137.3E	700MB	2563	938		090 85 340 15	10 5	CIRCULAR	10	+12 +21 + 6	24
33	120104	13.9N 137.1E	700MB	2673		120 150 8	220 110 150 15				+21 +10	25
34	120254	14.0N 137.0E	700MB	2625	946	120 150 8	220 110 150 15	4 3	CIRCULAR	12	+11 +22 +11	25
35	121459	14.9N 136.5E	700MB	2789	965		130 84 050 6	5 5	CIRCULAR	10	+10 +16 +11	26
36	121804	15.1N 136.5E	700MB	2766	963		120 90 090 0					26
37	122013	15.2N 136.7E	700MB	2761	961		100 83 360 7	10 3	CIRCULAR	13	+11 +17 +11	26
38	130028	15.4N 136.8E	700MB	2859		60 030 35	110 65 030 18				+23	27
39	130253	15.7N 136.7E	700MB	2925	977	65 090 15	090 40 340 60	5 2	CIRCULAR	10	+12 +19	27
40	131226	16.1N 137.2E	700MB	2959	985		170 67 100 20				+19 +10	28
41	131517	16.3N 137.2E	700MB	3017	989		040 57 280 30	5 5			+13 +20 +10	28
42	140004	16.5N 136.7E	700MB	3126	1005	50 330 20	160 45 040 60				+18 + 7	29
43	140308	16.1N 136.2E	700MB	3145		30 350 90	140 35 330 90	5 5			+14 +15 + 4	29

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	030330	7.7N 168.2E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
2	030620	8.4N 168.0E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
3	030730	8.2N 168.2E	LAND	FAIR				PSBL EYE	8.7N 167.7E	91366
4	030830	8.5N 168.2E	LAND	FAIR				PSBL CNTR	8.7N 167.7E	91366
5	030930	8.5N 168.2E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
6	031130	8.6N 168.2E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
7	032230	9.1N 167.7E	LAND	FAIR				PSBL CNTR	8.7N 167.7E	91366
8	040130	9.3N 167.4E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
9	040630	9.6N 167.6E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
10	040730	9.6N 167.6E	LAND	GOOD				PSBL EYE	8.7N 167.7E	91366
11	040800	9.6N 167.5E	LAND	GOOD				PSBL EYE	8.7N 167.7E	91366
12	040830	9.5N 167.5E	LAND	GOOD				PSBL EYE	8.7N 167.7E	91366
13	040900	9.5N 167.2E	LAND	GOOD				PSBL EYE	8.7N 167.7E	91366
14	040930	9.6N 167.1E	LAND	FAIR				PSBL EYE	8.7N 167.7E	91366
15	041000	9.6N 167.1E	LAND	FAIR				PSBL EYE	8.7N 167.7E	91366
16	041100	9.5N 166.9E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
17	041130	9.5N 166.8E	LAND	POOR				PSBL CNTR	8.7N 167.7E	91366
18	090435	12.3N 146.8E	LAND	POOR				WALL CLD VSB SSW-NNE	13.6N 144.9E	91218
19	090510	12.3N 146.7E	LAND	POOR					13.6N 144.9E	91218
20	090535	12.3N 146.7E	LAND	POOR					13.6N 144.9E	91218
21	090610	12.3N 146.5E	LAND	POOR				WALL CLD VSBL SW-N	13.6N 144.9E	91218

22	090635	12.2N	146.4E	LAND	POOR		WALL CLD VSBL SSW-N	13.6N	144.9E	91218
23	090705	12.3N	146.3E	LAND	POOR		WALL CLD VSBL SSW-NNE	13.6N	144.9E	91218
24	090735	12.3N	146.2E	LAND	POOR		WALL CLD VSBL SSW-W	13.6N	144.9E	91218
25	090805	12.4N	146.2E	LAND	POOR		WALL CLD VSBL SSW-NNW	13.6N	144.9E	91218
26	090835	12.3N	145.8E	LAND	FAIR		WALL CLD SSW-NNE	13.6N	144.9E	91218
27	090910	12.3N	145.8E	LAND	POOR		WALL CLD W-N	13.6N	144.9E	91218
28	090935	12.4N	145.7E	LAND	FAIR		WALL CLD SW-N	13.6N	144.9E	91218
29	091010	12.4N	145.7E	LAND	POOR		WALL CLD SSW-N-NNE	13.6N	144.9E	91218
30	091035	12.3N	145.7E	LAND	FAIR		WALL CLD S-N-NE	13.6N	144.9E	91218
31	091105	12.4N	145.5E	LAND	FAIR		WALL CLD S-NNE-NE	13.6N	144.9E	91218
32	091135	12.3N	145.3E	LAND	FAIR		WALL CLD S-N	13.6N	144.9E	91218
33	091205	12.3N	145.3E	LAND	GOOD		WALL SSW-NNE	13.6N	144.9E	91218
34	091235	12.3N	145.2E	LAND	FAIR		WALL S-NW	13.6N	144.9E	91218
35	091310	12.3N	145.0E	LAND	GOOD	20	GOOD CTR WALL CLD OPEN E-SSW	13.6N	144.9E	91218
36	091335	12.3N	144.9E	LAND	GOOD	20	GOOD CTR WALL CLD OPEN ENE-S-SW	13.6N	144.9E	91218
37	091410	12.3N	144.8E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218
38	091435	12.4N	144.7E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218
39	091510	12.4N	144.7E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218
40	091535	12.4N	144.6E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218
41	091510	12.4N	144.5E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218
42	091635	12.3N	144.4E	LAND	FAIR		HVY ATTENUATION	13.6N	144.9E	91218

TYPHOON BESS

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	161109	2.0N 148.5E	PCN 5		DMSP36		PGTW
2	180043	3.0N 148.0E	PCN 6	T0.0/0.0	DMSP35	INIT OBS	PGTW
3	182315	10.0N 145.8E	PCN 6	T1.5/1.5 /D1.5/23HRS	DMSP36		PGTW
4	191157	10.5N 142.5E	PCN 6		DMSP36		PGTW
5	191306	10.5N 143.0E	PCN 6		DMSP35		PGTW
6	192103	10.9N 142.8E	PCN 6	T2.5/2.5 /D1.0/22HRS	DMSP37		PGTW
7	192258	10.9N 142.1E	PCN 5		DMSP36		PGTW
8	200148	10.5N 141.2E	PCN 5		DMSP35		PGTW
9	200148	11.2N 142.2E	PCN 5	T1.5/1.5+	DMSP35	INIT OBS	RPMK
10	200943	10.6N 140.1E	PCN 6		DMSP37		PGTW
11	201140	10.9N 139.9E	PCN 5		DMSP36		PGTW
12	201430	11.2N 139.8E	PCN 6		DMSP35		PGTW
13	202043	11.0N 138.9E	PCN 6		DMSP36		PGTW
14	202240	11.4N 139.6E	PCN 3	T3.5/3.5 /D1.0/25HRS	DMSP36		PGTW
15	210130	11.9N 139.4E	PCN 4		DMSP35		PGTW
16	210130	11.3N 138.4E	PCN 3	T2.5/2.5+/D1.0/24HRS	DMSP35		RPMK
17	210923	12.5N 137.6E	PCN 4		DMSP37		PGTW
18	210924	13.1N 137.3E	PCN 4		DMSP37		RODN
19	211122	12.7N 137.3E	PCN 4		DMSP36		PGTW
20	211411	13.3N 136.7E	PCN 3		DMSP35		PGTW
21	212043	11.3N 138.7E	PCN 6		DMSP37		RODN
22	220004	13.9N 135.9E	PCN 4	T4.0/4.0 /D0.5/25HRS	DMSP36		PGTW
23	220112	13.9N 135.8E	PCN 4		DMSP35		PGTW
24	220112	13.9N 136.3E	PCN 3	T3.5/3.5	DMSP35	INIT OBS	RODN
25	221104	14.6N 135.0E	PCN 1		DMSP36		PGTW
26	221353	15.0N 135.1E	PCN 3		DMSP35		PGTW
27	221353	15.0N 135.2E	PCN 3		DMSP35		PGTW
28	222144	15.6N 134.9E	PCN 2	T4.0/4.0 /S0.0/22HRS	DMSP37		PGTW
29	222346	16.0N 134.9E	PCN 1		DMSP36		PGTW
30	230235	16.5N 134.9E	PCN 1		DMSP35		PGTW
31	230235	16.3N 135.1E	PCN 1	T4.0/4.0	DMSP35	INIT OBS	PGTW
32	231025	17.5N 135.7E	PCN 1		DMSP37		PGTW
33	231228	17.9N 136.0E	PCN 1		DMSP36		PGTW
34	231228	18.1N 136.3E	PCN 1		DMSP36		RKSO
35	231517	17.9N 136.4E	PCN 1		DMSP35		RPMK
36	231517	18.1N 136.5E	PCN 2		DMSP35		PGTW
37	232125	19.1N 137.7E	PCN 1	T3.5/4.0 /W0.5/24HRS	DMSP37		PGTW
38	232328	19.3N 137.9E	PCN 4		DMSP36		PGTW
39	240216	19.9N 138.5E	PCN 3		DMSP35		PGTW
40	240217	19.7N 138.9E	PCN 5	T3.0/4.0-/W2.0/24HRS	DMSP35		RPMK
41	240217	19.8N 138.5E	PCN 5	T3.0/3.0	DMSP35	INIT OBS	RKSO
42	241005	21.2N 140.1E	PCN 5		DMSP37	CI DOWN	PGTW
43	241005	20.9N 140.0E	PCN 5		DMSP37		RKSO
44	241210	21.3N 140.8E	PCN 5		DMSP36		PGTW
45	241317	21.5N 141.3E	PCN 6		DMSP35		PGTW
* 46	242104	23.7N 141.8E	PCN 5	T1.5/2.5 /W2.0/24HRS	DMSP37		PGTW
* 47	242105	23.2N 145.1E	PCN 5	T1.5/2.5-/W1.5/19HRS	DMSP37		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ INV DP/SST	MSN NO.
1	200259	10.5N 141.1E	1500FT		1005	35 300 40	060 50 300 40	2 5			+24 +26 +23 25	1
2	200330	10.7N 140.8E	700MB									1
3	200855	10.6N 140.3E	700MB	3088	1001	30 050 50	130 30 050 120	5 10			+12 +12	2
4	201200	10.8N 139.8E	700MB	3101	1002		250 23 160 60	5 10				2
5	201433	10.9N 139.6E	700MB	3090	1004		360 32 310 30	5 13			+10 +11	2
6	210213	11.9N 138.5E	700MB	3032	994	35 340 60	070 46 340 55	5 4			+11 +11 +11	4
7	211500	13.1N 136.1E	700MB	2970	987		170 61 080 30	2 5	CIRCULAR	30	+13 +13 +12	5
8	211744	13.3N 135.8E	700MB	2945	984							5
9	212006	13.3N 135.6E	700MB	2922	981		220 63 150 40	10 5	CIRCULAR	30	+14 +14 +11	5
10	220920	14.4N 135.0E	700MB	2819	969	75 090 30	180 90 130 60	2 2	ELLIPTICAL	40 30 360	+13 +17	7
11	230025	15.2N 134.6E	700MB	2764	963	55 130 45	200 69 140 30	2 2	CIRCULAR	30	+11 +20 + 8	8
12	230607	17.1N 135.2E	700MB	2731	959	80 120 15	070 78 340 25	4 2	CIRCULAR	20	+10 +19 + 4	9
13	230835	17.4N 135.4E	700MB	2747	961	70 140 10	200 128 140 15	4 2	CIRCULAR	22	+10 +21	9
14	231942	19.8N 136.9E	700MB	2841	972		140 63 130 20					10
15	232122	19.1N 137.3E	700MB	2863	974	120 270 15	230 110 230 8	7 2	CIRCULAR	25	+14 +24 + 4	10
16	240616	20.4N 139.2E	700MB	2996	989	110 310 15	280 120 160 18	2 4				11
17	240859	20.8N 139.8E	700MB	2999	990	100 310 10	280 86 170 10	2 10			+ 8 +15 +10	11

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	211200	12.7N 136.9E	SHIP	GOOD				MOVG NW AT 6 KNOTS	13.1N 137.3E	NRHY

TYPHOON CECIL

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	072225	3.0N 143.6E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	082349	3.4N 143.6E	PCN 6	T0.0/0.0 /S0.0/25HRS	DMSP36		PGTW
3	092331	6.1N 141.7E	PCN 6	T1.0/1.0 /D1.0/24HRS	DMSP36		PGTW
4	101212	6.3N 140.6E	PCN 6		DMSP36		PGTW
5	102314	6.4N 139.0E	PCN 5	T1.5/1.5 /D0.5/24HRS	DMSP36		PGTW
6	110910	6.6N 138.8E	PCN 6		DMSP37		PGTW
7	110911	6.9N 138.3E	PCN 6		DMSP37	INIT OBS STORM ON EDGE OF DATA	RODN
8	111155	6.3N 138.5E	PCN 5		DMSP36		PGTW
9	111434	6.3N 138.3E	PCN 6		DMSP35		PGTW
10	111434	6.5N 138.4E	PCN 6		DMSP35	INIT OBS	RPMK
11	112151	7.0N 137.6E	PCN 5	T3.0/3.0 /D1.5/23HRS	DMSP37		PGTW
12	112256	7.0N 137.4E	PCN 5		DMSP36		PGTW
13	120134	7.0N 136.1E	PCN 5	T3.0/3.0	DMSP35	INIT OBS	RODN
14	120134	7.1N 136.8E	PCN 5		DMSP35		PGTW
15	120135	6.7N 136.6E	PCN 5	T3.0/3.0+	DMSP35	INIT OBS	RPMK
16	121416	6.9N 135.7E	PCN 5		DMSP35		PGTW
17	121416	7.0N 135.8E	PCN 5		DMSP35		RODN
18	122131	7.1N 135.6E	PCN 5	T3.0/3.0 /S0.0/24HRS	DMSP37		PGTW
19	130020	7.4N 134.5E	PCN 3		DMSP36		PGTW
20	130256	7.6N 134.4E	PCN 3		DMSP35		PGTW
21	131011	7.8N 133.8E	PCN 6		DMSP37		PGTW
22	131119	8.1N 133.6E	PCN 6		DMSP36		PGTW
23	131357	8.2N 133.2E	PCN 5		DMSP35		PGTW
24	131358	8.0N 133.2E	PCN 6		DMSP35		RODN
25	131358	8.3N 132.9E	PCN 5		DMSP35		RPMK
26	132111	8.3N 132.2E	PCN 5		DMSP37		PGTW
27	140002	8.1N 131.5E	PCN 3	T3.5/3.5 /D0.5/26HRS	DMSP36		PGTW
28	140239	8.6N 131.1E	PCN 1	T4.0/4.0-	DMSP35	INIT OBS	RODN
29	140239	8.1N 131.1E	PCN 3		DMSP35		PGTW
30	140239	9.2N 131.1E	PCN 3	T3.5/3.5	DMSP35	INIT OBS	RPMK
31	140952	8.4N 129.4E	PCN 6		DMSP37		PGTW
32	141243	8.6N 129.2E	PCN 4		DMSP36		PGTW
33	141520	8.6N 128.8E	PCN 6		DMSP35		PGTW
34	141521	8.5N 128.6E	PCN 5		DMSP35		RODN
35	141521	8.5N 129.6E	PCN 5		DMSP35		RPMK
36	142233	9.2N 128.0E	PCN 1	T4.5/4.5-/D1.0/23HRS	DMSP37		PGTW
37	142344	9.4N 127.5E	PCN 1		DMSP36		PGTW
38	150221	9.9N 127.0E	PCN 1		DMSP35		PGTW
39	150221	9.8N 127.1E	PCN 1	T4.5/4.5-/D1.0/24HRS	DMSP35		RPMK
40	150932	10.6N 125.6E	PCN 1		DMSP37	SPLIT PASS	PGTW
41	151225	10.7N 125.6E	PCN 3		DMSP36		PGTW
42	151502	11.5N 124.7E	PCN 1		DMSP35		PGTW
43	151502	11.5N 124.7E	PCN 3		DMSP35		RODN
44	152213	11.8N 123.5E	PCN 3	T4.0/4.5 /W0.5/24HRS	DMSP37		PGTW
45	152213	11.7N 123.4E	PCN 5	T3.0/4.0 /W1.5/20HRS	DMSP37		RPMK
46	160203	12.0N 123.0E	PCN 1	T4.0/4.0	DMSP35	INIT OBS	RODN
47	160203	12.1N 123.0E	PCN 3		DMSP35		PGTW
48	160203	11.8N 123.0E	PCN 5		DMSP35		RPMK
49	161053	12.7N 122.4E	PCN 4		DMSP37		PGTW
50	161053	12.3N 122.5E	PCN 2		DMSP37		RODN
51	161053	12.6N 122.5E	PCN 5		DMSP37		RPMK
52	161208	12.7N 122.2E	PCN 3		DMSP36		PGTW
53	161444	12.7N 122.2E	PCN 2		DMSP35		RODN
54	161444	12.7N 122.0E	PCN 3		DMSP35		PGTW
55	162153	12.8N 121.9E	PCN 1	T4.0/4.0 /S0.0/24HRS	DMSP37		PGTW
56	162153	12.9N 122.0E	PCN 1	T4.5/4.5 /D1.5/23HRS	DMSP37		RPMK
57	170050	12.9N 122.3E	PCN 1	T4.5/4.5+/D0.5/22HRS	DMSP36		RODN
58	170326	13.2N 122.2E	PCN 1		DMSP35		RPMK
59	171033	13.8N 122.3E	PCN 1		DMSP37		RPMK
60	171033	13.7N 122.5E	PCN 2		DMSP37		PGTW
61	171332	13.9N 122.4E	PCN 1		DMSP36		RODN
62	171426	13.9N 122.4E	PCN 1		DMSP35		PGTW
63	171608	14.1N 122.4E	PCN 1		DMSP35		RPMK
64	171608	13.9N 122.3E	PCN 2		DMSP35		RODN
65	172133	14.3N 122.8E	PCN 5		DMSP37	N/A DUE TO TERMINATOR	PGTW
66	180032	14.5N 123.1E	PCN 3	T2.5/3.5 /W1.5/26HRS	DMSP36		PGTW
67	180308	14.9N 123.2E	PCN 3	T3.0/4.0+/W1.5/30HRS	DMSP35		RPMK
68	180308	14.5N 123.2E	PCN 3	T3.0/4.0 /W1.5/26HRS	DMSP35		RODN
69	181013	15.4N 124.2E	PCN 3		DMSP37		PGTW
70	181314	14.7N 123.7E	PCN 5		DMSP36		RODN
71	181549	15.7N 124.6E	PCN 5		DMSP35		RPMK
72	181549	15.5N 124.7E	PCN 4		DMSP35		RODN
73	190016	16.8N 125.1E	PCN 3	T3.5/3.5 /D1.0/24HRS	DMSP36		PGTW
74	190249	17.1N 125.2E	PCN 3	T3.0/3.0 /S0.0/24HRS	DMSP35		RPMK
75	190249	17.2N 125.7E	PCN 3		DMSP35		PGTW
76	190953	17.7N 126.5E	PCN 6		DMSP37	CI SAME	PGTW
77	191531	18.5N 127.2E	PCN 6		DMSP35		RODN
78	191531	18.3N 127.6E	PCN 6		DMSP35		PGTW
79	192357	21.1N 129.0E	PCN 5	T2.5/2.5	DMSP36	INIT OBS	RODN
80	192357	20.8N 129.2E	PCN 5	T3.0/3.5 /W0.5/26HRS	DMSP36		PGTW
81	200933	22.5N 132.0E	PCN 6		DMSP37	CI DOWN	PGTW
82	201238	21.4N 133.2E	PCN 5		DMSP36		RPMK
83	201238	22.8N 132.7E	PCN 6		DMSP36		PGTW
84	201513	24.5N 134.6E	PCN 6		DMSP35		RPMK
85	201513	23.7N 134.5E	PCN 5		DMSP35		RODN
86	201513	22.9N 133.6E	PCN 6		DMSP35		PGTW
87	202338	22.8N 136.4E	PCN 5		DMSP36	EXPOSED LLC SYSTEM DISSIPATED	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	102353	6.4N 130.7E	700MB		1000	30 290 5	240 30 120 30	4 4			+11 +16 +11 26	3
2	112129	7.1N 137.6E	700MB	3058	995	45 060 10	150 46 090 30	4 1	CIRCULAR	12	+13 +15 + 8	4
3	120528	6.9N 136.6E	700MB	3029	993	45 220 50	110 37 060 20	8 5			+13 +11	5
4	120906	6.9N 136.4E	700MB	3030	995	40 180 30	210 40 160 30	3 5			+13 +14 +12	5
5	122001	7.3N 135.3E	700MB	3034	997	30 330 50	040 44 330 90	5 5	CIRCULAR	40	+16 +17 +10	6
6	130510	7.9N 134.2E	700MB			50 090 5	170 35 060 30	4 2			+15 +12	7
7	130904	7.8N 133.8E	700MB		988	25 140 30	020 41 300 30	2 4			+11 +14 +14	7
8	132213	8.2N 131.8E	700MB	2994	984	80 330 20	100 78 020 25	5 3	CIRCULAR	20	+17 +17 +12	8
9	140520	8.6N 130.3E	700MB	2939	985	98 070 8	080 88 070 8				+18 +11	9
10	140832	8.6N 129.8E	700MB			90 160 10	010 88 330 15	12 10	CIRCULAR	20	+16 +18 +12	9
11	141932	9.1N 128.3E	700MB				130 100 060 25				+15 +12	10
12	142147	9.0N 127.9E	700MB		965	100 230 4	030 96 020 15	6 2	CIRCULAR	12	+11 +15 +11	10
13	150857	10.4N 125.9E	700MB	2800	966	90 150 8	080 90 320 16	2 3	CIRCULAR	20	+13 +21 +10	11
14	160850	12.6N 122.4E	700MB			50 0		5	CIRCULAR	20		12
15	162153	12.9N 122.1E	700MB				020 52 300 10	3 5	CIRCULAR	15	+ 3 + 3	14
16	170344	13.2N 122.3E	700MB	2937	982	60 090 10	070 52 360 20	2 3	CIRCULAR	20	+13 +12	14
17	170649	13.3N 122.4E	700MB			60 090 8	050 50 320 25	2 2	CIRCULAR		+11 +11	14
18	171540	14.1N 122.6E	700MB		976		360 50 090 10	2 5	CIRCULAR	20	+ 8 +10 +10	15
19	172005	14.2N 122.9E	700MB				240 48 160 30	2 3			+11 +10	15
20	172210	14.6N 123.0E	700MB	2977		65 360 4	290 55 240 5	1 1	CIRCULAR	10	+ 7 +13 + 8	15
21	180747	15.2N 123.6E	700MB	3004		55 150 10	280 55 150 15	5 2			+19 +11	16
22	181022	15.6N 123.9E	700MB	2996	990	55 110 10	180 66 110 20	5 5	CIRCULAR	30	+14 +19 +11	16
23	181910	15.5N 124.4E	700MB				200 73 120 30	5 5			+15 + 9	17
24	182129	16.8N 124.6E	700MB	3002	989	35 240 50	300 64 240 30	5 5	CIRCULAR	25	+18 +15 + 9	17
25	190600	17.3N 126.0E	700MB	2996		80 040 15	290 80 180 15	5 5	CIRCULAR	40	+15 + 7	18
26	190851	17.6N 126.2E	700MB	2964	986	95 120 25	260 70 120 25	5 8	CIRCULAR	40	+13 +15 + 5	18
27	191858	20.1N 127.9E	700MB				080 36 350 10				+11 +11	19
28	192030	20.5N 128.5E	700MB				250 80 160 8	10 10	CIRCULAR	30	+18 +11 +11	19
29	200342	22.7N 130.9E	700MB	3080	1004	50 230 25	260 50 140 50	5 6			+12 +11 +11	20

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	162200	13.3N 122.2E	LAND	POOR	CIRCULAR	19		EYE	15.2N 120.6E	98327
2	162230	13.4N 121.7E	LAND	POOR	CIRCULAR	19		SPIRAL BAND	15.2N 120.6E	98327
3	162305	13.2N 121.9E	LAND	POOR	CIRCULAR	19		SPIRAL BAND	15.2N 120.6E	98327
4	162335	13.3N 121.9E	LAND	POOR	CIRCULAR	18		SPIRAL BAND	15.2N 120.6E	98327
5	170003	13.3N 121.9E	LAND	POOR	CIRCULAR	17		SPIRAL BAND	15.2N 120.6E	98327
6	170030	13.3N 121.8E	LAND	GOOD	CIRCULAR	22		SPIRAL BAND	15.2N 120.6E	98327
7	170455	13.3N 122.3E	LAND	GOOD	CIRCULAR	13			15.2N 120.6E	98327
8	170530	13.5N 122.1E	LAND	GOOD	CIRCULAR	13		SPIRAL BAND	15.2N 120.6E	98327
9	170503	13.5N 122.2E	LAND	GOOD	CIRCULAR	14			15.2N 120.6E	98327
10	170530	13.5N 122.2E	LAND	GOOD	CIRCULAR	14		SPIRAL BAND	15.2N 120.6E	98327
11	170700	13.7N 122.2E	LAND	GOOD	CIRCULAR	15			15.2N 120.6E	98327
12	170730	13.6N 122.4E	LAND	GOOD	ELLIPTICAL			EYE AXIS 20/15	15.2N 120.6E	98327
13	170805	13.5N 122.3E	LAND	GOOD	CIRCULAR	18			15.2N 120.6E	98327
14	170930	13.7N 122.4E	LAND	FAIR	CIRCULAR	14			15.2N 120.6E	98327
15	171005	13.8N 122.5E	LAND	GOOD	CIRCULAR	12			15.2N 120.6E	98327
16	171030	13.9N 122.5E	LAND	GOOD	CIRCULAR	12			15.2N 120.6E	98327
17	171100	13.7N 122.6E	LAND				10533 73610		14.1N 123.0E	98440
18	171105	13.9N 122.5E	LAND	GOOD	CIRCULAR	15			15.2N 120.6E	98327
19	171130	13.9N 122.4E	LAND	FAIR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
20	171200	13.7N 122.7E	LAND				1060/ /////		16.3N 120.6E	98321
21	171205	13.9N 122.4E	LAND	FAIR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
22	171230	14.0N 122.4E	LAND	FAIR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
23	171305	14.1N 122.4E	LAND	FAIR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
24	171330	14.2N 122.3E	LAND	FAIR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
25	171405	14.3N 122.4E	LAND	POOR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
26	171430	14.3N 122.4E	LAND	POOR	CIRCULAR	15		SPIRAL OVERLAY	15.2N 120.6E	98327
27	171500	14.3N 122.3E	LAND	FAIR	CIRCULAR	15			15.2N 120.6E	98327
28	171535	14.3N 122.3E	LAND	FAIR	CIRCULAR	15			15.2N 120.6E	98327
29	171600	14.1N 122.8E	LAND				1051/ 60104	EYE 100 PERCENT CIRCULAR	16.3N 120.6E	98321
30	171600	14.0N 122.6E	LAND				10533 63610		14.1N 123.0E	98440
31	171605	14.3N 122.3E	LAND	POOR	CIRCULAR			SPIRAL OVERLAY	15.2N 120.6E	98327
32	171635	14.6N 122.3E	LAND	POOR	CIRCULAR			SPIRAL OVERLAY	15.2N 120.6E	98327
33	171700	14.2N 122.9E	LAND				1063/ 50304	EYE 70 PERCENT CIRCULAR	16.3N 120.6E	98321
34	171705	14.4N 122.3E	LAND	POOR	CIRCULAR			SPIRAL OVERLAY	15.2N 120.6E	98327
35	171735	14.4N 122.3E	LAND	POOR	CIRCULAR			SPIRAL OVERLAY	15.2N 120.6E	98327
36	171900	14.3N 123.1E	LAND				1164/ 50302	EYE ELLIPTICAL	16.3N 120.6E	98321
37	171900	14.2N 122.8E	LAND				11023 50412	EYE ELLIPTICAL	14.1N 123.0E	98440
38	172000	14.3N 123.2E	LAND				1173/ 30404	EYE 70 PCT ELLIPTICAL	16.3N 120.6E	98321
39	172000	14.3N 122.9E	LAND				///// 40410		14.1N 123.0E	98440
40	172200	14.5N 123.4E	LAND				10622 50308	EYE 60 PCT CIRCULAR OPEN SW	16.3N 120.6E	98321
41	172200	14.4N 123.0E	LAND				10333 60213	EYE 20-25NM DIAM 100 PCT ACCRY	14.1N 123.0E	98440
42	180000	14.6N 123.4E	LAND				10622 60306	EYE 60 PCT CIRCULAR OPEN SW	16.3N 120.6E	98321
43	180000	14.5N 122.9E	LAND				20433 63308	EYE BECOMING LARGER	14.1N 123.0E	98440
44	180100	14.6N 123.0E	LAND				20433 63618		14.1N 123.0E	98440
45	180200	14.6N 123.4E	LAND				2161/ 60000	EYE 50 PCT ELLIPTICAL OPEN SW	16.3N 120.6E	98321
46	180200	14.6N 123.3E	LAND				20493 60313	EYE CIRCULAR OPEN	14.1N 123.0E	98440
47	180300	14.6N 123.2E	LAND				22444 50215		14.1N 123.0E	98440
48	180300	14.7N 123.5E	LAND				2161/ 50602		16.3N 120.6E	98321
49	181000	15.5N 123.6E	LAND				206// /////	EYE 60 PCT CIRCULAR OPEN E	16.3N 120.6E	98321
50	181200	15.8N 123.6E	LAND				22914 73610	EYE OPEN ELLIPTICAL	14.1N 123.0E	98440
51	181400	15.9N 123.8E	LAND				25/// /////		16.3N 120.6E	98321

TROPICAL STORM DOT

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
	1	052235	4.0N 147.7E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
*	2	061116	4.2N 142.3E	PCN 5		DMSP36		PGTW
	3	062217	4.2N 143.6E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP36		PGTW
	4	072138	5.5N 139.0E	PCN 5	T0.0/0.0 /S0.0/23HRS	DMSP37		PGTW
	5	081222	4.0N 135.0E	PCN 5		DMSP36		PGTW
	6	082323	5.0N 134.1E	PCN 5	T1.0/1.0 /D1.0/25HRS	DMSP36		PGTW
	7	090147	5.1N 134.0E	PCN 5		DMSP35		PGTW
	8	090958	6.2N 133.4E	PCN 6		DMSP37		PGTW
	9	091204	7.2N 134.2E	PCN 5		DMSP36		PGTW
	10	091428	7.4N 133.7E	PCN 6		DMSP35		PGTW
	11	092058	7.3N 133.8E	PCN 6		DMSP37	NOT AVAIL EDGE OF DATA	PGTW
	12	092305	7.9N 131.7E	PCN 5		DMSP36	NOT AVAIL EDGE OF DATA	PGTW
	13	100129	7.5N 131.6E	PCN 5		DMSP35	NOT AVAIL EDGE OF DATA	PGTW
*	14	100310	9.1N 130.0E	PCN 5	T1.5/1.5	DMSP35	INIT OBS	RPMK
	15	100938	8.5N 129.8E	PCN 6		DMSP37		PGTW
	16	101146	8.9N 129.1E	PCN 6		DMSP36		PGTW
	17	101410	8.9N 128.7E	PCN 5		DMSP35		PGTW
	18	101411	8.9N 127.6E	PCN 6		DMSP35		RODN
	19	102219	8.9N 126.1E	PCN 5		DMSP37	N/A OVER LAND	PGTW
	20	102219	8.8N 126.8E	PCN 5	T2.5/2.5-/D1.0/19HRS	DMSP37		RPMK
	21	110029	9.1N 125.7E	PCN 5		DMSP36	N/A OVER LAND	PGTW
	22	110252	9.8N 125.5E	PCN 3		DMSP35	N/A OVER LAND	PGTW
	23	110252	9.6N 125.5E	PCN 3		DMSP35		RPMK
	24	111059	9.9N 123.6E	PCN 6		DMSP37		RPMK
	25	111100	10.0N 122.0E	PCN 6		DMSP37		RODN
	26	111310	9.8N 122.9E	PCN 6		DMSP36		RPMK
	27	111533	10.1N 122.8E	PCN 5		DMSP35		RPMK
*	28	111534	9.7N 122.1E	PCN 5		DMSP35		RODN
	29	112159	10.2N 122.0E	PCN 5		DMSP37	N/A DUE TO TERMINATOR	PGTW
*	30	112159	10.6N 122.4E	PCN 5	T1.5/2.5+/W1.0/24HRS	DMSP37		RPMK
	31	120011	10.7N 121.5E	PCN 5	T1.5/1.5	DMSP36		PGTW
*	32	120234	10.9N 121.2E	PCN 5		DMSP35		PGTW
*	33	121039	10.5N 119.2E	PCN 6		DMSP37		PGTW
	34	121040	10.5N 120.4E	PCN 6		DMSP37		RODN
	35	121252	10.7N 120.1E	PCN 5		DMSP36		PGTW
	36	121515	11.7N 119.6E	PCN 5		DMSP35		PGTW
	37	121515	11.9N 119.4E	PCN 6		DMSP35		RODN
	38	122139	12.1N 119.4E	PCN 5		DMSP36	N/A DUE TO TERMINATOR	PGTW
	39	122139	12.1N 119.7E	PCN 5		DMSP37		RPMK
	40	122353	12.0N 119.8E	PCN 5	T3.0/3.0+	DMSP36		RODN
	41	122353	12.1N 119.6E	PCN 5	T2.0/2.0 /D0.5/28HRS	DMSP36		PGTW
	42	130215	12.2N 119.9E	PCN 3		DMSP35		RODN
	43	130215	12.3N 119.8E	PCN 3		DMSP35		PGTW
	44	131020	13.1N 119.5E	PCN 4		DMSP37	CI UP BANDING EYE	PGTW
	45	131020	13.1N 119.5E	PCN 4		DMSP37		RPMK
	46	131235	13.1N 119.6E	PCN 1		DMSP36	CI UP RAGGED EYE	PGTW
	47	131457	13.5N 119.5E	PCN 3		DMSP35	EYE RAGGED	PGTW
	48	131457	12.9N 119.3E	PCN 3		DMSP35		RPMK
	49	132300	13.7N 120.1E	PCN 5		DMSP37		RPMK
	50	132301	13.9N 120.1E	PCN 3	T2.5/3.0-/W0.5/24HRS	DMSP37		RODN
	51	140117	14.2N 120.1E	PCN 3		DMSP36		RODN
	52	140117	14.0N 120.3E	PCN 5	T1.5/1.5+	DMSP36	INIT OBS	RPMK
	53	140339	13.9N 120.1E	PCN 5		DMSP35		RODN
	54	140339	13.9N 120.3E	PCN 5		DMSP35		RPMK
	55	141000	14.1N 120.6E	PCN 4		DMSP37		PGTW
	56	141000	14.0N 120.6E	PCN 6		DMSP37		RPMK
	57	141217	14.0N 121.1E	PCN 5		DMSP36		RODN
	58	141217	14.2N 121.0E	PCN 5		DMSP36	PSBL SECONDARY 14.0N 119.7E	PGTW
	59	141439	14.3N 121.4E	PCN 5		DMSP35	SECONDARY AT 14.5N 121.0E	PGTW
	60	141439	13.9N 121.0E	PCN 5		DMSP35		RPMK
	61	142240	15.2N 122.5E	PCN 6	T0.0/1.0-/W1.5/23HRS	DMSP37		RPMK
	62	142241	15.1N 122.3E	PCN 5	T1.0/2.0 /W1.5/24HRS	DMSP37		RODN
	63	150059	15.3N 122.6E	PCN 5		DMSP36		RODN
	64	150320	15.2N 122.7E	PCN 5		DMSP35		RODN
	65	150320	15.8N 123.2E	PCN 5	T1.0/1.5+/W0.5/26HRS	DMSP35		RPMK
	66	151121	16.2N 123.9E	PCN 3		DMSP37		RPMK
	67	151159	16.2N 123.9E	PCN 5		DMSP36		PGTW
*	68	151159	15.6N 123.8E	PCN 5		DMSP36		RODN
	69	151420	16.4N 124.5E	PCN 6		DMSP35		PGTW
*	70	152220	16.9N 126.1E	PCN 6	T1.0/1.0	DMSP37	INIT OBS	PGTW
	71	160041	16.9N 126.4E	PCN 5	T1.0/1.0 /S0.0/26HRS	DMSP36		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIA/ORIENTATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1	120313	10.2N 120.5E	700MB	3090	1002	25 160 55	210 34 160 70	2 40			+ 9 +10 +10	4
2	130209	12.2N 118.9E	700MB	3011		30 180 50	230 30 150 50	1 2			+18 +12 +10	5
3	132117	13.5N 120.0E	700MB	2974	986		020 35 180 15	2 2	ELLIPTICAL	30 20 360	+15 +15 +10	6
4	140100	13.7N 120.2E	700MB	2952		15 340 30	110 32 350 15	1 2				6
5	140314	13.8N 120.5E	700MB	3035		15 100 30	350 39 270 47	1 2	ELLIPTICAL	30 20 360	+ 9 +13 +12	6
6	152120	17.2N 125.5E	1500FT			25 310 120	210 32 310 90	10 5			+24 +24	8
7	152232	17.4N 125.5E	700MB	3127	1004	25 140 40	140 28 290 30	10 8			+11 +11 + 9	8

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	132233	13.7N 120.1E	LAND	POOR	CIRCULAR	20		PSHL CENTER	15.2N 120.6E	98327
2	132303	13.9N 120.1E	LAND	POOR	CIRCULAR	20			15.2N 120.6E	98327
3	132330	13.9N 120.1E	LAND	POOR	CIRCULAR	20			15.2N 120.6E	98327
4	140033	13.9N 120.2E	LAND	FAIR	CIRCULAR	20			15.2N 120.6E	98327
5	140105	13.9N 120.2E	LAND	FAIR	CIRCULAR	25		CNTR STNRY SINCE LAST REPORT	15.2N 120.6E	98327
6	140135	13.8N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	98327
7	140205	13.9N 120.2E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	98327
8	140235	13.9N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	98327
9	140305	13.9N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	98327
10	140410	13.9N 120.6E	LAND	GOOD	CIRCULAR	25			15.2N 120.6E	98327
11	140432	14.0N 120.7E	LAND	GOOD	CIRCULAR	25			15.2N 120.6E	98327
12	142346	14.5N 121.8E	LAND	POOR	CIRCULAR			EYE DIAM UNK	15.2N 120.6E	98327

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	161200	20.0N 129.0E	25	120	
2	170000	22.3N 133.0E	25	60	
3	171200	27.0N 140.5E	25	60	

TROPICAL DEPRESSION 05

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	210311	18.3N 114.2E	PCN 5	T1.5/1.5	DMSP35	INIT OBS	RPMK
2	220035	21.4N 118.0E	PCN 3	T1.0/1.0	DMSP36	INIT OBS	PGTW
3	220253	21.4N 118.3E	PCN 3	T1.5/1.5 /S0.0/24HRS	DMSP35		RPMK
4	220253	22.1N 118.5E	PCN 3	T1.5/1.5	DMSP35	INIT OBS	RODN
5	230018	22.0N 124.8E	PCN 3	T2.5/2.5-/D1.5/24HRS	DMSP36		PGTW
6	230235	22.2N 125.3E	PCN 4		DMSP35		PGTW
7	230235	22.0N 125.5E	PCN 3	T2.5/2.5 /D1.0/24HRS	DMSP35		RODN
8	231022	22.5N 128.0E	PCN 3		DMSP37		PGTW
9	231022	22.7N 128.0E	PCN 3		DMSP37		RKSO
10	231259	22.9N 129.0E	PCN 3		DMSP36	PSN BASED ON CB BANDS	PGTW
11	231516	22.9N 129.7E	PCN 5		DMSP35		RODN
12	231516	23.2N 129.8E	PCN 5		DMSP37		PGTW
13	232121	24.1N 132.0E	PCN 5	T1.5/2.5 /W1.0/21HRS	DMSP37		PGTW
14	232121	24.4N 133.5E	PCN 5	T2.0/2.0	DMSP37	INIT OBS/UPR LVL	RPMK
15	240000	24.8N 132.7E	PCN 5		DMSP36		PGTW
16	240216	25.4N 133.1E	PCN 3		DMSP35		PGTW
17	240216	25.1N 133.8E	PCN 3	T1.0/1.0	DMSP35	INIT OBS	RKSO
18	241000	27.7N 136.0E	PCN 5		DMSP37		PGTW
19	241002	28.0N 135.7E	PCN 5		DMSP37		RODN
20	241002	27.1N 136.0E	PCN 5		DMSP37		RKSO

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	230200	22.2N 125.1E	LAND				21822 50511		24.8N 125.3E	47927
2	230200	22.2N 125.1E	LAND				10823 50716		24.3N 124.2E	47918
3	230400	22.3N 125.7E	LAND				21812 50914		24.8N 125.3E	47927
4	230400	22.3N 125.7E	LAND				20942 50812		24.3N 124.2E	47918
5	230500	22.4N 126.0E	LAND				10872 50816		24.8N 125.3E	47927
6	230500	22.4N 126.0E	LAND				35/41 50819		24.3N 124.2E	47918
7	230600	22.4N 126.2E	LAND				22912 50814		24.8N 125.3E	47927
8	230600	22.4N 126.2E	LAND				20781 50911		24.3N 124.2E	47918
9	230700	22.5N 126.6E	LAND				24842 50822		24.8N 125.3E	47927
10	230800	22.5N 126.9E	LAND				24811 50816		24.8N 125.3E	47927
11	231500	23.6N 129.5E	LAND				3//// 40522		26.1N 127.7E	47937

