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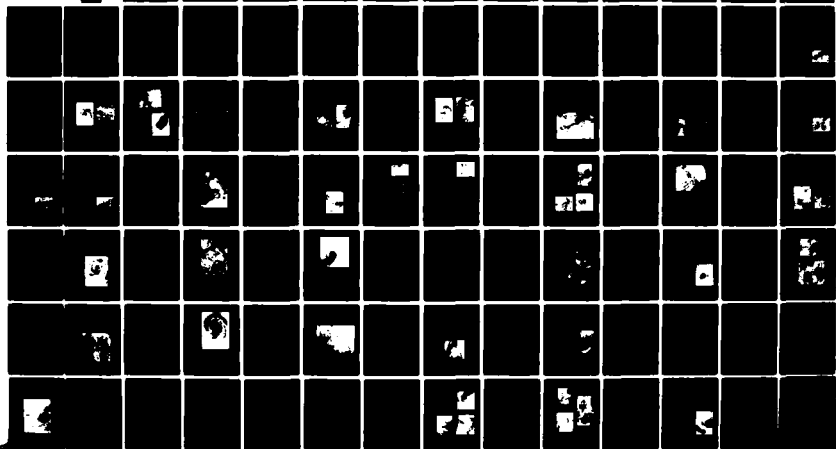
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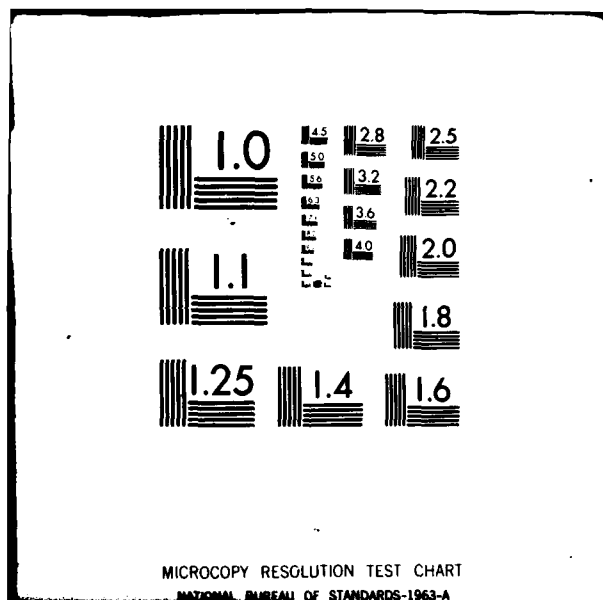
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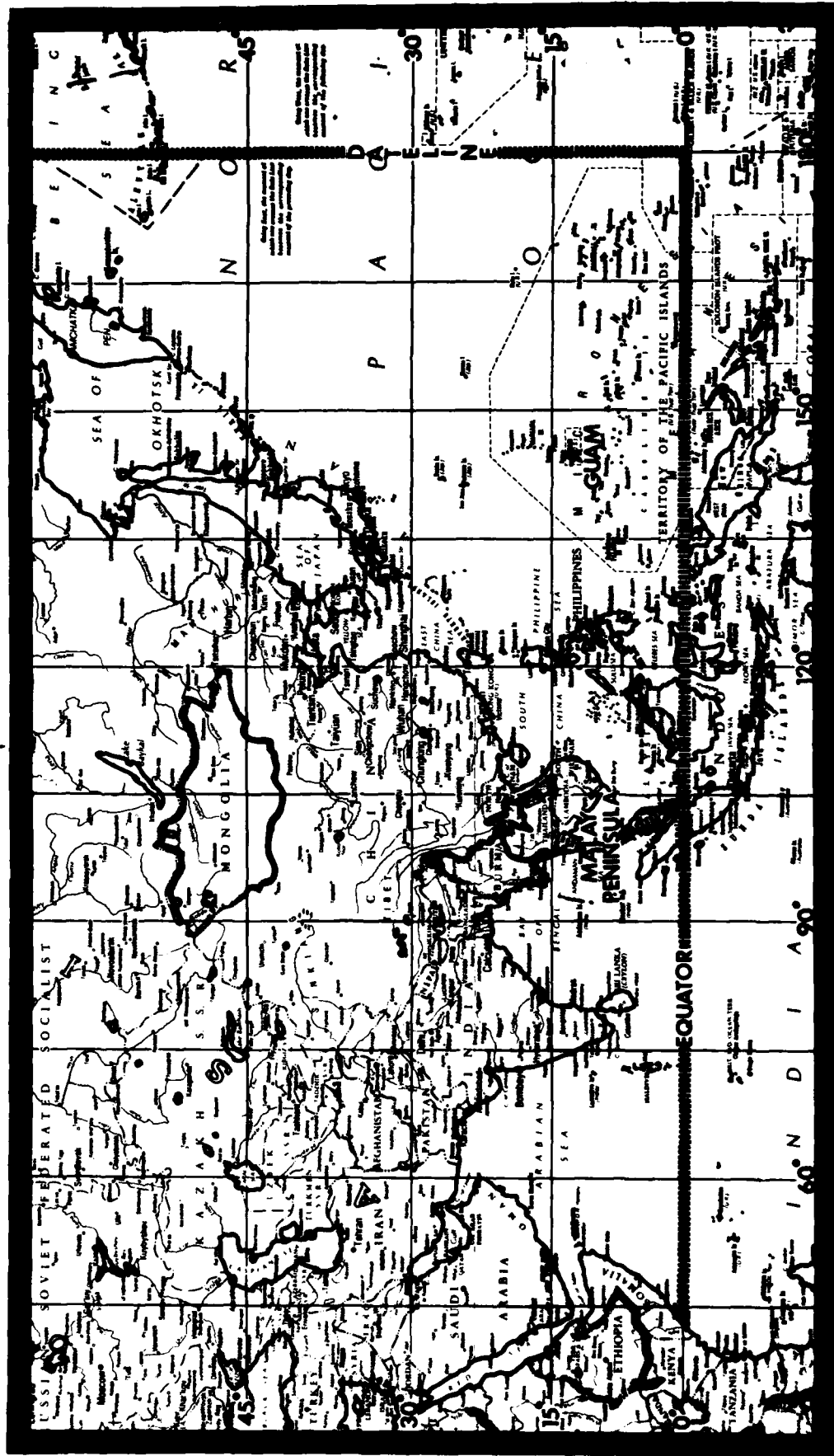
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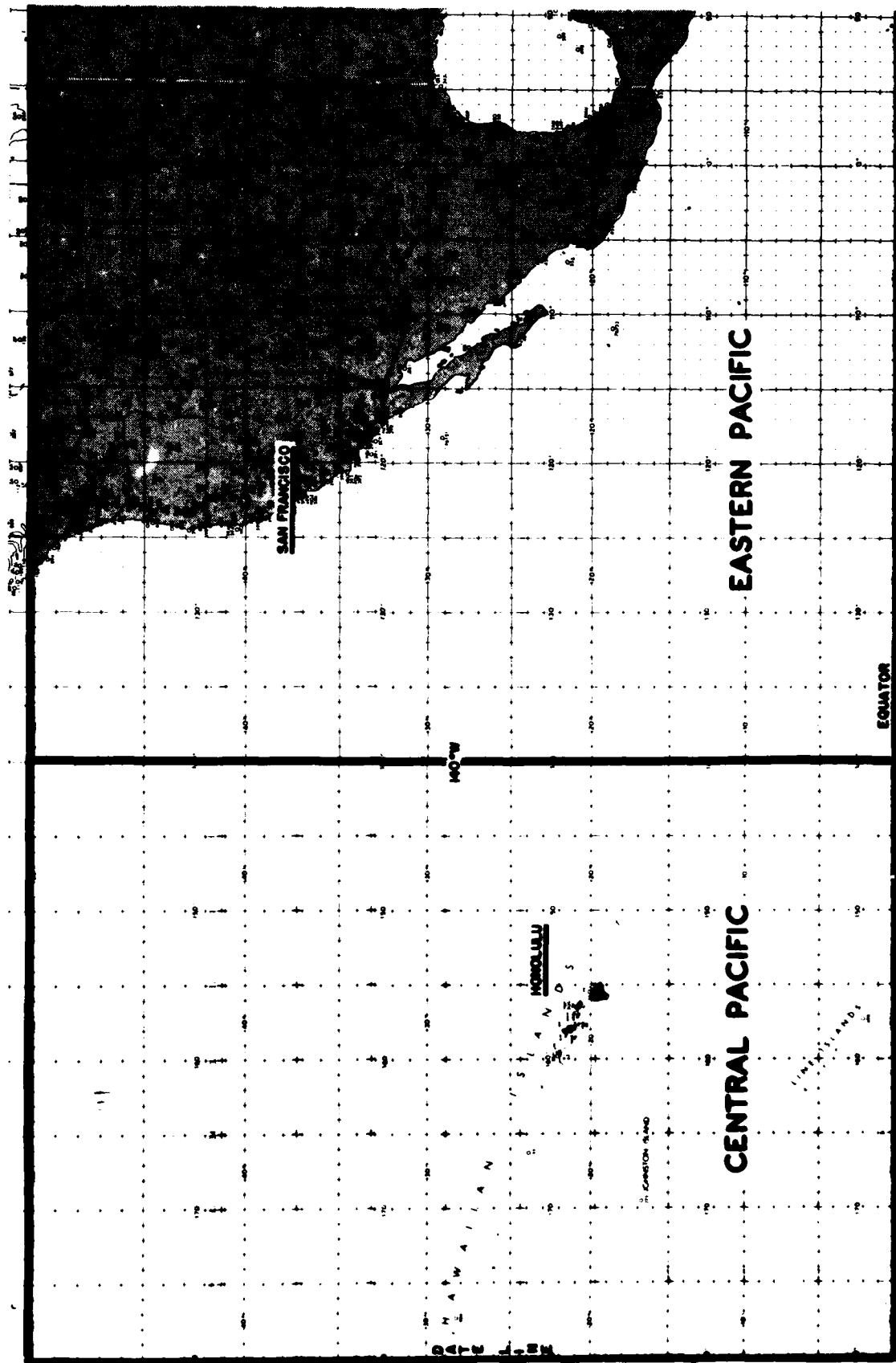
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Indian Ocean Area (Malay Peninsula to Africa)

Pacific Area (Dateline to Malay Peninsula)

AREA OF RESPONSIBILITY - JOINT TYPHOON WARNING CENTER, GUAM



Areas of Responsibility - Central and Eastern Pacific Hurricane Centers

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**CORRECTIONS TO ANNEX B - for 1978 and 79 Annual Typhoon Reports
(ATR)**

**1. The following tropical cyclones have aircraft fix data
(eye characteristics) listed incorrectly:**

1978 ATR

**RITA
VIOLA**

1979 ATR

**VERA
TIP
OWEN**

**2. The diameters of circular and concentric eye walls are
incorrectly listed under the EYE ORIENTATION column. (Only
elliptical eye walls have an orientation specified. These are
specified correctly.) The misplaced diameters must be divided
by 10 to obtain the correct figure and located in the EYE
DIAMETER column.**

Annual Typhoon Report 1979.

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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, LWW 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 TD0. 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, 1LW collocated 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 DMSF 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 DMSF spacecraft: F-1 (late-morning), F-2 (mid-morning), and F-3 (sunrise). In June, a fourth DMSF 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 DMSF 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 DMSF 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 cyclones 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

	<u>AIRCRAFT</u>	<u>DMSP</u>	<u>TIROS-N</u>	<u>GOES3</u>	<u>RADAR</u>	<u>SYNOPTIC</u>	<u>TOTAL</u>
<u>WESTERN PACIFIC</u>							
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
		<u>DMSP</u>	<u>TIROS-N</u>			<u>SYNOPTIC</u>	<u>TOTAL</u>
<u>INDIAN OCEAN</u>							
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)

FOR TROPICAL
TODAY'S T-NUMBER
CURRENT INTENSITY
NUMBER
INDICATION
OF ONGOING
CHANGE
PLUS
T () / () MINUS / S () / () hrs
LEAVE W

EXAMPLE: T5/6 MINUS/W1.5/24hrs.

(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 ARMO 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 ARMO) 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 devel-

oped 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

<u>CYCLONE</u>	<u>TYPE</u>	<u>NAME</u>	<u>PERIOD OF WARNING</u>	<u>CALENDAR DAYS OF WARNING</u>	<u>MAX SFC WIND</u>	<u>MIN OBS SLP</u>	<u>NUMBER OF WARNINGS</u>	<u>DISTANCE TRAVELLED</u>
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	OMEN	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 OB 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.

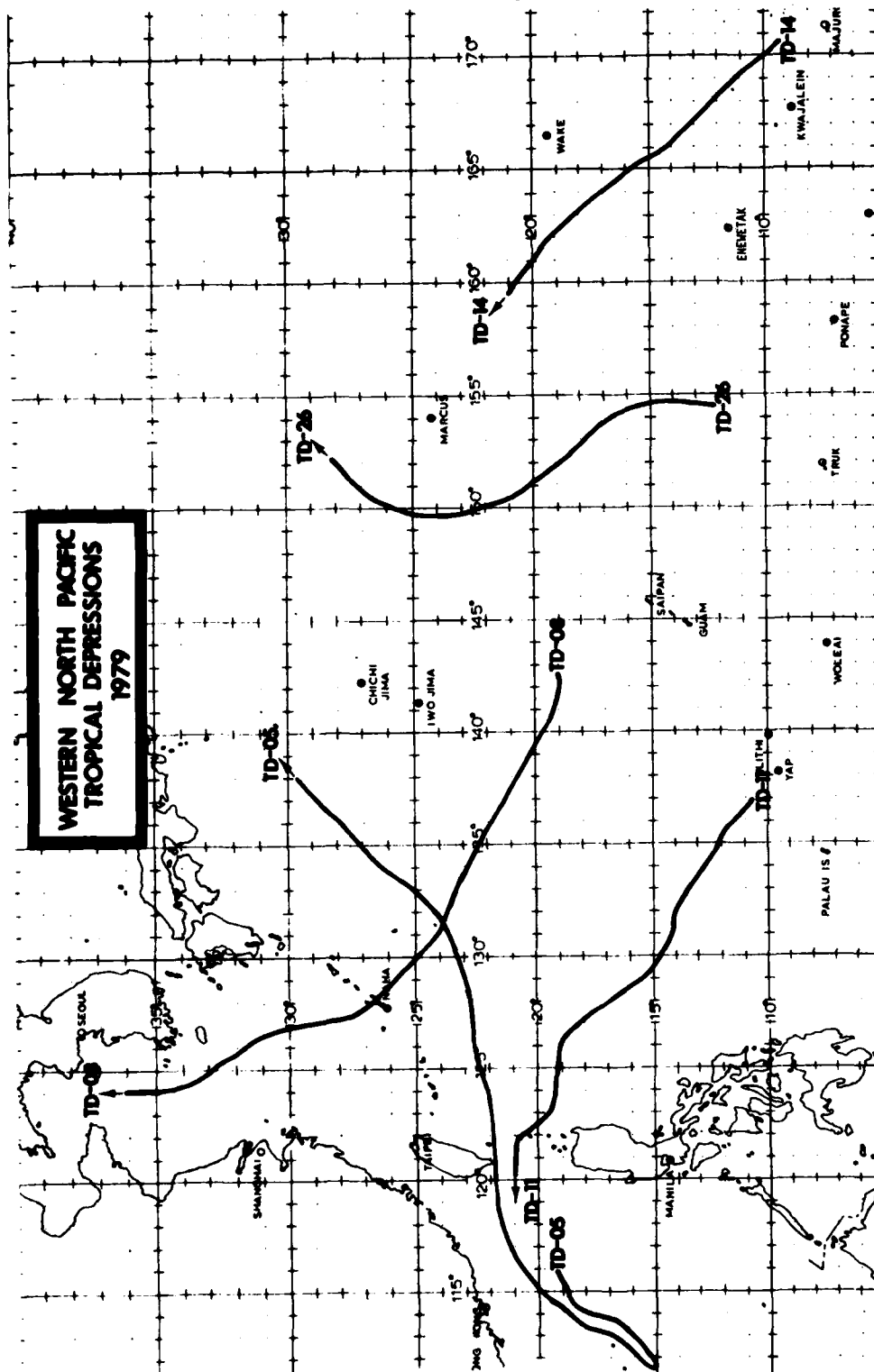
TABLE 3-2.