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	210000	19.0N 114.0E	15	60	
2	211200	20.0N 115.0E	15	60	

TYPHOON ELLIS

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	260019	5.9N 139.3E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	261119	8.0N 141.7E	PCN 5		DMSP36		PGTW
3	261441	8.9N 139.0E	PCN 6		DMSP35		PGTW
4	270001	9.0N 140.4E	PCN 6	T0.0/0.0 /S0.0/24HRS	DMSP36	POSSIBLE SECONDARY 10.8N 139.4E	PGTW
5	270200	8.7N 140.3E	PCN 6		DMSP35		PGTW
6	270847	8.6N 139.5E	PCN 5		DMSP37		PGTW
7	271102	8.7N 139.4E	PCN 6		DMSP36		PGTW
8	272128	11.3N 138.9E	PCN 6		DMSP37		PGTW
9	272343	11.6N 138.7E	PCN 5		DMSP36		PGTW
10	280141	11.8N 138.6E	PCN 5		DMSP35		PGTW
11	281008	12.1N 138.4E	PCN 6		DMSP37		PGTW
12	281225	12.9N 138.6E	PCN 6		DMSP36		PGTW
13	281423	13.2N 138.7E	PCN 6		DMSP35		PGTW
14	282325	12.5N 136.0E	PCN 5	T0.0/0.0 /S0.0/26HRS	DMSP36		PGTW
15	291208	12.9N 133.6E	PCN 6		DMSP36		PGTW
16	292307	13.7N 135.2E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP36		PGTW
17	301150	13.7N 132.6E			DMSP36		PGTW
18	301346	13.8N 132.3E	PCN 6		DMSP35		PGTW
19	302208	13.7N 132.7E	PCN 5	T1.0/1.0 /D1.0/23HRS	DMSP37		PGTW
20	010031	13.5N 132.4E	PCN 6		DMSP36		PGTW
21	010227	13.2N 131.5E	PCN 5		DMSP35		PGTW
22	010227	12.9N 131.3E	PCN 5	T2.0/2.0	DMSP35	INIT OBS	RPMK
23	011050	13.7N 131.0E	PCN 5		DMSP37	CI UP	PGTW
24	011050	13.8N 130.9E	PCN 6		DMSP37	UPR LVL OUTFLOW	RODN
25	011313	13.8N 130.7E	PCN 6		DMSP36		PGTW
26	011313	13.7N 130.7E	PCN 6		DMSP36		RODN
27	011509	13.9N 130.2E	PCN 6		DMSP35		PGTW
28	011509	13.6N 130.1E	PCN 5		DMSP35	UPR LVL ANTI/BANDING	RPMK
29	012148	14.7N 129.1E	PCN 5		DMSP37		RPMK
30	020013	14.5N 128.4E	PCN 5	T3.0/3.0 /D2.0/26HRS	DMSP36		PGTW
31	020137	16.4N 125.0E	PCN 1	T4.5/4.5 /D0.5/24HRS	DMSP39		RODN
32	020155	14.1N 128.3E	PCN 5		DMSP39		RPMK
33	020209	14.5N 128.1E	PCN 3		DMSP35		PGTW
34	020209	14.5N 128.5E	PCN 5		DMSP35		RPMK
35	020209	14.6N 128.1E	PCN 3	T4.0/4.0+	DMSP35	INIT OBS	RODN
36	021029	15.0N 127.1E	PCN 4		DMSP37	CI UP	PGTW
37	021255	15.1N 126.6E	PCN 6		DMSP36		PGTW
38	021450	15.1N 126.6E	PCN 5		DMSP35		RPMK
39	021451	15.3N 126.4E	PCN 5		DMSP35		PGTW
40	022128	15.9N 125.0E	PCN 5		DMSP37		RPMK
41	022129	15.9N 125.3E	PCN 5	T4.0/4.0 /D1.0/21HRS	DMSP37		PGTW
42	022356	16.0N 125.0E	PCN 5		DMSP36		PGTW
43	030137	16.2N 124.8E	PCN 1	T5.0/5.0 /D2.0/28HRS	DMSP39		RPMK
44	031009	17.6N 123.4E	PCN 6		DMSP37		PGTW
45	031237	17.8N 122.8E	PCN 6		DMSP36		PGTW
46	031432	18.1N 122.6E	PCN 6		DMSP35		PGTW
47	031432	18.1N 123.1E	PCN 6		DMSP35		RPMK
48	032249	18.6N 119.5E	PCN 3	T4.5/3.5 /W1.0/21HRS	DMSP37		RODN
49	032249	18.7N 121.5E	PCN 5	T3.0/4.0+/W2.0/21HRS	DMSP37		RPMK
50	040300	18.9N 120.6E	PCN 5		DMSP39		RPMK
51	040314	19.5N 120.4E	PCN 3		DMSP35	EXPOSED LLCC	RODN
52	041131	19.8N 119.4E	PCN 4		DMSP37		RODN
53	041555	20.1N 118.0E	PCN 3		DMSP35		RPMK
54	041555	20.2N 118.1E	PCN 3		DMSP35	EXPOSED LLCC NE OF DENSE CONV	RODN
55	042230	20.1N 116.3E	PCN 5	T3.5/3.5 /D0.5/24HRS	DMSP37		RPMK
56	050101	20.0N 116.0E	PCN 3		DMSP36		RPMK
57	050255	20.1N 115.8E	PCN 3		DMSP35		RPMK
58	050256	20.2N 115.9E	PCN 3	T4.5/4.5-/W1.0/24HRS	DMSP35		RODN
59	051110	20.5N 114.3E	PCN 3		DMSP37		RODN
60	051110	20.4N 114.5E	PCN 4		DMSP37	EXPOSED LLCC	RPMK
61	051343	20.6N 113.7E	PCN 3		DMSP35	WELL DEFINED LLCC	RODN
62	051537	20.7N 113.7E	PCN 3		DMSP35		RPMK
63	052210	21.7N 111.8E	PCN 5		DMSP37	N/A DUE TO TERMINATOR	PGTW
64	052210	21.5N 111.7E	PCN 5		DMSP37		RPMK
65	060043	21.5N 111.9E	PCN 5	T2.5/2.5-/W2.4/22HRS	DMSP36		RODN
66	060237	21.6N 110.0E	PCN 5		DMSP35		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	302003	13.3N 132.3E	700MB	3084	1000		150 19 040 30	8 12				3
2	302202	13.3N 132.3E	700MB	3085	1000	50 270 15	140 32 080 60	8 3			+12 +10 +10	3
3	011939	13.9N 129.1E	700MB	2946	984		140 55 070 60	5 5			+19 +13	4
4	012158	14.1N 129.1E	700MB	2951	981	55 180 15	250 60 180 15	5 5	CIRCULAR	40	+10 +19 + 9	4
5	020539	14.4N 127.7E	700MB	2857		55 020 40	100 85 020 35	6 5			+17 +12	5
6	020915	14.7N 127.3E	700MB	2859	974	50 320 20	040 62 310 45	6 5	ELLIPTICAL	35 25 180	+11 +17 +12	5
7	021933	15.7N 125.6E	700MB	2739	971		210 74 130 60	5 8			+15 +10	6
8	022157	15.7N 125.3E	700MB	2726	955	100 130 20	230 92 130 20	5 8	ELLIPTICAL	30 20 090	+13 +17 +10	6
9	030544	16.3N 124.1E	700MB	2750	961	90 030 40	110 98 030 40	5 6			+13 +14	7
10	030846	17.3N 123.9E	700MB	2731	956	50 350 50	090 88 360 30	5 6	ELLIPTICAL	30 20 070	+15 +19 +14	7
11	040952	19.5N 119.9E	700MB	2979	984	70 100 5	200 50 160 20	2 1			+16 +17	9
12	042156	20.2N 116.7E	700MB	3011	982	75 150 10	160 62 240 10	3 2			+13 +19 + 9	10

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	030600	16.9N 123.8E	LAND					PROBABLE EYE	14.1N 123.0E	98440
2	030700	17.0N 124.0E	LAND				4//// /////	SPIRAL OVERLAY	16.3N 120.6E	98321
3	031400	17.9N 123.5E	LAND				31801 5////		16.3N 120.6E	98321
4	031500	17.9N 123.1E	LAND				31811 529//		16.3N 120.6E	98231
5	031800	18.6N 122.5E	LAND				35421 629//		16.3N 120.6E	98231
6	040000	19.0N 121.3E	LAND				35411 52920		16.3N 120.6E	98231
7	040100	19.0N 121.2E	LAND				35351 52712		16.3N 120.6E	98231
8	040200	19.3N 120.5E	LAND				1090/ /999/	EYE 75 PERCENT CIRCULAR	16.3N 120.6E	98321
9	040300	19.6N 120.2E	LAND				1091/ /////	EYE FIXED CIRCULAR OPEN NW	16.3N 120.6E	98321
10	040500	19.5N 119.7E	LAND				5//// /////		16.3N 120.6E	98321
11	050510	20.7N 115.3E	LAND				65//5 /////		22.3N 114.2E	45005
12	051700	21.0N 113.2E	LAND				659// /2810		22.3N 114.2E	45005
13	051930	21.2N 112.5E	LAND				659// /////		22.3N 114.2E	45005
14	052100	21.5N 112.3E	LAND				659// /////		22.3N 114.2E	45005

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	250000	7.0N 141.0E	15	150	
2	251200	7.0N 140.0E	15	120	
3	270500	8.9N 136.3E	20	100	
4	280000	12.0N 135.0E	15	60	BROAD E-W TROUGH
5	281200	13.0N 134.5E	20	100	BROAD E-W TROUGH
6	300000	13.5N 133.5E	25	180	BROAD E-W TROUGH
7	300600	14.0N 132.0E	25	150	BROAD E-W TROUGH

TROPICAL STORM FAYE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	292307	2.0N 152.3E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	301346	3.6N 151.7E	PCN 6		DMSP35		PGTW
3	302249	5.6N 151.1E	PCN 5	T1.0/1.0 /D1.0/24HRS	DMSP36		PGTW
4	010906	5.7N 150.2E	PCN 6		DMSP37	CI SAME	PGTW
5	011132	6.1N 150.0E	PCN 6		DMSP36		PGTW
6	011328	6.4N 149.7E	PCN 6		DMSP35		PGTW
7	012007	6.3N 147.3E	PCN 6		DMSP37		PGTW
8	020209	7.6N 146.2E	PCN 5	T2.0/2.0 /D1.0/27HRS	DMSP35		PGTW
9	020948	7.9N 145.0E	PCN 6		DMSP37	CI SAME	PGTW
10	021114	7.8N 144.8E	PCN 5		DMSP36		PGTW
11	021309	8.0N 144.5E	PCN 6		DMSP35		PGTW
12	022128	9.0N 143.6E	PCN 5	T3.0/3.0	DMSP37	INIT OBS	RPMK
13	022129	9.2N 142.9E	PCN 6		DMSP37		PGTW
14	022356	9.4N 142.5E	PCN 5		DMSP36		PGTW
15	031009	9.3N 140.7E	PCN 6		DMSP37	EDGE OF DATA	PGTW
16	031055	9.7N 140.3E	PCN 6		DMSP36	EDGE OF DATA	PGTW
17	031432	10.0N 139.6E	PCN 6		DMSP35		PGTW
18	031432	10.0N 140.1E	PCN 6		DMSP35		RPMK
19	032109	10.6N 139.3E	PCN 5	T3.0/3.0 /S0.0/24HRS	DMSP37		PGTW
20	032338	10.3N 139.3E	PCN 5		DMSP36		PGTW
21	040118	10.9N 139.4E		T4.0/4.0 /D1.0/28HRS	DMSP39		RPMK
22	040132	10.5N 139.5E	PCN 3		DMSP35	EXPOSED LLCC	PGTW
23	040132	10.4N 140.2E	PCN 4	T3.0/3.0	DMSP35	INIT OBS	RODN
24	040949	10.4N 138.7E	PCN 6		DMSP37		PGTW
25	041219	10.4N 138.1E	PCN 4		DMSP36		PGTW
26	041413	10.7N 137.1E	PCN 6		DMSP35		PGTW
27	041414	10.5N 136.7E	PCN 5		DMSP35		RODN
28	042048	10.9N 136.8E	PCN 6		DMSP37	UPR LVL CNTR 10.5N 135.0E	PGTW
29	042320	10.5N 136.5E	PCN 5		DMSP36		PGTW
30	050114	10.3N 135.9E	PCN 3	T3.0/3.0 /S0.0/28HRS	DMSP35		PGTW
31	050114	10.1N 136.1E	PCN 3	T3.0/3.0 /S0.0/24HRS	DMSP35		RODN
32	050928	11.4N 135.6E	PCN 4		DMSP37	EXPOSED LLCC	PGTW
33	051201	11.9N 135.4E	PCN 4		DMSP36	EXPOSED LLCC	PGTW
34	051355	11.9N 135.2E	PCN 4		DMSP35		RPMK
35	051355	12.0N 134.9E	PCN 3		DMSP35	EXPOSED LLCC	PGTW
36	051355	12.3N 135.0E	PCN 3		DMSP35		RODN
37	052210	12.9N 133.8E	PCN 3	T2.0/3.0 /W1.0/21HRS	DMSP37		PGTW
38	052302	13.1N 133.7E	PCN 3		DMSP36		PGTW
39	060237	13.7N 133.4E	PCN 3		DMSP35		PGTW
40	060237	13.6N 133.3E	PCN 3	T2.0/3.0-/W1.0/25HRS	DMSP35		RODN
41	060909	15.0N 132.4E	PCN 6		DMSP37		PGTW
42	061144	15.2N 132.0E	PCN 4		DMSP36		PGTW
43	061518	15.4N 131.5E	PCN 4		DMSP35		PGTW
44	061519	15.6N 131.3E	PCN 3		DMSP35		RODN
45	070026	17.3N 129.6E	PCN 3	T0.0/1.0 /W2.0/26HRS	DMSP36		PGTW
46	071308	17.7N 127.2E	PCN 6		DMSP36	CI UP	PGTW
47	080008	18.6N 126.4E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP36		PGTW
48	081250	20.2N 126.3E	PCN 5		DMSP36		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	012300	6.1N 146.5E	1500FT		1008							1
2	020652	7.6N 145.5E	1500FT		1004	20 320 45	280 20 180 30	2 5				2
3	020845	7.6N 145.3E	1500FT		1004	25 200 50	280 25 200 100	5 5			+22 +23 +23 30	2
4	021309	8.9N 143.6E	700MB	3094			080 36 360 60	4 8				3
5	022050	8.8N 143.8E	1500FT		1001	40 270 15	250 37 270 15	4 2			+24 +25 +25 27	3
6	030810	9.5N 141.6E	700MB	3084	998	45 270 40	360 55 270 40	5 7			+12 +15 + 6	4
7	032014	10.1N 140.6E	700MB	3065	998	50 170 30	140 46 040 70	5 3			+14 +15 +12	5
8	040804	10.5N 138.5E	700MB	3097	1001	50 180 45	110 55 050 50	5 5			+16 +15 + 5	6
9	042122	10.2N 135.8E	700MB	3033	991	65 170 15	060 40 320 120	3 3	ELLIPTICAL	5 13 090	+14 +17 + 4	7
10	050804	11.3N 135.4E	1500FT		994	30 240 10	230 30 140 7	6 5			+23 +26 +24	8
* 11	051925	11.4N 133.6E	700MB	3100			220 33 150 60	5 5			+11 +11	9
* 12	052200	12.6N 132.3E	1500FT		1004	30 180 140	230 40 180 140	5 10			26	9
13	060717	13.9N 132.7E	1500FT		1001			5 5				11
* 14	070534	16.0N 127.5E	700MB	3117		10 090 70	170 20 090 70	5 5			+14 + 6	12

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	281200	3.0N 155.0E	15	150	EQUATORIAL DOUBLE-VORTICE INTERACTION
2	290000	2.5N 154.0E	15	80	EQUATORIAL DOUBLE-VORTICE INTERACTION
3	291200	3.0N 153.5E	15	130	EST MSLP 1008MB
4	300000	3.5N 153.0E	15	90	EST MSLP 1008MB
5	301200	4.0N 152.0E	15	150	SFC TROF NW-SE

TROPICAL DEPRESSION 08

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
*	1	202338	5.9N 134.4E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
*	2	211220	9.3N 135.5E	PCN 5		DMSP36	CI SAME/UPR LVL	PGTW
*	3	221202	13.5N 139.8E	PCN 6		DMSP36		PGTW
	4	222302	18.8N 139.6E	PCN 5	T1.0/1.0	DMSP36	INIT OBS/LLCC 235N 1407E	PGTW
	5	231012	20.2N 139.4E	PCN 6		DMSP37		PGTW
	6	231144	20.3N 138.9E	PCN 6		DMSP36		PGTW
	7	231303	20.5N 138.7E	PCN 6		DMSP39		PGTW
	8	231328	20.5N 138.6E	PCN 5		DMSP35		PGTW
*	9	232111	22.0N 137.0E	PCN 5	T1.0/1.0 /S0.0/22HRS	DMSP37		PGTW
*	10	232245	22.4N 136.6E	PCN 5		DMSP36		PGTW
*	11	240145	23.2N 135.1E	PCN 5		DMSP39	.	PGTW
*	12	240209	23.8N 134.5E	PCN 5	T1.0/1.0	DMSP35	INIT OBS	RPMK
*	13	240210	23.7N 134.8E	PCN 5		DMSP35		PGTW
*	14	240951	24.8N 134.0E	PCN 5		DMSP37		PGTW
*	15	241244	24.9N 133.6E	PCN 6		DMSP39		PGTW
*	16	241307	24.9N 133.5E	PCN 6		DMSP36		PGTW
*	17	241451	25.2N 132.9E	PCN 5		DMSP35		PGTW
*	18	241451	25.0N 133.0E	PCN 5		DMSP35	INIT NIGHTIME OBS	RODN
*	19	250008	25.6N 130.9E	PCN 5	T0.0/1.0 /W1.0/27HRS	DMSP36	POSSIBLE SECONDARY 27.0N 130.3E	PGTW
*	20	250126	26.2N 130.4E	PCN 5		DMSP39		PGTW
*	21	250151	26.6N 130.1E	PCN 5		DMSP35		PGTW
*	22	250151	26.5N 129.8E	PCN 5	T1.0/1.0	DMSP35	INIT OBS	RODN
	23	251226	30.7N 127.6E	PCN 5		DMSP39		PGTW
	24	251250	30.7N 127.5E	PCN 5		DMSP36		PGTW
	25	251433	30.9N 127.4E	PCN 5		DMSP35		PGTW
	26	252350	31.6N 125.7E	PCN 5	T4.0/4.0	DMSP36	INIT OBS	RKSO
	27	252350	31.9N 125.5E	PCN 5	T2.0/2.0-/D2.0/24HRS	DMSP36		PGTW
	28	260133	32.4N 125.4E	PCN 5		DMSP35		PGTW
	29	260314	32.9N 125.3E	PCN 3		DMSP35		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	241016	23.1N 133.5E	700MB	3127	1004	15 110 120	150 15 060 10	2 10			+10 + 9 + 8	1

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	240000	21.5N 136.0E	15	60	
2	241200	23.5N 133.0E	20	60	
3	250000	24.5N 129.9E	20	60	
4	251200	29.0N 127.5E	20	60	
5	260000	31.0N 126.5E	15	60	
6	261200	33.0N 125.0E	15	60	
7	270000	36.0N 124.0E	10	60	

SUPER TYPHOON HOPE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	250151	10.5N 145.2E	PCN 5	T1.0/1.0	DMSP35	INIT OBS	PGTW
2	250932	10.4N 143.4E	PCN 6		DMSP37		PGTW
* 3	251108	10.3N 142.7E	PCN 5		DMSP36		PGTW
* 4	251226	10.4N 142.6E	PCN 5		DMSP39		PGTW
* 5	251433	10.2N 142.1E	PCN 6		DMSP35		PGTW
6	252350	11.4N 140.8E	PCN 6	T1.0/1.0 /S0.0/22HRS	DMSP36		PGTW
7	260107	11.4N 140.5E	PCN 5		DMSP39		PGTW
8	260133	11.5N 140.5E	PCN 5		DMSP35		PGTW
9	260133	11.0N 141.5E	PCN 5	T1.0/1.0-	DMSP35	INIT OBS	RODN
10	260912	11.7N 140.1E	PCN 6		DMSP37		PGTW
11	261207	12.0N 140.0E	PCN 5		DMSP39		PGTW
12	261232	12.0N 139.9E	PCN 6		DMSP36		PGTW
13	261414	11.9N 139.5E	PCN 5		DMSP35		PGTW
14	261414	11.9N 140.4E	PCN 5		DMSP35	INIT NIGHTIME OBS	RPMK
15	270048	13.4N 140.7E	PCN 3		DMSP39		PGTW
16	270114	13.4N 140.5E	PCN 3	T0.0/1.0 /W1.0/24HRS	DMSP35		RODN
17	270114	13.6N 140.6E	PCN 3	T1.0/1.0 /W1.0/25HRS	DMSP35		PGTW
18	270951	14.7N 140.3E	PCN 4		DMSP37	EXPOSED LLCC	PGTW
19	272314	16.3N 138.0E	PCN 3	T1.0/1.0 /D1.0/26HRS	DMSP36		PGTW
20	280237	17.2N 137.7E	PCN 3		DMSP35		PGTW
* 21	281012	16.2N 134.5E	PCN 6		DMSP37	BASED ON UPR LVL	RPMK
22	281013	17.7N 137.5E	PCN 5		DMSP37		PGTW
* 23	281156	18.0N 137.0E	PCN 6		DMSP36		PGTW
* 24	281310	18.3N 136.3E	PCN 5		DMSP39		RPMK
* 25	281337	18.4N 136.8E	PCN 6		DMSP35		PGTW
26	282112	17.1N 136.2E	PCN 5	T2.0/2.0 /D1.0/22HRS	DMSP37		PGTW
27	282257	16.9N 135.7E	PCN 5		DMSP36		PGTW
28	290151	16.4N 135.9E	PCN 5	T3.0/3.0	DMSP39	INIT OBS	RPMK
29	290219	16.1N 135.7E	PCN 5		DMSP35		PGTW
30	290219	16.2N 135.6E	PCN 5	T3.0/3.0	DMSP35	INIT OBS	RODN
31	291138	16.5N 135.1E	PCN 6		DMSP36	CI UP	PGTW
32	291252	16.7N 134.9E	PCN 5		DMSP39		PGTW
33	291500	16.9N 134.7E	PCN 6		DMSP35		PGTW
34	291500	16.7N 134.7E	PCN 6		DMSP35		RODN
35	300014	16.6N 133.3E	PCN 3		DMSP36		RODN
36	300020	16.7N 133.4E	PCN 5	T4.0/4.0 /D2.0/21HRS	DMSP36		PGTW
37	300132	16.5N 133.4E	PCN 3	T4.0/4.0+/D1.0/24HRS	DMSP39		RPMK
38	300133	16.7N 133.3E	PCN 3		DMSP39		PGTW
39	300201	16.8N 133.3E	PCN 1	T4.5/4.5 /D1.5/24HRS	DMSP35		RODN
40	300201	16.9N 133.2E	PCN 2		DMSP35		PGTW
41	300932	17.0N 132.1E	PCN 3		DMSP37		PGTW
42	301233	17.7N 131.6E	PCN 3		DMSP39		RODN
43	301233	17.4N 132.0E	PCN 3		DMSP39		PGTW
44	301301	17.2N 131.7E	PCN 4		DMSP36		PGTW
45	301441	17.7N 131.3E	PCN 1		DMSP35		PGTW
46	301442	17.7N 131.4E	PCN 1		DMSP37		RKSO
47	302213	18.5N 129.7E	PCN 1	T5.5/5.5 /D1.5/21HRS	DMSP37		RPMK
48	302213	18.5N 129.5E	PCN 3	T5.0/5.0 /D1.0/22HRS	DMSP37		PGTW
49	310002	19.6N 129.3E	PCN 1		DMSP36		PGTW
50	310114	19.9N 128.9E	PCN 1		DMSP39		PGTW
51	311053	19.3N 126.6E	PCN 2		DMSP37		PGTW
52	311244	19.7N 125.9E	PCN 1		DMSP36		PGTW
53	311355	19.7N 125.9E	PCN 2		DMSP39		RPMK
54	311355	19.7N 125.6E	PCN 1		DMSP39		RODN
55	311423	19.8N 125.5E	PCN 1		DMSP35		PGTW
56	311424	19.5N 125.7E	PCN 1		DMSP35		RODN
57	312153	20.5N 123.7E	PCN 1	T6.5/6.5-/D1.5/24HRS	DMSP37		PGTW
58	312153	20.5N 123.7E	PCN 1	T6.5/6.5-/D1.0/24HRS	DMSP37		RPMK
59	312153	20.5N 123.7E	PCN 1	T6.5/6.5	DMSP37	INIT OBS	RODN
60	312344	20.6N 123.3E	PCN 1		DMSP36		PGTW
61	010236	20.7N 122.6E	PCN 1		DMSP39		RPMK
62	010236	20.6N 122.4E	PCN 1		DMSP39		RODN
63	011033	21.3N 120.6E	PCN 2		DMSP37		PGTW
64	011336	21.6N 119.5E	PCN 1		DMSP39		PGTW
65	011336	21.4N 119.6E	PCN 1		DMSP39		RPMK
66	011336	21.6N 119.5E	PCN 1		DMSP39		RODN
67	011408	21.6N 119.5E	PCN 1		DMSP36		RPMK
68	011547	21.7N 118.6E	PCN 1		DMSP35		RODN
69	012314	22.0N 117.1E	PCN 1	T5.5/6.5-/W1.0/24HRS	DMSP37		RPMK
70	020217	22.4N 115.7E	PCN 1	T5.0/5.5-/W1.5/28HRS	DMSP39		PGTW
71	020247	22.1N 115.3E	PCN 1		DMSP35		PGTW
72	020247	22.3N 115.3E	PCN 1	T5.0/6.0-/W1.5/29HRS	DMSP35		RODN
73	021155	22.6N 112.4E	PCN 4		DMSP37		RPMK
74	021155	22.7N 113.1E	PCN 3		DMSP37		RODN
75	021528	22.7N 110.8E	PCN 4		DMSP35		PGTW
76	021528	22.7N 107.9E	PCN 6		DMSP35		RPMK
77	022254	21.6N 109.4E	PCN 5	T3.5/4.5-/W1.5/20HRS	DMSP37		RODN
* 78	022254	22.4N 108.8E	PCN 5	T2.0/2.0	DMSP37	INIT OBS	RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST				MSN NO.
1	250928	10.8N 144.5E	1500FT		1005	25	310	120	020	38	310	120	5	10					+25	+23	+23	23	1
2	252113	11.2N 143.4E	1500FT	3085	1000	25	050	50	160	28	070	40	8	10						+25	+21	28	2
3	260509	11.4N 141.7E	700MB	3081	1000	15	050	90	160	31	050	90	3	25						+11	+ 9		3
4	260913	11.9N 141.3E	700MB	3091	1002	15	130	100	190	17	130	120	5	25					+12	+13	+ 9		3
5	261830	12.3N 139.8E	700MB	3098					230	50	300	30								+10	+ 7		4
6	262025	12.5N 140.0E	1500FT			10	080	50	330	30	210	30	10	10						+25	+23		4
7	272307	16.1N 137.9E	700MB	3094	999	50	120	15	180	30	120	15	4	4					+12	+11		28	5
8	281833	16.9N 135.7E	700MB	3052					110	41	070	120	6	5						+17	+ 9		6
9	282052	16.7N 135.7E	700MB	3047	995	40	100	30	360	49	270	20	4	2					+11	+13	+10		6
10	290715	16.6N 135.5E	700MB	2865		75	340	20	050	50	310	30	5	3						+15	+10		7
11	290920	16.6N 135.2E	700MB	2864	972	70	130	20	130	72	040	30	2	3	CIRCULAR	8			+18	+17	+10		7
12	291808	16.7N 134.1E	700MB	2778	965				220	68	110	18	4	3						+15	+15		8
13	292031	16.8N 133.8E	700MB	2745	961	80	360	30	080	75	360	20	4	3	ELLIPTICAL	5	3	340	+13	+15	+15		8
14	300615	17.1N 132.7E	700MB	2556		85	090	15	170	85	090	15	4	5						+19	+15		9
15	300925	17.1N 132.4E	700MB	2509	934	85	170	12	230	80	170	12	3	3	ELLIPTICAL	8	6	160	+12	+16	+13		9
16	301939	18.2N 130.2E	700MB			40	220	50	010	75	300	25	2	5	ELLIPTICAL	10	8	140		+15	+16		10
17	302225	18.4N 129.7E	700MB	2447	926	85	140	5	170	110	030	15	5	2	ELLIPTICAL	10	8	140	+11	+15	+16		10
18	310648	19.3N 127.6E	700MB	2323	912	95	360	20	090	130	360	15	5	7	CIRCULAR	15				+15	+16		11
19	310910	19.4N 126.9E	700MB	2205	898	100	360	10	120	147	020	10	5	5	CIRCULAR	14			+12	+27	+12		11
20	312148	20.5N 123.7E	700MB	2237	902	140	110	20	160	134	110	20	8	4	CIRCULAR	20			+18	+20	+17		12
21	010745	21.0N 121.1E	700MB	2366	917	85	060	30	140	120	200	20	5	3	CIRCULAR	18			+16	+15	+16		13
22	010906	21.2N 120.8E	700MB	2381	920	100	060	20	350	86	240	50	5	3	CIRCULAR	16			+15	+17	+17		13

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	010000	20.5N 123.0E	LAND				315/1 /////		14.2N 122.7E	98231
2	010100	20.7N 122.9E	LAND			5			25.1N 121.6E	46696
3	010150	20.7N 122.5E	LAND				31831 53023		14.2N 122.7E	98231
4	010300	20.6N 122.2E	LAND				30751 52716		14.2N 122.7E	98231
5	010350	20.7N 122.0E	LAND				30711 52914		14.2N 122.7E	98231
6	010500	20.6N 122.0E	LAND			5			22.6N 120.3E	46744
7	010500	20.5N 121.0E	LAND				3551 52519		14.2N 122.7E	98231
8	010500	20.7N 122.0E	LAND			5			24.0N 121.6E	46699
9	010550	20.5N 121.5E	LAND			5			14.2N 122.7E	98231
10	010600	20.8N 121.8E	LAND			5			24.0N 121.6E	46699
11	010600	20.7N 121.8E	LAND			5			22.6N 120.3E	46744
12	010600	21.0N 121.8E	LAND			5			25.1N 121.6E	46696
13	010650	20.7N 121.3E	LAND				35511 52912		14.2N 122.7E	98231
14	010700	20.9N 121.5E	LAND			5			22.6N 120.3E	46744
15	010700	21.1N 121.5E	LAND			5			24.0N 121.6E	46699
16	010700	22.5N 121.6E	LAND			5			25.1N 121.6E	46696
17	010800	21.2N 121.3E	LAND			5			24.0N 121.6E	46699
18	010830	20.9N 120.8E	LAND				7//// /////	SPIRAL OVERLAY 15 DEGREES	16.3N 120.6E	98321
19	010900	21.2N 121.0E	LAND			5			24.0N 121.6E	46699
20	010900	21.1N 120.2E	LAND			5			22.6N 120.3E	46744
21	010900	21.3N 120.9E	LAND			5			25.1N 121.6E	46696
22	010930	20.9N 120.2E	LAND				4//// /////	SPIRAL OVERLAY 15 DEGREES	16.3N 120.6E	98321
23	011000	21.2N 120.9E	LAND			5			24.0N 121.6E	46699
24	011000	21.3N 120.7E	LAND			5			22.6N 120.3E	46744
25	011200	21.5N 120.1E	LAND			5			22.6N 120.3E	46744
26	011300	21.6N 119.7E	LAND			5			22.6N 120.3E	46744
27	011400	21.6N 119.4E	LAND			5			22.6N 120.3E	46744
28	011500	21.6N 119.0E	LAND			5			22.6N 120.3E	46744
29	011600	21.7N 118.7E	LAND			5			22.6N 120.3E	46744
30	011700	21.7N 118.4E	LAND			5			22.6N 120.3E	46744
31	011800	21.7N 118.1E	LAND			5			22.6N 120.3E	46744
* 32	011840	23.1N 119.1E	LAND						24.3N 120.6E	46770
33	011900	21.7N 117.9E	LAND			5			22.6N 120.3E	46744
34	012000	21.7N 117.7E	LAND			5			22.6N 120.3E	46744
35	012100	21.8N 117.4E	LAND			5			22.6N 120.3E	46744
36	012100	21.8N 117.5E	LAND				10303 /////		22.3N 114.2E	45005
37	020100	22.3N 116.2E	LAND				///// /////		22.3N 114.2E	45005
38	020100	22.5N 116.1E	LAND				25/// 53032		22.6N 120.3E	46744
39	020200	22.4N 115.7E	LAND						22.3N 114.2E	45005
40	020300	22.4N 115.2E	LAND				///// /////		22.3N 114.2E	45005
41	020300	22.4N 115.2E	LAND						22.3N 114.2E	45005
42	020400	22.5N 114.8E	LAND						22.3N 114.2E	45005
43	020400	22.4N 114.8E	LAND						22.3N 114.2E	45005
44	020500	22.4N 114.3E	LAND						22.3N 114.2E	45005

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	241200	10.5N 147.0E	15	100	

TROPICAL STORM GORDON

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
*	1	250932	19.2N 134.1E	PCN 6		DMSP37	INIT NIGHTIME OBS	PGTW
*	2	251226	19.0N 133.7E	PCN 5		DMSP39		PGTW
	3	251250	19.1N 133.6E	PCN 5		DMSP36		PGTW
	4	251433	19.1N 133.3E	PCN 5		DMSP35		PGTW
*	5	252212	18.9N 128.3E	PCN 5	T1.0/1.0	DMSP37		PGTW
	6	252350	19.2N 129.3E	PCN 5		DMSP36		PGTW
	7	260107	19.3N 129.9E	PCN 5		DMSP39		PGTW
	8	260133	19.3N 130.1E	PCN 5		DMSP35		PGTW
	9	260133	19.8N 130.8E	PCN 5	T2.0/2.0	DMSP34	INIT OBS	RODN
	10	261232	20.1N 129.4E	PCN 5		DMSP36	CI UP	PGTW
	11	261346	20.3N 129.2E	PCN 5		DMSP39		PGTW
	12	261414	20.4N 129.0E	PCN 5		DMSP35		PGTW
	13	262332	20.5N 126.3E	PCN 3	T2.0/2.0 /01.0/25HRS	DMSP36		PGTW
	14	270230	20.4N 126.2E	PCN 3	T2.0/2.0	DMSP39	INIT OBS	RPMK
	15	270255	20.7N 126.0E	PCN 6		DMSP35	PARTIALLY EXPOSED LLCC	PGTW
	16	270256	20.3N 126.2E	PCN 3	T2.0/2.0	DMSP35	INIT OBS	RKSO
	17	270256	20.7N 125.7E	PCN 5	T3.0/3.0 /01.0/25HRS	DMSP35		RODN
	18	271033	20.7N 124.7E	PCN 5		DMSP37	CI UP	PGTW
	19	271329	21.0N 123.6E	PCN 3		DMSP39		PGTW
	20	271537	20.7N 123.4E	PCN 5		DMSP35		RODN
	21	271537	20.9N 124.1E	PCN 5		DMSP35		RPMK
	22	280056	20.9N 121.7E	PCN 3	T4.0/4.0 /01.0/22HRS	DMSP36		RODN
	23	280211	20.9N 121.4E	PCN 1		DMSP37		PGTW
	24	280237	20.9N 121.2E	PCN 1	T4.0/4.0 /02.0/26HRS	DMSP34	BANDING TYPE EYE	PGTW
	25	280237	20.9N 121.4E	PCN 1	T3.5/3.5 /01.5/24HRS	DMSP35		RKSO
	26	281013	21.9N 120.7E	PCN 5		DMSP37	CI SAME	PGTW
	27	281310	22.3N 119.9E	PCN 5		DMSP39		PGTW
	28	281310	22.6N 118.9E	PCN 5		DMSP39		RPMK
	29	281338	22.4N 119.6E	PCN 5		DMSP35		RODN
	30	281519	22.5N 119.5E	PCN 5		DMSP35		PGTW
	31	282253	23.0N 116.5E	PCN 5	T2.5/3.5 /W1.5/22HRS	DMSP37		RODN
	32	282253	22.5N 117.6E	PCN 5	T3.0/3.0-	DMSP37	INIT OBS	RPMK
	33	290038	22.6N 117.2E	PCN 1	T4.0/4.0-/S0.0/22HRS	DMSP36		PGTW
	34	290151	22.9N 117.0E	PCN 1		DMSP39		RPMK
	35	290219	22.8N 116.5E	PCN 1	T3.0/3.5-/W0.5/24HRS	DMSP35		RKSO
	36	290219	22.7N 116.7E	PCN 1		DMSP35		PGTW
	37	291134	22.5N 114.9E	PCN 5		DMSP37		RODN
	38	291134	22.9N 114.9E	PCN 6		DMSP37		RPMK
	39	291319	22.9N 114.1E	PCN 3		DMSP36		RKSO
	40	291320	23.1N 114.1E	PCN 5		DMSP36	CI DOWN	PGTW

AIRCRAFT FIXES

	FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
	1	260827	19.9N 129.7E	1500FT	3065	997	50 050 20	120 45 050 20	4 5			+25 +25 +25 29	2
*	2	262036	20.0N 127.2E	700MB	3063			120 39 050 170	4 15			+13	3
	3	262152	20.5N 126.5E	1500FT		994	50 320 30	080 35 320 60	4 3			+25	3
	4	270810	20.5N 125.0E	700MB	3006		50 330 40	070 40 330 35	5 2			+12 +10	4
	5	270948	20.7N 124.8E	700MB	3003	991	40 020 50	110 54 020 120	5 8			+12 +11 +11	4
*	6	271936	21.1N 122.4E	700MB	2942	983		110 51 400 28	5 2			+14 +12	5
	7	272152	20.7N 121.9E	700MB	2924	981	50 040 30	150 53 040 30	0 2	CIRCULAR	5	+11 +17 +14	5
	8	281050	21.8N 120.4E	700MB		975	45 150 30	200 45 120 120	2 4	ELLIPTICAL	40 25 010	+11 +15 +11	6

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	272250	21.0N 121.9E	LAND						25.1N 121.6E	46696
2	280200	20.9N 121.2E	LAND						25.1N 121.6E	46696
3	280300	20.9N 121.1E	LAND						25.1N 121.6E	46696
4	280400	21.0N 121.1E	LAND			5			22.6N 120.3E	46744
5	280500	21.0N 121.1E	LAND			5			22.6N 120.3E	46744
6	280700	21.2N 120.8E	LAND			5			22.6N 120.3E	46744
7	280800	21.4N 120.7E	LAND			5			22.6N 120.3E	46744
8	280900	21.5N 120.6E	LAND			5			22.6N 120.3E	46744
9	281000	21.6N 120.5E	LAND			5			22.6N 120.3E	46744
10	281100	21.7N 120.4E	LAND			5			22.6N 120.3E	46744
11	281200	22.0N 120.3E	LAND			5			22.6N 120.3E	46744
12	281300	22.2N 120.0E	LAND			5			22.6N 120.3E	46744
13	281400	22.3N 119.7E	LAND			5			22.6N 120.3E	46744
14	281500	22.4N 119.4E	LAND			5			22.6N 120.3E	46744
15	281600	22.5N 119.0E	LAND			5			22.6N 120.3E	46744
16	281700	22.5N 118.9E	LAND			5			22.6N 120.3E	46744
17	281800	22.5N 118.6E	LAND			5			22.6N 120.3E	46744
18	281900	22.5N 118.4E	LAND			5			22.6N 120.3E	46744
19	282000	22.6N 118.1E	LAND			5			22.6N 120.3E	46744
20	282100	22.7N 117.9E	LAND			5			22.6N 120.3E	46744
21	290000	22.6N 117.3E	LAND				10913 62709		22.3N 114.2E	45005
22	290300	22.9N 116.9E	LAND				10912 73111		22.3N 114.2E	45005
23	290600	23.1N 116.4E	LAND				55/63 73010		22.3N 114.2E	45005
24	290900	23.1N 115.8E	LAND				65163 72813		22.3N 114.2E	45005
25	291420	23.1N 114.4E	LAND				20400 /////		22.3N 114.2E	45005