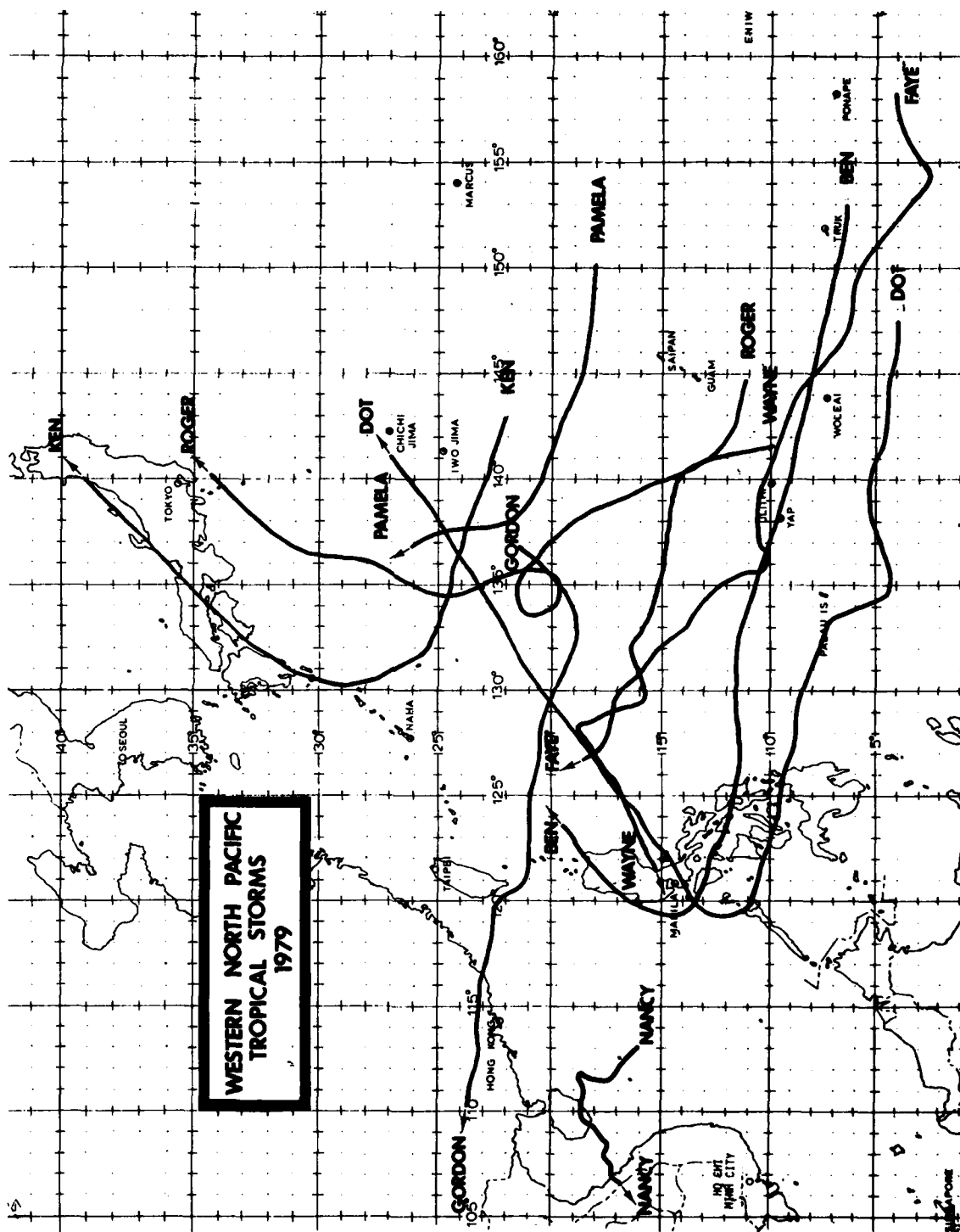
1979 SIGNIFICANT TROPICAL CYCLONE STATISTICS

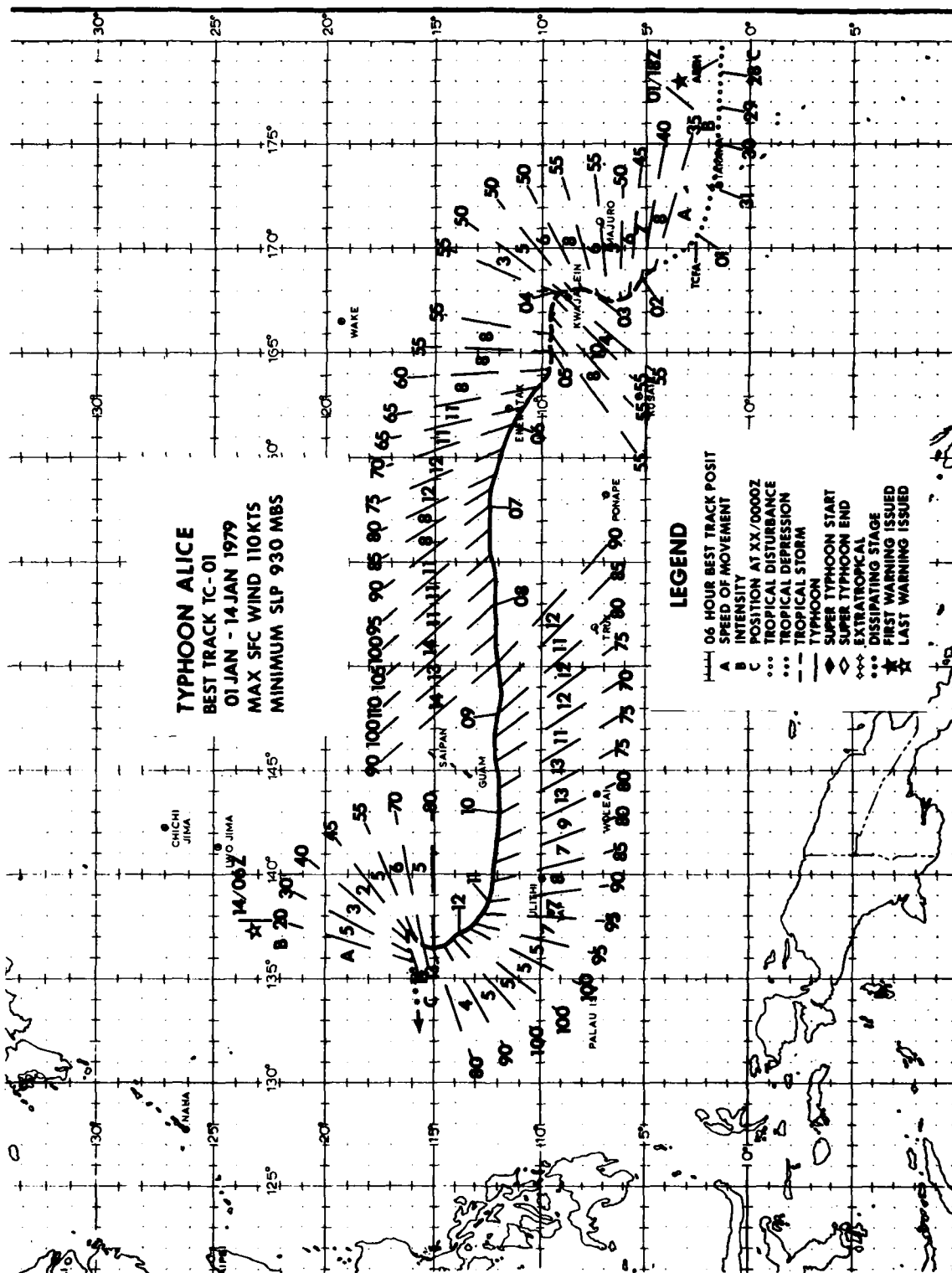
WESTERN NORTH PACIFIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	(1959-78) AVERAGE
TROPICAL DEPRESSIONS	0	0	0	0	1	0	1	2	0	0	0	1	5	4.8
TROPICAL STORMS	0	0	0	0	1	0	2	0	4	1	1	1	10	10.0
TYPHOONS	1	0	1	1	0	0	2	2	2	2	1	1	13	18.0
ALL CYCLONES	1	0	1	1	2	0	5	4	6	3	2	3	28	32.8
(1959-78) AVERAGE	0.6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