TROPICAL DEPRESSION 11

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	021317	12.1N 135.3E	PCN 6		DMSP39	INIT NIGHTIME OBS	PGTW
* 2	030228	13.4N 131.2E	PCN 5	T0.0/0.0	DMSP35	INIT OBS	PGTW
3	030953	13.9N 130.4E	PCN 6		DMSP37		PGTW
4	030953	14.5N 131.0E	PCN 6		DMSP37		RPMK
5	031150	14.2N 130.2E	PCN 6		DMSP36		PGTW
6	031258	14.6N 130.3E	PCN 5		DMSP39		PGTW
* 7	031510	13.3N 128.9E	PCN 5		DMSP35		RODN
8	031510	14.9N 130.3E	PCN 6		DMSP35		PGTW
* 9	040032	15.0N 127.7E	PCN 5	T0.0/0.0 /S0.0/22HRS	DMSP36		PGTW
* 10	040139	15.7N 128.1E	PCN 5		DMSP39		PGTW
* 11	040210	15.2N 128.1E	PCN 5	T0.0/0.0	DMSP35	INIT OBS	RODN
* 12	040210	15.4N 128.1E	PCN 5		DMSP35		PGTW
* 13	040933	15.9N 127.0E	PCN 6		DMSP37		PGTW
* 14	041239	16.4N 126.3E	PCN 5		DMSP39		PGTW
* 15	041314	16.5N 126.3E	PCN 5		DMSP36		PGTW
* 16	041451	16.5N 126.0E	PCN 5		DMSP35		PGTW
* 17	041451	16.2N 125.9E	PCN 5		DMSP35		RPMK
* 18	042214	17.8N 126.2E	PCN 5		DMSP37		PGTW
19	050014	17.7N 127.8E	PCN 5	T2.0/2.0 /D2.0/24HRS	DMSP36		PGTW
20	050120	17.7N 128.0E	PCN 3		DMSP39		PGTW
21	050151	17.8N 128.0E	PCN 3		DMSP35		PGTW
22	050151	18.0N 126.9E	PCN 5	T1.0/1.0+/D1.0/24HRS	DMSP35		RODN
23	051256	18.9N 126.2E	PCN 3		DMSP36	EXPOSED LLCC	PGTW
24	051402	19.2N 125.2E	PCN 6		DMSP39		RODN
25	051433	19.0N 125.8E	PCN 3		DMSP35		PGTW
* 26	052153	18.8N 122.8E	PCN 5	T2.0/2.0 /S0.0/22HRS	DMSP37		PGTW
27	052153	19.3N 123.6E	PCN 5	T1.0/1.0	DMSP37	INIT OBS	RPMK
* 28	052356	18.5N 122.9E	PCN 5		DMSP36		PGTW
29	060243	19.3N 123.5E	PCN 5	T1.0/1.0 /S0.0/25HRS	DMSP39		RODN
30	060314	19.3N 123.4E	PCN 5		DMSP35		RODN
31	060314	19.3N 123.5E	PCN 5		DMSP35		RPMK
32	061034	21.1N 122.0E	PCN 5	T0.0/0.0	DMSP37	INIT OBS	RKSO
33	061317	21.0N 119.6E	PCN 5		DMSP39		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	030615	14.0N 132.1E	700MB	3090	1003	10 230 48	220 15 060 48	5 5			+11 + 9 28	2
2	032200	14.7N 129.9E	700MB	3079	1004	15 150 50	060 12 330 10	5 5			+15 +13 + 8 28	2
3	042126	17.3N 127.6E	1500FT		1001	30 180 40	220 30 180 35	4 15			+25 +23 28	4
4	050815	19.0N 125.9E	1500FT		997	25 060 50	110 25 060 60	5 5			+25 +25	5
* 5	052130	18.8N 122.8E	700MB	3093	1001		250 25 150 10	3 10				6
6	052222	19.3N 123.4E	1500FT		1007	20 360 4	060 15 330 5	4 2			+25 +25 27	6

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	020600	12.0N 136.0E	15	120	
2	060600	20.7N 121.9E	15	30	

TYPHOON IRVING

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	071220	14.1N 137.5E	PCN 6		DMSP36		PGTW
2	080023	16.1N 138.1E	PCN 4	T0.0/0.0	DMSP39	INIT OBS	PGTW
3	081202	16.6N 137.9E	PCN 3		DMSP36		PGTW
4	082303	17.7N 136.6E	PCN 5	T1.0/1.0 /D1.0/23HRS	DMSP36		PGTW
5	090219	17.9N 135.9E	PCN 5		DMSP35		PGTW
6	090933	18.3N 135.5E	PCN 4		DMSP37		PGTW
7	091144	18.3N 134.3E	PCN 3		DMSP36		PGTW
8	091500	17.8N 134.6E	PCN 3		DMSP35		PGTW
9	091500	17.7N 134.8E	PCN 3		DMSP35		RPMK
10	091500	17.7N 134.8E	PCN 3		DMSP35		RODN
11	092214	18.8N 133.3E	PCN 4		DMSP37		PGTW
12	100026	18.8N 133.2E	PCN 3	T1.0/1.0 /S0.0/25HRS	DMSP36		PGTW
13	100127	18.8N 133.1E	PCN 3		DMSP39		PGTW
14	100127	18.5N 133.1E	PCN 3	T1.0/1.0	DMSP39	INIT OBS	RODN
15	100913	18.3N 132.0E	PCN 6		DMSP37		PGTW
16	100913	18.4N 132.2E	PCN 6		DMSP37		RODN
17	101226	18.3N 131.4E	PCN 3		DMSP36		PGTW
18	101307	18.5N 131.4E	PCN 6		DMSP36		PGTW
19	101442	18.1N 129.8E	PCN 5		DMSP35		RPMK
20	101442	18.3N 130.2E	PCN 5		DMSP37		PGTW
21	101442	17.0N 130.1E	PCN 3		DMSP35		RODN
22	102154	17.0N 129.8E	PCN 5		DMSP37		PGTW
23	102154	17.0N 129.8E	PCN 5	T1.0/1.0	DMSP37	INIT OBS	RPMK
24	110009	16.7N 129.7E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP36		PGTW
25	110108	16.7N 129.6E	PCN 5		DMSP39		PGTW
26	110142	16.9N 129.4E	PCN 5		DMSP35		PGTW
27	110142	16.7N 129.5E	PCN 6		DMSP35		RPMK
28	111034	16.6N 129.5E	PCN 6		DMSP37		PGTW
29	111250	17.1N 129.2E	PCN 5		DMSP36		PGTW
30	111349	17.2N 129.2E	PCN 6		DMSP39		PGTW
31	111423	17.3N 129.3E	PCN 5		DMSP35		PGTW
32	111423	17.1N 130.8E	PCN 5		DMSP35		RKSO
33	112134	17.5N 128.1E	PCN 5	T2.5/2.5 /D1.5/24HRS	DMSP37		RPMK
34	112134	17.3N 128.7E	PCN 5		DMSP37		PGTW
35	112351	17.6N 127.6E	PCN 3	T3.0/3.0 /D1.0/24HRS	DMSP36		PGTW
36	120230	17.5N 127.7E	PCN 5	T3.0/3.0	DMSP39	INIT OBS	RODN
37	120230	17.7N 127.0E	PCN 5		DMSP39		RPMK
38	120305	17.6N 127.6E	PCN 5		DMSP35		RODN
39	121015	18.7N 127.0E	PCN 5		DMSP37	CI UP	PGTW
40	121232	18.7N 126.7E	PCN 5		DMSP36		PGTW
41	121330	18.8N 126.3E	PCN 6		DMSP39		RPMK
42	121330	18.9N 126.6E	PCN 5		DMSP39		PGTW
43	121537	18.9N 126.3E	PCN 5		DMSP35		RODN
44	122114	19.9N 126.7E	PCN 5		DMSP37		PGTW
45	122333	20.0N 127.1E	PCN 5	T4.5/4.5 /D1.5/24HRS	DMSP36		PGTW
46	130211	20.0N 126.9E	PCN 3	T4.0/4.0 /D1.0/24HRS	DMSP39		RODN
47	130211	20.6N 127.0E	PCN 3	T4.0/4.0+/D1.5/28HRS	DMSP39		RPMK
48	130247	20.3N 126.9E	PCN 3		DMSP35		RODN
49	130247	20.7N 127.0E	PCN 3		DMSP35		PGTW
50	130954	21.5N 126.4E	PCN 4		DMSP37		RODN
51	130954	21.4N 126.7E	PCN 6		DMSP37		PGTW
52	131214	22.1N 125.9E	PCN 5		DMSP36		PGTW
53	131311	22.3N 125.4E	PCN 5		DMSP39		PGTW
54	131528	22.5N 125.4E	PCN 3		DMSP35		RODN
55	131528	22.7N 125.4E	PCN 5		DMSP35		RPMK
56	132234	23.6N 125.1E	PCN 5	T5.0/5.0-/D1.0/21HRS	DMSP37		RPMK
57	132235	23.0N 125.1E	PCN 5		DMSP37		RODN
58	140056	23.9N 124.0E	PCN 5		DMSP36		RPMK
59	140152	23.3N 125.1E	PCN 1	T4.5/4.5 /D0.5/24HRS	DMSP39		RODN
60	140152	23.6N 124.8E	PCN 3	T5.0/5.0-/D0.5/26HRS	DMSP39		PGTW
61	140152	23.7N 125.1E	PCN 3	T4.5/4.5	DMSP39	INIT OBS	RKSO
62	140228	23.6N 124.9E	PCN 1		DMSP35		PGTW
63	140228	23.6N 125.0E	PCN 1		DMSP35		RKSO
64	141115	24.7N 125.0E	PCN 2		DMSP37		RPMK
65	141116	24.5N 124.7E	PCN 2		DMSP37		RODN
66	141252	24.7N 124.9E	PCN 1		DMSP39		RPMK
67	141252	24.5N 124.6E	PCN 3		DMSP39		PGTW
68	141338	24.6N 124.5E	PCN 2		DMSP36		RKSO
69	141510	24.8N 124.5E	PCN 3		DMSP35		PGTW
70	142214	24.6N 124.8E	PCN 1	T5.5/5.5 /D0.5/24HRS	DMSP37		RPMK
71	142215	25.4N 124.7E	PCN 1		DMSP37		RODN
72	150038	25.9N 124.4E	PCN 3	T4.0/4.0 /W0.5/23HRS	DMSP36		RKSO
73	150039	25.8N 124.4E	PCN 3	T5.0/5.0 /D0.5/23HRS	DMSP39		RODN
74	150133	26.6N 124.6E	PCN 3	T5.0/5.0 /S0.0/24HRS	DMSP39		PGTW
75	150209	26.7N 124.7E	PCN 3		DMSP35		PGTW
76	150210	26.4N 124.4E	PCN 3		DMSP35		RODN
77	150210	26.3N 124.3E	PCN 3		DMSP35		RKSO
78	151055	27.2N 123.8E	PCN 1		DMSP37		RPMK
79	151055	27.2N 123.8E	PCN 2		DMSP37	PSN BASED ON EYE	RODN
80	151233	27.5N 123.7E	PCN 1		DMSP39		PGTW
81	151233	27.4N 123.6E	PCN 1		DMSP39		RKSO
82	151319	27.5N 123.7E	PCN 1		DMSP36		RPMK
83	151320	27.5N 123.8E	PCN 1		DMSP36		PGTW
84	151451	28.1N 124.0E	PCN 3		DMSP35		PGTW
85	151451	27.9N 123.8E	PCN 3		DMSP35		RKSO

86	152154	29.1N 123.8E	PCN 1	T5.0/5.0-/S0.0/20HRS	DMSP37	PGTW
87	152155	29.2N 123.7E	PCN 1	T5.0/5.5 /W0.5/24HRS	DMSP37	RPMK
88	160020	29.7N 123.9E	PCN 1		DMSP36	PGTW
89	160135	31.4N 123.7E	PCN 2		DMSP37	PGTW
90	160151	30.1N 123.7E	PCN 1		DMSP35	PGTW
91	160151	30.1N 123.5E	PCN 1	T5.0/5.0 /D1.0/25HRS	DMSP35	RKSO
92	160256	30.2N 123.7E	PCN 1	T5.0/5.0 /S0.0/26HRS	DMSP39	RODN
93	160256	30.1N 123.6E	PCN 1		DMSP39	RKSO
94	161035	31.3N 123.7E	PCN 1		DMSP37	RPMK
95	161035	31.4N 123.7E	PCN 1		DMSP37	RKSO
96	161302	31.7N 123.8E	PCN 3		DMSP36	PGTW
97	161302	31.7N 123.8E	PCN 3		DMSP36	RKSO
98	161356	32.5N 124.0E	PCN 3		DMSP39	RODN
99	161431	32.2N 123.9E	PCN 3		DMSP35	PGTW
100	161432	32.2N 123.7E	PCN 3		DMSP35	RPMK
101	161433	32.2N 123.8E	PCN 3		DMSP35	RKSO
102	162134	33.5N 124.9E	PCN 3	T3.0/4.0-/W2.0/20HRS	DMSP37	RKSO
103	162135	33.5N 124.6E	PCN 3		DMSP37	RODN
104	170002	33.9N 125.4E	PCN 3	T4.5/5.5 /W0.5/21HRS	DMSP36	RODN
105	170002	34.1N 125.2E	PCN 3		DMSP36	RKSO
106	170132	34.2N 125.7E	PCN 3	T3.0/4.0-/W2.0/27HRS	DMSP35	PGTW
107	170132	34.3N 125.7E	PCN 3		DMSP35	RKSO
108	170236	34.5N 125.9E	PCN 3		DMSP39	RKSO
109	170237	34.8N 126.0E	PCN 3		DMSP39	RPMK
110	171015	34.4N 128.3E	PCN 3		DMSP37	RKSO
111	171015	36.5N 128.2E	PCN 3		DMSP37	PGTW
112	171015	36.4N 128.3E	PCN 3		DMSP37	RPMK
113	171244	37.3N 129.1E	PCN 3		DMSP36	RKSO
114	171244	37.6N 129.0E	PCN 3		DMSP36	PGTW
115	171337	37.8N 129.8E	PCN 3		DMSP39	RPMK
116	171337	37.7N 130.0E	PCN 3		DMSP39	RKSO
117	171555	38.5N 130.9E	PCN 5		DMSP35	RKSO
118	171556	39.5N 131.1E	PCN 5		DMSP35	RPMK
119	172114	41.5N 133.1E	PCN 5	T2.5/3.5 /W2.0/22HRS	DMSP37	RPMK
120	172114	41.5N 133.9E	PCN 5	T1.5/2.5 /W1.5/24HRS	DMSP37	RKSO
121	172345	41.8N 133.5E	PCN 5		DMSP36	RPMK
122	180114	43.5N 134.5E	PCN 5		DMSP35	RKSO
123	180218	42.9N 134.6E	PCN 5		DMSP39	RPMK
124	180218	44.0N 135.1E	PCN 5		DMSP39	RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT	IN	DP	SST	MSN NO.
1	090008	17.8N 136.0E	1500FT	3077	996	45 220 35	280 15 220 20	3 1			+13	+14	+25	29	1
2	090828	18.1N 135.5E	1500FT	3037	994	20 100 35	190 30 100 35	5 5			+26	+25	+24		2
3	091926	17.4N 134.6E	700MB	3078	998		160 33 090 120	6 10				+12	+ 8		3
4	092122	18.3N 133.8E	1500FT		998	20 270 70	360 20 270 70	5 12				+25	+25	29	3
5	100716	18.1N 131.6E	700MB	3067		30 030 10	120 15 030 10	2 5							4
6	100814	18.6N 131.8E	700MB	3066	994	30 330 20	110 17 330 15	2 8				+15	+ 5		4
7	102207	17.4N 120.2E	1500FT	3065	996	30 210 50	110 30 050 120	5 5			+26	+28			5
8	110631	16.4N 128.6E	700MB	3018	992	45 290 150	340 31 290 200	5 3				+13	+ 9		6
9	110812	16.7N 129.2E	700MB	2994	988	25 290 90	020 28 290 120	2 3			+13	+12	+ 8		6
10	111916	17.9N 128.4E	700MB	2992	989		180 45 090 60	6 10				+14	+12		7
11	112145	17.5N 128.3E	700MB	2985	985	60 190 120	100 47 050 150	6 6			+15	+13	+ 9		7
12	120716	18.5N 127.2E	700MB	2907	979	55 280 55	350 48 280 65	2 5				+13	+ 8		8
13	120918	18.5N 127.0E	700MB	2905	980	55 310 95	020 60 310 95	2 5			+11	+14	+11		8
14	121944	19.3N 127.2E	700MB	2870	975		140 45 050 120	7 5				+14	+10		9
15	122222	19.7N 126.9E	700MB	2880	975	65 130 120	210 65 130 135	5 5			+14	+15	+10		9
16	130644	21.2N 126.7E	700MB	2843	972	70 020 120	140 61 020 110	5 1				+16	+14		10
17	130908	21.5N 126.7E	700MB	2833	969	75 330 90	070 52 330 100	5 2			+13	+15	+15		10
18	131912	23.0N 125.1E	700MB	2778	964		220 53 130 60	4 5				+18	+11		11
19	132148	23.2N 125.3E	700MB	2770	960	70 230 90	290 56 230 90	4 5			+16	+17	+12		11
20	140600	24.0N 124.9E	700MB	2732	959	65 260 30	120 68 030 60	1 1				+20	+13		12
21	140850	24.2N 124.9E	700MB	2717	954	75 130 150	210 63 140 40	1 5	CIRCULAR	30	+14	+18	+16		12
22	142143	25.5N 124.4E	700MB	2705	956		180 75 100 30	1 2	CIRCULAR	30	+15	+15	+12		13
23	150620	27.0N 124.2E	700MB	2711	957		220 65 120 140	10 5				+15	+16		14
24	150905	27.1N 123.9E	700MB	2700	956	60 020 120	110 65 020 60	10 5	CIRCULAR	20	+14	+15	+16		14
25	152151	29.2N 123.9E	700MB			60 150 20	220 61 150 30								15

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	131500	22.9N 125.4E	LAND				6///2 /////		24.3N 124.2E	47918
2	131700	23.0N 125.4E	LAND				6///2 53611		24.3N 124.2E	47918
3	131730	25.3N 125.3E	LAND	POOR		60		EYE MOVG 3315	24.8N 125.3E	47927
4	131800	23.0N 125.1E	LAND				5///2 52816		24.3N 124.2E	47918
5	131800	23.0N 125.1E	LAND				35//5 5////		24.8N 125.3E	47927
6	131900	23.2N 125.3E	LAND				6///4 5////		24.8N 125.3E	47927
7	131900	22.8N 125.1E	LAND				6///2 51916		24.3N 124.2E	47918
8	132000	23.2N 125.3E	LAND				6///2 73105		24.3N 124.2E	47918
9	132000	23.2N 125.2E	LAND				6///4 52808		24.8N 125.3E	47927
10	132030	23.2N 125.2E	LAND	POOR		50			24.8N 125.3E	47927
11	132100	23.2N 125.1E	LAND				6///4 52805		24.8N 125.3E	47927
12	132100	23.2N 125.3E	LAND				6///2 /////		24.3N 124.2E	47918
13	132200	23.3N 125.2E	LAND				6///2 53308		24.3N 124.2E	47918
14	132200	23.1N 125.1E	LAND				6///4 51805		24.8N 125.3E	47927
15	132200	23.2N 125.3E	LAND	POOR		50		EYE MOVG 0614	24.8N 125.3E	47927
16	132300	23.3N 125.0E	LAND				6///4 53314		24.8N 125.3E	47927
17	132300	23.4N 125.2E	LAND				6///2 73404		24.3N 124.2E	47918
18	132300	23.4N 125.1E	LAND	POOR		50		EYE MOVG 3115	24.8N 125.3E	47927

19	140000	23.4N	125.0E	LAND	POOR	50		EYE MOVG 3115	24.8N	125.3E	47927
20	140000	23.4N	125.0E	LAND			5///2 529//		24.3N	124.2E	47918
21	140000	23.3N	125.0E	LAND			2///4 50000		24.8N	125.3E	47927
22	140030	23.5N	124.9E	LAND	POOR	50		EYE MOVG 3220	24.8N	125.3E	47927
23	140100	23.5N	124.8E	LAND	POOR	60		EYE MOVG 2815	24.8N	125.3E	47927
24	140100	23.5N	124.8E	LAND			3///4 53215		24.8N	125.3E	47927
25	140100	23.5N	124.9E	LAND			5///2 53108		24.3N	124.2E	47918
* 26	140100	25.3N	125.5E	LAND			65//3 05516		24.0N	121.6E	46699
* 27	140200	23.5N	124.8E	LAND	POOR	60		EYE STNR	24.8N	125.3E	47927
28	140200	23.4N	124.7E	LAND			6///2 52511		24.3N	124.2E	47918
29	140200	23.5N	124.7E	LAND			5///4 52705		24.8N	125.3E	47927
30	140200	23.4N	125.0E	LAND			25993 52421		24.0N	121.6E	46699
31	140300	23.6N	124.9E	LAND			5///4 50415		24.8N	125.3E	47927
32	140300	23.5N	124.7E	LAND			6///2 72905		24.3N	124.2E	47918
33	140300	23.7N	125.0E	LAND			21984 50120		24.0N	121.6E	46699
34	140400	23.8N	125.1E	LAND			22974 50105		24.0N	121.6E	46699
35	140400	23.7N	124.9E	LAND			6///2 50515		24.3N	124.2E	47918
36	140400	23.9N	124.9E	LAND			5///4 50208		24.8N	125.3E	47927
37	140500	24.2N	124.9E	LAND			10984 53428		24.0N	121.6E	46699
38	140500	24.0N	124.9E	LAND			5///3 53514		24.8N	125.3E	47927
39	140500	23.9N	124.9E	LAND			5///2 53611		24.3N	124.2E	47918
40	140500	24.3N	124.9E	LAND			24944 53407		24.0N	121.6E	46699
41	140600	24.1N	125.0E	LAND			5///3 50308		24.8N	125.3E	47927
42	140600	24.1N	124.8E	LAND	GOOD	40		EYE MOVG 3335	24.8N	125.3E	47927
43	140600	24.1N	124.7E	LAND			5///2 73612		24.3N	124.2E	47918
44	140700	24.1N	124.7E	LAND			20773 52714		24.8N	125.3E	47927
45	140700	24.2N	124.8E	LAND	GOOD	40		EYE MOVG 3205	24.8N	125.3E	47927
46	140700	24.2N	124.8E	LAND			10984 52407		24.0N	121.6E	46699
47	140700	24.1N	124.7E	LAND			5///2 73315		24.3N	124.2E	47918
48	140800	24.1N	124.7E	LAND			11/14 52105		24.0N	121.6E	46699
49	140800	24.1N	124.6E	LAND	GOOD	10		EYE STNR	24.8N	125.3E	47927
50	140800	24.1N	124.7E	LAND			6///2 73305		24.3N	124.2E	47918
51	140800	24.1N	124.7E	LAND			5//43 50000		24.8N	125.3E	47927
52	140900	24.3N	124.9E	LAND			24/23 50316		24.8N	125.3E	47927
53	140900	24.2N	124.9E	LAND			6///3 70604		24.3N	124.2E	47918
54	141000	24.4N	124.7E	LAND			20713 53114		24.8N	125.3E	47927
55	141100	24.5N	124.7E	LAND			6///3 73507		24.3N	124.2E	47918
56	141100	24.5N	124.6E	LAND			55/63 53008		24.8N	125.3E	47927
57	141100	24.5N	124.5E	LAND	FAIR	50		EYE MOVG 3220	24.8N	125.3E	47927
58	141200	24.6N	124.6E	LAND			32993 63006		24.0N	121.6E	46699
59	141200	24.6N	124.6E	LAND			6///3 50108		24.8N	125.3E	47927
60	141200	24.6N	124.5E	LAND	FAIR	50		EYE MOVG 3220	24.8N	125.3E	47927
61	141200	24.5N	124.8E	LAND			6///3 73407		24.3N	124.2E	47918
62	141235	24.1N	125.0E	LAND	POOR				26.4N	127.8E	47931
* 63	141235	24.6N	125.2E	LAND	POOR				26.4N	127.8E	47931
64	141300	24.8N	124.5E	LAND	FAIR	30		EYE MOVG 3220	24.8N	125.3E	47927
65	141300	24.8N	124.6E	LAND			22933 53608		24.0N	121.6E	46699
66	141300	24.7N	124.6E	LAND			65/63 53607		24.8N	125.3E	47927
67	141300	24.6N	124.7E	LAND			6///3 73005		24.3N	124.2E	47918
* 68	141310	24.5N	125.4E	LAND	POOR				26.4N	127.8E	47931
69	141400	24.9N	124.5E	LAND	FAIR	30		EYE MOVG 3220	24.8N	125.3E	47927
70	141400	23.9N	124.6E	LAND			6///3 53605		24.8N	125.3E	47927
71	141400	24.7N	124.6E	LAND			6///3 73404		24.3N	124.2E	47918
72	~~141435~~	~~24.8N~~	~~124.8E~~	~~LAND~~	~~POOR~~				~~26.4N~~	~~127.8E~~	~~47931~~
73	141500	24.8N	124.5E	LAND			6///3 73208		24.3N	124.2E	47918
74	141500	24.9N	124.5E	LAND			6///3 53211		24.8N	125.3E	47927
75	141500	25.1N	124.3E	LAND	FAIR	30		EYE MOVG 3220	24.8N	125.3E	47927
76	141600	24.9N	124.4E	LAND			6///3 52705		24.8N	125.3E	47927
77	141600	25.0N	124.2E	LAND			21964 52720		24.0N	121.6E	46699
78	141600	24.9N	124.6E	LAND			6///3 73306		24.3N	124.2E	47918
79	141600	25.2N	124.4E	LAND	FAIR	30		EYE MOVG 3610	24.8N	125.3E	47927
80	141700	25.1N	124.3E	LAND			21983 53311		24.8N	125.3E	47927
81	141700	25.0N	124.5E	LAND			6///2 73407		24.3N	124.2E	47918
82	141700	24.3N	124.3E	LAND	FAIR	30		EYE MOVG 3510	24.8N	125.3E	47927
83	141700	25.1N	124.4E	LAND					24.0N	121.6E	46699
84	141800	25.2N	124.3E	LAND			55/43 53410		24.8N	125.3E	47927
85	141800	25.2N	124.5E	LAND			6///2 73608		24.3N	124.2E	47918
86	141800	25.3N	124.4E	LAND	FAIR	30		EYE MOVG 3610	24.8N	125.3E	47927
* 87	141910	25.1N	124.4E	LAND	FAIR				26.4N	127.8E	47931
88	141835	24.5N	124.5E	LAND	POOR				26.4N	127.8E	47931
89	141900	25.4N	124.3E	LAND			10915 50316		24.0N	121.6E	46699
90	141900	25.3N	124.2E	LAND	FAIR	30		EYE MOVG 3220	24.8N	125.3E	47927
91	142000	25.3N	124.2E	LAND	FAIR	30		EYE STNR	24.8N	125.3E	47927
92	142000	25.3N	124.2E	LAND			25/13 50000		24.8N	125.3E	47927
93	142000	25.4N	124.4E	LAND			6///2 73507		24.3N	124.2E	47918
94	142010	25.1N	124.3E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931
95	142100	25.5N	124.3E	LAND			21944 50509		24.0N	121.6E	46699
96	142100	25.4N	124.4E	LAND			6///2 73207		24.3N	124.2E	47918
97	142100	25.4N	124.2E	LAND	FAIR	30		EYE MOVG 3610	24.8N	125.3E	47927
98	142100	25.4N	124.3E	LAND			25/43 50508		24.8N	125.3E	47927
99	142135	25.5N	124.2E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931
100	142200	25.5N	124.4E	LAND			5//43 50607		24.8N	125.3E	47927
101	142200	25.4N	124.4E	LAND			6///3 73303		24.3N	124.2E	47918
102	142200	25.4N	124.3E	LAND			25/45		24.0N	121.6E	46699
103	142200	25.5N	124.3E	LAND	POOR			EYE MOVG 3605	24.8N	125.3E	47927
104	142210	25.3N	124.2E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931
105	142235	25.3N	124.4E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931
106	142300	25.5N	124.4E	LAND			6///2 73403		24.3N	124.2E	47918
107	142300	25.7N	124.6E	LAND			5//43 50311		24.8N	125.3E	47927
108	142300	23.5N	124.3E	LAND	POOR			EYE MOVG 3210	26.3N	125.8E	47929
109	142310	25.4N	124.2E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931
110	150000	25.9N	124.5E	LAND	POOR			EYE MOVG 0220	26.3N	125.8E	47929
111	150000	25.9N	124.5E	LAND			5///3 51415		24.8N	125.3E	47927
112	150000	25.6N	124.4E	LAND			6///2 70104		24.3N	124.2E	47918
113	150010	25.5N	124.3E	LAND	POOR			PSBL CNTR	26.4N	127.8E	47931

114	150035	26.0N 124.3E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
115	150100	25.0N 124.3E	LAND	POOR			EYE MOVG 3220	26.3N 125.8E	47929
116	150135	26.2N 124.5E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
117	150200	26.4N 124.5E	LAND			6///3 53611		24.8N 125.3E	47927
118	150200	26.2N 124.3E	LAND	POOR			EYE MOVG 3620	26.3N 125.8E	47929
119	150235	26.4N 124.5E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
120	150300	26.5N 124.4E	LAND			6///4 53414		24.8N 125.3E	47927
121	150300	26.4N 124.3E	LAND	POOR			EYE MOVG 3620	26.3N 125.8E	47929
122	150310	26.7N 124.7E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
123	150500	23.9N 125.0E	LAND	GOOD	50		EYE MOVG 3120	24.8N 125.3E	47927
124	150600	27.2N 123.9E	LAND			6///4 53222		24.8N 125.3E	47927
*125	150635	27.7N 125.2E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
126	150700	27.2N 123.8E	LAND	FAIR	40		EYE MOVG 2920	26.3N 125.8E	47929
*127	150710	27.9N 125.2E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
*128	150735	27.2N 125.0E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931
129	150800	27.1N 123.7E	LAND			6///3 72909		24.8N 125.3E	47927
130	150800	27.2N 123.8E	LAND	FAIR	50		EYE STNR	26.3N 125.8E	47929
131	150900	27.1N 123.8E	LAND			20973 50000		24.8N 125.3E	47927
132	150900	27.2N 123.9E	LAND	FAIR	50		EYE STNR	26.3N 125.8E	47929
133	151000	27.1N 123.8E	LAND			5//43 50000		24.8N 125.3E	47927
134	151100	27.3N 123.8E	LAND			5//43 53609		24.8N 125.3E	47927
135	151100	27.2N 123.8E	LAND	FAIR	55		EYE MOVG 3210	26.3N 125.8E	47929
136	151100	23.8N 123.8E	LAND	FAIR	55		EYE MOVG 3210	26.2N 127.7E	47930
137	151200	27.5N 123.9E	LAND			6//44 50211		24.8N 125.3E	47927
138	151200	27.5N 123.7E	LAND	FAIR	55		EYE MOVG 3210	26.3N 125.8E	47929
139	151300	27.5N 123.9E	LAND			6//14 50000		24.8N 125.3E	47927
140	151300	27.5N 123.8E	LAND	FAIR	30		EYE MOVG 3610	26.3N 125.8E	47929
141	151400	27.6N 123.9E	LAND			6///4 53606		24.8N 125.3E	47927
142	151400	27.3N 124.0E	LAND	GOOD	55		EYE MOVG 0215	26.3N 125.8E	47929
143	151500	27.9N 124.0E	LAND	GOOD	60		EYE MOVG 0120	26.3N 125.8E	47929
144	151700	28.3N 123.8E	LAND	GOOD	60		EYE MOVG 3620	26.3N 125.8E	47929
145	151900	28.5N 123.8E	LAND	POOR			EYE MOVG 3620	26.3N 125.8E	47929
146	151930	28.3N 124.0E	ACFT				NAV ACCURACY 6NM		54WRS
147	152151	29.2N 123.8E	ACFT						54WRS
148	152335	25.4N 124.2E	LAND	POOR			PSBL CNTR	26.4N 127.8E	47931

SUPER TYPHOON JUDY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	151310	13.7N 150.1E	PCN 6		DMSP35		PGTW
2	152238	13.2N 150.4E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
3	161120	13.5N 145.4E	PCN 5		DMSP36		PGTW
4	162134	13.1N 144.1E	PCN 5		DMSP37	EDGE OF DATA	PGTW
5	170055	13.9N 143.2E	PCN 5	T3.0/3.0 /D3.0/27HRS	DMSP39		PGTW
6	170132	13.9N 142.9E	PCN 6		DMSP35		PGTW
7	170133	14.1N 142.9E	PCN 5	T3.0/3.0	DMSP35	INIT OBS	RPMK
8	171015	13.9N 140.8E	PCN 5		DMSP37		PGTW
9	171155	14.4N 140.3E	PCN 5		DMSP39		PGTW
10	171414	14.6N 140.5E	PCN 5		DMSP35		PGTW
11	171414	14.9N 140.4E	PCN 6		DMSP35		RODN
12	172114	15.4N 138.7E	PCN 6		DMSP37		PGTW
13	172345	15.4N 138.6E	PCN 5	T4.0/4.0 /D1.0/23HRS	DMSP36		PGTW
14	172345	15.4N 138.7E	PCN 3	T4.0/4.0	DMSP36	INIT OBS	RODN
15	180036	15.6N 138.5E	PCN 5		DMSP39		PGTW
16	180036	15.5N 138.5E	PCN 5	T4.0/4.0+/D1.0/23HRS	DMSP39		RPMK
17	180114	15.6N 138.4E	PCN 5		DMSP35		PGTW
18	180954	16.4N 137.6E	PCN 6		DMSP37		PGTW
19	181226	16.7N 137.1E	PCN 5		DMSP36		PGTW
20	181355	17.1N 137.0E	PCN 5		DMSP35		PGTW
21	181356	16.5N 137.2E	PCN 5		DMSP35		RODN
22	181455	16.7N 137.0E	PCN 5		DMSP35		RPMK
23	182054	17.9N 136.1E	PCN 1		DMSP37		PGTW
24	182327	18.2N 135.8E	PCN 1	T6.0/6.0 /D2.0/24HRS	DMSP36		PGTW
25	190159	18.5N 135.6E	PCN 1		DMSP35		PGTW
26	190237	18.3N 135.5E	PCN 1	T6.0/6.0 /D1.5/26HRS	DMSP35		RPMK
27	190237	18.5N 135.5E	PCN 1		DMSP35		PGTW
28	190934	19.6N 134.9E	PCN 2		DMSP37		PGTW
29	191209	19.7N 134.6E	PCN 1		DMSP36		PGTW
30	191258	19.9N 134.7E	PCN 1		DMSP39		PGTW
31	191337	20.0N 134.8E	PCN 2		DMSP35		PGTW
32	191519	19.9N 134.7E	PCN 1		DMSP35		RPMK
33	191519	19.7N 134.4E	PCN 1		DMSP35		RODN
34	192034	20.5N 134.4E	PCN 5		DMSP37		PGTW
35	192309	21.3N 133.8E	PCN 1	T5.0/6.0 /W1.0/24HRS	DMSP36		PGTW
36	200140	21.6N 133.6E	PCN 1	T7.0/7.0 /D1.0/23HRS	DMSP39		RPMK
37	200140	21.5N 133.6E	PCN 1	T6.0/6.0	DMSP39	INIT OBS	RODN

38	200219	21.7N	133.6E	PCN 1		DMSP35		RODN
39	200219	21.7N	133.5E	PCN 1		DMSP35		PGTW
40	200914	22.7N	132.8E	PCN 2		DMSP37		PGTW
41	201055	22.8N	132.4E	PCN 4		DMSP37		RPMK
42	201150	23.1N	132.5E	PCN 5		DMSP36		PGTW
43	201239	23.0N	132.1E	PCN 5		DMSP39		PGTW
44	201500	22.9N	131.9E	PCN 2		DMSP35		RPMK
45	201500	22.9N	131.9E	PCN 1		DMSP35		RODN
46	201500	23.1N	131.7E	PCN 1		DMSP35		PGTW
47	202155	23.2N	131.6E	PCN 3	T5.0/6.0 /W2.0/20HRS	DMSP37		RPMK
48	202155	23.2N	131.1E	PCN 3		DMSP37		PGTW
49	210033	23.4N	131.1E	PCN 3	T5.0/5.0 /W1.0/22HRS	DMSP36		RODN
50	210033	23.3N	131.1E	PCN 3	T5.0/5.0 /S0.0/25HRS	DMSP36		PGTW
51	210121	23.5N	130.9E	PCN 3		DMSP39		RODN
52	210121	23.4N	130.9E	PCN 3		DMSP39		RPMK
53	210121	23.5N	130.4E	PCN 3		DMSP39		PGTW
54	210200	23.5N	130.8E	PCN 3		DMSP35		PGTW
55	211036	24.3N	129.9E	PCN 5		DMSP37		RODN
56	211036	23.7N	129.7E	PCN 4		DMSP37		PGTW
57	211220	24.4N	129.6E	PCN 5		DMSP39		PGTW
58	211314	24.5N	129.3E	PCN 5		DMSP36	CI DOWN	PGTW
59	211441	24.3N	129.2E	PCN 2		DMSP35		RPMK
60	211442	24.3N	129.2E	PCN 1		DMSP35		RODN
61	211442	24.7N	129.0E	PCN 5		DMSP35		PGTW
62	212135	24.5N	128.2E	PCN 1		DMSP37		RODN
63	212135	24.4N	128.1E	PCN 1	T5.0/5.0 /S0.0/24HRS	DMSP37		RPMK
64	212135	24.4N	128.1E	PCN 2		DMSP37		PGTW
65	220015	24.3N	127.7E	PCN 3	T4.5/5.0 /W0.5/24HRS	DMSP36		RODN
66	220015	24.4N	127.7E	PCN 3	T4.5/4.5 /W0.5/26HRS	DMSP36		PGTW
67	220102	24.1N	127.4E	PCN 3		DMSP39		RODN
68	220142	24.1N	127.4E	PCN 3		DMSP35		PGTW
69	220243	24.0N	127.5E	PCN 3		DMSP39		RKSO
70	220243	24.0N	127.4E	PCN 3		DMSP39		RODN
71	221016	24.5N	126.8E	PCN 6		DMSP37		RODN
72	221016	24.5N	127.0E	PCN 6		DMSP37		PGTW
73	221256	24.7N	126.7E	PCN 3		DMSP36		PGTW
74	221256	24.7N	126.8E	PCN 5		DMSP36		RODN
75	221343	24.4N	126.4E	PCN 4		DMSP39		RPMK
76	221343	24.7N	126.8E	PCN 5		DMSP39		RKSO
77	221343	25.0N	126.8E	PCN 5		DMSP39		RODN
78	221423	25.0N	126.6E	PCN 5		DMSP35		PGTW
79	222115	25.6N	125.9E	PCN 3		DMSP37		PGTW
80	222115	25.5N	126.1E	PCN 3		DMSP37		RODN
81	222115	25.4N	125.9E	PCN 2		DMSP37		RPMK
82	222357	25.9N	125.8E	PCN 5	T5.0/5.0	DMSP36	INIT 09S	RKSO
83	222357	26.4N	125.5E	PCN 5	T5.0/5.0-/D0.5/24HRS	DMSP36		PGTW
84	230224	26.5N	125.2E	PCN 1	T5.0/5.0 /S0.0/29HRS	DMSP39		RPMK
85	230224	26.4N	125.1E	PCN 1	T5.0/5.0 /D0.5/26HRS	DMSP39		RODN
86	230224	26.4N	125.3E	PCN 1		DMSP39		RKSO
87	230305	26.5N	125.1E	PCN 1		DMSP35		RODN
88	230955	27.2N	123.9E	PCN 2		DMSP37		RPMK
89	230955	27.5N	123.8E	PCN 2		DMSP37		RODN
90	230955	27.3N	124.0E	PCN 1		DMSP37		PGTW
91	231136	27.3N	123.7E	PCN 2		DMSP37		RPMK
92	231238	27.4N	123.7E	PCN 1		DMSP36		PGTW
93	231238	27.2N	123.7E	PCN 1		DMSP36		RODN
94	231324	27.6N	123.6E	PCN 1		DMSP39		RKSO
95	231324	27.5N	123.7E	PCN 1		DMSP39		PGTW
96	231547	27.9N	123.3E	PCN 3		DMSP35		RKSO
97	231547	27.5N	123.3E	PCN 1		DMSP35		RODN
98	232236	28.6N	123.2E	PCN 2		DMSP37		RPMK
99	232236	28.7N	123.0E	PCN 1		DMSP37		RODN
100	232338	28.5N	122.7E	PCN 1	T4.0/5.0 /W1.0/24HRS	DMSP36		PGTW
101	240120	28.9N	122.1E	PCN 3		DMSP36		RPMK
102	240205	29.0N	122.7E	PCN 1		DMSP39		PGTW
103	240205	29.0N	122.5E	PCN 1	T4.0/5.0-/W1.0/24HRS	DMSP39		RPMK
104	240205	29.0N	122.6E	PCN 1	T6.0/6.0-/D1.0/26HRS	DMSP39		RKSO
105	240246	29.1N	122.6E	PCN 1		DMSP35		RKSO
106	240247	29.0N	122.7E	PCN 1	T6.0/6.0-/D1.0/24HRS	DMSP35		RODN
107	241117	29.8N	122.6E	PCN 3		DMSP37		RKSO
108	241117	29.7N	122.8E	PCN 4		DMSP37		RPMK
109	241305	30.1N	122.6E	PCN 3		DMSP39		PGTW
110	241401	30.3N	122.4E	PCN 3		DMSP36		RPMK
111	241525	30.2N	122.5E	PCN 3		DMSP35		RKSO
112	241528	30.1N	122.5E	PCN 3		DMSP35		RODN
113	242216	30.6N	122.9E	PCN 3	T3.0/4.0 /W1.0/20HRS	DMSP37		RPMK
114	242216	30.6N	122.8E	PCN 3		DMSP37		RODN
115	250102	30.9N	123.0E	PCN 3	T4.0/5.0-/W2.0/23HRS	DMSP36		RKSO
116	250146	31.0N	123.2E	PCN 3	T3.0/4.0 /W1.0/26HRS	DMSP39		PGTW
117	250228	31.0N	123.3E	PCN 3		DMSP35		RKSO
118	250228	31.0N	123.4E	PCN 3	T4.0/5.0-/W2.0/24HRS	DMSP35		RODN
119	251056	31.6N	124.3E	PCN 3		DMSP37		RPMK
120	251056	31.9N	124.0E	PCN 3		DMSP37		RODN
121	251246	32.0N	124.6E	PCN 5		DMSP39		RKSO
122	251246	31.7N	124.4E	PCN 5		DMSP39		PGTW
123	251344	31.4N	124.4E	PCN 3		DMSP36		RPMK
124	251510	31.9N	124.8E	PCN 5		DMSP35		PGTW
125	251510	31.5N	124.5E	PCN 3		DMSP35		RODN
126	251510	32.1N	124.7E	PCN 5		DMSP35		RKSO
127	252155	32.7N	125.9E	PCN 3	T2.0/3.0-/W1.0/24HRS	DMSP37		RPMK
128	252156	32.5N	126.1E	PCN 3		DMSP37		RODN
129	260045	32.9N	127.5E	PCN 3		DMSP36		RPMK
130	260127	33.6N	126.2E	PCN 5	T2.0/3.0 /W1.0/24HRS	DMSP39		PGTW
131	260210	32.8N	126.8E	PCN 3	T2.0/3.0-/W2.0/24HRS	DMSP35		RODN
132	260210	33.7N	126.5E	PCN 5		DMSP35		PGTW
133	260210	32.9N	126.7E	PCN 3	T2.0/3.0-/W2.0/25HRS	DMSP35		RKSO
134	261036	34.6N	128.6E	PCN 4		DMSP37		RODN
135	261036	33.9N	128.3E	PCN 3		DMSP37		RPMK