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 Eniwetok (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 synop-

tic 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.

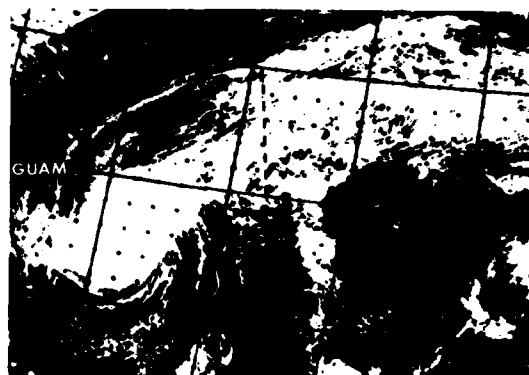
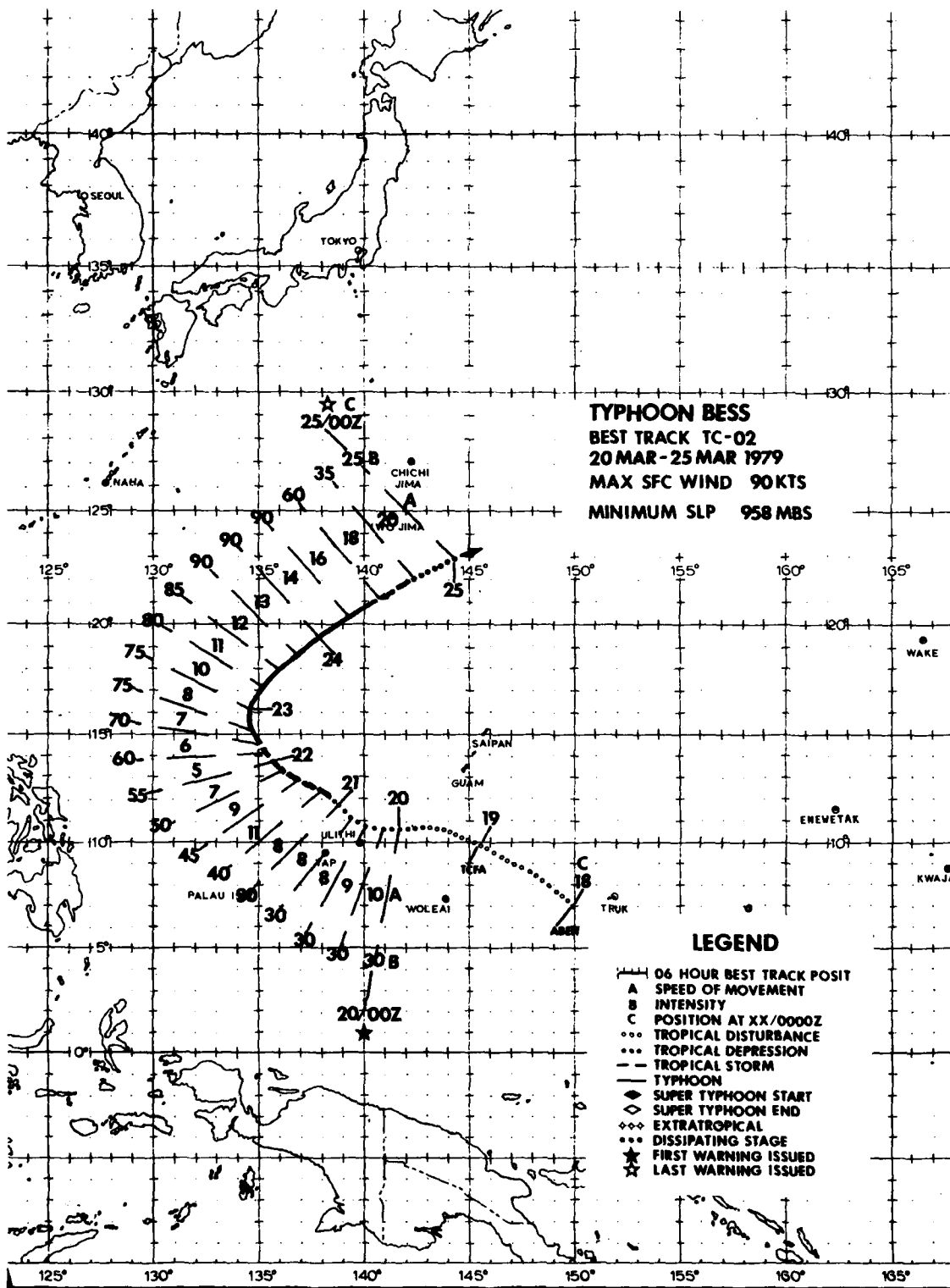


FIGURE 3-01-1. Typhoon Alice merging with the trailing end of a frontal shear-line, 9 January 1979, 0054Z. (DMSP imagery)



TYPHOON BESS (02)

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.

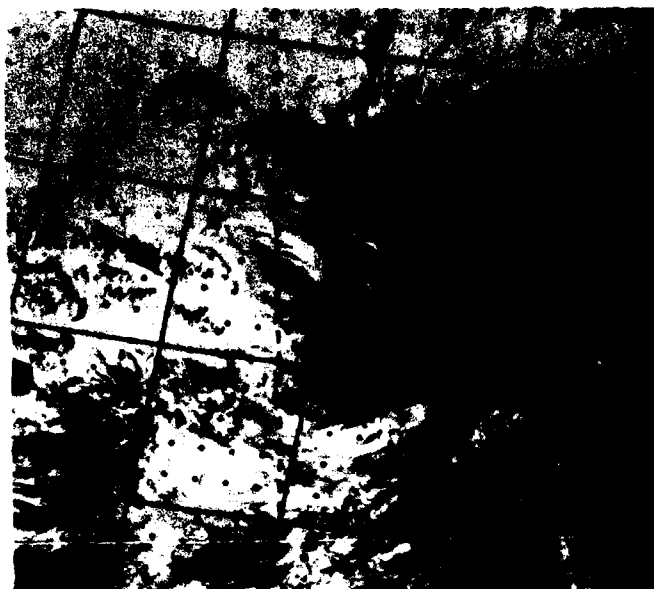


FIGURE 3-02-3. Infrared imagery of Typhoon Bess developing under good upper-level outflow which is visible from the southeast through the northwest, 18 March 1979, 2315Z. (DMSP imagery)

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)

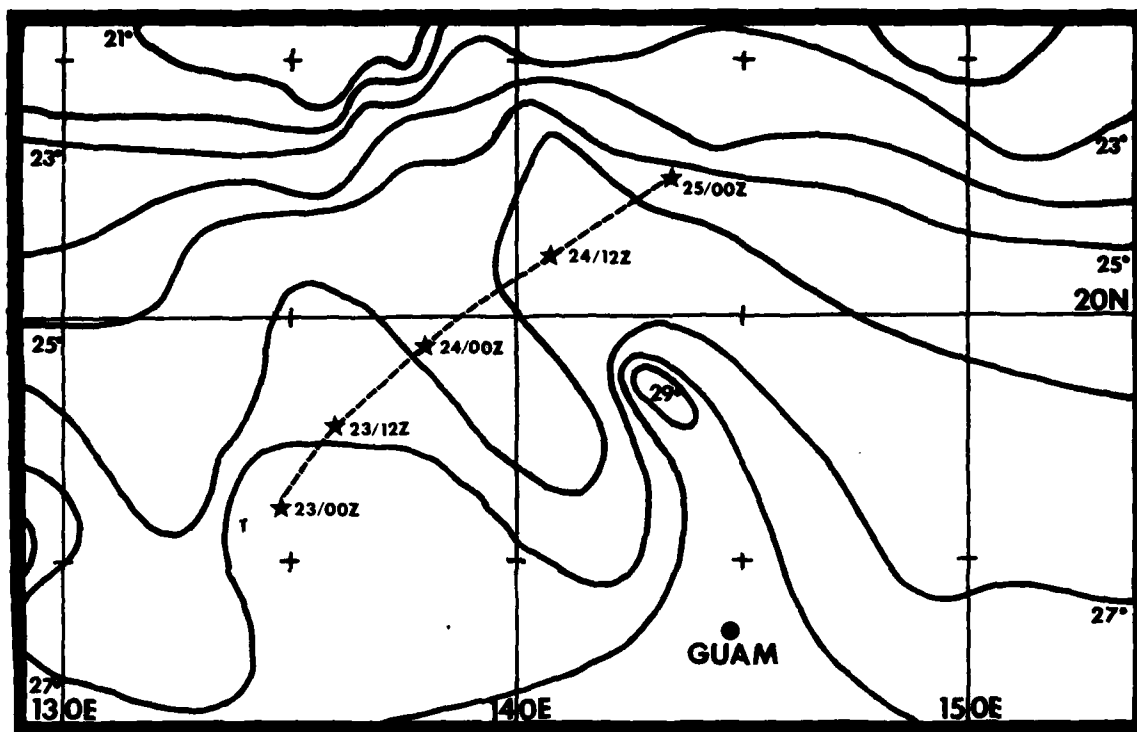
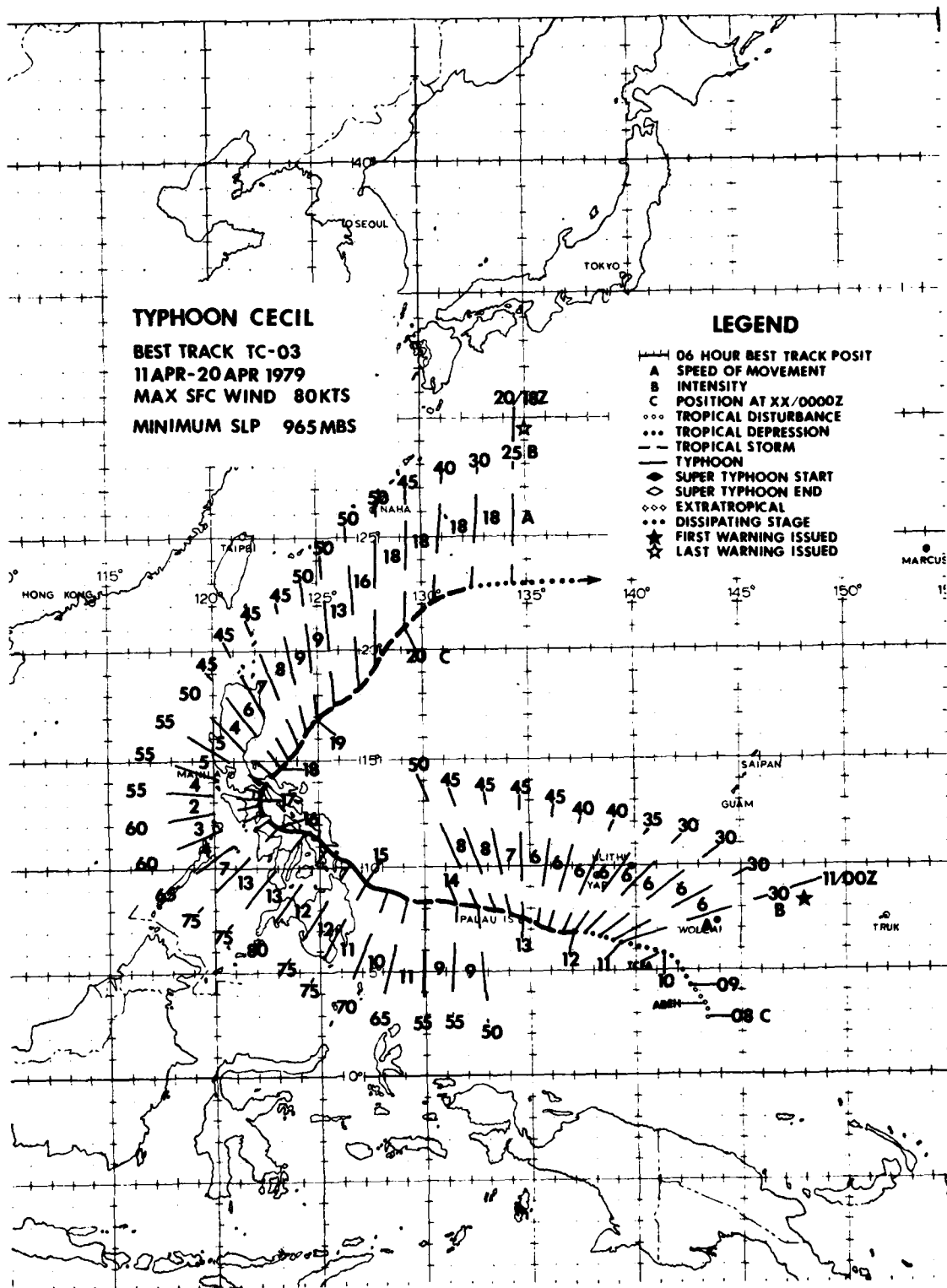


FIGURE 3-02-5. Composite of sea surface temperature analyses from 24-27 March 1979. Northeastward track of Typhoon Bess during dissipation stage is indicated by a dashed line with 12-hour positions.



Typhoon Cecil, 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.