136	261227	34.4N 128.5E	PCN 3	DMSP39	RKSO
137	261227	34.4N 128.7E	PCN 3	DMSP39	PGTW
138	261325	34.3N 129.2E	PCN 5	DMSP36	RPMK
139	261451	34.5N 129.0E	PCN 5	DMSP35	RKSO
140	261451	34.2N 129.0E	PCN 6	DMSP35	RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	162341	13.5N 143.5E	700MB	3068	998	35 110 70	090 54 030 15	3 5			+18 +12 +12	2
2	170303	14.0N 142.7E	700MB	3043	995	35 360 15	060 46 350 90	3 10			+11 +11	2
3	170505	14.2N 142.2E	700MB	3025	994	40 090 16	180 46 090 16	5 10			+10 +11 +10	2
4	172048	15.3N 139.5E	700MB	2992	987	70 090 15	170 61 090 10	5 2	CIRCULAR	10	+11 +12 +14 26	3
5	180554	16.3N 138.2E	700MB	2707	956	65 270 10	030 84 260 5	1 3	CIRCULAR	6	+15 +11	4
6	180845	16.6N 137.8E	700MB	2717	956	65 320 5	350 90 330 5	2 2	CIRCULAR	5	+13 +18 +10	4
7	181932	17.7N 136.3E	700MB	2411	922		360 93 280 5	3 2			+18 +17	5
8	182149	17.9N 136.2E	700MB	2336	914	55 260 12	320 90 260 7	1 1	CIRCULAR	5	+13 +23 +18	5
9	191036	19.5N 134.8E	700MB	2295	909		280 92 170 15	4 3	CIRCULAR	7	+14 +15	6
10	191921	20.7N 134.3E	700MB	2121	889		270 108 180 5	5 2			+34 +18	7
11	192145	21.0N 134.0E	700MB	2091	887	70 060 15	360 110 270 5	5 2	CIRCULAR	5	+13 +24 +15	7
12	200600	22.1N 133.1E	700MB	2291	908	130 030 3	120 136 030 3	2 2			+18 +18	8
13	200843	22.5N 133.0E	700MB	2380	919	50 280 40	360 110 270 10	2 2	CIRCULAR	7	+18 +19 +15	8
14	202259	23.3N 131.2E	700MB	2579	940	100 020 30	020 84 120 14	5 5	CIRCULAR	10	+17 +18 +12	9
15	210300	23.5N 130.8E	700MB	2611	945	90 010 30	070 98 010 30	5 10	CIRCULAR	25	+18 +18 +14	9
16	210503	24.2N 130.5E	700MB	2613	945	100 360 10	250 75 170 40	10 5			+20 +15	10
17	210842	24.2N 130.2E	700MB	2614	944	100 360 10	340 76 270 30	5 2	CIRCULAR	30	+14 +18 +15	10
18	212206	24.2N 128.2E	700MB	2679	952	85 340 20	110 71 360 155	4 2			+16 +16 +16	11
19	220117	24.3N 127.8E	700MB	2679		85 350 15	340 81 260 30	4 2			+18 +16	11
20	220247	24.3N 127.6E	700MB	2684	951	95 030 35	120 78 030 120	4 2			+18 +19 +17	11
21	220650	24.2N 127.3E	700MB	2678	953		120 78 020 143	5 3			+16 +15	12
22	220958	24.3N 127.2E	700MB	2665	949	95 300 15	290 74 220 62	4 5	CIRCULAR	35	+14 +15 +15	12
23	221932	25.2N 126.2E	700MB	2636	948		130 91 050 90	2 8			+18 +15	13
24	222200	25.6N 125.9E	700MB	2667	946	55 120 150	180 75 120 90	3 10	CIRCULAR	20	+13 +18 +16	13
25	230600	26.9N 124.3E	700MB	2669	952	65 080 190	120 65 080 15	5 2			+15 +15	14
26	230818	27.1N 124.2E	700MB	2669	950	40 140 140	210 65 140 30	5 5	CIRCULAR	15	+14 +15 +15	14

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TODFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	161635	13.1N 145.1E	LAND	FAIR				NEG WALL CLD	13.6N 144.9E	91218
2	161710	13.2N 144.9E	LAND	FAIR	ELLIPTICAL			AXIS 10/5	13.6N 144.9E	91218
3	161935	13.5N 144.5E	LAND						13.6N 144.9E	91218
4	162010	13.5N 144.2E	LAND	FAIR	CIRCULAR	35		CNTR OPEN SW-N	13.6N 144.9E	91218
5	162135	13.9N 143.8E	LAND	FAIR	CIRCULAR	30		NEG WALL CLD OPEN SW AND NE	13.6N 144.9E	91218
6	210600	23.4N 130.3E	LAND				308/4 4////		26.1N 127.7E	47937
7	210700	24.0N 130.4E	LAND				30842 53022		26.1N 127.7E	47937
8	210800	24.0N 130.2E	LAND				35/// 52709		26.1N 127.7E	47937
9	210800	24.2N 130.2E	LAND	GOOD		40			26.1N 127.7E	47937
10	210900	24.1N 130.1E	LAND				35/// 53010		26.1N 127.7E	47937
11	210900	24.1N 130.1E	LAND	GOOD		40			26.1N 127.7E	47937
12	211000	24.1N 129.8E	LAND	GOOD		36		EYE MOVG 2820	26.1N 127.7E	47937
13	211100	24.0N 129.8E	LAND				35//0 52412		26.1N 127.7E	47937
14	211100	24.1N 129.7E	LAND	FAIR		40		EYE MOVG 2720	26.1N 127.7E	47937
15	211200	24.0N 129.4E	LAND				5///2 72611		26.1N 127.7E	47937
16	211200	24.1N 129.5E	LAND	FAIR		40		EYE MOVG 2720	26.1N 127.7E	47937
17	211300	24.0N 129.3E	LAND				5///1 72710		26.1N 127.7E	47937
18	211300	24.1N 129.4E	LAND	GOOD		40		EYE MOVG 2720	26.1N 127.7E	47937
19	211400	24.1N 129.2E	LAND				5///2 72707		26.1N 127.7E	47937
20	211400	24.1N 129.2E	LAND	GOOD		40		EYE MOVG 2720	26.1N 127.7E	47937
21	211500	24.1N 129.1E	LAND				5///2 72806		26.1N 127.7E	47937
22	211500	24.1N 129.1E	LAND	POOR				EYE MOVG 2720	26.1N 127.7E	47937
23	211500	24.2N 129.2E	LAND				5///2 70408		26.1N 127.7E	47937
24	211500	24.1N 128.9E	LAND	POOR				EYE MOVG 2720	26.1N 127.7E	47937
25	211700	24.3N 128.9E	LAND				5///3 73107		26.1N 127.7E	47937
26	211700	24.2N 128.7E	LAND	POOR				EYE MOVG 2720	26.1N 127.7E	47937
27	211800	24.3N 128.9E	LAND				35//3 73307		26.1N 127.7E	47937
28	211800	24.2N 128.5E	LAND	POOR				EYE MOVG 2720	26.1N 127.7E	47937
29	211900	24.3N 128.7E	LAND				25//3 72909		26.1N 127.7E	47937
30	211910	24.2N 128.5E	LAND	POOR				EYE STNR	26.1N 127.7E	47937
31	212000	24.3N 128.6E	LAND				6///1 72706		26.1N 127.7E	47937
32	212000	24.4N 128.5E	LAND	GOOD		40			26.1N 127.7E	47937
33	212100	24.3N 128.3E	LAND				6///1 72611		26.1N 127.7E	47937
34	212100	24.6N 128.3E	LAND	POOR				EYE MOVG 2715	26.1N 127.7E	47937
35	212200	24.2N 128.2E	LAND				5///1 72609		26.1N 127.7E	47937
36	212200	24.3N 128.3E	LAND	POOR				EYE MOVG 2715	26.1N 127.7E	47937
37	212300	24.3N 128.0E	LAND	POOR				EYE MOVG 2715	26.1N 127.7E	47937
38	220000	24.3N 127.9E	LAND				5///3 72808		26.1N 127.7E	47937
39	220000	24.3N 127.9E	LAND	POOR				EYE MOVG 2720	26.1N 127.7E	47937
40	220100	24.3N 127.7E	LAND	POOR				EYE MOVG 2730	26.1N 127.7E	47937
41	220200	27.0N 127.5E	LAND				3///2 72719		26.1N 127.7E	47937
42	220300	24.2N 127.5E	LAND				3///2 72507		26.1N 127.7E	47937
43	220300	24.3N 127.2E	LAND	POOR				EYE MOVG 2320	26.1N 127.7E	47937
44	220400	24.1N 127.2E	LAND				22704 5////		24.8N 125.3E	47927
45	220400	24.1N 127.3E	LAND				3///1 72511		26.1N 127.7E	47937
46	220500	24.1N 127.1E	LAND				6//// 50000		24.3N 124.2E	47918
47	220500	24.2N 127.2E	LAND				22814 53306		24.8N 125.3E	47927
48	220500	24.1N 127.3E	LAND				5///1 72405		26.1N 127.7E	47937

49	220500	24.3N	127.3E	LAND	GOOD	70		EVE MOVG 0920	26.1N	127.7E	47937
50	220600	24.0N	127.1E	LAND			6//// 51204		24.3N	124.2E	47918
51	220600	24.3N	127.3E	LAND	GOOD	70		EVE STNR	26.1N	127.7E	47937
52	220600	24.2N	127.2E	LAND			5///1 72506		26.1N	127.7E	47937
53	220700	23.9N	127.1E	LAND			6//// 71804		24.3N	124.2E	47918
54	220700	24.1N	127.0E	LAND	POOR			EVE MOVG 2430	26.1N	127.7E	47937
55	220800	24.3N	127.2E	LAND			5///3 73404		26.1N	127.7E	47937
56	220800	24.1N	127.2E	LAND			22803 5////		24.8N	125.3E	47927
57	220800	24.0N	127.1E	LAND			6//// 71502		24.3N	124.2E	47918
58	220800	24.1N	127.0E	LAND	POOR			EVE STNR	26.1N	127.7E	47937
59	220835	24.3N	127.2E	LAND	POOR				26.4N	127.8E	47931
60	220900	24.1N	127.0E	LAND	POOR			EVE STNR	26.1N	127.7E	47937
61	220900	24.3N	127.2E	LAND			20874 53607		24.8N	125.3E	47927
62	220900	24.3N	127.2E	LAND			21873 73605		26.1N	127.7E	47937
63	220910	24.3N	127.2E	LAND	POOR				26.4N	127.8E	47931
64	221000	24.4N	127.2E	LAND			22863 53605		24.8N	125.3E	47927
65	221035	24.3N	127.0E	LAND	POOR				26.4N	127.8E	47931
66	221100	24.4N	127.0E	LAND			21973 52711		24.8N	125.3E	47927
67	221100	24.4N	127.0E	LAND	POOR			EVE MOVG 2420	26.1N	127.7E	47937
68	221100	24.4N	127.3E	LAND			3///3 73204		26.1N	127.7E	47937
69	221110	24.1N	126.8E	LAND	POOR				26.4N	127.8E	47931
70	221135	24.4N	127.0E	LAND	POOR				26.4N	127.8E	47931
71	221200	24.6N	126.9E	LAND	POOR			EVE MOVG 3525	26.1N	127.7E	47937
72	221200	24.5N	126.9E	LAND			2///3 72908		26.1N	127.7E	47937
73	221200	24.6N	126.9E	LAND			21684 53414		24.8N	125.3E	47927
74	221210	24.4N	127.0E	LAND	POOR				26.4N	127.8E	47931
75	221235	24.5N	126.9E	LAND	POOR				26.4N	127.8E	47931
76	221300	24.7N	126.7E	LAND			22712 52814		24.8N	125.3E	47927
77	221300	24.7N	126.7E	LAND	GOOD	45		EVE MOVG 3020	26.1N	127.7E	47937
78	221300	24.6N	126.8E	LAND			2///2 73011		26.1N	127.7E	47937
79	221310	24.7N	126.6E	LAND	POOR				26.4N	127.8E	47931
80	221335	24.6N	126.8E	LAND	POOR				26.4N	127.8E	47931
81	221400	24.6N	126.5E	LAND			6//// /////		24.3N	124.2E	47918
82	221400	24.7N	126.6E	LAND			21552 52906		24.8N	125.3E	47927
83	221400	24.7N	126.4E	LAND	GOOD	45		EVE MOVG 3020	26.1N	127.7E	47937
84	221400	24.7N	126.5E	LAND			5///3 73111		26.1N	127.7E	47937
85	221410	24.7N	126.7E	LAND	POOR				26.4N	127.8E	47931
86	221435	24.8N	126.6E	LAND	POOR				26.4N	127.8E	47931
87	221500	24.7N	126.3E	LAND	GOOD	45		EVE MOVG 2710	26.1N	127.7E	47937
88	221500	24.7N	126.4E	LAND			5///3 73010		26.1N	127.7E	47937
89	221500	24.8N	126.4E	LAND			21713 52911		24.8N	125.3E	47927
90	221500	24.6N	126.5E	LAND			6//// 00000		24.3N	124.2E	47918
91	221510	24.7N	126.7E	LAND	POOR				26.4N	127.8E	47931
92	221535	24.7N	126.7E	LAND	FAIR				26.4N	127.8E	47931
93	221600	24.[illegible]	126.2E	LAND	GOOD	45		EVE MOVG 3220	26.1N	127.7E	47937
94	221600	24.8N	126.3E	LAND			21713 53107		24.8N	125.3E	47927
95	221600	24.7N	126.4E	LAND			6//// 53310		24.3N	124.2E	47918
96	221610	24.9N	126.6E	LAND	FAIR				26.4N	127.8E	47931
97	221635	25.0N	126.6E	LAND	FAIR				26.4N	127.8E	47931
98	221700	24.9N	126.2E	LAND	GOOD	45		EVE MOVG 3520	26.1N	127.7E	47937
99	221700	24.7N	126.3E	LAND			6//// 73004		24.3N	124.2E	47918
100	221700	24.9N	126.3E	LAND			5///3 73004		26.1N	127.7E	47937
101	221700	25.0N	126.3E	LAND			21613 53406		24.8N	125.3E	47927
102	221710	25.4N	126.7E	LAND	POOR				26.4N	127.8E	47931
103	221735	25.2N	126.7E	LAND	FAIR				26.4N	127.8E	47931
104	221800	25.0N	126.2E	LAND			21414 52904		24.8N	125.3E	47927
105	221800	24.9N	126.2E	LAND			5///3 73203		26.1N	127.7E	47937
106	221800	25.0N	126.1E	LAND	GOOD	45		EVE MOVG 3510	26.1N	127.7E	47937
107	221900	24.9N	126.3E	LAND			6//// 73207		24.3N	124.2E	47918
108	221900	25.0N	126.3E	LAND			6//// 73405		24.3N	124.2E	47918
109	221900	25.0N	126.3E	LAND			5///2 73504		26.1N	127.7E	47937
110	221900	25.0N	126.0E	LAND	GOOD	45		EVE MOVG 3510	26.1N	127.7E	47937
111	221900	25.1N	126.2E	LAND			21673 50108		24.8N	125.3E	47927
112	221910	25.1N	126.2E	LAND	POOR				26.4N	127.8E	47931
113	221935	25.2N	126.2E	LAND	POOR				26.4N	127.8E	47931
114	222000	25.3N	126.1E	LAND			3///3 73410		26.1N	127.7E	47937
115	222000	25.2N	126.3E	LAND			6//// 73512		24.3N	124.2E	47918
116	222000	25.3N	126.2E	LAND			22513 53512		24.8N	125.3E	47927
117	222010	25.4N	126.1E	LAND	POOR				26.4N	127.8E	47931
118	222100	25.5N	125.9E	LAND			3///2 73415		26.1N	127.7E	47937
119	222100	25.5N	126.2E	LAND			22713 53514		24.8N	125.3E	47927
120	222100	25.3N	126.2E	LAND			6//// 73511		24.3N	124.2E	47918
121	222110	25.6N	126.1E	LAND	POOR				26.4N	127.8E	47931
122	222135	25.7N	126.1E	LAND	POOR				26.4N	127.8E	47931
123	222200	25.7N	~~126.0E~~	~~LAND~~			~~3///2 73415~~		~~26.1N~~	~~127.7E~~	~~47937~~
124	222200	25.5N	126.0E	LAND			6//// 73308		24.3N	124.2E	47918
125	222200	25.7N	125.9E	LAND			5///3 53219		24.8N	125.3E	47927
126	222235	26.0N	126.1E	LAND	FAIR				26.4N	127.8E	47931
127	222300	26.0N	125.7E	LAND			3///3 73315		26.1N	127.7E	47937
128	222300	25.5N	125.9E	LAND			6//// 73109		24.3N	124.2E	47918
129	222300	25.9N	125.9E	LAND			5///3 53412		24.8N	125.3E	47927
130	222310	26.2N	126.1E	LAND	FAIR				26.4N	127.8E	47931
131	222335	26.1N	126.1E	LAND	FAIR				26.4N	127.8E	47931
132	230000	26.1N	125.4E	LAND			5///4 53030		24.8N	125.3E	47927
133	230000	26.0N	125.6E	LAND			5///4 73325		26.1N	127.7E	47937
134	230010	26.1N	126.1E	LAND	FAIR				26.4N	127.8E	47931
135	230035	26.2N	126.1E	LAND	FAIR				26.4N	127.8E	47931
136	230100	26.4N	125.4E	LAND			30504 53612		24.8N	125.3E	47927
137	230100	26.3N	125.3E	LAND			5///4 73116		26.1N	127.7E	47937
138	230110	26.3N	126.0E	LAND	POOR				26.4N	127.8E	47931
139	230135	26.4N	125.5E	LAND	POOR				26.4N	127.8E	47931
140	230200	26.4N	125.2E	LAND			20514 52816		24.8N	125.3E	47927
141	230200	26.5N	125.4E	LAND			5///5 73312		26.1N	127.7E	47937
142	230210	26.4N	125.4E	LAND	POOR				26.4N	127.8E	47931
143	230235	26.4N	125.4E	LAND	POOR				26.4N	127.8E	47931
144	230300	26.5N	125.0E	LAND			20224 53113		24.8N	125.3E	47927
145	230300	26.6N	124.9E	LAND			5///5 73115		26.1N	127.7E	47937
146	230310	26.4N	125.4E	LAND	POOR				26.4N	127.8E	47931
147	230335	26.7N	125.2E	LAND	POOR				26.4N	127.8E	47931

148	230400	26.7N 124.6E	LAND			5///5 73115		26.1N 127.7E	47937
149	230400	26.8N 124.8E	LAND	POOR			EYE MOVG 3330	24.8N 125.3E	47927
150	230400	26.8N 124.7E	LAND			22434 53122		24.8N 125.3E	47927
151	230410	26.8N 125.1E	LAND	POOR				26.4N 127.8E	47931
152	230435	25.8N 124.9E	LAND	FAIR				26.4N 127.8E	47931
153	230500	27.0N 124.5E	LAND			3///6 73020		26.1N 127.7E	47937
154	230500	26.1N 124.6E	LAND			22434 53008		24.8N 125.3E	47927
155	230500	25.8N 124.5E	LAND	POOR			EYE MOVG 2720	26.3N 125.8E	47929
156	230510	26.9N 124.6E	LAND	FAIR				26.4N 127.8E	47931
157	230535	26.9N 124.5E	LAND	FAIR				26.4N 127.8E	47931
158	230600	26.8N 124.4E	LAND	POOR			EYE MOVG 3320	26.3N 126.8E	47929
159	230700	26.9N 124.4E	LAND	FAIR	30		EYE STNR	26.3N 125.8E	47929
160	230700	25.8N 124.3E	LAND			30415 72806		24.8N 125.3E	47927
161	230800	27.2N 124.2E	LAND	POOR			EYE MOVG 3320	26.3N 125.8E	47929
162	230800	26.4N 124.1E	LAND			22515 53012		24.8N 125.3E	47927
163	230900	27.0N 124.0E	LAND			21735 53008		24.8N 125.3E	47927
164	230900	27.0N 124.1E	LAND	POOR			EYE MOVG 1810	26.3N 125.8E	47929
165	231000	27.1N 124.0E	LAND	POOR			EYE MOVG 3320	26.3N 125.8E	47929
166	231100	27.2N 123.7E	LAND			31835 52909		24.8N 125.3E	47927
167	231100	27.2N 123.8E	LAND	POOR			EYE MOVG 3220	26.3N 125.8E	47929
168	231200	27.2N 123.7E	LAND	POOR			EYE STNR	26.3N 125.8E	47929
169	231200	27.3N 123.7E	LAND			31815 53408		24.8N 125.3E	47927
170	231300	27.4N 123.6E	LAND	POOR			EYE MOVG 3220	26.3N 125.8E	47929
171	231300	27.5N 123.6E	LAND			6///5 53312		24.8N 125.3E	47927
172	231400	27.5N 123.5E	LAND	POOR			EYE MOVG 3205	26.3N 125.8E	47929
173	231500	27.5N 123.5E	LAND	POOR			EYE MOVG 3205	26.3N 125.8E	47929
174	231600	27.7N 123.3E	LAND	POOR			EYE MOVG 3430	26.3N 126.8E	47929
175	231700	27.8N 123.3E	LAND	POOR			EYE MOVG 3415	26.3N 126.8E	47929
176	231800	28.0N 123.2E	LAND	GOOD	45		EYE MOVG 3315	26.3N 126.8E	47929
177	231900	28.1N 123.0E	LAND	GOOD	45		EYE MOVG 3120	26.3N 126.8E	47929

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	150000	9.0N 154.0E	015	250	
2	151200	11.5N 150.0E	020	250	

TROPICAL DEPRESSION 14

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
	1	161435	12.0N 168.2E	PCN 6		DMSP35	PSN BSU ON WK UL CONV ACTIVITY	KGWC
*	2	170552	14.7N 168.3E	PCN 6		DMSP37		PHIK
*	3	170921	15.9N 167.3E	PCN 6		DMSP36		PHIK
*	4	171233	16.5N 169.7E	PCN 5		DMSP35		PGTW
*	5	172203	13.8N 166.5E	PCN 3	T1.0/1.0	DMSP36	INIT OBS	PGTW
	6	172333	13.6N 166.5E	PCN 4	T0.5/0.5 /S0.0/24HRS	DMSP35		KGWC
*	7	180813	14.3N 167.0E	PCN 6		DMSP37		PGTW
	8	181044	14.4N 165.9E	PCN 4		DMSP36		PGTW
*	9	181214	14.2N 165.9E	PCN 4		DMSP35		PGTW
	10	181214	14.8N 165.5E	PCN 6		DMSP35		KGWC
	11	181912	18.4N 167.6E	PCN 6		DMSP37		KGWC
	12	181913	15.6N 165.2E	PCN 3	T1.0/1.0 /S0.0/21HRS	DMSP37		PGTW
	13	182145	15.8N 164.8E	PCN 5		DMSP36		PGTW
	14	182236	16.4N 164.2E	PCN 6		DMSP39		PHIK
*	15	182314	19.9N 164.2E	PCN 6	T1.0/1.0 /D0.5/24HRS	DMSP35		KGWC
	16	190753	17.7N 163.7E	PCN 6		DMSP37		PGTW
*	17	190753	19.1N 163.6E	PCN 6		DMSP37		KGWC
	18	191026	18.2N 163.6E	PCN 6		DMSP36		PGTW
	19	191117	18.9N 163.8E	PCN 6		DMSP39		PGTW
*	20	191155	20.4N 162.4E	PCN 6		DMSP35		KGWC
	21	192127	22.0N 161.1E	PCN 5	T0.0/0.0 /W1.0/26HRS	DMSP36		PGTW
	22	192358	22.3N 160.7E	PCN 5		DMSP39		PGTW
	23	200037	22.5N 160.6E	PCN 5		DMSP35		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	180026	13.6N 166.6E	1500FT		1007	25 330 50	140 25 060 120	4 10			+25 +24 30	1
2	190539	17.0N 163.9E	1500FT		1009	10 120 75	210 15 110 35	5 5			+24 +24 28	3
3	200100	19.7N 160.5E	700MB	3165			180 15 230 10	5 60				4

SYNOPTIC FIXES

	FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
	1	160000	12.0N 168.0E	15	300	
*	2	170000	13.0N 160.0E	15	300	

TROPICAL STORM KEN

SATELLITE FIXES

	FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
*	1	312136	25.7N 133.0E	PCN 5		DMSP37	INIT OBS	PGTW
*	2	010115	25.8N 132.4E	PCN 5	T1.0/1.0	DMSP39		PGTW
	3	010200	25.2N 133.3E	PCN 5		DMSP35		PGTW
	4	010200	24.9N 133.9E	PCN 3	T1.0/1.0	DMSP35	INIT OBS	RODN
	5	011016	24.9N 132.6E	PCN 6		DMSP37		PGTW
	6	011016	24.9N 133.2E	PCN 4		DMSP37		RODN
	7	011214	25.1N 132.5E	PCN 5		DMSP39		PGTW
	8	011320	25.3N 132.2E	PCN 5		DMSP36		PGTW
	9	011442	25.2N 132.1E	PCN 5		DMSP35		PGTW
	10	012115	25.4N 132.2E	PCN 3	T1.0/1.0 /S0.0/20HRS	DMSP37		PGTW
	11	020020	25.7N 131.7E	PCN 3		DMSP36		PGTW
	12	020055	25.4N 131.9E	PCN 3		DMSP39		PGTW
	13	020141	26.0N 132.1E	PCN 3		DMSP35		PGTW
	14	020142	25.9N 132.2E	PCN 3	T1.0/1.0 /S0.0/24HRS	DMSP35		RODN
	15	020956	27.2N 131.3E	PCN 5		DMSP37		PGTW
	16	021302	27.7N 131.1E	PCN 5		DMSP36		PGTW
	17	021423	28.0N 131.2E	PCN 5		DMSP35		PGTW
	18	022055	28.8N 130.8E	PCN 5	T1.5/1.5	DMSP37	INIT OBS	RPMK
	19	022055	28.5N 130.2E	PCN 6		DMSP37		PGTW
	20	030002	29.1N 129.9E	PCN 5	T2.5/2.5-/D1.5/27HRS	DMSP36		PGTW
*	21	030123	29.2N 129.5E	PCN 3		DMSP35		RPMK
	22	030123	29.2N 129.8E	PCN 5		DMSP35		PGTW
	23	030217	29.1N 129.4E	PCN 5	T3.0/3.0-/D2.0/24HRS	DMSP39		RODN
*	24	030217	29.2N 130.1E	PCN 5	T3.0/3.0	DMSP39	INIT OBS	RKSO
	25	030936	30.7N 130.3E	PCN 6		DMSP37		RODN
	26	030936	31.1N 130.3E	PCN 5		DMSP37		PGTW
*	27	031117	30.7N 130.6E	PCN 5		DMSP37		RODN
	28	031244	31.6N 131.0E	PCN 5		DMSP36		PGTW
	29	031317	31.7N 131.5E	PCN 3		DMSP39		RPMK
	30	031318	31.7N 131.0E	PCN 5		DMSP		PGTW
	31	031404	32.0N 131.5E	PCN 3		DMSP35		RKSO
	32	031405	31.7N 131.2E	PCN 5		DMSP35		PGTW
	33	031405	31.6N 131.3E	PCN 6		DMSP35		RODN
	34	031546	32.1N 131.3E	PCN 6		DMSP35		RODN
	35	031546	32.5N 131.7E	PCN 5		DMSP35		RKSO
	36	032035	32.9N 132.4E	PCN 3		DMSP37		RODN
	37	032035	33.0N 132.2E	PCN 4		DMSP37		PGTW
	38	032035	33.1N 132.3E	PCN 3		DMSP37		RKSO
	39	032344	33.5N 133.4E	PCN 3	T2.5/2.5-/D1.0/27HRS	DMSP36		RPMK
	40	032344	33.8N 133.1E	PCN 3	T1.0/2.0 /W1.5/24HRS	DMSP36		PGTW
	41	040158	34.3N 134.4E	PCN 4		DMSP39	FINALED 00Z	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-WND DIR/VEL/BRG/RNG	ACCRY NAV/MET	EYE SHAPE	EYE DIAM/ORIEN-TATION	EYE TEMP (C) OUT/ INV DP/SST	MSN NO.
1	012105	25.4N 132.1E	1500FT		998	40 030 40	120 33 080 45	2 5			+25 +25	1
2	020928	27.0N 131.0E	700MB	2884	977	60 200 50	220 55 200 60	5 20	CIRCULAR	20	+16 +18 +18	2
3	022132	28.3N 130.4E	700MB	3068	998	35 030 50	130 36 050 120	2 5			+11 +12 + 9	4
4	030725	30.3N 130.8E	700MB	2984	988	50 090 5	210 65 110 40	2 10			+16 +12 + 2	5
5	030913	30.7N 130.7E	700MB	2976	988	50 180 10	210 65 190 40	2 15			+13 +12 + 2	5

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	012000	28.0N 130.5E	LAND				65/// 50113		28.4N 129.5E	47909
2	020700	26.7N 131.2E	LAND				65//1 /////		28.4N 129.5E	47909
3	020800	26.9N 131.2E	LAND				65//1 53512		28.4N 129.5E	47909
4	020900	27.1N 131.1E	LAND				65//1 53413		28.4N 129.5E	47909
5	021000	27.3N 130.9E	LAND				65/// 53113		28.4N 129.5E	47909
6	021100	27.3N 130.7E	LAND				65/// 52811		28.4N 129.5E	47909
7	021200	27.2N 130.6E	LAND				65/// 52309		28.4N 129.5E	47909
8	021300	26.9N 130.6E	LAND				65/// 51808		28.4N 129.5E	47909
9	021400	27.1N 130.6E	LAND				65/// 53512		28.4N 129.5E	47909
10	021500	27.2N 130.5E	LAND				65/// 53211		28.4N 129.5E	47909
11	021600	27.6N 130.4E	LAND				65/// 53511		28.4N 129.5E	47909
12	021700	27.6N 130.5E	LAND				65/// 50211		28.4N 129.5E	47909
13	021800	27.7N 130.5E	LAND				65/// 50106		28.4N 129.5E	47909
14	021900	27.8N 130.5E	LAND				65/// 53608		28.4N 129.5E	47909
15	022100	28.2N 130.6E	LAND				65/// 50211		28.4N 129.5E	47909
16	022200	28.4N 130.7E	LAND				65/// 50113		28.4N 129.5E	47909
17	022300	28.5N 130.6E	LAND				65/// 53308		28.4N 129.5E	47909
18	030000	28.8N 130.4E	LAND				65/// 53319		28.4N 129.5E	47909
19	030100	29.0N 130.2E	LAND				65/// 53212		28.4N 129.5E	47909
20	030200	29.2N 130.2E	LAND				65/// 53513		28.4N 129.5E	47909
21	030300	29.4N 130.3E	LAND				65/// 50210		28.4N 129.5E	47909
22	030400	29.6N 130.4E	LAND				6///3 5////		30.6N 131.0E	47869
23	030500	30.0N 130.4E	LAND				65/// 50122		28.4N 129.5E	47909
24	030500	30.0N 130.5E	LAND				6///4 50216		30.6N 131.0E	47869
25	031300	31.5N 131.1E	LAND				55/41 50208		33.4N 130.3E	47806

26	031400	31.9N 131.5E	LAND	POOR		32.1N 131.5E	47854
27	031400	31.6N 131.3E	LAND		55/41 50316	33.4N 130.3E	47806
28	031455	32.0N 131.6E	LAND	POOR		32.1N 131.5E	47854
29	031500	32.0N 131.5E	LAND		65//1 5////	34.3N 132.6E	47792
30	031500	31.9N 131.5E	LAND		55/11 50319	33.4N 130.3E	47806
31	031600	32.1N 131.6E	LAND		65//1 50211	34.3N 132.6E	47792
32	031500	32.1N 131.7E	LAND		55/41 50319	33.4N 130.3E	47806
33	031602	32.3N 131.6E	LAND	POOR		32.1N 131.5E	47854
34	031700	32.3N 131.7E	LAND		55/// 5////	33.2N 134.2E	47899
35	031700	32.3N 131.7E	LAND		21601 50316	34.3N 132.6E	47792
36	031700	32.4N 131.9E	LAND		20401 50222	33.4N 130.3E	47806
37	031701	32.4N 131.7E	LAND	POOR		32.1N 131.5E	47854
38	031755	32.7N 132.0E	LAND	FAIR		32.1N 131.5E	47854
39	031800	32.6N 131.9E	LAND		45//1 50416	34.3N 132.6E	47792
40	031800	32.5N 132.0E	LAND		55/// 50422	33.2N 134.2E	47899
41	031800	32.6N 131.9E	LAND		20531 50111	33.4N 130.3E	47806
42	031855	32.8N 132.2E	LAND	FAIR		33.7N 131.0E	47480
43	031900	32.9N 132.1E	LAND		/1371 50322	34.3N 132.6E	47792
44	031900	32.9N 132.1E	LAND		55/// 50319	33.2N 134.2E	47899
45	031955	33.2N 132.3E	LAND	POOR		33.7N 131.0E	47440
46	032000	33.1N 132.4E	LAND		55//1 50516	34.3N 132.6E	47792
47	032000	33.1N 132.2E	LAND		55/// 50314	33.2N 134.2E	47899
48	032100	33.3N 132.4E	LAND		24411 50316	34.3N 132.6E	47792
49	032100	33.2N 132.4E	LAND		55/// 50411	33.2N 134.2E	47899
50	032200	33.4N 132.8E	LAND		2/4/1 50516	34.3N 132.6E	47792
51	032200	33.3N 132.7E	LAND		55/// 50619	33.2N 134.2E	47499
52	032300	33.7N 133.2E	LAND		55/52 50527	34.3N 132.6E	47792
53	032300	33.6N 133.1E	LAND		65/// 50527	33.2N 134.2E	47899
54	032300	33.7N 133.1E	LAND		54/01 /////	34.6N 135.6E	47773
55	040000	33.9N 133.4E	LAND		55/50 50522	34.6N 135.6E	47773
56	040000	33.9N 133.5E	LAND		55//2 50616	34.3N 132.6E	47792
57	040000	33.6N 133.6E	LAND		65/// 50532	33.2N 134.2E	47499
58	040200	34.7N 133.9E	LAND		6///2 5////	34.3N 132.6E	47792
59	040800	35.5N 135.2E	LAND		2296/ 50722	35.3N 138.7E	47639
* 60	040900	35.2N 135.1E	LAND		22402 40415	36.2N 135.1E	47705
61	040900	35.9N 135.5E	LAND		2291/ 70422	35.3N 138.7E	47639
62	041000	36.1N 135.7E	LAND		2298/ 70519	35.3N 138.7E	47639
63	041000	36.1N 135.6E	LAND		11772 50515	36.2N 135.1E	47705
64	041000	36.1N 135.6E	LAND		65861 50420	35.2N 137.0E	47636
65	041100	36.4N 136.2E	LAND		6586/ 50525	35.2N 137.0E	47636
66	041100	36.2N 136.0E	LAND		35/0/	37.7N 138.8E	47572
67	041100	35.2N 136.1E	LAND		11712 50720	36.2N 135.1E	47705
68	041200	36.6N 136.6E	LAND		6586/ 50527	35.2N 137.0E	47636
69	041200	36.5N 136.6E	LAND		21642 50630	36.2N 135.1E	47705
70	041200	36.6N 136.7E	LAND		60831 50637	37.7N 138.8E	47572
71	041300	36.9N 137.2E	LAND		3581/ 50625	37.7N 138.8E	47572
72	041300	36.9N 137.2E	LAND		51742 50638	36.2N 136.1E	47705
73	041500	35.5N 134.8E	LAND		127// 50330	35.3N 138.7E	47639

TYPHOON LOLA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	021120	21.9N 151.3E	PCN 5		DMSP36		PGTW
2	021242	22.1N 151.0E	PCN 5		DMSP35		PGTW
3	022055	22.9N 150.9E	PCN 5	T1.0/1.0	DMSP37	INIT OBS	RPMK
4	022056	22.4N 151.1E	PCN 6		DMSP37		PGTW
5	022221	22.5N 151.3E	PCN 6		DMSP36		PGTW
6	030036	22.3N 151.1E	PCN 6	T2.0/2.0	DMSP39	INIT OBS	PGTW
7	030123	22.0N 151.3E	PCN 5	T1.0/1.0	DMSP35	INIT OBS	RODN
8	030123	23.0N 150.7E	PCN 5	T2.0/2.0	DMSP35	INIT OBS	RKSO
9	030123	22.5N 151.1E	PCN 6		DMSP35		PGTW
10	030936	22.7N 150.7E	PCN 5		DMSP37		PGTW
11	031103	23.0N 150.7E	PCN 5		DMSP36		PGTW
12	031136	23.1N 150.6E	PCN 5		DMSP39		PGTW
13	031405	22.5N 150.5E	PCN 5		DMSP35		RKSO
14	031405	23.5N 150.4E	PCN 5		DMSP35		PGTW
15	032035	23.5N 149.0E	PCN 5		DMSP37		RODN
16	032035	23.2N 149.5E	PCN 6	T3.0/3.0 /D1.0/20HRS	DMSP37		PGTW
17	032203	23.3N 149.1E	PCN 4		DMSP36	BEGINNING OF EYE	PGTW
18	040017	23.4N 148.8E	PCN 3		DMSP39		PGTW
19	040104	23.8N 149.0E	PCN 5	T3.0/3.0 /D2.0/24HRS	DMSP35		RODN
20	040105	23.7N 148.8E	PCN 3	T3.5/3.5 /D1.5/24HRS	DMSP35		RKSO
21	040105	23.6N 148.8E	PCN 4		DMSP35		PGTW
22	040916	24.1N 147.8E	PCN 3		DMSP37		PGTW
23	041117	24.3N 147.7E	PCN 5		DMSP39		PGTW
24	041226	24.4N 147.5E	PCN 3		DMSP36		PGTW
25	041346	24.5N 147.4E	PCN 3		DMSP35		PGTW
26	041346	24.7N 147.5E	PCN 4		DMSP35		RKSO
27	041346	24.7N 147.6E	PCN 3		DMSP35		RODN
28	042015	24.9N 146.7E	PCN 1		DMSP37		RODN
29	042015	24.9N 146.7E	PCN 1	T5.0/5.0 /D2.0/24HRS	DMSP37		PGTW
30	042327	25.1N 146.7E	PCN 1		DMSP39		PGTW
31	042358	25.5N 146.4E	PCN 2	T5.0/5.0 /D2.0/23HRS	DMSP39		RODN
32	042358	25.2N 146.5E	PCN 1		DMSP39		PGTW
33	050046	25.3N 146.5E	PCN 1		DMSP35		RODN
34	050046	25.2N 146.6E	PCN 1	T4.5/4.5 /D1.0/24HRS	DMSP35		RKSO
35	050046	25.3N 146.5E	PCN 1		DMSP35		PGTW
36	050856	26.0N 146.4E	PCN 1		DMSP37		PGTW