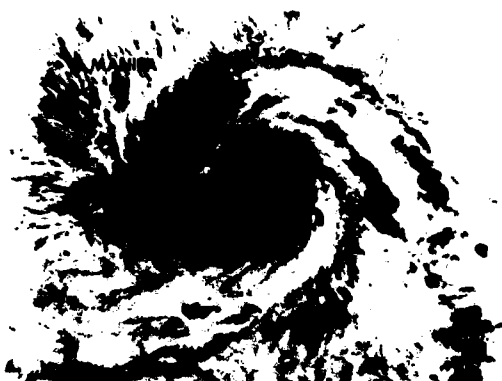


Figure 3-03-1. Infrared imagery of Typhoon Cecil 36 hours prior to recurvature with maximum sustained winds of 80 kt (41 m/sec), 15 April 1979, 1225Z. (DMSP imagery)

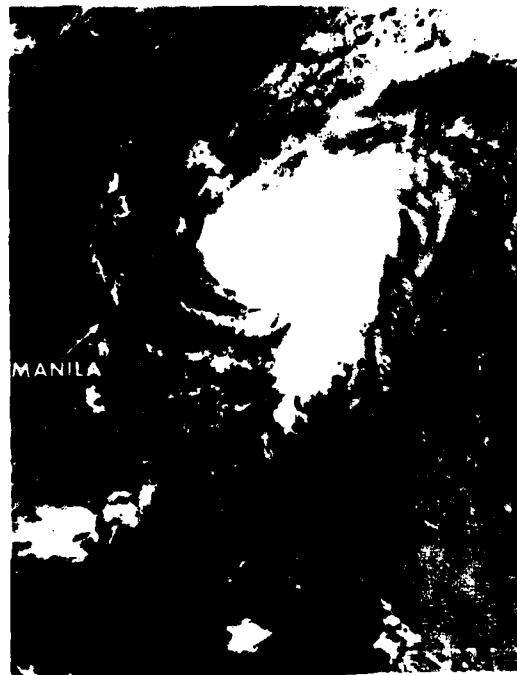
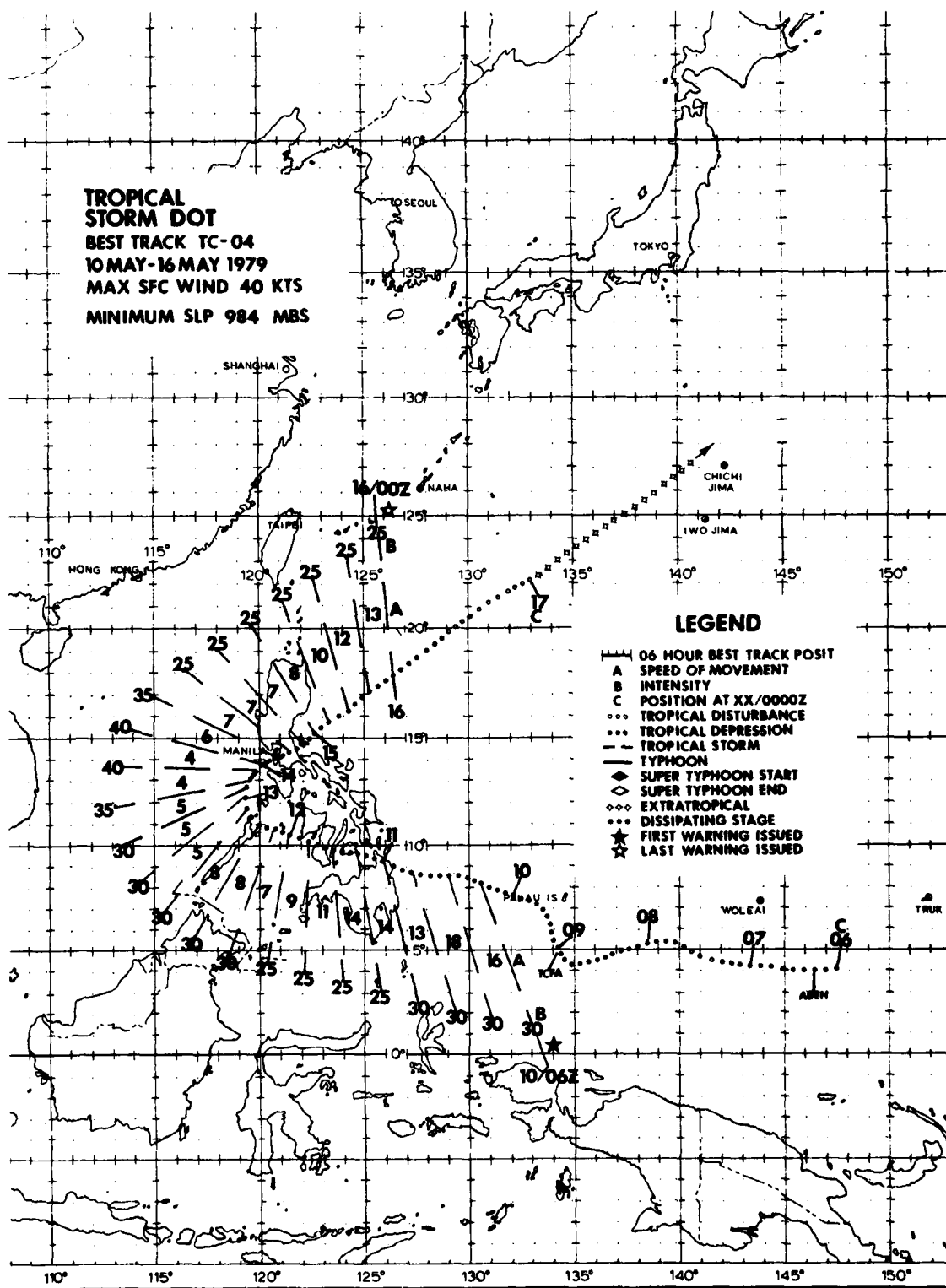


FIGURE 3-03-2. Cecil after recurvature with maximum sustained winds of 50 kt (26 m/sec), 19 April 1979, 0014Z. (DMSP imagery)



TROPICAL STORM DOT (04)

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.

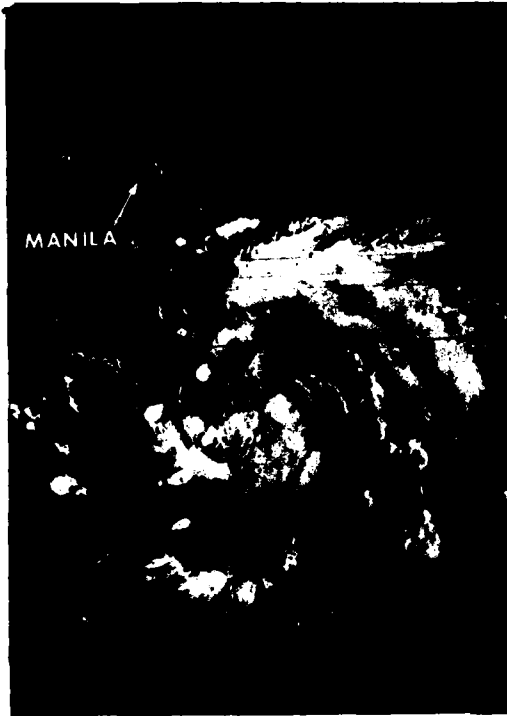
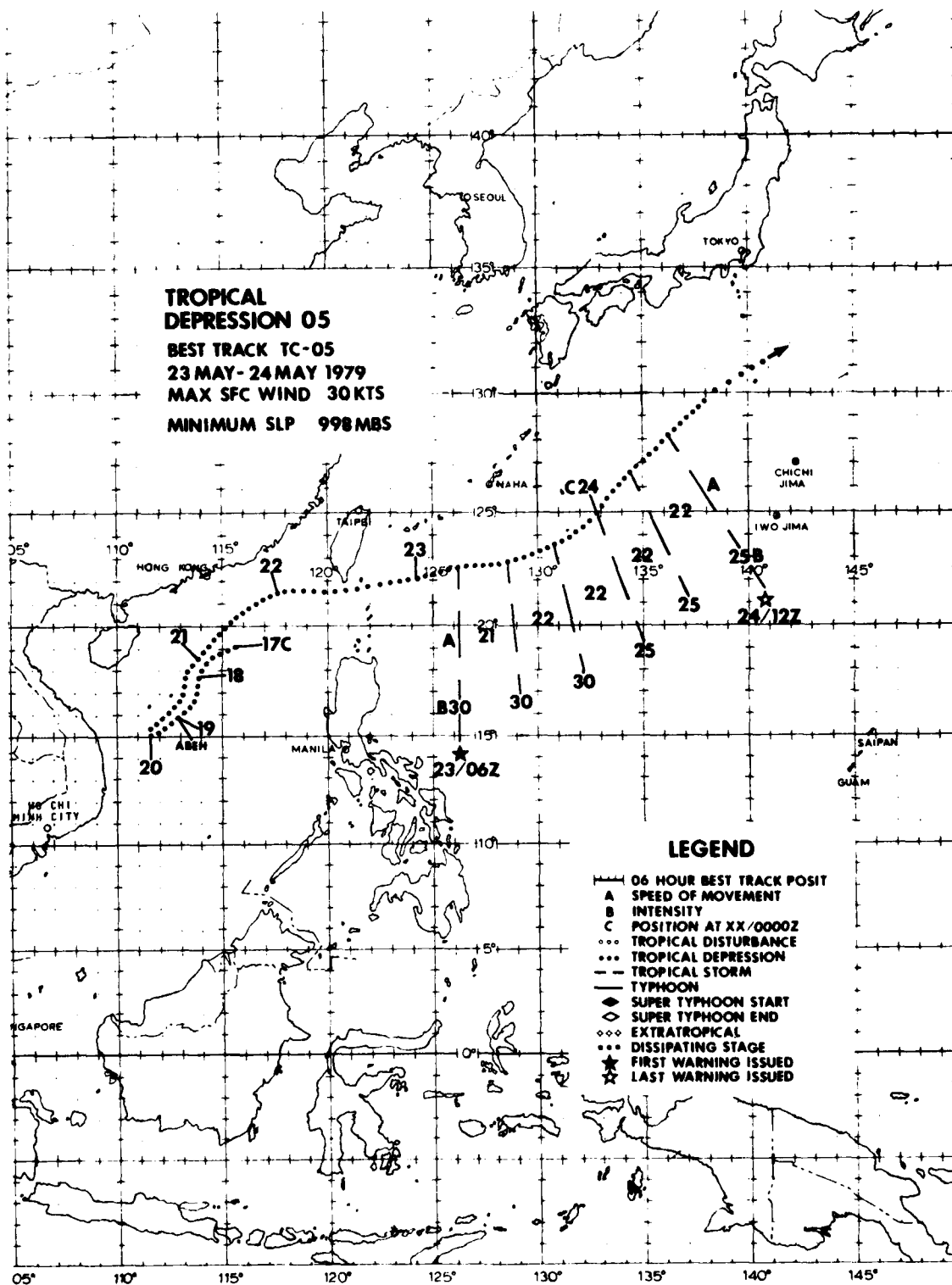


FIGURE 3-04-1. Tropical Storm Dot at 30 kt (15 m/sec) intensity while over northern Mindanao, 11 May 1979, 0029Z. (DMSP imagery)



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



MONSOON/TROPICAL DEPRESSION (05)

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).

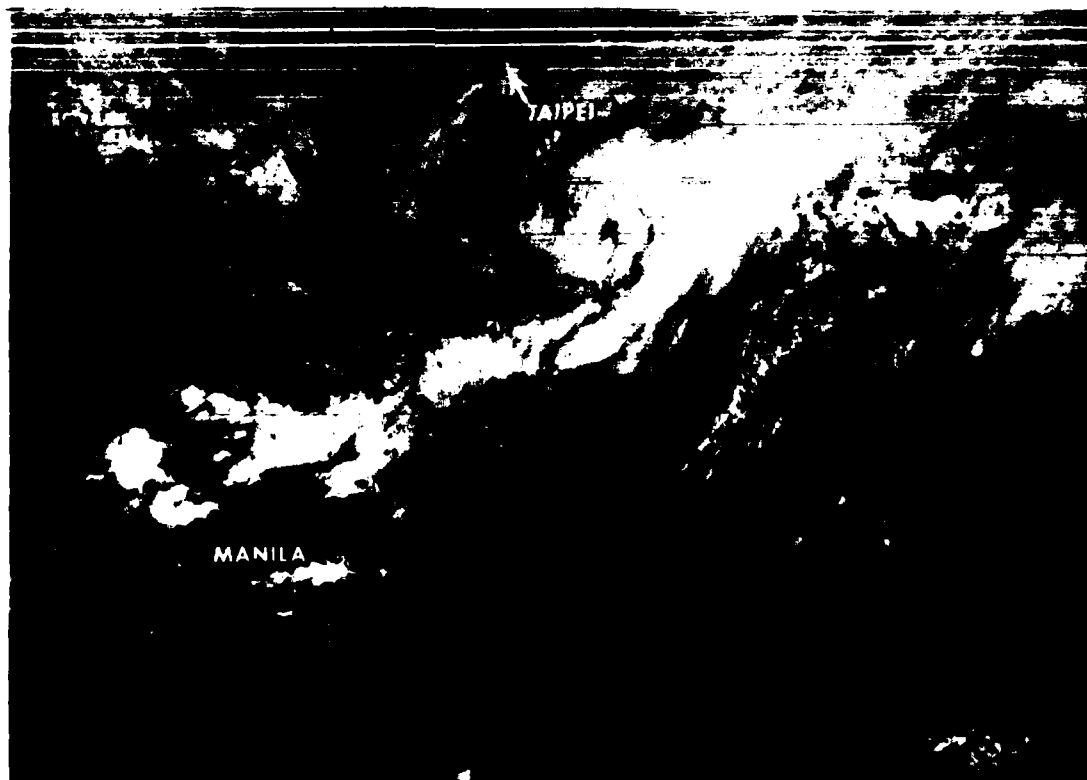
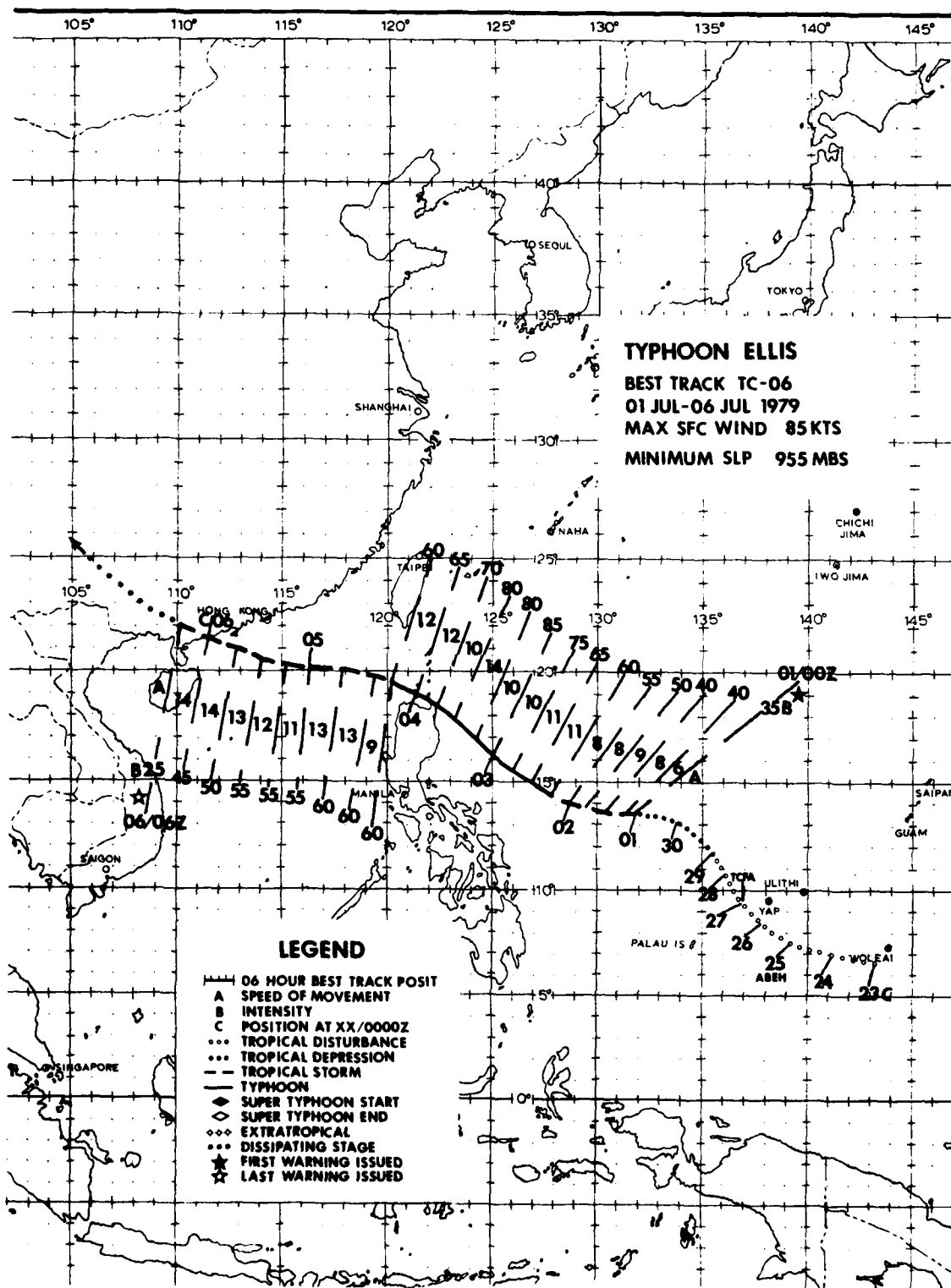