37	051208	26.1N 146.5E	PCN 1		DMSP36		PGTW
38	051240	26.3N 146.6E	PCN 1		DMSP39		PGTW
39	051328	26.5N 146.4E	PCN 1		DMSP35		PGTW
40	051328	26.2N 146.3E	PCN 2		DMSP35		RODN
41	051955	27.0N 146.3E	PCN 2		DMSP37		PGTW
42	052309	27.3N 146.6E	PCN 1	T5.0/5.0-/S0.0/21HRS	DMSP36		PGTW
43	060028	27.5N 146.6E	PCN 1		DMSP35		PGTW
44	060121	27.5N 146.6E	PCN 1		DMSP39		PGTW
45	060121	27.5N 146.5E	PCN 1	T4.5/4.5	DMSP39	INIT OBS	RPMK
46	060835	27.7N 146.2E	PCN 4		DMSP37		PGTW
47	061150	28.3N 146.0E	PCN 1		DMSP36		PGTW
48	061221	28.9N 146.2E	PCN 1		DMSP39		RODN
49	061221	28.7N 146.2E	PCN 1		DMSP39		PGTW
50	061309	28.9N 146.0E	PCN 1		DMSP35		PGTW
51	061935	29.5N 146.0E	PCN 2		DMSP37		PGTW
52	070009	29.7N 146.2E	PCN 2		DMSP35		PGTW
53	070101	30.1N 146.4E	PCN 1	T4.5/4.5-	DMSP39		RODN
54	070102	30.0N 146.4E	PCN 3	T3.5/4.5 /W1.5/26HRS	DMSP39		PGTW
55	070957	30.7N 146.5E	PCN 1		DMSP37		PGTW
56	071137	30.9N 146.4E	PCN 1		DMSP36		PGTW
57	071202	31.7N 148.2E	PCN 5		DMSP39		RODN
58	071202	31.7N 147.0E	PCN 5		DMSP39		PGTW
59	071432	32.0N 147.1E	PCN 3		DMSP35		PGTW
60	072056	33.7N 148.2E	PCN 3	T2.0/3.0 /W1.5/20HRS	DMSP37		PGTW
61	072233	34.0N 148.6E	PCN 3		DMSP36		PGTW
62	080043	34.2N 148.9E	PCN 3	T2.5/3.5 /W2.0/24HRS	DMSP39		RODN
63	080043	34.3N 148.8E			DMSP39		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	031932	23.6N 149.7E	700MB	3046			030 45 270 15	8 3			+14 +13	4
2	032046	23.5N 149.4E	700MB	3001	990	45 090 20	170 49 080 40	6 2	ELLIPTICAL	25 20 170	+11 +15 +13	4
3	040809	24.0N 148.1E	700MB	2913	978	65 320 15	360 71 320 30	2 5	CIRCULAR	15	+09 +14 +12	5
4	041913	24.8N 147.0E	700MB	2811		35 270 30	290 50 200	5 5			+17 + 6	6
5	042118	25.1N 146.8E	700MB	2751	965	75 350 15	020 68 330	5 10	CIRCULAR	30	+11 +15 + 8	6
6	050504	25.7N 146.6E	700MB	2743		90 300 10	310 87 230 10	3 5	CIRCULAR		+18 +10	7
7	050848	25.9N 146.5E	700MB	2750	959	40 210 50	250 86 180 10	2 3	CIRCULAR	20	+12 +19 +12	7
8	051943	27.0N 146.4E	700MB	2665		45 250 50	360 82 300 20	4 3	ELLIPTICAL	15 12	+23	8
9	052120	27.1N 146.5E	700MB	2656		95 070 40	070 85 360 30	4 3	ELLIPTICAL	17 12 030	+14 +17	8
10	060610	27.9N 146.5E	700MB	2683	953	70 280 20	040 71 290 50	2 5			+19 +13	9
11	060850	28.1N 146.4E	700MB	2746	960	50 080 40	180 72 090 95	2 5	CIRCULAR	20	+17 +17 +15	9
12	061943	29.7N 146.3E	700MB	2869		75 080 5	050 60 330 30	5 0	CIRCULAR		+14 +12	10
13	062137	29.7N 146.2E	700MB	2890	984	75 080 5	230 60 170 30	5 10	CIRCULAR	30	+11 +15 +14	10
14	070539	30.7N 146.4E	700MB	2907		50 260 50	020 57 310 30	3 0			+15 +12	11
15	070929	31.2N 146.8E	700MB	2924	979	70 040 10	200 77 170 65	2 3			+ 9 +15 +12	11
16	071846	33.2N 147.9E	700MB	2992		45 120 50	230 57 120 30	5 2			+13 +12	12
17	072105	33.6N 148.1E	700MB	3008		40 060 140	170 49 060 125	4 5			+14 +17 +12	12

TYPHOON MAC

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	140008	11.8N 136.5E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	140030	11.9N 136.5E	PCN 5		DMSP39		PGTW
3	140917	11.5N 134.9E	PCN 5		DMSP37		PGTW
4	141250	11.9N 134.7E	PCN 5		DMSP36		PGTW
5	141404	12.0N 134.2E	PCN 5		DMSP35		PGTW
6	142157	12.2N 133.6E	PCN 5	T0.0/0.0	DMSP37	INIT OBS	RPMK
7	142350	12.2N 133.0E	PCN 5	T1.0/1.0 /D1.0/24HRS	DMSP36		PGTW
8	151037	12.8N 131.6E	PCN 6		DMSP37		RPMK
9	151232	12.9N 130.8E	PCN 5		DMSP36		PGTW
* 10	151252	12.5N 130.0E	PCN 5		DMSP39		PGTW
11	151346	12.2N 131.9E	PCN 6		DMSP35		RODN
12	151527	12.2N 131.0E	PCN 5		DMSP35		RODN
13	152136	12.8N 129.1E	PCN 5	T0.5/0.5 /D0.5/24HRS	DMSP37		RPMK
14	152137	13.0N 129.6E	PCN 5		DMSP37		PGTW
15	152332	13.3N 129.0E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP36		PGTW
16	160133	13.5N 128.8E	PCN 5		DMSP39		PGTW
17	160227	13.6N 128.7E	PCN 5		DMSP35		PGTW
18	161017	13.4N 127.3E	PCN 5		DMSP37		PGTW
19	161017	13.9N 127.0E	PCN 6		DMSP37		RPMK
* 20	161214	13.2N 126.3E	PCN 5		DMSP36		PGTW
21	162117	14.1N 125.2E	PCN 6		DMSP37		PGTW
22	170114	13.6N 125.4E	PCN 5	T2.5/2.5 /D1.5/26HRS	DMSP39		PGTW
23	170114	13.6N 125.8E	PCN 5	T2.0/2.0 /D1.5/24HRS	DMSP39		RPMK
24	170957	13.9N 125.3E	PCN 5		DMSP37		PGTW
25	171355	13.9N 125.0E	PCN 5		DMSP39		RPMK
26	171356	13.6N 125.2E	PCN 5		DMSP39		RODN
27	172238	13.8N 124.4E	PCN 6		DMSP37		RPMK
28	180038	13.6N 123.8E	PCN 5	T3.5/3.5-/D1.0/23HRS	DMSP36		PGTW
29	180237	13.7N 123.5E	PCN 3	T3.5/3.5 /D1.5/24HRS	DMSP39		RPMK
30	180237	13.6N 123.4E	PCN 3	T3.5/3.5	DMSP39	INIT OBS	RODN
31	181118	13.9N 122.3E	PCN 4		DMSP37		RPMK
32	181118	13.3N 122.7E	PCN 6		DMSP37		RODN
33	181320	13.2N 122.2E	PCN 5		DMSP36		PGTW
34	181336	13.2N 122.3E	PCN 5		DMSP39		RPMK
35	181337	13.3N 122.2E	PCN 5		DMSP39		PGTW
36	182218	13.7N 121.5E	PCN 6		DMSP37		RPMK
37	182218	13.5N 121.4E	PCN 6		DMSP37		PGTW
38	190020	13.6N 121.1E	PCN 5	T2.5/3.5+/W1.0/24HRS	DMSP36		PGTW
39	190218	13.8N 120.7E	PCN 5	T2.5/3.0 /W1.0/24HRS	DMSP39		RPMK
40	190218	13.2N 120.8E	PCN 5	T2.5/3.5 /W1.0/24HRS	DMSP39		RODN
* 41	191058	13.7N 120.6E	PCN 6		DMSP37	PSBL 2ND CNTR AT 153N 1206E	RPMK
* 42	191058	13.7N 119.7E	PCN 5		DMSP37		RODN
* 43	191302	13.5N 118.8E	PCN 5		DMSP36		PGTW
* 44	191313	13.2N 118.6E	PCN 5		DMSP39		RODN
* 45	191317	13.7N 119.3E	PCN 5		DMSP39		RPMK
* 46	191318	13.5N 118.8E	PCN 5		DMSP39		PGTW
* 47	192157	14.5N 118.4E	PCN 5		DMSP37		PGTW
* 48	192157	14.7N 117.8E	PCN 5		DMSP37		RODN
* 49	192157	13.9N 118.2E	PCN 6		DMSP37		RPMK
50	200144	16.5N 118.8E	PCN 5	T1.0/2.0 /W1.5/24HRS	DMSP36		RODN
51	200159	16.8N 118.9E	PCN 3	T2.0/2.0 /W0.5/24HRS	DMSP39		RPMK
52	200159	16.9N 118.8E	PCN 3	T1.5/2.5 /W1.0/24HRS	DMSP35		PGTW
53	201038	17.5N 118.5E	PCN 5		DMSP37		PGTW
54	201244	17.5N 117.7E	PCN 5		DMSP36		PGTW
55	201439	17.7N 117.5E	PCN 6		DMSP39		RPMK
56	201440	17.8N 118.3E	PCN 5		DMSP39		RODN
57	202137	18.4N 117.3E	PCN 5		DMSP37		PGTW
58	202319	18.4N 117.7E	PCN 5		DMSP37		RODN
59	210114	18.9N 117.3E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP39		RODN
60	210126	18.7N 117.7E	PCN 5	T1.0/2.0 /W1.0/24HRS	DMSP36		RPMK
61	210140	18.9N 117.2E	PCN 5	T1.0/1.5 /S0.0/24HRS	DMSP39		PGTW
* 62	210321	19.0N 116.8E	PCN 5		DMSP39		RODN
63	211018	19.4N 117.4E	PCN 5		DMSP37		PGTW
64	211421	19.4N 117.1E	PCN 5		DMSP39		RPMK
65	211421	19.4N 116.9E	PCN 5		DMSP39		RODN
* 66	212258	19.4N 116.6E	PCN 5	T2.0/2.0-/D1.0/24HRS	DMSP37		RPMK
67	212258	20.4N 116.4E	PCN 5		DMSP37		RODN
68	220108	20.4N 116.6E	PCN 5		DMSP36		RPMK
69	220302	20.8N 116.4E	PCN 5	T3.0/3.0 /D2.0/25HRS	DMSP39		RODN
70	220302	20.8N 116.1E	PCN 5		DMSP39		RPMK
71	221139	20.3N 116.8E	PCN 5		DMSP37	PSN BSD ON EXTRAP OF CLD LINES	RODN
72	221402	20.6N 116.9E			DMSP39		RODN
73	221402	21.3N 116.2E	PCN 5		DMSP39		RPMK
74	222238	21.4N 114.7E	PCN 5	T2.0/2.0 /S0.0/24HRS	DMSP37		RPMK
75	230050	21.4N 114.5E		T2.5/3.0 /W0.5/23HRS	DMSP36		RODN
76	230050	21.5N 114.5E	PCN 5	T2.5/2.5-	DMSP36	INIT OBS	PGTW
77	230243	21.5N 114.1E	PCN 3		DMSP39		RODN
78	230243	21.9N 113.9E	PCN 5		DMSP35		RPMK
79	231118	22.2N 113.4E	PCN 6		DMSP37		RPMK
80	231119	22.1N 113.9E	PCN 6		DMSP37		RODN
81	231342	22.1N 113.6E	PCN 5		DMSP39		RPMK
82	231343	22.6N 113.3E	PCN 6		DMSP39		RODN
83	231343	22.1N 113.8E	PCN 5		DMSP39		PGTW
84	232218	22.5N 112.8E			DMSP37		RKSO
85	240031	22.5N 112.9E	PCN 5		DMSP36		RPMK
86	240224	22.5N 112.8E	PCN 3	T1.5/2.5 /W1.0/24HRS	DMSP39		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	160503	13.7N 128.0E	700MB	3056	995	50 050 10	170 68 050 10	3 5			+16 +15 +11	2
2	170507	13.6N 125.6E	700MB	3043	984	90 110 30	160 58 090 40	5 5			+13 +11	4
3	170818	13.9N 125.5E	700MB	3054	994	90 360 30	100 52 340 30	5 20			+15 +14 + 8	4
4	180911	13.6N 122.9E	700MB	2961		40 360 75	090 65 360 50	2 4			+11 +15 + 9	6
5	181836	13.9N 121.9E	700MB	3039			330 45 230 25	3 5			+11 +11	7
6	182042	13.5N 121.7E	700MB	3044			350 27 250 50	3 5			+10 +11 +11	7
7	190929	14.7N 120.3E	700MB	3101		20 310 30	080 28 050 28	3 2			+10 +11 +11	9
8	200009	16.2N 119.1E	700MB	3109	1005	40 350 25		5 2			+11 + 4	10
9	200900	17.4N 118.8E	700MB	3087	1000	40 070 35	130 31 050 15	2 5			+11 +13 + 8	12
10	201933	17.9N 118.1E	700MB	3061			110 60 360 120	4 5			+12 +10	14
11	202151	18.1N 118.1E	700MB	3067	997	20 090 30	150 24 090 60	4 4			+12 +15 + 9	14
12	210619	19.1N 118.0E	700MB	3093	998	40 350 30	050 20 300 45	10 10				15
13	210906	19.2N 117.5E	1500FT		999	40 070 40	110 37 070 40	20 1			+26 +26 28	15
14	212100	21.0N 116.1E	1500FT									16

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TODFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	171859	13.7N 124.3E	ACFT							54WR5
2	172300	13.8N 123.9E	LAND				10210 /////		14.1N 123.0E	98440
3	172300	14.5N 123.5E	LAND				4//// /////		16.3N 120.6E	98321
4	180900	13.3N 122.9E	LAND				202// 52118		14.1N 123.0E	98440
5	181030	13.7N 122.9E	LAND				25/// /////		22.3N 114.2E	45005
6	181100	13.6N 122.8E	LAND				1048/ /////		16.3N 120.6E	98321
7	181100	13.7N 122.9E	LAND				25/// /////		16.3N 120.6E	98321
8	181200	13.5N 122.7E	LAND				//56/ /////		16.3N 120.6E	98321
9	181300	13.6N 122.7E	LAND				1042/ /////		16.3N 120.6E	98321
10	181500	13.6N 122.6E	LAND				1056/ /////		16.3N 120.6E	98321
11	181530	13.5N 122.3E	LAND				302// 727//		14.1N 123.0E	98440
12	181600	13.6N 122.5E	LAND				1173/ 52705		16.3N 120.6E	98321
13	182145	13.9N 121.6E	LAND	FAIR	CIRCULAR	15			15.2N 120.6E	98327
14	182230	13.9N 121.5E	LAND	FAIR	CIRCULAR	15			15.2N 120.6E	98327
15	182255	13.9N 121.4E	LAND	FAIR	CIRCULAR	15			15.2N 120.6E	98327
16	191205	15.1N 120.5E	LAND	POOR	CIRCULAR	5			15.2N 120.6E	98327
17	191300	15.2N 120.4E	LAND	POOR	CIRCULAR	5			15.2N 120.6E	98327
18	191300	14.7N 120.2E	LAND				4//// /////		16.3N 120.6E	98321
19	191335	15.3N 120.4E	LAND	POOR		5			15.2N 120.6E	98327
20	191400	15.0N 120.0E	LAND				4//// /////		16.3N 120.6E	98321
21	192200	16.0N 119.4E	LAND				104// 104//		16.3N 120.6E	98321
22	200000	16.3N 119.0E	LAND				105// /////		16.3N 120.6E	98321
23	200040	16.9N 118.5E	LAND				1266/ 52912		16.3N 120.6E	98321
24	200100	16.6N 118.8E	LAND				1051/ 53218		16.3N 120.6E	98321
25	200100	17.5N 118.5E	LAND				106// 5////		16.3N 120.6E	98321
26	200130	16.7N 118.7E	LAND				1042/ 42916		16.3N 120.6E	98321
27	200300	16.2N 118.9E	LAND				1051/ 630//		16.3N 120.6E	98321
28	200500	17.0N 118.6E	LAND				1089/ 6////		16.3N 120.6E	98321
29	200700	17.2N 118.5E	LAND				10932 5////		16.3N 120.6E	98321
30	200800	17.3N 118.7E	LAND				1068/ 5////		16.3N 120.6E	98321
31	200900	17.3N 118.7E	LAND				1061/ 5////		16.3N 120.6E	98321
32	201200	17.6N 118.4E	LAND				4561/ 6////		16.3N 120.6E	98321
33	220200	20.6N 115.8E	LAND				6///2 /////		22.3N 114.2E	45004
34	220200	20.5N 115.9E	LAND				6///2 /////		22.3N 114.2E	45004
35	220600	20.5N 116.0E	LAND				65/// /////		22.3N 114.2E	45004
36	220900	20.9N 115.9E	LAND				60/// /////		22.3N 114.2E	45004
37	221200	20.9N 115.5E	LAND				60/// /////		22.3N 114.2E	45004
38	221300	20.9N 115.5E	LAND				50913 5//00		22.3N 114.2E	45004
39	221400	20.9N 115.5E	LAND				40913 54400		22.3N 114.2E	45004
40	222100	21.2N 114.7E	LAND				40523 53106		22.3N 114.2E	45004
41	222300	21.4N 114.6E	LAND				40523 53007		22.3N 114.2E	45004
42	230000	21.4N 114.5E	LAND				40523 53001		22.3N 114.2E	45004
43	230200	21.4N 114.3E	LAND				50562 32906		22.3N 114.2E	45004
44	230300	21.6N 114.1E	LAND				5///2 52906		22.3N 114.2E	45004
45	230600	21.7N 113.8E	LAND				5///2 52906		22.3N 114.2E	45004
46	230900	21.7N 113.7E	LAND				5///2 52903		22.3N 114.2E	45004
47	231200	21.9N 113.9E	LAND				6///2 /////		22.3N 114.2E	45004
48	231500	22.2N 113.8E	LAND				///// /////		22.3N 114.2E	45004
49	231800	22.3N 113.3E	LAND				6//// /////		22.3N 114.2E	45004
50	232000	22.3N 113.0E	LAND				50912 /////		22.3N 114.2E	45004
51	232100	22.3N 113.0E	LAND				5//// /////		22.3N 114.2E	45004
52	232200	22.3N 113.0E	LAND				6//// /////		22.3N 114.2E	45004
53	240000	22.3N 112.7E	LAND				5//// /////		22.3N 114.2E	45004
54	240100	22.3N 112.6E	LAND				5//// /////		22.3N 114.2E	45004
55	240300	22.3N 112.6E	LAND				6//// /////		22.3N 114.2E	45005

TROPICAL STORM NANCY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	182218	19.3N 111.9E	PCN 6		DMSP37		PGTW
2	182218	19.1N 111.5E	PCN 6		DMSP37		RPMK
3	190218	18.9N 111.2E	PCN 5	T1.0/1.0	DMSP39	INIT 3dS	RPMK
4	190218	18.0N 112.0E	PCN 5	T3.0/3.0	DMSP39	INIT 3dS	RODN
5	191058	18.9N 110.8E	PCN 4		DMSP37		RPMK
6	191058	18.2N 110.7E	PCN 3		DMSP37	EYE BANDING POSSIBLE	RODN
7	191459	19.1N 110.4E	PCN 3		DMSP39		RPMK
8	191459	18.5N 110.5E	PCN 4		DMSP39		KGWC
9	192338	18.6N 109.5E	PCN 6		DMSP37		KGWC
10	192339	19.0N 110.0E	PCN 4	T3.0/3.0 /D2.0/21HRS	DMSP39		RPMK
11	200144	18.0N 109.4E		T3.0/3.0 /S0.0/24HRS	DMSP36		RODN
12	200340	19.4N 109.8E	PCN 3		DMSP39		RPMK
13	201219	18.7N 109.2E	PCN 4		DMSP37		RPMK
14	201219	18.9N 108.6E	PCN 4		DMSP37		KGWC
15	201439	18.4N 108.7E	PCN 4		DMSP39		RPMK
16	201440	19.4N 108.4E	PCN 3		DMSP39		RODN
17	202319	17.5N 108.3E	PCN 5		DMSP37		RODN
18	202319	18.2N 108.6E	PCN 5	T2.5/3.0 /W0.5/24HRS	DMSP37		RPMK
19	210108	17.6N 107.0E	PCN 5		DMSP36		RPMK
20	210126	18.2N 108.2E	PCN 5		DMSP36		RPMK
21	210321	17.7N 107.9E	PCN 3	T4.0/4.0-/D1.0/26HRS	DMSP39		RODN
22	210321	18.1N 108.1E	PCN 5		DMSP39		RPMK
23	211159	18.1N 108.1E	PCN 4		DMSP37		RPMK
24	211421	17.9N 107.4E	PCN 3		DMSP39		RODN
25	211421	17.9N 107.9E	PCN 3		DMSP39		RPMK
26	212258	17.3N 107.3E	PCN 5		DMSP37		RODN
27	212258	17.6N 107.9E	PCN 5	T1.5/2.5 /W1.0/24HRS	DMSP37		RPMK
28	220302	17.3N 107.2E	PCN 3	T4.0/4.0-/S0.0/24HRS	DMSP39		RODN
29	220302	17.5N 106.9E	PCN 3		DMSP39		RPMK
30	221139	16.4N 106.6E	PCN 3		DMSP37		RODN
31	221139	16.8N 106.6E	PCN 6		DMSP37		RPMK
32	221402	16.4N 106.5E	PCN 5		DMSP39		RODN
33	221402	16.4N 106.1E	PCN 5		DMSP39		RPMK

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	171200	16.0N 113.0E	15	120	
2	180000	17.5N 111.5E	15	90	
3	181200	19.0N 111.5E	15	60	
4	190000	18.0N 111.2E	20	120	
5	191200	18.3N 110.7E	25	120	
6	200000	18.5N 109.5E	25	50	
7	201200	18.1N 109.5E	10	20	
8	210000	17.2N 108.9E	20	70	
9	211200	17.0N 108.0E	5	20	
10	220000	17.0N 107.0E	5	70	
11	220600	16.5N 108.0E	25	120	
12	221200	17.0N 107.0E	5	120	
13	230000	16.3N 106.0E	16	120	
14	240000	15.0N 104.0E	17	120	
15	250000	15.7N 102.5E	10	60	

TYPHOON OWEN

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
* 1	210140	12.7N 139.9E	PCN 5	T1.0/1.0	DMSP39	INIT OBS	PGTW
2	211226	11.8N 130.4E	PCN 5		DMSP36		PGTW
* 3	212117	10.4N 136.9E	PCN 5		DMSP37		PGTW
* 4	212326	11.3N 136.6E	PCN 5	T2.0/2.0 /D1.0/23HRS	DMSP36		PGTW
* 5	220120	11.0N 136.7E	PCN 5		DMSP39		PGTW
* 6	220957	11.5N 137.2E	PCN 5		DMSP37		PGTW
* 7	221208	11.5N 136.4E	PCN 5		DMSP36		PGTW
* 8	221220	11.6N 136.5E	PCN 5		DMSP39		PGTW
* 9	221220	11.5N 136.2E	PCN 5		DMSP39		RODN
* 10	222057	12.0N 135.9E	PCN 5		DMSP37		PGTW
* 11	222308	12.0N 136.7E	PCN 5		DMSP36		PGTW
12	230102	11.8N 135.4E	PCN 5	T0.0/0.0	DMSP39	INIT OBS	RPMK
13	230102	12.4N 136.5E	PCN 5	T2.0/2.0 /S0.0/26HRS	DMSP39		PGTW
14	230937	12.4N 135.6E	PCN 6		DMSP37		PGTW
15	231201	13.7N 136.2E	PCN 5		DMSP39		PGTW
16	232036	14.6N 135.5E	PCN 5		DMSP37		PGTW
17	240031	16.6N 134.7E	PCN 5	T2.0/2.0 /D2.0/23HRS	DMSP36		RPMK
18	240032	16.7N 135.0E	PCN 5		DMSP36		PGTW
19	240042	16.9N 135.0E	PCN 3	T3.0/3.0 /D1.0/24HRS	DMSP39		PGTW
20	240043	16.8N 134.7E	PCN 3	T3.0/3.0	DMSP39	INIT OBS	RODN
21	240917	18.2N 133.7E	PCN 5		DMSP37		PGTW
22	240917	18.7N 133.3E	PCN 5		DMSP37		RODN
23	241313	19.4N 133.2E	PCN 3		DMSP36		RPMK
24	241314	19.3N 132.7E	PCN 5		DMSP36		PGTW
25	241324	19.2N 132.7E	PCN 5		DMSP39		PGTW
26	241324	19.1N 133.1E	PCN 5		DMSP39		RODN
27	242157	20.9N 131.2E	PCN 3	T4.0/4.0 /D2.0/22HRS	DMSP37		RPMK
28	242158	20.7N 130.9E	PCN 3		DMSP37		PGTW
29	242158	20.9N 130.9E	PCN 3		DMSP37		RODN
30	250014	21.0N 130.8E	PCN 3	T4.5/4.5 /D1.5/24HRS	DMSP36		PGTW
31	250205	21.3N 130.6E	PCN 3		DMSP39		PGTW
32	250205	21.2N 130.5E	PCN 1	T4.5/4.5 /D1.5/25HRS	DMSP39		RODN
33	251038	21.9N 129.7E	PCN 1		DMSP37		PGTW
34	251039	21.3N 129.7E	PCN 1		DMSP37		RODN
35	251256	22.0N 129.8E	PCN 1		DMSP36		PGTW
36	251304	24.3N 129.9E	PCN 2		DMSP39		RPMK
37	251305	22.0N 129.7E	PCN 1		DMSP39		RODN
38	252137	23.1N 129.2E	PCN 1		DMSP37		PGTW
39	252137	22.9N 129.2E	PCN 1	T5.5/5.5 /D1.5/24HRS	DMSP37		RPMK
40	260146	23.3N 129.9E	PCN 1		DMSP39		RPMK
41	260146	23.3N 129.1E	PCN 1	T6.0/6.0 /D1.5/24HRS	DMSP39		RODN
42	260146	23.3N 129.0E	PCN 1	T6.0/6.0 /D1.5/25HRS	DMSP39		PGTW
43	261018	23.8N 129.2E	PCN 1		DMSP37		PGTW
44	261018	23.8N 129.2E	PCN 1		DMSP37		RODN
45	261238	24.0N 129.3E	PCN 1		DMSP36		PGTW
46	261238	23.7N 129.3E	PCN 1		DMSP37		RODN
47	261246	23.8N 129.1E	PCN 1		DMSP39		RPMK
48	261246	23.9N 129.3E	PCN 3		DMSP39	EYE NOT VSBL	PGTW
49	261246	24.0N 129.2E	PCN 3		DMSP39		RKSO
50	262117	24.5N 129.5E	PCN 1		DMSP37		PGTW
51	262117	24.3N 129.5E	PCN 1		DMSP37		RODN
52	262338	24.7N 129.5E	PCN 1	T5.0/6.0 /W1.0/22HRS	DMSP36		PGTW
53	262338	24.6N 129.4E	PCN 1	T5.0/6.0 /W1.0/22HRS	DMSP36		RODN
54	270127	24.8N 129.5E	PCN 1	T6.0/6.0 /D0.5/24HRS	DMSP39		RPMK
55	270127	25.0N 129.5E	PCN 1		DMSP39		PGTW
56	270127	24.9N 129.3E	PCN 1		DMSP39		RODN
57	270958	25.7N 129.6E	PCN 1		DMSP37		RODN
58	270958	25.9N 129.8E	PCN 1		DMSP37		PGTW
59	271220	26.1N 129.8E	PCN 1		DMSP36		PGTW
60	271226	26.0N 129.9E	PCN 1		DMSP39		RPMK
61	271227	26.1N 129.6E	PCN 1		DMSP39		PGTW
62	271227	25.8N 129.5E	PCN 1		DMSP39		RODN
63	272057	26.7N 129.9E	PCN 1		DMSP37		PGTW
64	272057	26.5N 130.0E	PCN 1		DMSP37		RODN
65	272320	27.0N 129.8E	PCN 1	T4.0/5.0 /W1.0/24HRS	DMSP36		PGTW
66	280108	27.2N 129.8E	PCN 1		DMSP39		PGTW
67	280108	27.1N 129.5E	PCN 1	T4.5/5.0 /W0.5/26HRS	DMSP39		RODN
68	280937	27.7N 129.7E	PCN 1		DMSP37		PGTW
69	281119	27.4N 129.8E	PCN 1		DMSP37		RODN
70	281202	27.6N 129.6E	PCN 1		DMSP36		PGTW
71	281207	27.5N 129.6E	PCN 1		DMSP39		RKSO
72	281207	27.5N 129.3E	PCN 1		DMSP39		PGTW
73	282037	27.8N 129.6E	PCN 2		DMSP37		PGTW
74	290026	30.7N 131.8E	PCN 3	T4.0/4.5 /W0.5/22HRS	DMSP36		RKSO
75	290043	28.0N 129.9E	PCN 1	T4.5/4.5 /S0.0/24HRS	DMSP36		RODN
76	290230	28.2N 129.7E	PCN 1	T4.5/4.5	DMSP39	INIT OBS	RKSO
77	291058	28.8N 130.2E	PCN 1		DMSP37		RPMK
78	291325	29.2N 130.4E	PCN 1		DMSP36		PGTW
79	291325	28.9N 130.0E	PCN 1		DMSP36		RODN
80	291330	29.2N 130.5E	PCN 1		DMSP39		RKSO
81	292158	30.4N 131.3E	PCN 3	T4.0/4.0	DMSP37	INIT OBS	PGTW
82	292158	30.3N 131.3E	PCN 3		DMSP37		RODN
83	300211	31.5N 132.0E	PCN 3	T4.5/4.5	DMSP39	INIT OBS	RPMK
84	300211	31.4N 132.2E	PCN 3		DMSP39		PGTW
85	301129	34.0N 135.5E	PCN 6		DMSP39		PGTW
86	301311	34.5N 136.2E	PCN 5		DMSP39		RPMK
87	301311	34.6N 135.8E	PCN 5		DMSP39		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	220315	12.6N 138.5E	1500FT		999	15 250 55	150 16 100 65	5 10			+24 +23 +22 29	1
2	220833	12.3N 137.8E	1500FT		1002	15 290 30	060 20 330 30	5 10			+26 +26 +25 27	2
* 3	221904	11.2N 137.2E	700MB	3077			040 28 310 35	5 5				3
4	222213	12.2N 137.0E	1500FT		1002	15 060 30	170 18 060 25	5 10			+26 +25 +23	3
5	230630	13.3N 136.7E	1500FT		999	70 150 25	160 60 180 15	5 15			+25 +23	4
6	230901	13.3N 136.4E	700MB	3091	1002	15 0	240 33 210 75	5 35			+ 9 + 8	4
7	231923	14.9N 135.8E	700MB	3015			190 45 120 150	5 10			+11 +10	5
8	232216	16.2N 135.4E	700MB	2997	990	60 090 8	170 46 110 90	5 2	CIRCULAR	20	+12 +13 +10	5
9	240609	17.5N 134.2E	700MB	3022		65 100 45	140 50 080 100	1 3			+13 +10	6
10	240858	18.5N 133.8E	700MB	3001		45 090 30	140 65 050 50	3 2	CIRCULAR	8	+11 +15 +10	6
11	241910	20.5N 131.8E	700MB	2827			180 70 100 30	5 1			+18 + 4	7
12	242155	20.6N 131.2E	700MB	2833	967	90 040 5	130 63 040 90	5 5			+18 +19 + 6	7
13	250733	21.5N 129.8E	700MB	2701		90 360 8	120 75 080 12	5 5				8
14	250904	21.5N 129.8E	700MB	2655	949	90 110 8	020 79 340 5	5 5	CIRCULAR	15	+18 +15 +14	8
15	252131	22.9N 129.4E	700MB	2375	918	90 050 3	110 12 8	2 1	CIRCULAR	10	+13 +20 +13	9
16	260033	23.2N 129.0E	700MB	2403		100 250 3	310 95 250 8	2 1				9
17	260222	23.2N 129.0E	700MB	2416	922	90 330 3	020 90 330 10	2 1	CIRCULAR	8	+15 +18 +15	9
18	260330	23.6N 129.2E	700MB	2382	919	90 250 15	300 95 250 5	5 2	CIRCULAR	12	+15 +17 + 7	10
19	262140	24.5N 129.4E	700MB	2594	942	90 170 18	300 84 230 15	5 10	CONCENTRIC	25 180	+15 +16 +16	11
20	270240	24.9N 129.6E	700MB	2632		90 270 72	350 60 270 30	5 10	CIRCULAR	12	+16 +17	11
21	270848	25.5N 129.7E	700MB	2599		70 190 35	250 70 190 35	2 1	CIRCULAR	20	+14 +17	12
22	280112	27.1N 129.6E	700MB	2698	953	50 230 30	310 61 230 90	5 5	ELLIPTICAL	20 10 030	+16 +15 +15	13
23	280315	27.0N 129.7E	700MB	2697		50 090 120	360 65 270 30	5 5	ELLIPTICAL	35 15 220	+16 +16 +16	13
24	280414	25.9N 129.9E	700MB	2694		50 040 50	130 78 040 50	5 5			+16 +16	13
25	280835	27.4N 129.8E	700MB	2701	954	70 090 30	180 81 090 60	5 3	ELLIPTICAL	25 15 120	+16 +17 +13	14
26	282147	27.9N 129.8E	700MB	2682	952	65 040 30	120 75 020 60	2 1	CIRCULAR	2	+16 +17	15
27	290048	28.0N 129.7E	700MB	2683		70 250 30	360 70 260 60	2 1				15
28	290218	28.0N 129.7E	700MB	2685		65 050 120	190 75 090 15	2 1	CIRCULAR	12	+14 +15	15
29	290642	28.8N 129.8E	700MB	2689		40 090 120	150 64 110 70	10 5	CIRCULAR		+17 +15	16
30	290848	28.5N 130.3E	700MB	2686	952	65 270 40	360 64 270 20	5 5	ELLIPTICAL	15 10 310	+14 +18 +15	16
31	292142	30.4N 131.1E	700MB	2702	956	60 040 30	150 74 040 60	5 5	CIRCULAR	9	+15 +12	17
32	300006	30.8N 131.4E	700MB	2707		90 160 15	230 100 160 15	5 5	CIRCULAR		+16 +12	17
33	300200	31.2N 131.8E	700MB	2702	954	100 250 20	160 78 070 40	5 5	CIRCULAR	10	+17 +18 +10	17
34	300821	32.9N 133.4E	700MB	2694	957	90 310 5	270 60 360 12	5 5			+16 +17 + 6	18

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	252100	22.9N 129.3E	LAND				35//6 43316		26.2N 127.8E	47937
2	252200	23.1N 129.3E	LAND				34//2 53411		26.2N 127.8E	47937
3	252300	23.2N 129.2E	LAND				34//2 53411		26.2N 127.8E	47937
4	252300	23.3N 129.2E	LAND	POOR					26.3N 126.8E	47929
5	260000	23.2N 129.2E	LAND				55//3 53308		26.2N 127.8E	47937
6	260100	23.1N 129.1E	LAND				65//3 52005		26.2N 127.8E	47937
7	260100	23.2N 129.0E	LAND	GOOD		30			~~26.3N 126.8E~~	~~47929~~
8	260200	23.3N 129.0E	LAND				65//3 53416		26.2N 127.8E	47937
9	260200	23.3N 129.0E	LAND	POOR				EYE MOVG 3225	26.1N 127.7E	47937
10	260300	23.5N 129.0E	LAND				65//2 501//		26.2N 127.8E	47937
11	260300	23.3N 129.0E	LAND	GOOD		30			26.3N 125.8E	47929
12	260400	24.5N 128.0E	LAND	POOR		30		EYE MOVG 3610	26.1N 127.7E	47937
13	260500	23.5N 129.0E	LAND				35//1 70204		26.2N 127.8E	47937
14	260500	24.5N 128.1E	LAND	GOOD		30		EYE MOVG 3210	26.1N 127.7E	47937
15	260600	23.5N 129.1E	LAND	GOOD		30			26.1N 127.7E	47937
16	260500	23.4N 129.0E	LAND				55//1 70202		26.2N 127.8E	47937
17	260700	23.7N 129.2E	LAND				35/41 70304		26.2N 127.8E	47937
18	260700	23.7N 129.3E	LAND	GOOD		30			26.1N 127.7E	47937
19	260800	23.6N 129.1E	LAND	GOOD		30			26.1N 127.7E	47937
20	260900	23.6N 129.2E	LAND				20411 70603		26.2N 127.8E	47937
21	260900	23.7N 129.2E	LAND	GOOD		30		EYE MOVG 0205	26.1N 127.7E	47937
22	261000	23.6N 129.2E	LAND	POOR				EYE MOVG 0205	26.1N 127.7E	47937
23	261000	23.7N 129.1E	LAND				20//1 53306		26.2N 127.8E	47937
24	261100	23.8N 129.3E	LAND				55/41 70504		26.2N 127.8E	47937
25	261100	23.7N 129.2E	LAND	POOR				EYE STNR	26.1N 127.7E	47937
26	261200	23.9N 129.2E	LAND	POOR				EYE STNR	26.1N 127.7E	47937
27	261200	23.9N 129.2E	LAND				25/11 73605		26.2N 127.8E	47937
28	261300	24.0N 129.2E	LAND	GOOD		20		EYE MOVG 0205	26.1N 127.7E	47937
29	261300	24.0N 129.2E	LAND				55/11 70106		26.2N 127.8E	47937
30	261400	24.1N 129.3E	LAND				55/11 73606		26.2N 127.8E	47937
31	261400	24.0N 129.3E	LAND	GOOD		20		EYE MOVG 0205	26.1N 127.7E	47937
32	261500	24.2N 129.3E	LAND	GOOD		20		EYE MOVG 3610	26.1N 127.7E	47937
33	261500	24.2N 129.2E	LAND				55/11 70105		26.2N 127.8E	47937
34	261600	24.3N 129.2E	LAND				55/11 70105		26.2N 127.8E	47937
35	261700	24.3N 129.3E	LAND				31/11 73603		26.2N 127.8E	47937
36	261700	24.3N 129.3E	LAND	GOOD		20		EYE MOVG 3610	26.1N 127.7E	47937
37	261800	24.3N 129.3E	LAND	GOOD		20		EYE MOVG 3610	26.1N 127.7E	47937
38	261800	24.4N 129.3E	LAND				3//11 70204		26.2N 127.8E	47937
39	261900	24.5N 129.4E	LAND				3//11 70306		26.2N 127.8E	47937

40	261900	24.4N	129.3E	LAND	GOOD	20		EYE MOVG 0510	26.1N	127.7E	47937
41	262000	24.5N	129.4E	LAND	GOOD	20		EYE MOVG 0510	26.1N	127.7E	47937
42	262000	24.5N	129.4E	LAND			3//11 70205		26.2N	127.8E	47937
43	262100	24.6N	129.5E	LAND			5//11 70406		26.2N	127.8E	47937
44	262100	24.6N	129.5E	LAND	FAIR	65		EYE MOVG 0515	26.1N	127.7E	47937
45	262200	24.7N	129.5E	LAND	FAIR	65		EYE MOVG 0515	26.1N	127.7E	47937
46	262200	24.7N	129.5E	LAND			5//41 70204		26.2N	127.8E	47937
47	262300	24.9N	129.5E	LAND	FAIR	65		EYE MOVG 0515	26.1N	127.7E	47937
48	270000	24.9N	129.6E	LAND	GOOD	65		EYE MOVG 0515	26.1N	127.7E	47937
49	270000	24.9N	129.5E	LAND			6//41 73602		26.1N	127.7E	47937
50	270000	24.5N	129.5E	LAND			7//// /9997		28.4N	129.5E	47909
51	270100	25.0N	129.5E	LAND			6//11 73606		26.1N	127.7E	47937
52	270100	24.8N	129.6E	LAND			7//// 50211		28.4N	129.5E	47909
53	270100	25.0N	129.6E	LAND	GOOD	65		EYE MOVG 3620	26.1N	127.7E	47937
54	270200	25.1N	129.6E	LAND			65/// 53616		28.4N	129.5E	47909
55	270200	25.1N	129.6E	LAND	GOOD	65		EYE MOVG 3610	26.1N	127.7E	47937
56	270200	25.1N	129.5E	LAND			6//11 73602		26.1N	127.7E	47937
57	270300	25.2N	129.6E	LAND	GOOD	65		EYE MOVG 3610	26.1N	127.7E	47937
58	270300	25.2N	129.5E	LAND			6//11 53602		26.1N	127.7E	47937
59	270300	25.2N	129.6E	LAND			65/// 53608		28.4N	129.5E	47909
60	270400	25.4N	129.4E	LAND			6//41 73509		26.1N	127.7E	47937
61	270400	25.3N	129.6E	LAND			65/// 53608		28.4N	129.5E	47909
62	270400	25.2N	129.6E	LAND	GOOD	65		EYE MOVG 3610	26.1N	127.7E	47937
63	270500	25.4N	129.3E	LAND			6//41 73604		26.1N	127.7E	47937
64	270500	25.4N	129.6E	LAND			65/// 53603		28.4N	129.5E	47909
65	270510	25.5N	129.6E	LAND	GOOD				26.4N	127.83	47931
66	270535	25.5N	129.6E	LAND	GOOD				26.4N	127.8E	47931
67	270600	25.4N	129.6E	LAND			6///1 70205		26.1N	127.7E	47937
68	270600	25.4N	129.6E	LAND			65/// 50000		28.4N	129.5E	47909
69	270610	25.7N	129.5E	LAND	GOOD				26.4N	127.8E	47931
70	270630	25.7N	129.5E	LAND	GOOD				26.4N	127.8E	47931
71	270700	25.5N	129.6E	LAND			65/// 50108		28.4N	129.5E	47909
72	270700	25.5N	129.7E	LAND	GOOD	55		EYE MOVG 3610	26.1N	127.7E	47937
73	270700	25.5N	129.7E	LAND			55/11 70605		26.1N	127.7E	47937
74	270710	25.7N	129.4E	LAND	GOOD				26.4N	127.8E	47931
75	270800	25.5N	129.7E	LAND	GOOD	50		EYE MOVG 3610	26.1N	127.7E	47937
76	270800	25.7N	129.7E	LAND			5//11 70206		26.1N	127.7E	47937
77	270800	25.5N	129.6E	LAND			65/// 53505		28.4N	129.5E	47909
78	270810	25.7N	129.3E	LAND	GOOD				26.4N	127.8E	47931
79	270840	25.7N	129.3E	LAND	GOOD				26.4N	127.8E	47931
80	270900	25.7N	129.7E	LAND			6//41 70205		26.1N	127.7E	47937
81	270900	25.9N	129.7E	LAND			65/// 50208		28.4N	129.5E	47909
82	270900	25.7N	129.8E	LAND	GOOD	60		EYE MOVG 3615	26.1N	127.7E	47937
83	270910	25.9N	129.4E	LAND	GOOD				26.4N	127.8E	47931
84	270940	22.9N	129.4E	LAND	GOOD				26.4N	127.8E	47931
85	271000	25.8N	129.7E	LAND			65/// 50000		28.4N	129.5E	47909
86	271000	25.9N	129.8E	LAND	GOOD	60		EYE MOVG 3610	26.1N	127.7E	47937
87	271000	25.7N	129.7E	LAND			6//41 73604		26.1N	127.7E	47937
88	271035	25.9N	129.6E	LAND	POOR				26.4N	127.8E	47931
89	271100	25.8N	129.8E	LAND	GOOD	60		EYE MOVG 3610	26.1N	127.7E	47937
90	271100	25.8N	129.8E	LAND			2//41 70502		26.1N	127.7E	47937
91	271100	25.9N	129.8E	LAND			65/// 50602		28.4N	129.5E	47909
92	271200	26.0N	129.7E	LAND	GOOD	60		EYE MOVG 3620	26.1N	127.7E	47937
93	271200	25.9N	129.8E	LAND			6//11 70104		26.1N	127.7E	47937
94	271300	26.1N	129.7E	LAND			5//11 73507		26.1N	127.7E	47937
95	271300	26.0N	129.7E	LAND	GOOD	60		EYE MOVG 3615	26.1N	127.7E	47937
96	271400	26.2N	129.7E	LAND	GOOD	60		EYE MOVG 3515	26.1N	127.7E	47937
97	271400	26.2N	129.6E	LAND			5//11 73309		26.1N	127.7E	47937
98	271400	26.1N	129.6E	LAND			65/// 53011		28.4N	129.5E	47909
99	271500	26.2N	129.7E	LAND			6///1 73505		26.1N	127.7E	47937
100	271500	26.3N	129.6E	LAND			65/// 53608		28.4N	129.5E	47909
101	271600	26.3N	129.7E	LAND			6///1 73605		26.1N	127.7E	47937
102	271600	26.5N	129.6E	LAND			65/// 53611		28.4N	129.5E	47909
103	271600	26.5N	129.7E	LAND	POOR			EYE MOVG 3615	26.1N	127.7E	479 R
104	271700	26.4N	129.7E	LAND			65/// 51104		28.4N	129.5E	47909
105	271700	26.5N	129.8E	LAND	POOR			EYE MOVG 0410	26.1N	127.7E	47937
106	271700	26.4N	129.8E	LAND			6///1 70204		26.1N	127.7E	47937
107	271800	26.6N	129.8E	LAND	POOR			EYE MOVG 0510	26.1N	127.7E	47937
108	271800	26.6N	129.7E	LAND			6///1 70106		26.1N	127.7E	47937
109	271800	26.5N	129.7E	LAND			65/// 53603		28.4N	129.5E	47909
110	271900	26.6N	129.7E	LAND			65/// 53203		28.4N	129.5E	47909
111	271900	26.6N	129.6E	LAND			6///1 73506		26.1N	127.7E	47937
112	271900	26.6N	129.8E	LAND	POOR			EYE STNR	26.3N	125.8E	47929
113	272000	26.7N	129.7E	LAND			6//11 73506		26.1N	127.7E	47937
114	272000	26.6N	129.7E	LAND	POOR			EYE MOVG 0305	27.4N	128.7E	47942
115	272100	26.7N	129.8E	LAND	POOR			EYE MOVG 0310	27.4N	128.7E	47942
116	272100	26.8N	129.7E	LAND			5//11 73605		26.1N	127.7E	47937
117	272200	26.8N	129.8E	LAND			65/// 50205		28.4N	129.5E	47909
118	272200	26.9N	129.8E	LAND	FAIR	40		EYE MOVG 3610	27.4N	128.7E	47942
119	272300	27.0N	129.8E	LAND	GOOD	30		EYE MOVG 3615	27.4N	128.7E	47942
120	272300	27.0N	129.8E	LAND			65/// 53611		28.4N	129.5E	47909
121	280000	27.0N	129.8E	LAND			65/// 50000		28.4N	129.5E	47909
122	280000	27.1N	129.8E	LAND	GOOD	45		EYE MOVG 3610	27.4N	128.7E	47942
123	280035	27.0N	129.3E	LAND	GOOD				26.4N	127.8E	47931
124	280110	27.3N	129.9E	LAND	FAIR				26.4N	127.8E	47931
125	280135	27.4N	129.6E	LAND	FAIR				26.4N	127.8E	47931
126	280200	27.1N	129.6E	LAND			65/// 53108		28.4N	129.5E	47909

127	280210	27.4N	129.6E	LAND	FAIR
128	280210	27.3N	129.7E	LAND	GOOD
129	280300	27.1N	129.6E	LAND	
130	280300	27.2N	129.8E	LAND	GOOD
131	280310	27.5N	129.9E	LAND	POOR
132	280400	27.2N	129.7E	LAND	GOOD
133	280400	27.2N	129.7E	LAND	
134	280400	27.1N	129.6E	LAND	
135	280500	27.3N	129.8E	LAND	
136	280500	27.3N	129.8E	LAND	
137	280500	27.3N	129.8E	LAND	GOOD
138	280600	27.4N	129.8E	LAND	GOOD
139	280600	27.4N	129.8E	LAND	
140	280700	27.4N	129.9E	LAND	
141	280700	27.4N	129.8E	LAND	GOOD
142	280800	27.4N	129.9E	LAND	GOOD
143	280800	27.4N	129.9E	LAND	
144	280835	27.4N	129.7E	LAND	GOOD
145	280900	27.5N	129.9E	LAND	
146	280900	27.5N	129.9E	LAND	GOOD
147	280910	27.5N	129.8E	LAND	FAIR
148	280935	27.5N	129.8E	LAND	FAIR
149	281000	27.5N	129.9E	LAND	GOOD
150	281000	27.5N	129.9E	LAND	
151	281010	27.5N	129.5E	LAND	POOR
152	281035	27.5N	129.7E	LAND	GOOD
153	281100	27.6N	129.9E	LAND	GOOD
154	281110	27.5N	129.7E	LAND	FAIR
155	281200	27.5N	129.8E	LAND	
156	281210	27.6N	129.9E	LAND	GOOD
157	281300	27.5N	129.8E	LAND	
158	281330	27.5N	129.9E	LAND	GOOD
159	281400	27.5N	129.9E	LAND	GOOD
160	281400	27.4N	129.8E	LAND	
161	281535	27.6N	129.9E	LAND	GOOD
162	281600	27.6N	129.9E	LAND	
163	281615	27.6N	129.9E	LAND	GOOD
164	281700	27.6N	129.8E	LAND	
165	281700	27.7N	129.9E	LAND	GOOD
166	281800	27.9N	129.8E	LAND	GOOD
167	281900	27.9N	129.8E	LAND	
168	281915	27.9N	129.8E	LAND	GOOD
169	282000	27.9N	129.8E	LAND	
170	282100	27.9N	129.7E	LAND	
171	282110	27.9N	129.8E	LAND	GOOD
172	282200	27.9N	129.7E	LAND	
173	282200	27.9N	129.8E	LAND	GOOD
174	282300	27.9N	129.8E	LAND	
175	290000	28.1N	129.8E	LAND	GOOD
176	290000	28.0N	129.8E	LAND	
177	290100	28.1N	129.7E	LAND	GOOD
178	290200	28.1N	129.7E	LAND	
179	290200	28.1N	129.7E	LAND	GOOD
180	290300	28.2N	129.7E	LAND	
181	290300	28.2N	129.8E	LAND	GOOD
182	290400	28.3N	129.8E	LAND	GOOD
183	290400	28.3N	129.8E	LAND	
184	290500	28.4N	129.7E	LAND	
185	290500	28.4N	129.8E	LAND	GOOD
186	290520	28.4N	129.8E	LAND	FAIR
187	290600	28.5N	129.8E	LAND	
188	290610	28.5N	129.9E	LAND	GOOD
189	290700	28.5N	129.8E	LAND	GOOD
190	290700	28.6N	129.8E	LAND	GOOD
191	290700	28.6N	129.8E	LAND	
192	290700	28.6N	129.8E	LAND	
193	290800	28.6N	129.9E	LAND	
194	290800	28.6N	130.0E	LAND	GOOD
195	290800	28.6N	129.9E	LAND	GOOD
196	290800	28.7N	129.8E	LAND	
197	290900	28.7N	129.9E	LAND	
198	290900	28.7N	130.0E	LAND	
199	290900	28.7N	129.9E	LAND	GOOD
200	291000	28.8N	130.1E	LAND	
201	291000	28.7N	130.1E	LAND	GOOD
202	291000	28.8N	130.0E	LAND	
203	291100	28.9N	130.1E	LAND	
204	291100	28.8N	130.1E	LAND	GOOD
205	291100	28.8N	130.1E	LAND	GOOD
206	291100	28.9N	130.1E	LAND	
207	291200	29.0N	130.2E	LAND	GOOD
208	291200	29.0N	130.2E	LAND	
209	291200	29.0N	130.1E	LAND	
210	291300	29.1N	130.2E	LAND	
211	291300	29.1N	130.2E	LAND	
212	291400	29.2N	130.4E	LAND	GOOD
213	291400	29.2N	130.3E	LAND	
214	291400	29.1N	130.3E	LAND	GOOD
215	291400	29.2N	130.3E	LAND	
216	291500	29.3N	130.3E	LAND	GOOD
217	291500	29.3N	130.3E	LAND	
218	291500	29.4N	130.3E	LAND	
219	291500	29.4N	130.3E	LAND	GOOD
220	291600	29.5N	130.4E	LAND	
221	291600	29.5N	130.4E	LAND	
222	291600	29.5N	130.4E	LAND	GOOD
223	291700	29.6N	130.5E	LAND	GOOD
224	291700	29.7N	130.5E	LAND	
225	291700	29.7N	130.5E	LAND	GOOD
226	291700	29.7N	130.5E	LAND	
227	291800	29.9N	130.5E	LAND	GOOD
228	291800	29.9N	130.6E	LAND	

45		EYE MOVG 3510	
	65/// 53303		
40		EYE MOVG 3610	
40		EYE MOVG 3205	
	21871 70601		
	65/// 50203		
	20711 70502		
	65/// 50308		
50		EYE MOVG 3605	
50		EYE MOVG 3605	
	5//11 70204		
	65/// 50603		
40		EYE MOVG 3605	
40		EYE MOVG 0305	
	65/// 53504		
	55/// 50103		
20		EYE STNR	
25		EYE MOVG 0505	
	55/// 53604		
25		EYE MOVG 3610	
	55/// 52004		
25		EYE STNR	
	55/// 52003		
25		EYE MOVG 3205	
30		EYE MOVG 3605	
	55/// 51203		
30		EYE MOVG 3605	
	55/// 53404		
30		EYE STNR	
	55/// -53302		
30		EYE STNR	
30		EYE MOVG 3610	
	55/// 53604		
30		EYE STNR	
	55/// 53403		
	45/// 53102		
30		EYE STNR	
	55/// 53605		
30		EYE STNR	
	55/// 50903		
30		EYE MOVG 3610	
	55/// 53405		
30		EYE MOVG 3210	
	55//2 53504		
30		EYE MOVG 3605	
	10382 50205		
30		EYE MOVG 3605	
30		EYE MOVG 3615	
	10412 50105		
	11512 53608		
30		EYE MOVG 3610	
		EYE STNR	TAKAHATA
	11322 50208		
20		EYE STNR	TAKAHATA
20		EYE STNR	TAKAHATA
30		EYE MOVG 3610	
	5///1 5////		
	11312 53605		
	11312 50405		
30		EYE MOVG 3610	
25		EYE MOVG 0310	TAKAHATA
	5///1 53505		
	5///1 50505		
	11412 50605		
25		EYE MOVG 0310	TAKAHATA
	11412 50505		
20		EYE MOVG 0820	TAKAHATA
	5///1 50508		
	11532 50108		
20		EYE MOVG 0215	TAKAHATA
30		EYE MOVG 2020	
	5///1 50311		
30		EYE MOVG 0215	
	5///1 50405		
	11412 50107		
	5///1 50208		
	11412 50105		
25		EYE MOVG 0520	
	11511 50309		
20		EYE MOVG 0315	TAKAHATA
	204/1 50305		
20		EYE MOVG 0315	TAKAHATA
	21411 50307		
	5///1 53608		
25		EYE MOVG 3625	
	5///1 50308		
	51441 50107		
25		EYE MOVG 3625	
15		EYE MOVG 0325	TAKAHATA
	21411 50211		
25		EYE MOVG 0325	
	5///1 /////		
15		EYE MOVG 0320	TAKAHATA
	21431 50311		

26.4N	127.8E	47931
26.1N	127.7E	47937
28.4N	129.5E	47909
27.4N	128.7E	47942
26.4N	127.8E	47931
27.4N	128.7E	47942
26.2N	127.8E	47937
28.4N	129.5E	47909
26.2N	127.8E	47937
28.4N	129.5E	47909
27.4N	128.7E	47942
27.4N	128.7E	47942
26.2N	127.8E	47937
28.4N	129.5E	47909
27.4N	128.7E	47942
27.4N	128.7E	47942
28.4N	129.5E	47909
26.4N	127.8E	47931
28.4N	129.5E	47909
27.4N	128.7E	47942
26.4N	127.8E	47931
26.4N	127.8E	47931
27.4N	128.7E	47942
28.4N	129.5E	47909
26.4N	127.8E	47931
26.4N	127.8E	47931
27.4N	128.7E	47942
26.4N	127.8E	47931
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
27.4N	128.7E	47942
28.4N	129.5E	47909
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
30.6N	131.0E	47869
28.4N	129.5E	47909
28.4N	129.5E	47909
27.4N	128.7E	47942
30.6N	131.0E	47869
30.6N	131.0E	47869
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28.4N	129.5E	47909
30.6N	131.0E	47869
28.4N	129.5E	47909
27.4N	128.7E	47942
30.6N	131.0E	47869
27.4N	128.7E	47942
30.6N	131.0E	47869
28.4N	129.5E	47909
30.6N	131.0E	47869
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
30.6N	131.0E	47869
28.4N	129.5E	47909
30.6N	131.0E	47869
27.4N	128.7E	47942
30.6N	131.0E	47869
28.4N	129.5E	47909
27.4N	128.7E	47942
28.4N	129.5E	47909
27.4N	128.7E	47942
30.6N	131.0E	47869
28.4N	129.5E	47909

229	291800	29.9N 130.5E	LAND			21771 50108			30.6N 131.0E	47869
230	291900	29.9N 130.7E	LAND			21771 50511			30.6N 131.0E	47869
231	291900	29.9N 130.7E	LAND			21661 50306			28.4N 129.5E	47909
232	291900	30.0N 130.7E	LAND	GOOD	20		EYE MOVG 0320	TAKAHATA		
233	292000	30.1N 130.8E	LAND	GOOD	20		EYE MOVG 0420	TAKAHATA		
234	292000	30.1N 130.8E	LAND			55//1 50216			28.4N 129.5E	47909
235	292000	30.2N 130.9E	LAND			21571 50314			30.6N 131.0E	47869
236	292100	30.3N 130.9E	LAND			215/1 50108			30.6N 131.0E	47869
237	292100	30.3N 131.0E	LAND			65/// 50511			28.4N 129.5E	47909
238	292100	30.3N 130.9E	LAND	GOOD	20		EYE MOVG 0420	TAKAHATA		
239	292200	30.3N 131.1E	LAND			65/// 50506			28.4N 129.5E	47909
240	292200	30.4N 131.1E	LAND			21571 50614			30.6N 131.0E	47869
241	292300	30.5N 131.2E	LAND			65/// 50313			28.4N 129.5E	47909
242	292300	30.4N 131.4E	LAND			10401 50419			30.6N 131.0E	47869
243	292300	30.6N 131.4E	LAND	GOOD	20		EYE MOVG 0520	SIMOKOSIKI		
244	300000	30.9N 131.5E	LAND	GOOD	20		EYE MOVG 0530	SIMOKOSIKI		
245	300000	30.8N 131.6E	LAND			5///1 50414			30.6N 131.0E	47869
246	300100	31.0N 131.7E	LAND	GOOD	20		EYE MOVG 0524	SIMOKOSIKI		
247	300200	31.3N 131.9E	LAND			20371 50316			30.6N 131.0E	47869
248	300200	31.4N 131.8E	LAND			65/12 5////			33.4N 130.3E	47806
249	300200	31.3N 131.9E	LAND	GOOD	20		EYE MOVG 0530	SIMOKOSIKI		
250	300300	31.4N 132.0E	LAND			6//// /////			33.3N 134.2E	47899
251	300300	31.5N 131.9E	LAND			65/12 50411			33.4N 130.3E	47806
252	300300	31.5N 132.2E	LAND						32.1N 131.5E	47854
253	300300	31.5N 132.2E	LAND	GOOD	10		EYE MOVG 0530	SIMOKOSIKI		
254	300300	31.5N 132.2E	LAND			5///1 50419			30.6N 131.0E	47869
255	300400	31.7N 132.3E	LAND		30		EYE MOVG 0645	KUSHIMOTO		
256	300400	31.8N 132.4E	LAND			5///1 50419			30.6N 131.0E	47869
257	300400	31.8N 132.5E	LAND	GOOD	20		EYE MOVG 0550	SEBURI		
258	300400	31.9N 132.2E	LAND			55/72 64019			33.4N 130.3E	47806
259	300400	31.7N 132.3E	LAND			5//// 50424			33.3N 134.2E	47899
260	300500	32.0N 132.7E	LAND			5//// 50522			30.6N 131.0E	47869
261	300500	32.1N 132.7E	LAND	GOOD	20		EYE MOVG 0540	SEBURI		
262	300500	32.0N 132.7E	LAND			10501 50524			33.3N 134.2E	47899
263	300500	31.9N 132.7E	LAND		35		EYE MOVG 0440	KUSHIMOTO		
264	300500	32.2N 132.8E	LAND			65/42 50430			33.4N 130.3E	47806
265	300520	32.2N 132.8E	LAND	GOOD					32.1N 131.5E	47854
266	300600	32.3N 132.9E	LAND			10611 50522			33.3N 134.2E	47899
267	300600	32.2N 133.1E	LAND			5///1 50519			30.6N 131.0E	47869
268	300600	32.2N 132.9E	LAND	GOOD					32.1N 131.5E	47954
269	300500	32.2N 133.0E	LAND			246/3 50322			34.3N 132.6E	47792
270	300600	32.3N 133.0E	LAND	GOOD	25		EYE MOVG 0540	SEBURI		
271	300600	32.2N 132.7E	LAND		45		EYE MOVG 0155	KUSHIMOTO		
272	300700	32.6N 133.3E	LAND	GOOD	20		EYE MOVG 0540	SEBURI		
273	300700	32.6N 133.2E	LAND			10511 50522			33.3N 134.2E	47899
274	300700	32.6N 132.6E	LAND		40		EYE MOVG 0150	KUSHIMOTO		
275	300700	32.5N 133.2E	LAND			246/3 50419			34.3N 132.6E	47792
276	300800	32.9N 133.7E	LAND			246/3 5052/			34.3N 132.6E	47792
277	300800	32.8N 133.6E	LAND			20761 50524			33.3N 134.2E	47899
278	300800	33.0N 133.7E	LAND	GOOD	20		EYE MOVG 0540	SEBURI		
279	300900	33.1N 134.0E	LAND		45		EYE MOVG 0345	KUSHIMOTO		
280	300900	33.1N 133.9E	LAND			20541 50522			33.3N 134.2E	47899
281	300900	33.1N 133.9E	LAND	POOR	20		EYE MOVG 0540	SEBURI		
282	300900	33.1N 134.0E	LAND			65//2 50524			34.3N 132.6E	47792
283	301000	33.6N 134.3E	LAND			20541 50522			33.3N 134.2E	47899
284	301000	33.3N 133.2E	LAND		45		EYE MOVG 0540	KUSHIMOTO		
285	301000	33.4N 134.4E	LAND			65//2 5052/			34.3N 132.6E	47792
286	301000	33.2N 133.9E	LAND			65/// 50716			35.3N 138.7E	47639
287	301100	33.5N 134.5E	LAND		40		EYE MOVG 0645	KUSHIMOTO		
288	301100	33.8N 134.8E	LAND			65//2 50427			34.3N 132.6E	47792
289	301100	33.5N 134.6E	LAND			20541 50524			33.3N 134.2E	47899
290	301100	33.4N 134.5E	LAND			65/// 50632			35.3N 138.7E	47639
291	301100	33.8N 134.7E	LAND			105// /////			34.6N 135.7E	47773
292	301200	33.7N 134.7E	LAND		45		EYE MOVG 0435	KASATORI		
293	301200	33.5N 135.1E	LAND			65/// 70724			35.3N 138.7E	47639
294	301200	34.0N 134.8E	LAND			30541 54024			33.3N 134.2E	47899
295	301200	34.1N 135.0E	LAND			3264/ /////			34.6N 135.7E	47773
296	301300	33.9N 135.0E	LAND			65/// 70522			35.3N 138.7E	47639
297	301300	34.2N 135.2E	LAND			30541			26.2N 127.8E	47937
298	301300	34.1N 135.0E	LAND		30		EYE MOVG 0345	KASATORI		
299	301300	34.2N 135.0E	LAND			3273/ /////			34.6N 135.7E	47773
300	301400	34.3N 135.7E	LAND			3186/ /////			34.6N 135.7E	47773
301	301400	34.4N 135.6E	LAND			35/// 70424			35.3N 138.7E	47639
302	301400	34.6N 135.5E	LAND		20		EYE MOVG 0445	KASATORI		
303	301500	35.0N 136.2E	LAND			30860 5////			34.6N 135.7E	47773
304	301500	35.0N 136.1E	LAND		45		EYE MOVG 0445	KASATORI		
305	301500	34.9N 136.0E	LAND			35/// 70330			35.3N 138.7E	47639
306	301600	35.0N 136.6E	LAND		75		EYE MOVG 3635		37.4N 136.9E	47600
307	301500	35.4N 136.7E	LAND			34961 50532			34.6N 135.7E	47773
308	301700	35.8N 137.2E	LAND			34961 50535			34.6N 135.7E	47773
309	301700	35.5N 137.3E	LAND		75		EYE MOVG 0455		37.4N 136.9E	47600
310	301700	35.6N 137.2E	LAND			35/// 70432			35.3N 138.7E	47639
311	302300	39.1N 141.3E	LAND	GOOD	20		EYE MOVG 0595	YAMADA		
312	010020	40.5N 141.8E	LAND	POOR	00		EYE MOVG 3110	YAMADA		

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	190000	15.0N 149.0E	10	200	
2	191200	13.5N 147.5E	10	200	
3	200000	13.0N 146.0E	10	150	
4	201200	12.0N 143.0E	10	200	
5	210000	11.5N 140.5E	15	200	
6	211200	11.0N 138.0E	15	150	
7	211800	12.9N 139.8E	15	150	
8	220000	13.0N 138.0E	20	150	

TROPICAL STORM PAMELA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	232250	14.5N 145.3E	PCN 5	T0.0/0.0	DMSP36	INIT OBS	PGTW
2	242232	14.9N 143.9E	PCN 3	T2.0/2.0 /D2.0/24HRS	DMSP36	EXPOSED LLCC	PGTW
3	250957	19.0N 141.4E	PCN 6		DMSP37		PGTW
4	251114	19.0N 142.3E	PCN 5		DMSP36		PGTW
5	252137	20.5N 139.2E	PCN 6		DMSP37		PGTW
6	260146	21.2N 138.9E	PCN 3	T1.5/2.0 /W0.5/27HRS	DMSP39	EXPOSED LLCC	PGTW
7	260146	21.2N 138.8E	PCN 5	T1.0/1.0	DMSP39	INIT OBS	RPMK
8	261018	23.2N 137.9E	PCN 3		DMSP37		PGTW
9	261246	24.3N 137.6E	PCN 3		DMSP39		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
* 1	250827	19.6N 142.1E	700MB	3151	1004	50 100 35	160 54 100 35	3 3			+16 + 7	1
2	252222	20.5N 140.1E	1500FT		1004	25 050 30	130 16 050 30	5 5			+24 +22 +21	2
3	252258	20.5N 140.1E	700MB	3128		20 360 50	120 20 360 60				+11 + 7	2
4	260307	21.2N 138.5E	1500FT		1003	25 060 50	150 17 100 60	5 10				2
5	260504	21.9N 137.9E	1500FT		1003	15 150 20	220 21 110 40	10 5			+24 +25 + 8 30	3

TROPICAL STORM ROGER

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
* 1	021233	13.5N 135.7E	PCN 5		DMSP39		PGTW
2	031213	18.1N 138.6E	PCN 5		DMSP36		PGTW
3	032036	20.8N 134.9E	PCN 5		DMSP37		PGTW
4	032313	20.5N 136.4E	PCN 5	T1.0/1.0 /S0.0/24HRS	DMSP36		PGTW
5	040055	20.9N 135.7E	PCN 5		DMSP39		PGTW
6	040055	20.9N 135.6E	PCN 5	T1.5/1.5	DMSP39	INIT OBS	RPMK
7	040917	21.9N 135.2E	PCN 5		DMSP37		PGTW
8	041154	21.7N 133.4E	PCN 5		DMSP39		RODN
9	041155	21.6N 133.5E	PCN 5		DMSP36		PGTW
10	042157	20.8N 133.1E	PCN 6	T2.0/2.0 /D1.0/22HRS	DMSP37		PGTW
11	042158	20.3N 133.6E	PCN 5	T3.5/3.5	DMSP37	INIT OBS	RODN
12	050036	20.0N 133.8E	PCN 6		DMSP36		PGTW
13	050217	20.2N 133.3E	PCN 6		DMSP39	EDGE OF DATA	PGTW
14	050217	20.0N 133.5E	PCN 5		DMSP39		RPMK
15	050217	20.3N 133.3E	PCN 5		DMSP39		RODN
16	051317	21.7N 135.6E	PCN 3		DMSP39	EXPOSED LLCC	PGTW
17	051317	21.7N 135.6E	PCN 3		DMSP39		RODN
18	051317	21.8N 135.7E	PCN 5		DMSP39		RKSO
19	051319	21.9N 135.4E	PCN 5		DMSP36		RPMK
20	051319	21.8N 135.7E	PCN 3		DMSP36		PGTW
21	052137	23.4N 134.9E	PCN 5	T1.0/2.0 /W1.0/24HRS	DMSP37		PGTW
22	060018	23.9N 135.0E	PCN 5		DMSP36		PGTW
23	060158	24.4N 135.0E	PCN 5	T3.0/3.0	DMSP39	INIT OBS	RPMK
24	060158	24.1N 135.1E	PCN 5		DMSP39		PGTW
25	060158	24.2N 135.0E	PCN 5	T3.0/3.0	DMSP39	INIT OBS	RKSO
26	061017	26.6N 134.6E	PCN 5		DMSP37		RKSO
27	061018	26.8N 134.2E	PCN 5		DMSP37		RPMK
28	061016	25.0N 135.6E	PCN 5		DMSP37		PGTW
29	061257	27.3N 135.4E	PCN 5		DMSP39		RKSO
30	061301	27.1N 135.1E	PCN 5		DMSP39		PGTW
31	061301	26.9N 135.4E	PCN 5		DMSP36		RPMK
32	062117	29.0N 136.3E	PCN 6		DMSP37		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	050220	14.1N 140.2E	1500FT		998	40 180 50	240 30 180 60	5 5			+25 +24 +24 28	2
2	040308	21.1N 135.7E	1500FT		982	35 080 10	150 35 080 10	3 3			+26 +23 +24	3
3	040305	21.2N 135.1E	1500FT		987	40 030 25	100 40 030 25	2 5			+25 +25 +26 28	4
4	041820	20.9N 133.5E	700MB	3003			330 32 210 60	5 5			+15 +11	5
5	042125	20.4N 133.7E	700MB	3015	992	35 180 10	080 36 320 45	5 3			+13 +14 + 6	5
6	060124	24.1N 134.5E	700MB	3061		40 220 30	180 48 120 85	5 5			+12 +12 +10	8

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
* 1	010000	13.0N 141.1E	20	120	
* 2	011800	13.1N 138.0E	20	240	
3	020000	12.9N 142.0E	20	210	
4	060000	24.0N 134.5E	40	10	
5	061200	27.0N 135.5E	45	70	
6	070000	31.5N 137.0E	35	190	

TYPHOON SARAH

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
* 1	012259	16.2N 121.0E	PCN 5	T1.0/1.0	DMSP37	INIT ODS	RODN
* 2	020131	17.5N 122.8E	PCN 5	T0.0/0.0	DMSP36	INIT ODS	RPMK
* 3	021139	16.4N 120.4E	PCN 5		DMSP39		RPMK
* 4	021412	15.9N 120.0E	PCN 5		DMSP36		RPMK
* 5	021414	16.0N 120.1E	PCN 5		DMSP39		RODN
6	022239	15.5N 121.7E	PCN 5	T0.0/0.0 /S0.0/21HRS	DMSP37		RPMK
7	030113	14.5N 119.8E	PCN 5	T1.0/1.0 /S0.0/26HRS	DMSP36		RODN
* 8	030255	14.4N 118.9E	PCN 5		DMSP39		RPMK
9	031355	14.2N 120.4E	PCN 5		DMSP39		RODN
* 10	031355	15.8N 119.2E	PCN 5		DMSP36		RPMK
* 11	032218	15.3N 119.0E	PCN 5	T0.0/0.0 /S0.0/24HRS	DMSP37		RPMK
12	040055	14.3N 119.1E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP36		RODN
* 13	040236	15.1N 118.8E	PCN 5		DMSP39		RPMK
14	041058	13.9N 119.0E	PCN 5		DMSP37		RODN
15	041336	14.4N 118.6E	PCN 5		DMSP39		PGTW
* 16	041337	15.0N 119.8E	PCN 5		DMSP36		RPMK
17	042157	13.5N 118.3E	PCN 5		DMSP39		PGTW
18	050036	12.8N 119.1E			DMSP36		PGTW
19	050036	12.4N 119.1E	PCN 5		DMSP37		PGTW
20	050217	12.5N 118.8E	PCN 5	T2.0/2.0	DMSP39	INIT ODS	PGTW
21	050217	13.1N 118.2E	PCN 5	T1.5/1.5 /D1.5/28HRS	DMSP39		RPMK
22	050217	12.5N 119.1E	PCN 5	T2.5/2.5 /D0.5/25HRS	DMSP39		RODN
23	051038	12.1N 119.2E	PCN 6		DMSP37		PGTW
24	051317	12.3N 119.0E	PCN 6		DMSP39		PGTW
25	051317	12.1N 118.7E	PCN 5		DMSP39		RODN
26	051319	12.3N 119.2E	PCN 5		DMSP36		PGTW
27	051319	12.3N 119.2E	PCN 5		DMSP36		RPMK
28	052319	12.3N 118.9E	PCN 5		DMSP37		RODN
29	052319	12.3N 118.7E			DMSP37		RPMK
30	060016	12.3N 119.9E	PCN 5		DMSP36		PGTW
31	060158	12.4N 119.7E	PCN 5	T2.0/2.0 /S0.0/24HRS	DMSP39		PGTW
32	060158	12.3N 119.5E	PCN 5	T1.0/1.5 /W0.5/24HRS	DMSP39		RPMK
33	061018	12.2N 119.3E	PCN 5		DMSP37		RPMK
34	061018	12.5N 119.9E	PCN 5		DMSP37		PGTW
35	061301	12.2N 119.1E	PCN 5		DMSP36		RPMK
36	061301	12.4N 119.6E	PCN 5		DMSP36		PGTW
37	061439	12.1N 119.4E	PCN 5		DMSP39		RODN
38	061439	12.2N 119.2E	PCN 5		DMSP39		RPMK
39	062259	12.2N 119.2E	PCN 3	T2.0/2.0 /D1.0/21HRS	DMSP36		RPMK
40	062259	12.0N 120.0E	PCN 5	T2.5/2.5	DMSP37	INIT ODS	RODN
41	070138	12.2N 119.3E	PCN 3	T2.5/2.5 /D0.5/24HRS	DMSP39		PGTW
42	070139	12.2N 119.3E	PCN 3		DMSP39		RODN
43	070143	12.2N 119.3E	PCN 5		DMSP36		RPMK
44	070240	11.4N 118.1E	PCN 5		DMSP39		RPMK
45	071139	12.1N 119.3E	PCN 5		DMSP37		RPMK
46	071139	11.7N 119.2E	PCN 5		DMSP37		RODN
47	071242	11.5N 118.4E	PCN 5		DMSP36		RPMK
48	071243	11.9N 119.3E	PCN 5		DMSP36		PGTW
49	071420	12.0N 119.3E	PCN 5		DMSP39		RODN
50	072238	11.2N 119.3E	PCN 5	T3.0/3.5+/D0.5/24HRS	DMSP37		RPMK
51	072238	11.1N 119.2E	PCN 5		DMSP37		RODN
52	080124	11.2N 119.3E	PCN 5		DMSP36		RPMK
53	080301	11.2N 119.5E	PCN 3	T3.0/3.0 /D0.5/28HRS	DMSP39		RODN
54	081118	11.3N 119.0E	PCN 5		DMSP37	PSN CNTR OF CDO	RPMK
55	081118	10.9N 119.3E	PCN 5		DMSP37	NO EYE/PSN BASED ON 2 CB BANDS	RODN
56	081406	10.9N 119.2E	PCN 5		DMSP36	CI UP/OUTFLOW INCREASED	RPMK
57	081406	10.8N 119.3E	PCN 5		DMSP36		RODN
58	082218	10.6N 118.2E	PCN 5	T4.0/4.0 /D1.5/21HRS	DMSP37		PGTW
59	082218	11.0N 118.1E	PCN 5	T4.0/4.0 /D1.0/24HRS	DMSP37		RPMK
60	090107	11.2N 118.0E	PCN 1	T4.5/4.5 /D1.5/22HRS	DMSP36		RODN
61	090242	11.1N 118.0E	PCN 3		DMSP39		RPMK
62	091058	11.6N 117.5E	PCN 1		DMSP37		RPMK
63	091059	11.6N 117.4E	PCN 1		DMSP37		ROON
64	091342	11.6N 117.1E	PCN 1		DMSP39		PGTW
65	091342	11.5N 117.4E	PCN 1		DMSP39		RODN
66	091348	11.9N 117.3E	PCN 1		DMSP36		RPMK
67	092158	11.4N 116.5E	PCN 1		DMSP37		RPMK
68	100049	11.4N 116.2E	PCN 1	T5.0/5.0 /D1.0/26HRS	DMSP36		RPMK
69	100049	11.3N 116.4E	PCN 1	T5.0/5.0 /D1.0/26HRS	DMSP36		PGTW
70	100223	11.4N 116.4E	PCN 1	T5.5/5.5 /D1.0/25HRS	DMSP39		RODN
71	101038	11.7N 116.1E	PCN 1		DMSP37		RPMK
72	101038	11.6N 116.0E	PCN 1		DMSP39		RODN
73	101038	11.9N 116.1E	PCN 1		DMSP37		PGTW
74	101331	11.9N 115.9E	PCN 1		DMSP36		RPMK
75	101331	11.5N 115.9E	PCN 2		DMSP36		RODN
76	101504	11.9N 116.0E	PCN 6		DMSP39	ESTIMATE CNTR OFF EDGE OF DATA	RPMK
77	102319	12.1N 115.7E	PCN 3	T5.0/5.0 /S0.0/22HRS	DMSP37		RPMK
78	102319	11.9N 115.6E	PCN 3	T4.5/5.5 /W1.0/21HRS	DMSP37		RODN
79	110031	12.0N 115.5E	PCN 3		DMSP36		RPMK
80	110204	12.0N 115.2E	PCN 3	T4.5/5.0 /W0.5/25HRS	DMSP39		PGTW
81	111018	12.3N 114.8E	PCN 5		DMSP37		PGTW
82	111159	12.9N 115.2E	PCN 6		DMSP37		RPMK
83	111312	12.4N 114.7E	PCN 3		DMSP36		PGTW
84	111445	12.4N 114.3E	PCN 3		DMSP39		RPMK
85	111445	12.5N 114.3E	PCN 5		DMSP39		RODN
86	112258	12.2N 114.4E	PCN 3		DMSP37		RODN
87	120154	13.0N 114.0E	PCN 5	T4.5/5.0 /W0.5/26HRS	DMSP36		RPMK
88	120154	12.9N 114.3E	PCN 5	T3.5/4.5 /W1.0/26HRS	DMSP36		RODN
89	120326	13.0N 113.9E	PCN 5		DMSP39		RPMK

90	121139	13.3N 113.0E	PCN 3		DMSP37	RPMK
91	121426	13.4N 112.4E	PCN 3		DMSP39	RPMK
92	121426	13.4N 112.8E	PCN 5		DMSP39	RODN
93	122238	13.0N 112.3E	PCN 5		DMSP37	RPMK
94	122238	13.2N 112.5E	PCN 3		DMSP37	RODN
95	130136	13.1N 112.4E	PCN 5	T3.5/4.5 /W1.0/24HRS	DMSP36	RPMK
96	130307	13.2N 112.3E	PCN 1		DMSP39	RPMK
97	130307	13.3N 112.4E	PCN 1	T5.0/5.0 /D1.5/25HRS	DMSP39	RODN
98	131119	13.6N 111.7E	PCN 3		DMSP37	RPMK
99	131119	13.6N 111.7E	PCN 3		DMSP37	RODN
100	131401	13.4N 111.6E	PCN 3		DMSP37	RODN
101	131407	13.7N 111.1E	PCN 3		DMSP39	RPMK
102	140118	13.5N 110.7E	PCN 5	T2.5/3.5 /W1.0/24HRS	DMSP36	RPMK
103	140248	13.4N 110.7E	PCN 3		DMSP39	RPMK
104	140248	13.3N 110.7E	PCN 3	T4.0/5.0-/W1.0/24HRS	DMSP39	RODN
105	141058	12.3N 109.0E	PCN 5		DMSP37	RODN
106	141058	13.3N 109.5E	PCN 3		DMSP37	RPMK
107	141348	13.2N 109.2E	PCN 5		DMSP39	PGTW
108	141348	13.0N 109.6E	PCN 5		DMSP39	RODN
109	141359	13.1N 109.2E	PCN 3		DMSP36	RPMK
110	142339	13.2N 108.7E	PCN 5	T1.5/2.5 /W1.0/22HRS	DMSP37	RPMK
111	150229	13.3N 107.9E	PCN 5		DMSP39	RPMK
112	150229	12.3N 107.5E	PCN 5	T2.0/3.0-/W2.0/24HRS	DMSP39	RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	051001	12.6N 119.3E	700MB	3017	991	45 360 50	340 35 270 30	3 4			+14 +17 + 9	1
2	060342	12.4N 119.7E	700MB	3055	996	40 010 50	130 32 010 30	3 4	CIRCULAR	20	+13 +13 + 5	3
3	070203	12.2N 119.4E	700MB	2994		50 030 11	090 50 360 15	3 5	CIRCULAR	20	+15 + 3	4
4	070431	12.2N 119.3E	700MB	2970	985	75 330 10	360 73 270 10	3 4	CIRCULAR	20	+11 +14 + 5	4
5	080210	11.3N 119.2E	700MB	2920	982	75 300 20	120 78 360 20	5 5	CIRCULAR	10	+11 +12 + 8	5
6	080512	11.1N 119.2E	700MB	2922	980	45 080 5	320 40 220 30	3 4	CIRCULAR	8	+13 +14 + 9	5
7	090405	11.3N 117.9E	700MB	2761	960	90 140 10	100 101 040 20	4 5	CIRCULAR	20	+11 +19 + 8	6
8	100142	11.5N 116.5E	700MB	2496		100 060 5	150 93 060 10	5 2	CIRCULAR		+25 +10	7
9	100422	11.7N 116.4E	700MB	2488	929	100 180 7	070 115 020 5	5 1	CIRCULAR	15	+11 +25 + 4	7
10	110131	12.0N 115.4E	700MB	2737		50 070 60	120 73 060 12	4 2				8
11	110343	12.0N 115.2E	700MB	2733	959	65 130 25	040 74 320 15	4 2	CIRCULAR	12	+14 +15 +11	8
12	120700	12.9N 113.6E	700MB	2786		65 080 20	240 70 140 50	5 5	CIRCULAR			9
13	120923	13.1N 113.4E	700MB	2784	962	45 180 30	110 63 040 20	5 4			+14 +15 + 6	9

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	041208	14.1N 119.7E	LAND						16.3N 120.6E	98321
2	041300	13.8N 119.8E	LAND		CIRCULAR				16.3N 120.6E	98321
3	041308	14.0N 119.5E	LAND						16.3N 120.6E	98321
4	041800	13.4N 119.2E	LAND						16.3N 120.6E	98321
5	060000	13.6N 119.0E	LAND						13.7N 100.6E	48455

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	011200	14.5N 120.5E	10	60	
2	020000	15.0N 121.0E	10	90	
3	030000	15.0N 121.0E	10	60	
4	041200	14.0N 119.8E	15	90	

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	041154	5.9N 152.9E	PCN 5		DMSP39		PGTW
2	042015	6.5N 154.7E	PCN 6	T1.0/1.0	DMSP37	INIT ODS	PGTW
3	042255	6.3N 154.7E	PCN 6		DMSP36		PGTW
4	050957	6.3N 153.9E	PCN 6		DMSP37		PGTW
5	051137	6.3N 153.4E	PCN 5		DMSP37		PGTW
6	051955	6.8N 152.8E	PCN 6		DMSP37		PGTW
7	052237	7.2N 153.6E	PCN 3	T2.0/2.0 /D1.0/26HRS	DMSP36		PGTW
8	060016	7.5N 153.0E	PCN 4		DMSP39		PGTW
9	060836	7.4N 153.0E	PCN 6		DMSP37		PGTW
10	061116	7.4N 152.4E	PCN 6		DMSP39		KGWC
11	061119	7.6N 152.8E	PCN 6	T2.5/2.5 /D0.5/25HRS	DMSP39		PGTW
12	062219	7.5N 153.2E	PCN 6		DMSP36	LOW CONFIDENCE	PGTW
13	070816	6.9N 152.1E	PCN 6		DMSP37		PGTW
14	071101	7.3N 152.4E	PCN 5		DMSP36		PGTW
15	072338	7.4N 151.9E	PCN 5	T3.0/3.0 /D1.0/24HRS	DMSP39		PGTW
16	072343	7.4N 152.1E	PCN 5		DMSP36		PGTW
17	080755	9.1N 151.2E	PCN 6		DMSP37		PGTW
18	081043	9.4N 151.0E	PCN 4		DMSP36		PGTW
19	082037	11.6N 148.8E	PCN 3		DMSP37		PGTW
20	082325	11.7N 148.3E	PCN 3	T3.5/3.5 /D0.5/24HRS	DMSP36		PGTW
21	090101	11.9N 148.1E	PCN 3		DMSP39		PGTW
22	092016	12.8N 142.7E	PCN 4		DMSP37		PGTW
23	100042	13.2N 142.7E	PCN 3	T5.0/5.0	DMSP39	INIT ODS	RODN
24	100042	13.0N 142.4E	PCN 3	T4.5/4.5	DMSP39	INIT ODS	RPMK
25	100042	13.0N 142.4E	PCN 3	T4.5/4.5 /D1.0/25HRS	DMSP39		PGTW
26	100857	13.7N 141.4E	PCN 6		DMSP37		PGTW
* 27	100957	14.2N 141.6E	PCN 6		DMSP37		RODN
28	101149	13.9N 141.1E	PCN 2		DMSP36		PGTW
29	101149	13.9N 141.3E	PCN 2		DMSP36		RPMK
30	101149	13.1N 141.0E	PCN 2		DMSP36		RODN
31	110031	14.1N 139.7E	PCN 1	T6.0/6.0 /D1.5/24HRS	DMSP36		RPMK
32	111018	14.9N 139.6E	PCN 1		DMSP36		PGTW
33	111018	14.8N 139.3E	PCN 1		DMSP37		RODN
34	111131	15.0N 138.1E	PCN 4		DMSP36		PGTW
35	111304	14.9N 139.2E	PCN 1		DMSP39		RPMK
36	112117	16.1N 138.6E	PCN 1	T7.5/7.5	DMSP37	INIT ODS	RODN
37	112117	15.1N 138.5E	PCN 1	T7.0/7.0	DMSP37	INIT ODS	PGTW
38	120012	16.2N 139.2E	PCN 1		DMSP36		PGTW
39	120144	16.4N 138.3E	PCN 1	T7.0/7.0 /D1.0/25HRS	DMSP39		RPMK
40	120145	16.5N 138.0E	PCN 1		DMSP39		PGTW
41	120957	16.9N 137.3E	PCN 1		DMSP37		PGTW
42	121254	17.0N 137.2E	PCN 1		DMSP36		PGTW
43	121254	16.8N 137.2E	PCN 1		DMSP36		RODN
44	122057	16.9N 136.3E	PCN 1		DMSP37		PGTW
45	122354	16.5N 136.1E	PCN 1	T6.5/7.0 /W0.5/27HRS	DMSP36		PGTW
46	130126	16.5N 136.0E	PCN 1		DMSP39		PGTW
47	130126	16.5N 136.1E	PCN 1	T7.0/7.5 /W0.5/28HRS	DMSP39		RODN
48	130937	16.5N 135.4E	PCN 1		DMSP37		PGTW
49	131220	16.7N 135.4E	PCN 1		DMSP39		RODN
50	131236	16.7N 135.4E	PCN 3		DMSP36		PGTW
51	132036	16.8N 134.6E	PCN 5		DMSP37		PGTW
52	132336	16.9N 133.9E	PCN 1	T5.0/6.0 /W1.5/24HRS	DMSP36		PGTW
53	140106	17.1N 133.7E	PCN 1		DMSP39		PGTW
54	140107	17.0N 133.8E	PCN 1	T6.0/7.0 /W1.0/24HRS	DMSP39		RODN
55	140917	17.1N 132.5E	PCN 1		DMSP37		PGTW
56	141206	17.3N 132.2E	PCN 1		DMSP39		PGTW
57	141206	17.1N 132.2E	PCN 1		DMSP39		RODN
58	141348	17.4N 132.1E	PCN 1		DMSP39		PGTW
59	142157	17.9N 131.2E	PCN 1	T5.0/5.0 /S0.0/22HRS	DMSP37		PGTW
60	150047	18.1N 130.6E	PCN 1		DMSP39		PGTW
61	150048	18.1N 130.7E	PCN 1	T5.5/6.0 /W0.5/24HRS	DMSP39		RODN
62	150059	18.0N 130.7E	PCN 2		DMSP36		PGTW
63	150229	18.2N 130.6E	PCN 1		DMSP39		RODN
64	151038	18.2N 129.5E	PCN 5		DMSP37		PGTW
65	151200	13.4N 129.3E	PCN 5		DMSP36		PGTW
66	151329	18.5N 129.2E	PCN 5		DMSP39		PGTW
67	151329	18.5N 129.2E	PCN 5		DMSP39		RODN
68	152137	19.3N 129.2E	PCN 1	T5.0/5.0 /S0.0/24HRS	DMSP37		PGTW
69	160041	19.4N 129.1E	PCN 3		DMSP36		PGTW
70	160209	19.3N 129.2E	PCN 3		DMSP39		PGTW
71	160210	19.4N 129.1E	PCN 3	T5.0/5.5 /W0.5/25HRS	DMSP39		RODN
72	161018	20.2N 128.7E	PCN 3		DMSP37		PGTW
73	161324	20.3N 128.6E	PCN 3		DMSP36		PGTW
74	162117	20.9N 128.2E	PCN 3		DMSP37		PGTW
75	170024	21.2N 128.1E	PCN 3	T5.0/5.0-/S0.0/27HRS	DMSP36		PGTW
76	170151	21.4N 128.0E	PCN 3		DMSP39		PGTW
77	170151	21.6N 128.0E	PCN 3	T5.0/5.0	DMSP39	INIT ODS	RPMK
78	170151	21.6N 127.9E	PCN 1	T5.0/5.0 /S0.0/24HRS	DMSP39		RODN
79	170957	22.7N 127.8E	PCN 3		DMSP37		PGTW
80	171251	23.0N 127.8E	PCN 3		DMSP39		RODN
81	171306	22.9N 127.8E	PCN 3		DMSP36		PGTW
82	172056	24.1N 128.0E	PCN 3		DMSP37		PGTW
83	172057	24.4N 127.7E	PCN 6		DMSP37		RODN
84	180006	25.0N 128.3E	PCN 3	T4.5/5.0 /W0.5/24HRS	DMSP36		PGTW
85	180131	25.2N 128.2E	PCN 3	T4.5/5.0 /W0.5/24HRS	DMSP39		RPMK
86	180132	25.2N 128.0E	PCN 3		DMSP39		PGTW
87	180132	25.4N 128.0E	PCN 3	T3.5/4.5 /W1.5/24HRS	DMSP39		RODN
88	180937	27.2N 129.4E	PCN 3		DMSP37		PGTW
89	180937	27.5N 129.4E	PCN 4		DMSP37		RODN
90	181118	28.2N 129.6E	PCN 3		DMSP37		RODN

91	181231	28.6N 130.5E	PCN 5		DMSP39		RPMK
92	181248	28.7N 130.5E	PCN 3		DMSP36		PGTW
93	182036	30.6N 131.8E	PCN 3		DMSP37		PGTW
94	182348	32.7N 134.8E	PCN 3	T3.0/4.0 /W1.5/24HRS	DMSP36		PGTW
95	190112	33.4N 134.6E	PCN 5	T4.0/4.0	DMSP39	INIT OBS	RKSO
96	190112	33.3N 135.2E	PCN 3		DMSP39		PGTW
* 97	191212	41.1N 145.6E	PCN 5		DMSP39	PSBL LLCC	RODN
98	191212	41.1N 145.5E	PCN 5		DMSP39		RKSO
99	192016	43.7N 146.4E	PCN 5		DMSP37	EXPSD LLCC	RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT	IN	DP/SST	MSN NO.
1	040614	6.2N 153.0E	1500FT		1004	25	270	10	270	29	180	30	5	5							1
2	050030	5.4N 154.6E	700MB	3095	1004	25	270	18	140	33	360	120	5	10				+10	+11	+07	2
3	050610	5.9N 155.3E	1500FT		1003	25	050	30	170	27	360	15	2	5							3
4	050800	5.7N 155.1E	700MB	3113	1003	35	230	40	270	37	210	65	2	6					+24	+23	3
5	051943	7.1N 153.4E	700MB	3112		40	110	12	060	34	300	20	8	4					+13	+ 7	4
6	052222	7.2N 153.4E	700MB	3124		35	010	30	100	26	010	60	4	2				+12	+14	+ 7	4
7	060713	7.6N 153.0E	700MB	3110	1000	30	040	20	040	31	270	60	5	5				+12	+15	+ 8	5
8	062111	7.9N 152.5E	700MB	3100	998	40	360	15	080	30	290	90	2	2					+14		6
9	070305	7.4N 152.3E	700MB	3101		35	320	90	100	33	320	30	4	4				+11	+14	+10	7
10	070617	6.9N 152.4E	700MB	3095		30	310	60	100	32	310	60	5	10					+13	+ 8	7
11	070801	6.4N 152.0E	700MB	3106		30	300	65	070	56	010	15	4	5				+11	+10	+10	7
12	071428	6.3N 151.7E	700MB	3091	1005				070	51	310	65	5	5				+11	+10	+10	8
13	071856	6.6N 152.2E	700MB	3072					180	45	060	36	10	5							8
14	072030	6.9N 152.2E	700MB	3054	997	40	180	35	270	40	180	30	5	5				+10	+10		8
15	080248	8.2N 151.5E	700MB	3047	995	35	230	105	220	44	130	120	5	5				+12	+12	+12	9
16	080650	9.0N 151.3E	700MB	3038		35	050	30	160	35	050	30	4	4				+12	+11		9
17	080825	9.3N 150.9E	700MB	3043	995				090	38	350	30	8	10				+12	+13		9
18	081457	10.3N 150.1E	700MB	3027	991				110	50	360	100	5	10				+13	+14	+10	10
* 19	081900	10.8N 148.0E	700MB						070	37	340	75	5	10					+11	+11	11
20	082140	11.9N 148.5E	700MB	2994	989	50	320	20	190	50	120	60	5	10	CIRCULAR	25		+14	+15	+12	11
21	090005	12.1N 147.7E	700MB	2996		50	150	10	070	48	310	80	3	2					+14	+13	12
22	090241	12.6N 146.8E	700MB	2960	985	50	330	10	190	43	130	115	2	3	CIRCULAR	25		+11	+14	+14	12
23	090621	12.7N 145.6E	700MB	2936		60	360	45	080	69	360	50	2	2							13
24	090735	12.7N 145.2E	700MB	2931	981	55	080	48	100	57	020	72	2	2				+12	+17	+13	13
25	091201	12.8N 144.3E	700MB	2889	974				290	43	210	10	2	2				+13	+18	+15	13
26	092006	12.9N 143.2E	700MB	2773		70	070	10	180	57	070	10	1	5					+17	+15	14
27	092110	12.9N 142.9E	700MB	2712	959	80	360	10	130	78	360	15	1	10	CIRCULAR	8		+12	+15	+14	14
28	100951	13.7N 141.3E	700MB	2654	949					106	10	10	3	3	CIRCULAR	20		+11	+15	+14	15
29	102340	14.2N 139.5E	700MB	2233	900	130	050	10	140	125	050	10	2	2	CIRCULAR	15		+13	+24	+ 8	18
30	111308	15.3N 139.4E	700MB	2271					260	120	160	18	4	5	CONCENTRIC						19
31	111529	15.6N 139.1E	700MB	2201	900				180	125	130	70	4	5	CONCENTRIC	20	130	+13	+20	+15	19
32	120353	16.7N 137.8E	700MB	1944	870	130	090	5	200	110	090	15	4	4	CIRCULAR	12		+14	+30	+13	20
33	120655	16.9N 137.5E	700MB	1995		130	310	07	010	110	310	10	4	4	CIRCULAR				+25	+16	20
34	120837	16.9N 137.3E	700MB	2058	884	130	130	6	210	110	130	15	4	4	CIRCULAR	12		+19	+18	+18	20
35	121901	16.9N 136.8E	700MB	2201					350	125	270	35	6	2	CIRCULAR	10			+19	+16	21
36	122122	16.7N 136.5E	700MB	2228	903	130	360	25	060	114	360	18	4	2	CIRCULAR	12		+16	+18	+18	21
37	130503	16.7N 135.8E	700MB	2248		90	140	55	210	105	130	30	5	2	CIRCULAR				+18	+18	22
38	130810	16.7N 135.6E	700MB	2262	905				030	100	310	30	2	2	ELLIPTICAL	40 25	100	+14	+19	+18	22
39	140009	17.0N 133.0E	700MB	2417	922	50	230	135	080	86	340	90	2	5	ELLIPTICAL	10 7	150	+16	+17	+13	24
40	140616	17.2N 133.4E	700MB	2391		130	100	7	190	110	100	10	4	2							25
41	140900	17.2N 132.8E	700MB	2389	919				090	95	040	50	4	2	CIRCULAR	18		+17	+18	+16	25
42	150600	18.4N 130.4E	700MB	2383		50	240	130	230	82	140	90	2	3	CIRCULAR				+18	+ 8	27
43	150824	18.5N 130.1E	700MB	2387	919	95	030	15	140	98	050	60	2	5	CIRCULAR	13		+19	+18	+ 9	27
44	151900	19.0N 129.4E	700MB	2433					220	101	140	95	4	3					+19	+16	28
45	152135	19.3N 129.4E	700MB	2435	924				110	87	360	20	5	4				+17	+18	+16	28
46	160808	20.2N 128.9E	700MB	2490	931	80	240	14	320	74	240	56	5	5	CIRCULAR	25		+16	+19	+ 6	29
47	161203	20.4N 128.6E	700MB	2520						67	18	90	5	5					+19	+ 4	29
48	161407	20.7N 128.6E	700MB	2513	931				220	76	150	50	5	5	CIRCULAR	25		+14	+ 9	+ 5	29
49	161904	21.0N 128.3E	700MB	2521					230	85	130	50	4	4					+18		30
50	162150	21.2N 128.3E	700MB	2356	935				140	80	040	150	5	5				+15	+18		30
51	170735	22.6N 128.0E	700MB	2562		70	160	30	190	87	120	12	4	3					+17	+15	31
52	170908	22.7N 127.8E	700MB	2562	939				130	77	020	60	4	3				+17	+17	+16	31
53	170908	22.7N 127.8E	700MB	2562					110	80	360	90	4	3					+17	+16	31
54	171407	23.4N 127.3E	700MB	2582					300	99	200	30	5	3	CIRCULAR	35		+16	+19	+14	31
55	171901	24.2N 127.7E	700MB	2579					290	72	210	12	5	3					+18	+16	32
56	172114	24.6N 127.7E	700MB	2599					230	95	140	100	8	4				+16	+17	+15	33
57	181132	28.3N 130.0E	700MB	2694					190	89	090	120	4	3				+14	+15		34
58	181401	29.0N 130.7E	700MB	2719					160	60	010	120	4	4				+17	+19		34
59	182221	32.2N 133.4E	700MB	2831	971	80	120	10	230	85	110	110	2	2				+16	+17	+11	35

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	090335	12.8N 146.5E	LAND	FAIR					13.6N 144.9E	91218
2	090410	12.8N 146.3E	LAND	FAIR					13.6N 144.9E	91218
3	090435	12.8N 146.1E	LAND	FAIR					13.6N 144.9E	91218
4	090500	12.9N 145.8E	LAND	GOOD	CIRCULAR	20			13.6N 144.9E	91218
5	090510	12.8N 146.0E	LAND	GOOD	CIRCULAR	20			13.6N 144.9E	91218
6	090610	12.8N 145.8E	LAND	GOOD	CIRCULAR	25			13.6N 144.9E	91218
7	090635	12.8N 145.6E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
8	090710	12.8N 145.5E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
9	090735	12.8N 145.4E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
10	090810	12.7N 145.2E	LAND	GOOD	CIRCULAR	20		WALL OPEN SE-SW-NW-N	13.6N 144.9E	91218
11	090835	12.8N 145.1E	LAND	GOOD	CIRCULAR	20			13.6N 144.9E	91218
12	090910	12.6N 145.0E	LAND	GOOD	CIRCULAR	20			13.6N 144.9E	91218
13	090935	12.6N 144.8E	LAND	GOOD	CIRCULAR	20			13.6N 144.9E	91218
14	091010	12.7N 144.8E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
15	091035	12.7N 144.7E	LAND	FAIR	CIRCULAR	15			13.6N 144.9E	91218

16	091110	12.7N 144.7E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
17	091135	12.8N 144.5E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
18	091210	12.9N 144.5E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
19	091235	12.9N 144.4E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
20	091310	12.8N 144.3E	LAND	FAIR	CIRCULAR	15			13.6N 144.9E	91218
21	091335	12.8N 144.2E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
22	091410	12.9N 144.1E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
23	091435	12.8N 143.8E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
24	091510	12.8N 143.8E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
25	091535	12.7N 143.8E	LAND	GOOD	CIRCULAR	15			13.6N 144.9E	91218
26	091600	12.7N 143.6E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
27	091635	12.6N 143.6E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
28	091710	12.7N 143.6E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
29	091735	12.9N 143.5E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
30	091810	12.9N 143.5E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
31	091835	12.8N 143.3E	LAND	GOOD	CIRCULAR	7			13.6N 144.9E	91218
32	091910	12.8N 143.3E	LAND	GOOD	CIRCULAR	10		HVY ATTENUATION	13.6N 144.9E	91218
33	091935	12.8N 143.3E	LAND	GOOD	CIRCULAR	10			13.6N 144.9E	91218
34	092010	12.9N 143.1E	LAND	FAIR	CIRCULAR	10			13.6N 144.9E	91218
35	171230	23.2N 127.8E	LAND	GOOD		45		EYE MOVG 3410	24.8N 125.3E	47927
36	171400	23.3N 127.7E	LAND	GOOD		45		EYE MOVG 3210	24.8N 125.3E	47927
37	171500	23.5N 127.7E	LAND	GOOD		45		EYE MOVG 3420	24.8N 125.3E	47927
38	171600	23.7N 127.6E	LAND	GOOD		45		EYE MOVG 3420	24.8N 125.3E	47927
39	171700	23.9N 127.6E	LAND	GOOD		45		EYE MOVG 3420	24.8N 125.3E	47927
40	171708	24.0N 127.5E	LAND				3///3 53/16		26.2N 127.8E	47937
41	171800	24.0N 127.6E	LAND	POOR				EYE MOVG 3205	24.8N 125.3E	47927
42	171900	24.1N 127.5E	LAND	POOR				EYE MOVG 3615	26.3N 125.8E	47929
43	171900	24.3N 127.8E	LAND				6///2 70311		26.2N 127.8E	47937
44	172000	24.2N 127.6E	LAND	POOR				EYE MOVG 0115	26.3N 125.8E	47929
45	172000	24.5N 127.7E	LAND				6///3 70211		26.2N 127.8E	47937
46	172035	24.9N 127.5E	LAND	FAIR					26.4N 127.8E	47931
47	172100	24.3N 127.5E	LAND	POOR				EYE MOVG 3415	26.3N 125.8E	47929
48	172100	24.6N 127.7E	LAND				6///3 70110		26.2N 127.8E	47937
49	172200	24.5N 127.4E	LAND	GOOD				EYE MOVG 3520	26.3N 126.8E	47929
50	172200	24.7N 127.8E	LAND				6///3 73608		26.2N 127.8E	47937
51	172235	25.0N 127.5E	LAND	POOR					26.4N 127.8E	47931
52	172300	24.9N 127.9E	LAND				5///1 70209		26.2N 127.8E	47937
53	172310	24.9N 127.7E	LAND	POOR					26.4N 127.8E	47931
54	172320	24.9N 127.7E	LAND	POOR				EYE MOVG 3520	24.8N 125.3E	47927
55	172335	24.9N 127.8E	LAND	POOR					26.4N 127.8E	47931
56	180000	25.0N 128.0E	LAND	GOOD		40		EYE MOVG 0220	26.3N 126.8E	47929
57	180000	25.1N 127.9E	LAND				3//19 70111		26.2N 127.8E	47937
58	180010	25.1N 127.8E	LAND	POOR					26.4N 127.8E	47931
59	180035	25.2N 127.8E	LAND	POOR					26.4N 127.8E	47931
60	180100	25.2N 128.0E	LAND				3//12 70308		26.2N 127.8E	47937
61	180120	25.2N 128.1E	LAND	GOOD		40		EYE MOVG 0420	26.3N 126.8E	47929
62	180135	25.5N 127.9E	LAND	POOR					26.4N 127.8E	47931
63	180200	25.5N 128.0E	LAND				3//12 70111		26.2N 127.8E	47937
64	180210	25.5N 128.1E	LAND	GOOD		45		EYE MOVG 3430	26.3N 126.8E	47929
65	180210	25.8N 128.0E	LAND	POOR					26.4N 127.8E	47931
66	180235	25.7N 128.1E	LAND	POOR					26.4N 127.8E	47931
67	180300	25.7N 128.5E	LAND				3//42 70514		26.2N 127.8E	47937
68	180300	25.7N 128.3E	LAND	GOOD		55		EYE MOVG 0320	26.3N 126.8E	47929
* 69	180310	25.9N 127.3E	LAND	POOR					26.4N 127.8E	47931
70	180335	26.1N 128.5E	LAND	POOR					26.4N 127.8E	47931
71	180400	26.1N 128.4E	LAND				6//42 70218		26.2N 127.8E	47937
72	180400	25.9N 128.1E	LAND				65/// 5////		28.4N 129.5E	47909
73	180400	26.0N 128.4E	LAND	GOOD		55		EYE MOVG 0335	26.3N 126.8E	47929
74	180410	26.2N 128.5E	LAND	POOR					26.4N 127.8E	47931
75	180435	26.4N 128.7E	LAND	POOR					26.4N 127.8E	47931
76	180445	26.4N 128.4E	LAND	GOOD					26.2N 127.7E	47930
77	180445	26.4N 128.4E	LAND	GOOD				EYE MOVG NNE	26.2N 127.7E	47930
78	180500	26.4N 128.4E	LAND				65/// 50327		28.4N 129.5E	47909
79	180500	26.5N 128.5E	LAND				6///4 70222		26.2N 127.8E	47937
80	180500	26.3N 128.5E	LAND	GOOD		60		EYE MOVG 0235	26.3N 126.8E	47929
81	180510	26.7N 128.6E	LAND	POOR					26.4N 127.8E	47931
82	180535	26.8N 128.7E	LAND	POOR					26.4N 127.8E	47931
83	180545	26.6N 128.6E	LAND	POOR					26.2N 127.7E	47930
84	180545	26.6N 128.6E	LAND	POOR				EYE MOVG NE	26.2N 127.7E	47930
85	180600	26.6N 128.7E	LAND	FAIR		55		EYE MOVG 0330	26.3N 126.8E	47929
86	180600	26.6N 128.7E	LAND				6///4 70219		26.2N 127.8E	47937
87	180600	26.4N 128.5E	LAND				65/// 50509		28.4N 129.5E	47909
88	180610	26.9N 128.7E	LAND	POOR					26.4N 127.8E	47931
89	180700	27.0N 129.0E	LAND				6///2 70320		26.2N 127.8E	47937
90	180700	26.9N 128.7E	LAND	POOR				EYE MOVG 0230	26.3N 126.8E	47929
91	180700	26.8N 128.9E	LAND				65/// 50430		28.4N 129.5E	47909
92	180800	27.1N 128.9E	LAND	POOR				EYE MOVG 0435	26.3N 126.8E	47929
93	180800	27.1N 129.2E	LAND				6///3 70618		26.2N 127.8E	47937
94	180800	27.2N 129.0E	LAND				65/// 50327		28.4N 129.5E	47909
95	180900	27.5N 129.3E	LAND	POOR				EYE MOVG 0445	27.4N 128.7E	47942
96	180900	27.2N 129.5E	LAND				////3 70516		26.2N 127.8E	47937
97	180900	27.5N 129.3E	LAND				65/// 50519		28.4N 129.5E	47909
98	181000	27.7N 129.5E	LAND				65/// 50316		28.4N 129.5E	47909
99	181000	27.7N 129.4E	LAND	POOR				EYE MOVG 0335	27.4N 128.7E	47942
100	181100	27.8N 129.8E	LAND	POOR				EYE MOVG 0640	27.4N 128.7E	47942
101	181100	28.0N 129.7E	LAND				65/// 50324		28.4N 129.5E	47909
102	181200	28.3N 129.8E	LAND				55/// 50316		28.4N 129.5E	47909
103	~~181300~~	~~28.6N 130.0E~~	~~LAND~~				~~55/// 50423~~		~~28.4N 129.5E~~	~~47909~~
104	181400	28.8N 130.4E	LAND				65/// 50527		28.4N 129.5E	47909
105	181500	29.2N 130.8E	LAND				6///2 5////		30.6N 131.0E	47869
106	181500	29.1N 130.9E	LAND				65/// 50629		28.4N 129.5E	47909
107	181600	29.4N 131.3E	LAND				6///1 50627		30.6N 131.0E	47869
108	181700	29.6N 131.6E	LAND				6///1 50522		30.6N 131.0E	47869
109	182330	32.2N 134.2E	LAND	POOR				KUSHIMOTO		

SUPER TYPHOON VERA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	312316	6.2N 149.0E	PCN 5	T1.0/1.0	DMSP36	INIT OBS	PGTW
2	010026	6.2N 148.9E	PCN 5		DMSP39		PGTW
3	010814	6.0N 148.3E	PCN 6		DMSP37	CI UP	PGTW
4	011126	6.3N 147.0E	PCN 5		DMSP39		PGTW
5	011158	6.3N 147.2E	PCN 5		DMSP36		PGTW
6	012055	6.9N 146.7E	PCN 5		DMSP37		PGTW
7	012258	6.9N 146.0E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP36		PGTW
8	020007	6.6N 145.7E	PCN 5		DMSP39		PGTW
9	020935	7.2N 143.9E	PCN 5		DMSP37		PGTW
10	021140	7.2N 143.6E	PCN 5		DMSP36		PGTW
11	021248	7.1N 143.4E	PCN 5		DMSP39		PGTW
12	021248	6.9N 143.2E	PCN 6		DMSP39		RPMK
13	022034	7.5N 141.5E	PCN 3		DMSP37		PGTW
14	030021	8.3N 141.0E	PCN 3	T3.5/3.5	DMSP36	INIT OBS	RODN
15	030021	7.9N 141.1E	PCN 3	T3.0/3.0 /D1.0/25HRS	DMSP36		PGTW
16	030129	8.2N 140.7E	PCN 3		DMSP39		PGTW
17	030914	9.0N 137.8E	PCN 6		DMSP37		PGTW
18	031228	9.2N 137.1E	PCN 6		DMSP39		PGTW
19	031229	9.4N 137.2E	PCN 5		DMSP39		RODN
20	031302	9.2N 136.9E	PCN 6		DMSP36		PGTW
21	032155	10.5N 133.8E	PCN 1		DMSP37		PGTW
22	040003	10.5N 133.0E	PCN 1	T5.0/5.0+/D2.0/24HRS	DMSP36		PGTW
23	040110	10.5N 132.7E	PCN 1		DMSP39		PGTW
24	040110	10.5N 132.6E	PCN 1	T5.0/5.0	DMSP39	INIT OBS	RPMK
25	041035	11.4N 129.7E	PCN 2		DMSP37		PGTW
26	041244	11.9N 129.0E	PCN 1		DMSP36		PGTW
27	041245	11.7N 128.8E	PCN 2		DMSP36		RODN
28	041351	11.9N 128.7E	PCN 2		DMSP39		PGTW
29	042135	12.4N 126.6E	PCN 1	T5.5/6.5 /D0.5/22HRS	DMSP37		PGTW
30	042135	12.5N 126.5E	PCN 1		DMSP37		RPMK
31	050126	12.9N 125.9E	PCN 1	T6.0/6.0-/D1.0/24HRS	DMSP36		RPMK
32	050232	13.1N 125.9E	PCN 1	T6.5/6.5	DMSP39	INIT OBS	RODN
33	050232	13.1N 125.8E	PCN 1		DMSP39		RPMK
34	051015	14.1N 124.4E	PCN 2		DMSP37		PGTW
35	05 226	14.4N 123.9E	PCN 1		DMSP36		PGTW
36	051332	14.6N 123.6E	PCN 1		DMSP39		RODN
37	051332	14.5N 123.7E	PCN 1		DMSP39		PGTW
38	051408	14.5N 124.1E	PCN 1		DMSP36		RPMK
39	052256	15.4N 122.9E	PCN 3		DMSP39		RODN
40	060108	15.6N 123.1E	PCN 3	T4.5/5.5 /W1.0/27HRS	DMSP36		PGTW
41	060109	15.6N 122.9E	PCN 3	T5.5/6.5-/W1.0/23HRS	DMSP36		RODN
42	060213	15.7N 122.3E	PCN 1		DMSP39		RODN
43	060213	15.8N 122.5E	PCN 1	T6.0/6.0-/S0.0/24HRS	DMSP39		RPMK
44	060954	16.7N 122.2E	PCN 3		DMSP37		PGTW
45	061312	17.1N 122.2E	PCN 5		DMSP39		PGTW
46	061350	17.2N 122.3E	PCN 5		DMSP36		RPMK
47	061351	17.2N 122.3E	PCN 3		DMSP36		RODN
48	062236	18.3N 121.5E	PCN 3		DMSP37		RODN
49	070050	18.5N 121.7E	PCN 5		DMSP36		PGTW
50	070153	17.9N 121.7E	PCN 5	T4.0/5.0 /W2.0/24HRS	DMSP35		RPMK
51	070154	18.6N 121.7E	PCN 5	T3.0/4.0 /W1.5/25HRS	DMSP39		PGTW
52	071116	18.7N 122.1E	PCN 1		DMSP37		RPMK
53	071332	16.8N 117.8E	PCN 5		DMSP36		PGTW
54	080032	16.1N 116.5E	PCN 5		DMSP36	APRNT LLCC	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	020625	7.4N 144.5E	1500FT		994	50 130 7	160 65 060 20	5 2				+21 +24 +22	2
2	030500	8.6N 139.3E	700MB	2971		70 090 5	350 46 240 30	5 2				+14 +10	4
3	030753	8.8N 138.4E	700MB	2946	982		150 73 020 8	5 2	CIRCULAR	17		+11 +15 + 8	4
4	031833	10.1N 134.7E	700MB	2720			120 120 080 13	5 5	CIRCULAR	20		+14 +11	5
5	032049	10.2N 134.3E	700MB	2643	945	130 270 3	330 125 270 10	5 3	CIRCULAR	8		+18 +19 + 8	5
6	040507	11.0N 131.5E	700MB	2399		130 110 5	180 170 110 5	6 1	CIRCULAR	8		+12 +25 +13	6
~~7~~	~~041300~~	~~12.2N 127.4E~~	~~700MB~~	~~2349~~	~~915~~		~~120 100 060 10~~	~~4 2~~	~~CIRCULAR~~			~~+18 +14~~	7
8	042125	12.5N 126.5E	700MB	2372	919	120 330 3	240 111 180 15	4 2	CONCENTRIC	25	70	+14 +18 +14	7
9	050418	13.2N 125.1E	700MB	2413		130 050 7	120 116 050 12	8 5				+16 +12	8
10	050702	13.6N 124.8E	700MB	2410		130 340 4	340 100 270 10	4 2	CIRCULAR	7		+10 +16 +15	8
11	052017	15.1N 123.3E	700MB	2557			190 103 110 30	4 2	CIRCULAR	10		+15 +15	9
12	052232	15.1N 122.7E	700MB	2587	941	65 060 40	180 85 070 25	5 1	CIRCULAR	30	120	+15 +15 +15	9
13	060620	16.3N 122.3E	700MB	2647		100 050 35		10	CIRCULAR				10
14	062001	17.8N 121.6E	700MB				130 52 020 60	5				+15 + 4	11

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	040716	11.2N 130.7E	ACFT							54WRS
2	050500	13.2N 124.6E	LAND				20471 /////		10.3N 124.0E	98646
3	050505	13.5N 125.5E	LAND				11255 301//		14.1N 123.0E	98440
4	050600	13.7N 125.3E	LAND				10111 53408		14.1N 123.0E	98440
5	050500	13.5N 125.0E	LAND				2060/ /////		14.0N 124.3E	98447
6	050500	15.5N 122.7E	LAND				10543 53515		14.1N 123.0E	98440
7	050630	13.7N 124.7E	LAND				206// 53028		14.0N 124.3E	98447
8	050700	13.8N 124.5E	LAND				257/0 54535		10.3N 124.0E	98646
9	050700	13.9N 125.1E	LAND				20211 53313		14.1N 123.0E	98440
10	050800	13.9N 124.9E	LAND				20211 53309		14.1N 123.0E	98440
11	050800	13.8N 124.6E	LAND				2065/ 53325		14.0N 124.3E	98447
12	050900	14.0N 124.5E	LAND				2061/ 53125		14.0N 124.3E	98447
13	050900	13.9N 124.6E	LAND				20211 52921		14.1N 123.0E	98440
14	050900	13.9N 124.6E	LAND				20211 52921		14.0N 124.3E	98447
15	051000	14.1N 124.5E	LAND				202// 53314		14.0N 124.3E	98447
16	051100	13.5N 125.5E	LAND				301// /////		14.1N 123.0E	98440
17	051300	14.3N 124.0E	LAND				20231 54714		14.1N 123.0E	98440
18	051400	14.5N 123.8E	LAND				20211 53212		14.1N 123.0E	98440
19	051500	14.7N 123.7E	LAND				10332 53414		14.1N 123.0E	98440
20	051800	15.1N 123.3E	LAND				10412 53414		14.1N 123.0E	98440
21	051840	14.9N 123.6E	LAND	POOR					15.2N 120.6E	98327
22	051900	15.0N 123.6E	LAND	POOR					15.2N 120.6E	98327
23	051945	15.0N 123.5E	LAND	POOR					15.2N 120.6E	98327
24	052005	15.1N 123.2E	LAND	POOR					15.2N 120.6E	98327
25	052035	15.1N 123.1E	LAND	POOR					15.2N 120.6E	98327
26	052110	15.2N 123.1E	LAND	POOR					15.2N 120.6E	98327
27	052135	15.2N 123.0E	LAND	POOR					15.2N 120.6E	98327
28	052215	15.3N 122.9E	LAND	POOR					15.2N 120.6E	98327
29	052235	15.3N 122.9E	LAND	POOR					15.2N 120.6E	98327
* 30	052300	15.2N 123.4E	LAND				1//// /////		16.3N 120.6E	98321
* 31	052300	15.4N 122.8E	LAND				10543 53504		14.1N 123.0E	98440
32	052300	15.4N 122.7E	LAND	POOR					15.2N 120.6E	98327
33	060000	15.6N 123.0E	LAND				1022/ 5////		16.3N 120.6E	98321
34	060100	15.1N 122.6E	LAND				10543 53204		14.1N 123.0E	98440
35	060100	15.7N 122.9E	LAND				202// 5////		16.3N 120.6E	98321
36	060200	15.8N 122.5E	LAND				10543 53520		14.1N 123.0E	98440
37	060200	15.9N 122.9E	LAND				1021/ 5////		16.3N 120.6E	98321
38	060300	15.9N 122.4E	LAND				10543 53410		14.1N 123.0E	98440
39	060300	16.0N 122.9E	LAND				1021/ 5////		16.3N 120.6E	98321
40	060400	16.2N 122.3E	LAND				10543 53411		16.3N 120.6E	98321
41	060400	16.2N 122.3E	LAND				10543 53411		14.1N 123.0E	98440
42	060430	16.3N 122.8E	LAND				1083/ 43606		16.3N 120.6E	98321
43	060500	16.3N 122.2E	LAND				10543 53409		14.1N 123.0E	98440
44	060600	16.5N 122.6E	LAND				1074/ 43408		16.3N 120.6E	98321
45	060500	16.4N 122.4E	LAND				10543 53513		14.1N 123.0E	98440
46	060700	16.5N 122.5E	LAND				1083/ 53210		16.3N 120.6E	98321
47	060930	16.5N 122.3E	LAND				21253 527//		16.3N 120.6E	98321
48	061200	16.7N 122.1E	LAND				15000 52705		16.3N 120.6E	98321
49	061500	17.3N 122.1E	LAND				45/// 728//		16.3N 120.6E	98321
50	061500	17.4N 122.0E	LAND				45/// 728//		16.3N 120.6E	98321
51	061900	17.4N 121.9E	LAND				45/// /////		16.3N 120.6E	98321
52	061900	16.7N 122.4E	LAND				1021/ 53406		16.3N 120.6E	98321
53	070100	17.9N 121.1E	LAND				20381 52713		16.3N 120.6E	98321
54	070200	18.0N 120.7E	LAND				20351 52915		16.3N 120.6E	98321
55	070300	18.1N 120.6E	LAND				20341 52913		16.3N 120.6E	98321
56	070300	18.1N 120.8E	LAND				45/// /////		16.3N 120.6E	98321
57	070500	18.2N 120.4E	LAND				45/// /////		16.3N 120.6E	98321
58	070500	18.3N 120.1E	LAND				53/// /////		16.3N 120.6E	98321
59	070700	18.4N 120.2E	LAND				35242 242//		16.3N 120.6E	98321
60	070800	18.3N 119.9E	LAND				40/// 728//		16.3N 120.6E	98321

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	290000	6.0N 158.5E	05	60	
2	291200	6.0N 156.5E	05	120	
3	300000	5.0N 155.0E	10	225	
4	301200	6.0N 153.0E	05	320	
5	310000	6.0N 151.0E	10	90	
6	311200	6.0N 149.0E	15	75	
7	071200	17.0N 118.0E	30	30	
8	080000	15.5N 117.5E	20	90	
9	081200	15.0N 117.0E	15	120	

TROPICAL STORM WAYNE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	070012	12.7N 140.7E	PCN 5	T0.0/0.0	DMSP39	INIT OBS/2ND CNTR AT 113N 1439E	PGTW
2	070935	13.0N 137.5E	PCN 6		DMSP37	PSN BSD ON UL FLOW	PGTW
3	071254	14.5N 136.8E	PCN 5		DMSP39	PSN RELCTD ESTWRD	PGTW
4	072034	14.7N 135.8E	PCN 6		DMSP37		PGTW
5	080032	15.4N 135.6E	PCN 5	T1.5/1.5 /D1.5/24HRS	DMSP35		PGTW
6	080914	16.2N 132.5E	PCN 5		DMSP37		PGTW
7	080914	16.2N 132.5E	PCN 5		DMSP37		RODN
8	081234	16.6N 131.8E	PCN 5		DMSP39		PGTW
9	081234	16.6N 131.5E	PCN 5		DMSP39		RODN
10	081314	16.6N 131.7E	PCN 5		DMSP36		PGTW
11	082155	16.0N 130.1E	PCN 5		DMSP37	ULC 155N 1294E	PGTW
12	090014	16.0N 129.7E	PCN 3	T2.5/2.5-/D1.0/24HRS	DMSP36		PGTW
13	090115	15.7N 129.6E	PCN 3		DMSP39		PGTW
14	090115	15.7N 129.7E	PCN 5	T2.0/2.0	DMSP39	INIT OBS	RPMK
15	091035	16.0N 129.7E	PCN 5		DMSP37		PGTW
16	091256	16.4N 129.8E	PCN 5		DMSP36		PGTW
17	091256	16.2N 129.9E	PCN 5		DMSP36		RPMK
18	091356	16.4N 129.3E	PCN 6		DMSP39		RPMK
19	092134	17.0N 129.2E	PCN 6	T2.0/2.5 /W0.5/21HRS	DMSP37		PGTW
20	092355	17.7N 129.3E	PCN 5		DMSP36		PGTW
21	100056	17.6N 129.2E	PCN 5		DMSP39	EDGE OF DATA	RODN
22	100056	17.5N 129.3E	PCN 5		DMSP39		PGTW
23	101015	18.7N 128.3E	PCN 5		DMSP37		PGTW
24	101238	18.6N 127.5E	PCN 5		DMSP36		PGTW
* 25	101337	17.5N 127.6E	PCN 5		DMSP39		PGTW
* 26	101337	17.5N 127.6E	PCN 5		DMSP36		PGTW
27	102113	18.4N 128.6E	PCN 4		DMSP37	EXPSD LLCC	PGTW
28	102337	18.6N 128.5E	PCN 3		DMSP36		PGTW
29	110218	18.7N 128.4E	PCN 3	T1.0/1.0	DMSP	INIT OBS	PGTW
30	110218	18.6N 128.4E	PCN 3	T1.0/1.5 /W1.0/27HRS	DMSP39		PGTW
31	110954	18.9N 128.2E	PCN 5		DMSP37		PGTW
32	111219	18.9N 128.2E	PCN 2		DMSP36		PGTW
33	111318	18.7N 128.1E	PCN 3		DMSP39		PGTW
34	111318	18.3N 128.5E	PCN 3		DMSP39		RKSO
35	112234	18.6N 127.2E	PCN 3	T1.0/1.0 /S0.0/20HRS	DMSP37		RODN
36	120100	18.3N 127.2E	PCN 3		DMSP36		PGTW
37	122214	17.1N 125.2E	PCN 3		DMSP37		PGTW
38	130043	16.9N 124.6E	PCN 3	T3.0/3.0	DMSP36	INIT OBS	RPMK
39	130043	17.0N 124.6E	PCN 3		DMSP36		PGTW
40	130140	16.9N 124.5E	PCN 3		DMSP39		RPMK
41	130140	16.9N 124.4E	PCN 3	T1.0/1.0	DMSP39	INIT OBS	PGTW
42	131054	15.9N 123.0E	PCN 4		DMSP37		PGTW
43	131326	15.6N 122.4E	PCN 5		DMSP36		PGTW
44	131325	15.6N 122.3E	PCN 3		DMSP36		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	082027	15.8N 130.1E	700MB	3047			110 32 080 15	10 3			+13 +12	5
2	082153	15.8N 130.1E	700MB	3046	993	40 330 15	100 37 360 15	5 3			+12 +14 +11	5
3	090828	15.9N 129.8E	700MB	3026	990	55 270 10	160 51 070 12	5 5			+13 +15 +11	6
4	091947	17.3N 129.2E	700MB	3004			170 35 090 30	5 5			+18 +14 +11	7
5	092140	17.4N 129.2E	700MB	3010		50 060 20	160 38 060 30	5 5			+18 +14 +11	7
6	101906	18.3N 128.6E	700MB	3035			210 27 230 15	6 2			+19 +10	9
7	102213	18.5N 128.6E	700MB	3071		35 140 75	230 30 140 90	4 5			+15 +19 + 8	9
8	110540	18.6N 128.4E	700MB	3065		35 210 30	060 30 320 90	5 10			+15 +11	10
9	110825	18.6N 128.5E	700MB	3079	995	20 180 30	150 17 010 30	5 5			+12 +16 +10	10
10	120615	18.1N 126.8E	1500FT		1003	40 220 30	040 48 010 180	4 5			+23 +25 +24	11
11	120658	18.2N 126.5E	700MB	3129	1001			4 10				11

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	070000	9.9N 141.5E	15	180	

TROPICAL DEPRESSION 26

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	292255	13.2N 154.6E	PCN 3		DMSP36	LL EXP	PGTW
2	301137	16.1N 154.5E	PCN 5		DMSP36	ULCC	PGTW
3	302238	18.7N 152.5E	PCN 3	T2.0/2.0	DMSP36	INIT OBS	PGTW
4	010056	18.7N 152.0E	PCN 3		DMSP39		PGTW
5	010807	20.3N 152.2E	PCN 6		DMSP37		PGTW
6	011119	20.4N 151.1E	PCN 6		DMSP36		PGTW
7	011156	20.5N 151.0E	PCN 5		DMSP39		PGTW
8	012048	22.5N 150.6E	PCN 5		DMSP37		PGTW
9	012219	22.6N 151.0E	PCN 5	T1.0/2.0-/W1.0/24HRS	DMSP36		PGTW
10	012219	23.9N 149.8E	PCN 5		DMSP36	RELOCATED	PGTW
11	020037	24.3N 149.7E	PCN 3		DMSP39	LLCC	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	011913	23.0N 149.8E	700MB	3091			270 27 200 40	4 6			+15	3
2	012149	23.8N 149.8E	700MB	3102	1001	40 090 5	260 35 200 20	4 3			+11 +14 + 6	3

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	021200	28.2N 152.1E	15	120	

TYPHOON ABBY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	302238	6.5N 162.0E	PCN 5	T1.5/1.5	DMSP36	INIT OBS	PGTW
2	010807	6.0N 161.2E	PCN 6		DMSP37		PGTW
3	011119	5.7N 161.9E	PCN 5		DMSP36		PGTW
4	011156	5.6N 162.2E	PCN 5		DMSP39		PGTW
5	012219	5.7N 160.2E	PCN 5	T3.0/3.0 /D1.5/24HRS	DMSP36		PGTW
6	020746	6.1N 159.2E	PCN 6		DMSP37		PGTW
7	021101	5.9N 150.4E	PCN 6		DMSP36		PGTW
8	021136	6.0N 159.5E	PCN 6		DMSP39		PGTW
9	022201	5.9N 159.0E	PCN 5		DMSP36		PGTW
10	030018	6.0N 159.2E	PCN 5	T3.5/3.5 /D0.5/26HRS	DMSP39		PGTW
11	031042	6.7N 159.5E	PCN 6		DMSP36		PGTW
12	031117	6.7N 159.4E	PCN 6		DMSP39		PGTW
13	031619	5.9N 158.8E	PCN 6		TIROSN		KGWC
14	032324	8.0N 159.4E	PCN 3		DMSP36		PGTW
15	032358	8.0N 158.5E	PCN 3	T4.0/4.0 /D0.5/24HRS	DMSP39		PGTW
16	041024	8.3N 156.1E	PCN 6		DMSP36		PGTW
17	041058	8.2N 156.0E	PCN 6		DMSP39		PGTW
18	042306	8.4N 153.9E	PCN 5		DMSP36		PGTW
19	042339	8.5N 153.9E	PCN 5	T4.0/4.0 /S0.0/24HRS	DMSP39		PGTW
20	051147	7.7N 152.8E	PCN 5		DMSP36		PGTW
21	051220	7.5N 152.5E	PCN 6		DMSP39	APRNT LLC INDICATED TO N	PGTW
22	051739	7.7N 150.7E	PCN 6		TIROSN		KGWC
23	052248	8.4N 151.1E	PCN 5		DMSP36	2ND CIRC AT 08.4N 150.4E	PGTW
24	052319	8.9N 151.2E	PCN 5	T4.0/4.0 /S0.0/24HRS	DMSP39		PGTW
25	061129	9.3N 150.4E	PCN 5		DMSP36	UL CNTR AT 10.5N 147.9E	PGTW
26	061201	9.5N 150.5E	PCN 5		DMSP39		PGTW
27	061728	10.2N 149.0E	PCN 6		TIROSN		KGWC
28	070011	10.0N 145.7E	PCN 5	T3.5/4.0 /W0.5/25HRS	DMSP36		PGTW
29	070042	10.0N 145.6E	PCN 5		DMSP39		PGTW
30	071111	10.3N 146.3E	PCN 5		DMSP36		PGTW
31	071141	10.3N 146.2E	PCN 5		DMSP39		PGTW
32	072352	11.4N 144.5E	PCN 5	T2.5/3.5 /W1.0/24HRS	DMSP36		PGTW
33	080022	11.5N 143.7E	PCN 5	T2.5/2.5	DMSP39	INIT OBS	RODN
34	080022	11.5N 144.3E	PCN 5		DMSP39		PGTW
35	081234	12.3N 141.8E	PCN 5		DMSP36		PGTW
36	081303	12.1N 139.6E	PCN 5		DMSP39	UPR LVL	RODN
37	081303	12.2N 141.8E	PCN 5		DMSP39		PGTW
38	082334	11.5N 130.4E	PCN 5	T3.0/3.0 /D0.5/24HRS	DMSP36		PGTW
39	090144	11.4N 138.8E	PCN 5		DMSP39		PGTW
40	091216	10.0N 135.4E	PCN 5		DMSP36		PGTW
41	091244	9.8N 134.9E	PCN 5		DMSP39		RODN
42	091244	10.0N 135.2E	PCN 5		DMSP39		PGTW
43	091837	11.5N 135.2E	PCN 4		TIROSN		KGWC
44	100058	11.3N 133.5E	PCN 5		DMSP36		PGTW
45	100125	11.3N 133.4E	PCN 5	T4.0/4.0 /D1.0/26HRS	DMSP39		PGTW
46	101157	12.2N 132.6E	PCN 5		DMSP36		PGTW
47	101157	12.2N 132.5E	PCN 5		DMSP36		RODN
48	101224	12.4N 132.3E	PCN 5		DMSP39		PGTW
49	101826	13.8N 131.3E	PCN 4		TIROSN		KGWC
50	110039	13.9N 130.6E	PCN 5		DMSP36		PGTW
51	110105	14.0N 130.4E	PCN 4	T4.5/4.5	DMSP39	INIT OBS	RPMK
52	110106	13.9N 130.4E	PCN 3	T5.0/5.0-/D1.0/24HRS	DMSP39		PGTW
53	111320	15.2N 130.4E	PCN 1		DMSP36		PGTW
54	111346	15.1N 130.4E	PCN 2		DMSP39		PGTW
55	111346	15.2N 130.3E	PCN 1	T5.0/5.0	DMSP39	INIT OBS	RODN
56	120021	16.4N 130.7E	PCN 1		DMSP36		PGTW
57	120046	16.5N 130.6E	PCN 1	T5.0/5.0 /S0.0/23HRS	DMSP39		PGTW
58	120046	16.6N 130.4E	PCN 1	T5.0/5.0 /D0.5/24HRS	DMSP39		RPMK
59	120227	16.7N 130.9E	PCN 1		DMSP39		RPMK
60	120700	17.3N 130.2E	PCN 2		TIROSN		KGWC
61	121302	18.2N 132.4E	PCN 3		DMSP36		PGTW
62	121327	18.4N 132.1E	PCN 3		DMSP39		RPMK
63	121327	18.3N 132.4E	PCN 3		DMSP39		PGTW
64	130003	19.9N 134.7E	PCN 3	T4.5/5.0 /W0.5/23HRS	DMSP36		PGTW
65	130208	20.0N 135.3E	PCN 3		DMSP39		PGTW
66	130208	20.1N 135.2E	PCN 1	T4.0/5.0 /W1.0/26HRS	DMSP39		RODN
67	131244	21.6N 138.5E	PCN 5		DMSP36		PGTW
68	131308	21.6N 138.5E	PCN 5		DMSP39		PGTW
69	131308	21.8N 139.2E	PCN 5		DMSP39		RODN
70	131753	21.9N 139.8E	PCN 6		TIROSN		KGWC
71	132345	22.0N 142.5E	PCN 1	T4.0/4.0 /S0.0/22HRS	DMSP36		RODN
72	132345	22.1N 142.1E	PCN 5		DMSP36		PGTW
73	140007	22.1N 142.5E	PCN 5	T4.0/4.5 /W0.5/24HRS	DMSP39		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB 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) OUT/ IN/ DP/SST	MSN NO.
1	012216	5.8N 160.4E	700MB		996	45 050 15	090 36 020 50	3 5			+26 +26 +23	1
2	022010	6.3N 159.1E	700MB	3075		60 050 05	090 89 360 12	2 5			+ 9 +11	2
3	030920	6.6N 159.2E	700MB	3064	998		130 39 360 25	3 5			+ 9 +10 + 9	3
4	031302	6.6N 159.0E	700MB	3049	995		150 38 110 20	2 2			+10 +14	3
5	032130	7.9N 158.8E	700MB	3050	992	55 030 15	150 40 070 60	5 5			+ 9 +14 +10	4
6	040108	8.2N 158.2E	700MB	3050	994	50 010 25	050 41 340 90	5 5			+11 +14 +10	4
7	040718	8.1N 156.9E	700MB	3019	989	50 340 10	360 50 270 56	5 5			+ 8 +14 +10	5
8	050159	8.2N 154.9E	700MB		986	80 270 30	090 53 330 20	2 5			+14 +18 +10	6
* 9	050940	7.6N 153.4E	700MB	3101			120 53 330 60	3 9			+12 +13 +12	7
10	051300	7.7N 153.4E	700MB	3089			140 59 050 15	6 3			+13 + 9	7
11	051421	7.7N 152.5E	700MB	3070	1001		120 50 350 60	7 4			+12 +12 +12	7
12	052150	8.3N 151.9E	700MB	3136	1000	50 090 30	070 45 310 50	2 4			+10 +14 + 6	8

13	060051	8.8N 151.9E	700MB	3135		35	170	35	090	41	360	90	2	3							8
14	060215	9.0N 151.7E	700MB	3123	1002	30	220	30	120	41	360	90	5	5			+14	+14	+ 7		8
15	060835	9.4N 150.9E	700MB	3094	1000	40	290	30	050	47	290	150	10	5			+10	+13	+12		9
16	061205	9.3N 149.7E	700MB	3099					130	10	240	30						+13	+10		9
* 17	061402	9.4N 148.4E	700MB	3098	1002				260	28	160	135	5	20			+14	+11	+10		9
* 18	062030	9.4N 146.1E	700MB	3080		25	350	25	090	51	350	120	4	5							10
19	062127	10.0N 146.8E	700MB		995	50	050	25	140	52	050	22	4	20			+25	+25	+22	27	10
* 20	071503	10.2N 144.7E	700MB	3059	996				230	30	150	20	5	5			+12	+13	+10		12
21	071907	10.9N 144.8E	700MB	3053					140	33	090	90	5	5				+15	+ 9		12
22	072128	11.1N 144.8E	700MB	3062	996	35	020	50	150	43	040	80	4	5			+13	+15	+11		12
23	080553	12.2N 143.6E	700MB	3084		30	020	30	110	34	020	35	5	5							13
24	080858	11.9N 142.4E	700MB	3092					180	27	100	110	10	5			+16	+13	+10		13
25	081938	11.3N 139.7E	700MB	3045					150	23	070	5	15	10				+13	+10		14
26	082126	11.6N 139.9E	700MB	3084		25	230	15	140	22	070	60	10	5				+15	+ 9		14
27	090617	11.2N 137.6E	700MB	3066		35	300	30	100	39	300	40	4	5				+16	+ 7		15
28	090812	10.5N 136.3E	700MB	2992	988	40	360	5	110	74	360	10	9	5	CIRCULAR	12	+ 9	+15	+ 6		15
29	091934	10.9N 134.4E	700MB	2925					080	61	330	30	5	5				+15	+ 9		16
30	092207	11.1N 134.2E	700MB	2935		60	190	25	150	55	090	30	5	3							16
31	102247	13.5N 130.9E	700MB	2797	964	80	120	35	170	78	120	35	4	5			+12	+21	+ 9		18
32	110554	14.3N 130.2E	700MB	2792		75	300	10	310	85	230	60	5	5				+15	+10		19
33	110827	14.4N 130.1E	700MB	2776	963	75	030	13	250	76	140	76	5	5			+15	+15	+10		19
34	112149	15.9N 130.3E	700MB	2682	954	100	110	30	200	105	130	30	5	5			+18	+18	+11		20
35	122105	19.4N 133.8E	700MB	2681					320	84	270	15	4	3							22
36	122214	19.5N 134.0E	700MB	2669	951	90	310	30	220	106	120	30	5	3					+14		22
37	130806	20.7N 136.8E	700MB	2762	962	110	180	20	260	118	170	25	5	7	CIRCULAR	30	+13	+19	+ 9		23
38	131938	22.1N 141.4E	700MB	2934					180	75	060	30	5	5				+17	+ 9		24
39	132220	22.2N 142.0E	700MB	3002		80	350	50	230	45	080	30	5	10			+ 8	+17	+ 9		24
40	140737	22.7N 145.5E	1500FT		1001	40	270	15	230	39	070	45	4	2							25

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	290000	7.0N 169.0E	15	100	
2	300000	7.0N 164.5E	15	120	
3	141200	23.0N 148.0E	20	200	

TROPICAL STORM BEN

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	200134	11.7N 132.0E	PCN 5		DMSP39		PGTW
2	201217	11.7N 130.9E	PCN 5		DMSP36		PGTW
3	210059	11.5N 127.0E	PCN 3	T2.0/2.0-	DMSP36	INIT OBS	PGTW
4	210114	11.5N 126.9E	PCN 3		DMSP39		PGTW
5	210114	11.5N 126.7E	PCN 5	T2.0/2.0	DMSP39	INIT OBS	RPMK
6	211340	11.7N 123.8E	PCN 5		DMSP36		RODN
7	211355	11.6N 123.8E	PCN 5		DMSP39		PGTW
8	211356	11.6N 123.7E	PCN 5		DMSP39		RPMK
9	211356	11.6N 123.8E	PCN 5		DMSP39		RODN
10	220041	12.4N 121.4E	PCN 5	T3.5/3.5-/D1.5/24HRS	DMSP36		PGTW
11	220236	13.1N 121.0E	PCN 5	T3.5/3.5	DMSP39	INIT OBS	RODN
12	220237	12.5N 120.9E	PCN 5	T3.0/3.0 /D1.0/25HRS	DMSP39		RPMK
13	220652	13.6N 119.4E	PCN 6		TIROSN		KGWC
14	221322	13.9N 119.1E	PCN 5		DMSP36		PGTW
15	221336	13.9N 119.2E	PCN 5		DMSP39		PGTW
16	230023	15.9N 119.3E	PCN 5	T2.5/3.5 /W1.0/24HRS	DMSP36		PGTW
17	230204	15.7N 119.6E	PCN 5		DMSP36		RODN
18	230217	16.3N 119.7E	PCN 5		DMSP39		PGTW
19	230217	15.5N 119.3E	PCN 5	T2.5/3.0 /W0.5/24HRS	DMSP39		RPMK
20	230640	18.0N 121.3E	PCN 6		TIROSN		KGWC
21	231304	20.0N 123.9E	PCN 5		DMSP36		PGTW
22	231317	20.0N 124.1E	PCN 5		DMSP39		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700MB HGT	OBS 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) OUT/ IN/ DP/SST	MSN NO.
1	210620	11.5N 125.8E	700MB	3047	992	50 030 20	100 46 330 60	4 5				+11 +11	1
2	212225	12.5N 122.3E	700MB			60 360 10	210 38 120 60	3 4					2
3	220813	13.4N 119.8E	700MB	3013	996	70 320 10	120 72 060 15	1 3				+13 + 8	4
4	222239	15.5N 119.4E	700MB	3052	995	70 020 12	170 56 090 15	2 2	CIRCULAR	25		+14 + 9	6

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
1	210710	12.0N 125.2E	LAND				1051/ /////		10.3N 124.0E	98646
2	210840	12.0N 125.2E	LAND				10510 5////		10.3N 124.0E	98646
3	211108	12.0N 124.2E	LAND				12013 52714		10.3N 124.0E	98646
4	211200	11.9N 123.9E	LAND				10330 52618		10.3N 124.0E	98646
5	211300	11.9N 123.4E	LAND				25250 52620		10.3N 124.0E	98646
6	220700	13.5N 119.9E	LAND	FAIR	CIRCULAR	28			15.2N 120.6E	98327
7	221900	15.2N 119.4E	LAND		CIRCULAR				15.2N 120.6E	98327

2. NORTH INDIAN OCEAN CYCLONE FIX DATA

TC 17-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	052354	6.5N	89.7E	PCN 6	T1.0/1.0	DMSP37	CNTR BASED ON UPR LVL OUTFLOW	KGWC
2	061240	7.7N	87.6E	PCN 6	T1.0/1.0	DMSP37	POSIT BASED UPR LVL ANTICYCLONE	KGWC
3	061705	8.5N	88.5E	PCN 6	T1.0/1.0	DMSP35	INIT OBS	KGWC
4	070121	7.6N	88.4E	PCN 6	T1.0/1.0	DMSP37		KGWC
5	070549	6.9N	87.8E	PCN 6	T2.5/2.5 /D1.5/30HRS	DMSP		KGWC
6	071220	6.9N	86.8E	PCN 6		DMSP37	EDGE OF DATA POSIT BASED CURV	KGWC
7	071547	7.0N	86.7E	PCN 6		DMSP35		KGWC
8	080100	5.9N	86.1E	PCN 4	T3.0/3.0 /D0.5/19HRS	DMSP37	APPRNT LOW LVL CIRC	KGWC
9	080528	5.7N	86.3E	PCN 1	T4.0/4.0 /D1.5/24HRS	DMSP35		KGWC
10	081341	6.1N	86.4E	PCN 1		DMSP37	STORM ON EAST EDGE OF PICTURE	KGWC
11	081810	7.2N	86.7E	PCN 2		DMSP		KGWC
12	090040	7.2N	86.3E	PCN 2		DMSP37	EYE COVERED BY THIN CI CANOPY	KGWC
13	090840	7.8N	87.5E			TIROSN	EYE DISTORTED	FJDG
14	091321	9.7N	86.0E	PCN 4	T3.5/4.0-/W0.5/24HRS	DMSP37	CTR BASED ON CU BANDS	KGWC
15	091751	10.2N	85.5E	PCN 1		DMSP	EYE RAGGED	KGWC
16	100021	10.7N	84.6E	PCN 1		DMSP37		KGWC
17	100451	11.6N	84.5E	PCN 1	T5.0/5.0 /D1.0/24HRS	DMSP35	EYE EMBEDDED	KGWC
18	101302	12.1N	83.6E	PCN 2		DMSP	GOOD EYE GOOD CI OUTFLOW	KGWC
19	101734	12.6N	83.4E	PCN 1		DMSP	EYE WELL DEFINED	KGWC
* 20	102115	13.0N	87.2E			TIROSN	EYE WELL DEFINED EST. DTG	FJDG
* 21	102124	9.4N	84.3E			TIROSN	EYE NOT VSBL	FJDG
22	110001	12.6N	82.5E	PCN 2	T5.0/5.0 /D1.5/24HRS	DMSP37	EYE ON EDGE OF DATA	KGWC
23	110142	12.7N	83.3E	PCN 2		DMSP37	EYE WELL DEFINED	KGWC
24	110615	13.3N	82.7E	PCN 2	T6.0/6.0 /D1.0/26HRS	DMSP35	EYE WELL DEFINED AND EMBEDDED	KGWC
25	111001	14.3N	80.5E			TIROSN	EYE WELL DEFINED	FJDG
26	111241	14.1N	82.0E	PCN 2	T6.0/6.0 /D1.0/24HRS	DMSP37	EYE NOT VSBL DUE TO CI CANOPY	KGWC
27	111715	13.9N	81.2E	PCN 1		DMSP	W EDGE OF DATA CI CAP OVER EYE	KGWC
28	120122	14.3N	81.0E	PCN 4		DMSP37	CDO MORE OVAL	KGWC
29	120556	14.7N	80.8E	PCN 4		DMSP35	EYE NOT VSBL GOOD CI OUTFLOW	KGWC
* 30	121135	15.5N	78.9E			TIROSN	EYE DEFINABLE EST. DTG	FJDG
31	121402	16.2N	79.1E	PCN 4		DMSP37	EYE NOT VSBL	KGWC
32	130102	16.9N	78.0E	PCN 6		DMSP37	UPR LVL ANTICYCLONE	KGWC
33	130538	16.0N	77.4E	PCN 6	T3.0/4.0-/W2.0/24HRS	DMSP35		KGWC

TC 18-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	170645	18.0N	69.2E	PCN 6	T1.0/1.0	DMSP35	INIT OBS/ANTICYCLONE ALOFT	KGWC
* 2	171349	18.7N	71.1E	PCN 6		DMSP37		KGWC
3	171927	17.6N	66.0E	PCN 6		DMSP35		KGWC
4	180230	18.2N	65.0E	PCN 6		DMSP37	UPR LVL ANTICYCLONE CI OUTFLOW	KGWC
5	180627	17.7N	64.2E	PCN 4	T2.0/2.0 /D1.0/24HRS	DMSP35		KGWC
* 6	181100	18.1N	60.0E			TIROSN		KNSS
7	181511	18.2N	62.9E	PCN 6		DMSP37		KGWC
8	181909	18.5N	62.6E	PCN 6		DMSP35	POSIT BASED ON EXTRAP	KGWC
9	190000	18.0N	59.9E			TIROSN		KNSS
10	190210	18.0N	60.7E	PCN 6		DMSP37		KGWC
11	190608	18.2N	60.1E	PCN 5	T2.5/2.5 /D0.5/24HRS	DMSP35		KGWC
12	190750	18.3N	59.3E	PCN 5		DMSP35	ON EDGE OF DATA	KGWC
* 13	191139	18.7N	57.0E			TIROSN		KNSS
14	191450	19.0N	59.5E	PCN 5	T2.5/2.5 /D0.5/24HRS	DMSP37	BASED ON EXPOSED LLC	KGWC
15	191950	19.1N	59.7E	PCN 6		DMSP35	POSIT BASED ON EXTRAP	KGWC
16	192300	19.0N	58.0E			TIROSN		KNSS
17	200150	19.1N	57.6E	PCN 6	T2.0/2.5 /W0.5/24HRS	DMSP37		KGWC
18	200731	19.3N	56.6E	PCN 5		DMSP35		KGWC
* 19	201430	21.4N	54.9E	PCN 6		DMSP37	POSIT BASED ON EXTRAP	KGWC
* 20	210419	19.4N	57.1E	PCN 5	T1.0/2.0 /W1.0/27HRS	DMSP37		KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION		INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	171200	17.5N	67.0E	30	40	
2	171800	18.0N	65.5E	30	20	
* 3	190600	19.0N	59.0E	45	60	
4	191200	19.0N	60.0E	35	80	
* 5	211800	21.0N	56.5E	15	200	

TC 22-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
* 1	211200	8.5N	84.0E			TIROSN		KNSS
2	211340	11.5N	85.4E	PCN 6		DMSP37	INIT DMS	KGWC
3	211602	12.0N	85.2E	PCN 6		DMSP39	INIT DMS	KGWC
* 4	220039	14.6N	87.2E	PCN 6	T1.5/1.5	DMSP37		KGWC
* 5	220100	13.5N	83.1E			TIROSN		KNSS
6	220443	14.3N	84.0E	PCN 6		DMSP39		KGWC
7	221320	15.0N	82.8E	PCN 6	T1.5/1.5	DMSP37	INIT DMS	KGWC
8	221543	15.2N	82.4E	PCN 6		DMSP39	INIT DMS	KGWC
9	230413	16.8N	81.2E	PCN 6	T1.5/1.5	DMSP36	INIT DMS/PSN BASED ON CONV	KGWC
10	230424	16.9N	81.3E	PCN 6	T1.0/1.5 /W0.5/24HRS	DMSP39	PSN BASED ON CENTER OF CONV	KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION		INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	200000	9.0N	88.0E	20	250	
2	201200	10.0N	87.0E	20	200	

TC 23-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	180559	12.4N	71.8E	PCN 5	T1.0/1.0	DMSP39	INIT DMS/CENTER BASED ON LLCC	KGWC
* 2	181441	12.6N	70.1E	PCN 6		DMSP37		KGWC
3	190140	14.4N	70.4E	PCN 5	T2.0/2.0 /D1.0/24HRS	DMSP37		KGWC
4	190443	14.1N	71.3E	PCN 5		DMSP36		KGWC
* 5	190541	14.1N	71.9E	PCN 5		DMSP39		KGWC
* 6	191421	14.0N	69.0E	PCN 6		DMSP37		KGWC
* 7	191640	13.5N	68.7E	PCN 6		DMSP39		KGWC
8	200120	14.4N	70.3E	PCN 6	T0.5/1.5 /W1.5/24HRS	DMSP37	PSN BSD ON CNTR OF CONV/NO LLC	KGWC
9	200512	15.6N	70.4E	PCN 6		DMSP39		KGWC
* 10	201015	15.0N	69.0E			TIROSN		KNSS
11	201400	15.9N	69.8E	PCN 6		DMSP37		KGWC
12	201606	16.2N	69.4E	PCN 6		DMSP36	PSN BSD ON APPRNT LLCC	KGWC
13	210059	16.7N	69.0E	PCN 6		DMSP37	PSN BSD ON APPRNT LLCC	KGWC
14	210321	16.9N	69.5E	PCN 4		DMSP39		KGWC
15	211100	18.0N	68.0E	PCN 4		TIROSN		KNSS
16	211340	17.9N	69.4E	PCN 6	T1.0/1.0 /D0.5/24HRS	DMSP37		KGWC
* 17	211447	16.6N	67.0E			TIROSN		FJDJ
18	220039	18.5N	66.2E	PCN 3	T3.0/3.0 /D2.0/24HRS	DMSP37		KGWC
* 19	220100	17.7N	65.4E			TIROSN		KNSS
20	220221	18.5N	66.2E	PCN 3		DMSP37		KGWC
21	220625	18.8N	65.7E	PCN 3		DMSP39		KGWC
22	221130	19.0N	64.2E			TIROSN		KNSS
23	221501	19.4N	64.3E	PCN 6		DMSP37	UPR LVL OUTFLOW GOOD	KGWC
24	221712	20.2N	63.3E	PCN 6		DMSP36		KGWC
25	221724	19.3N	63.5E	PCN 6	T3.0/3.0 /D2.0/24HRS	DMSP39	PSN BASED ON CENTROID OF CDO	KGWC
26	230200	19.7N	62.4E	PCN 4	T2.0/3.0 /W1.0/24HRS	DMSP37		KGWC
27	230413	19.6N	62.3E	PCN 3		DMSP36		KGWC
28	230606	19.7N	63.2E	PCN 3		DMSP39	PSN BASED ON EXPOSED LLC	KGWC
29	231100	19.1N	61.0E			TIROSN		KNSS
30	231441	20.0N	61.0E	PCN 6	T2.0/3.0 /W1.0/24HRS	DMSP37		KGWC
31	231705	20.3N	60.8E	PCN 6		DMSP39	POSIT BSD ON EXTRAP	KGWC
32	240140	20.4N	60.1E	PCN 3	T1.0/2.0 /W1.0/24HRS	DMSP37		KGWC
33	240354	20.3N	60.0E	PCN 3		DMSP36		KGWC
34	240547	19.9N	59.4E	PCN 3		DMSP39	GOOD LL CLD LINE/NO CDO	KGWC
35	241421	19.8N	58.8E	PCN 6		DMSP37	PSN-DS BSD ON LL CU LINE	KGWC
* 36	241646	18.6N	58.1E	PCN 6		DMSP39	CONV NIL/POSIT BSD ON LLC	KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION		INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	241800	20.0N	57.0E	10	200	

TC 24-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	281424	10.2N	92.5E	PCN 6	T0.5/0.5	DMSP39	INIT OBS	KGWC
2	282358	10.5N	91.5E	PCN 6	T1.5/1.5	DMSP37		KGWC
3	290144	10.9N	90.6E			TIROSN	INIT OBS	FJDJ
4	290333	11.2N	90.7E	PCN 6		DMSP36		KGWC
5	290446	11.5N	90.3E	PCN 6		DMSP39		KGWC
6	291238	12.5N	89.6E	PCN 6		DMSP37		KGWC
7	291546	12.3N	89.3E	PCN 6		DMSP39		KGWC
8	300130	12.1N	89.1E			TIROSN		FJDJ
9	300315	12.5N	88.5E	PCN 5	T1.5/1.5	DMSP36		KGWC
10	300427	13.0N	86.7E	PCN 5	T1.5/1.5 /S0.0/27HRS	DMSP39		KGWC
11	301218	13.4N	85.8E	PCN 6		DMSP37		KGWC
12	301527	12.6N	86.3E	PCN 6		DMSP39		KGWC
13	302230	12.6N	85.9E			DMSP		KNSS
14	310058	13.7N	85.3E	PCN 5	T2.0/2.0 /D0.5/22HRS	DMSP37		KGWC
15	310257	13.9N	84.7E	PCN 5		DMSP36		KGWC
16	310408	13.6N	84.1E	PCN 3		DMSP39		KGWC
17	310900	12.0N	82.5E			TIROSN		FJDJ
18	311339	13.2N	83.2E	PCN 3		DMSP37		KGWC
19	010038	12.3N	81.0E	PCN 5	T2.5/2.5 /D0.5/24HRS	DMSP37		KGWC
20	010530	12.5N	80.6E	PCN 5		DMSP39		KGWC
21	011318	12.9N	79.4E			DMSP37		KGWC
* 22	011630	11.2N	79.4E	PCN 6		DMSP39		KGWC

TC 25-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
* 1	130502	11.3N	72.0E		T0.5	DMSP	INIT OBS	KGWC
* 2	131417	14.6N	70.1E	PCN 6		DMSP37		KGWC
3	131648	13.4N	69.9E	PCN 5		DMSP36		KGWC
4	140116	12.6N	69.5E	PCN 5		DMSP		KGWC
5	140524	12.9N	69.2E	PCN 5	T0.5/0.5 /S0.0/26HRS	DMSP39		KGWC
6	141356	15.0N	68.5E	PCN 6		DMSP37		KGWC
7	150505	13.1N	70.5E	PCN 3	T0.5/0.5 /S0.0/24HRS	DMSP39	EXPSD LLCC	KGWC
8	151336	14.9N	69.9E	PCN 6		DMSP37		KGWC
9	151705	15.0N	69.7E	PCN 6		DMSP39		KGWC
10	160216	14.5N	69.5E	PCN 6		DMSP37		KGWC
11	160546	14.7N	69.7E	PCN 3	T1.5/1.5 /D1.0/24HRS	DMSP39	EXPSD LLCC	KGWC
12	161457	16.4N	70.1E	PCN 6		DMSP37		KGWC
13	161646	17.2N	70.9E	PCN 6		DMSP39		KGWC
* 14	170156	17.0N	71.1E	PCN 5		DMSP37		KGWC
15	170527	18.5N	69.8E	PCN 3	T1.0/1.5 /W0.5/24HRS	DMSP39		KGWC
16	171436	19.6N	70.1E	PCN 5		DMSP37		KGWC
17	171626	19.8N	70.2E	PCN 6		DMSP39		KGWC

TC 26-79

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		ACCRY	DVORAK CODE	SATELLITE	COMMENTS	SITE
1	201528	8.0N	94.0E			DMSP39	UPR LVL CNTR	KGWC
2	210033	9.0N	92.5E			DMSP39	UPR LVL CNTR	KGWC
3	210409	10.0N	92.6E			DMSP39		KGWC
4	211314	10.5N	91.8E	PCN 5		DMSP37	INIT OBS	KGWC
5	211509	10.9N	91.8E	PCN 6		DMSP39		KGWC
* 6	211510	7.7N	91.6E			DMSP39		RPMK
7	220013	10.9N	91.6E	PCN 6		DMSP37	ULAC	KGWC
8	221253	10.9N	90.8E	PCN 6		DMSP37	ULAC	KGWC
9	221631	10.8N	88.7E	PCN 6	T0.5/0.5	DMSP39	INIT OBS	KGWC
10	222353	10.7N	88.1E	PCN 6		DMSP37	ULAC	KGWC
11	222353	10.3N	89.2E	PCN 6		DMSP37		RPMK
12	230330	10.0N	88.6E	PCN 5	T0.5/0.5 /S0.5/24HRS	DMSP39		KGWC
13	230331	10.8N	87.5E	PCN 5	T0.0/0.0	DMSP39	INIT OBS	RPMK
* 14	231233	12.0N	84.3E	PCN 5		DMSP37		KGWC
15	231612	10.7N	84.5E	PCN 5		DMSP39	LLCC	KGWC
16	240453	10.3N	82.7E	PCN 3	T2.5/2.5 /D2.0/25HRS	DMSP39	LLCC	KGWC
17	241353	13.5N	80.1E	PCN 6		DMSP37		KGWC
* 18	250052	12.9N	78.9E	PCN 6		DMSP37	ULAC	KGWC
19	250443	13.1N	80.6E	PCN 3	T1.5/2.5 /W1.0/24HRS	DMSP39	LLCC	KGWC
20	251631	15.7N	77.9E	PCN 5		DMSP36		KGWC

APPENDIX

1. CONTRACTIONS

AC&W	Aircraft Control and Warning System
ACCRY	Accuracy
ACFT	Aircraft
AIREP	Aircraft Weather Report(s) (Commerical 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)
CPA	Closest Point of Approach
DEG	Degree(s)
DIAM	Diameter
DIR	Direction
DMSP	Defense Meteorological Satellite Program
EASTPAC	Eastern Pacific
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
NAVPGSCOL	Naval Postgraduate School
NEDN	Naval Environmental Data Network
NEDS	Naval Environmental Display Station
NEPRF	Naval Environmental Prediction Research Facility
NESS	National Environmental Satellite Service
NET	Near Equatorial Trough
NM	Nautical Mile(s)
NOAA	National Oceanic and Atmospheric Administration
NRL	Naval Research Laboratory
NTCC	Naval Telecommunications Center
OBS	Observation(s)
PCN	Position Code Number
PE	Primitive Equation
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
SST	Sea Surface Temperature
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 (Sadler, 1976)
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.

EXPLOSIVE DEEPENING - A decrease in the minimum sea level pressure of a tropical cyclone of 2.5 mb/hr for 12 hrs or 5.0 mb/hr for 6 hrs (ATR 1971).

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.

FUJIWHARA EFFECT - An interaction in which tropical cyclones within about 700 nm of each other begin to rotate cyclonically about one another. When intense tropical cyclones are within about 400 nm of each other, they may also begin to move closer to each other.

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.

RAPID DEEPENING - A decrease in the minimum sea level pressure of a tropical cyclone of 1.25 mb/hr for 24 hrs (ATR 1971).

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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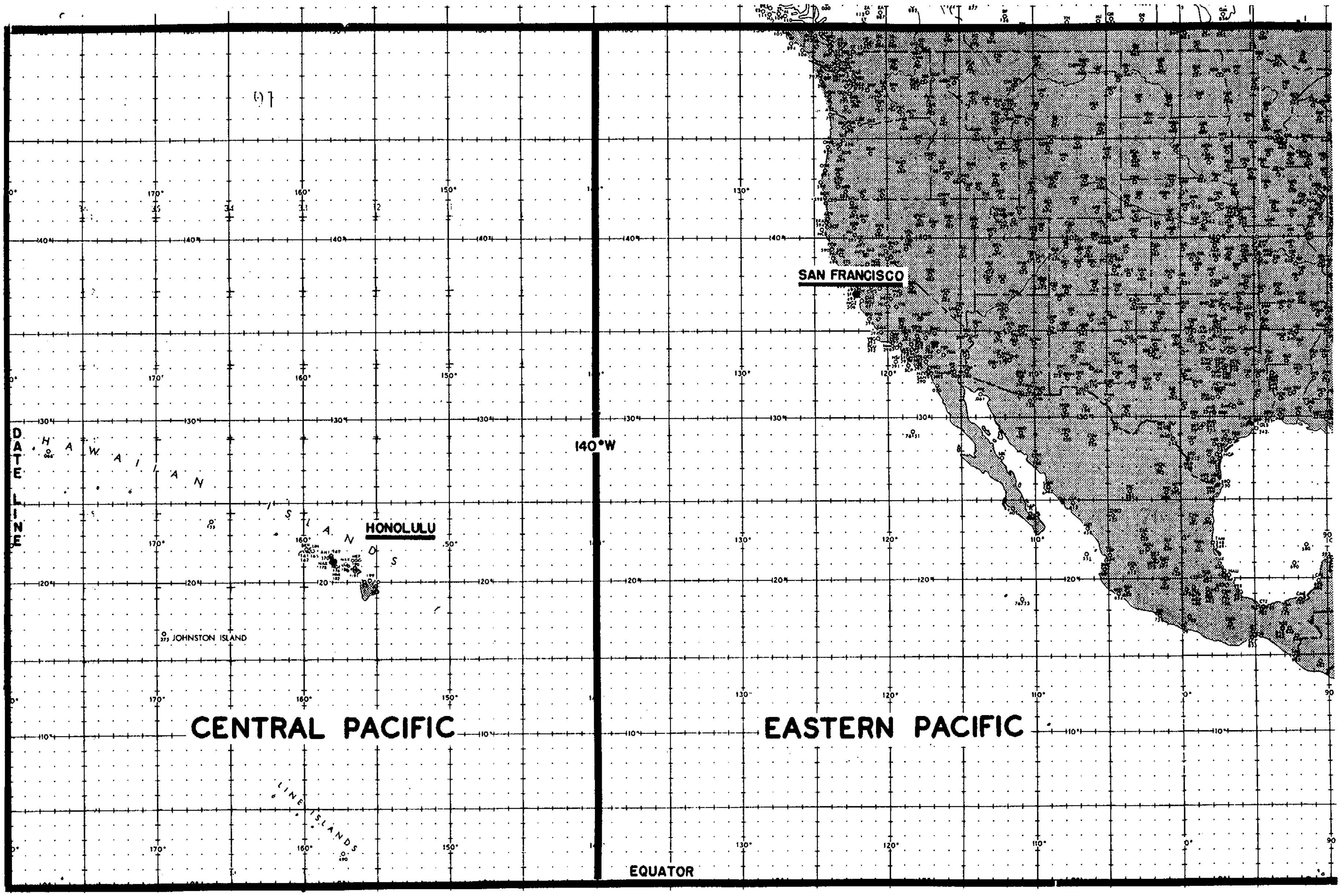

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