FIGURE 3-05-1. TD 05 at 30 kt (15 m/sec) intensity with banding-type eye moving east-northeastward at 20 kt (37 km/hr), 23 May 1979, 0018Z. (DMSP imagery)



TYPHOON ELLIS (06)

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.

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.

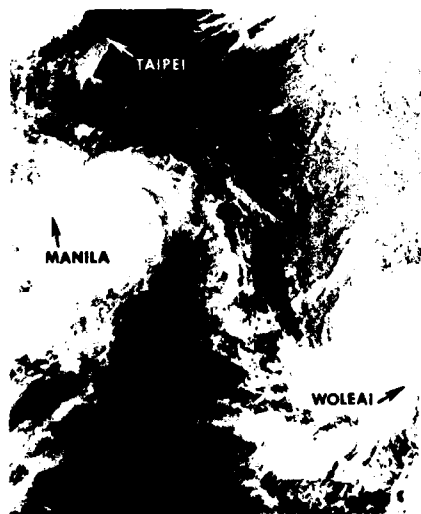


FIGURE 3-06-1. Typhoon Ellis (left) at maximum intensity of 85 kt (44 m/sec), 2 July 1979, 2356Z. TS Faye (right) is developing north of Woleai. (DMSP imagery)

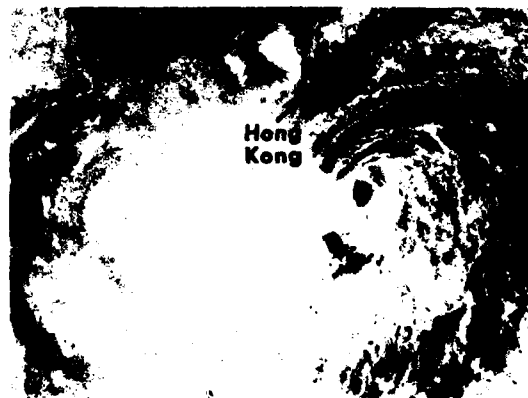


FIGURE 3-06-2. Tropical Storm Ellis as an exposed low-level circulation in the South China Sea, 5 July 1979, 0101Z. (DMSP imagery from Det 5, 14W, Clark AB, RP)

TROPICAL STORM FAYE (07)

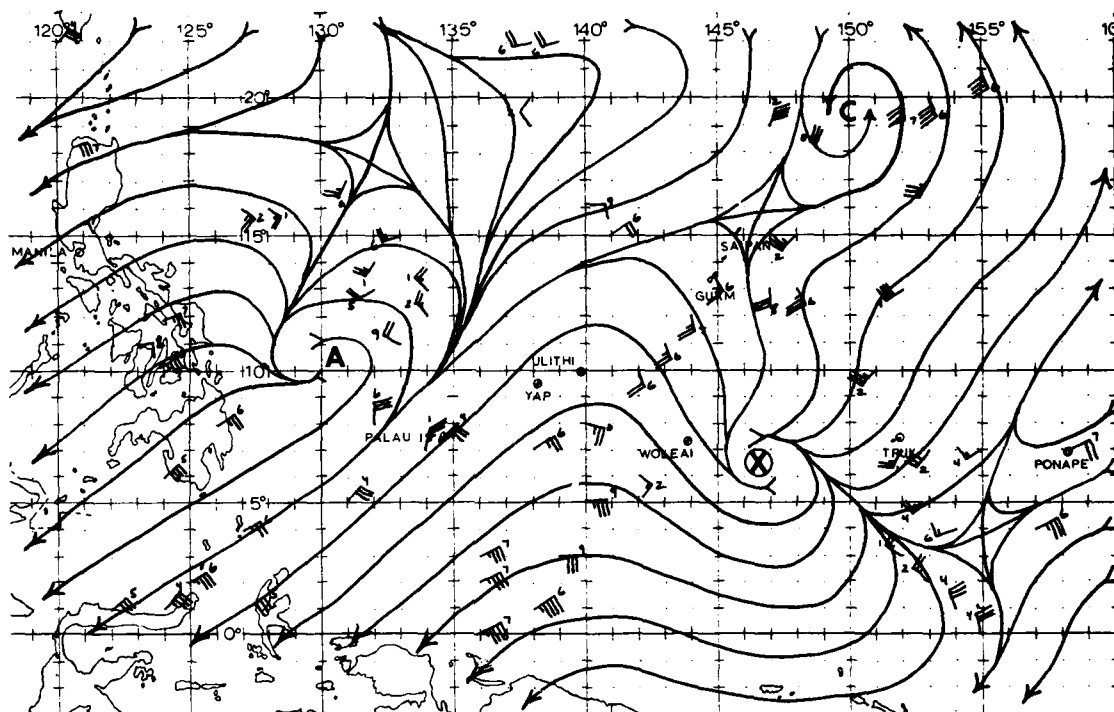


FIGURE 3-07-1. Upper-level streamline analysis at 020000Z July 1979.

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.

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

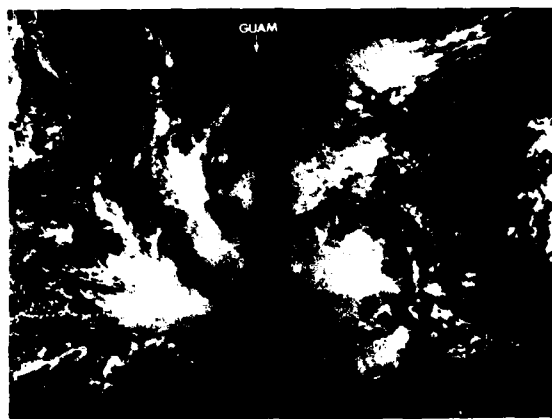


FIGURE 3-07-2. The tropical depression that was to become TS Faye, 02 July 1979, 0022Z. (DMSP imagery)

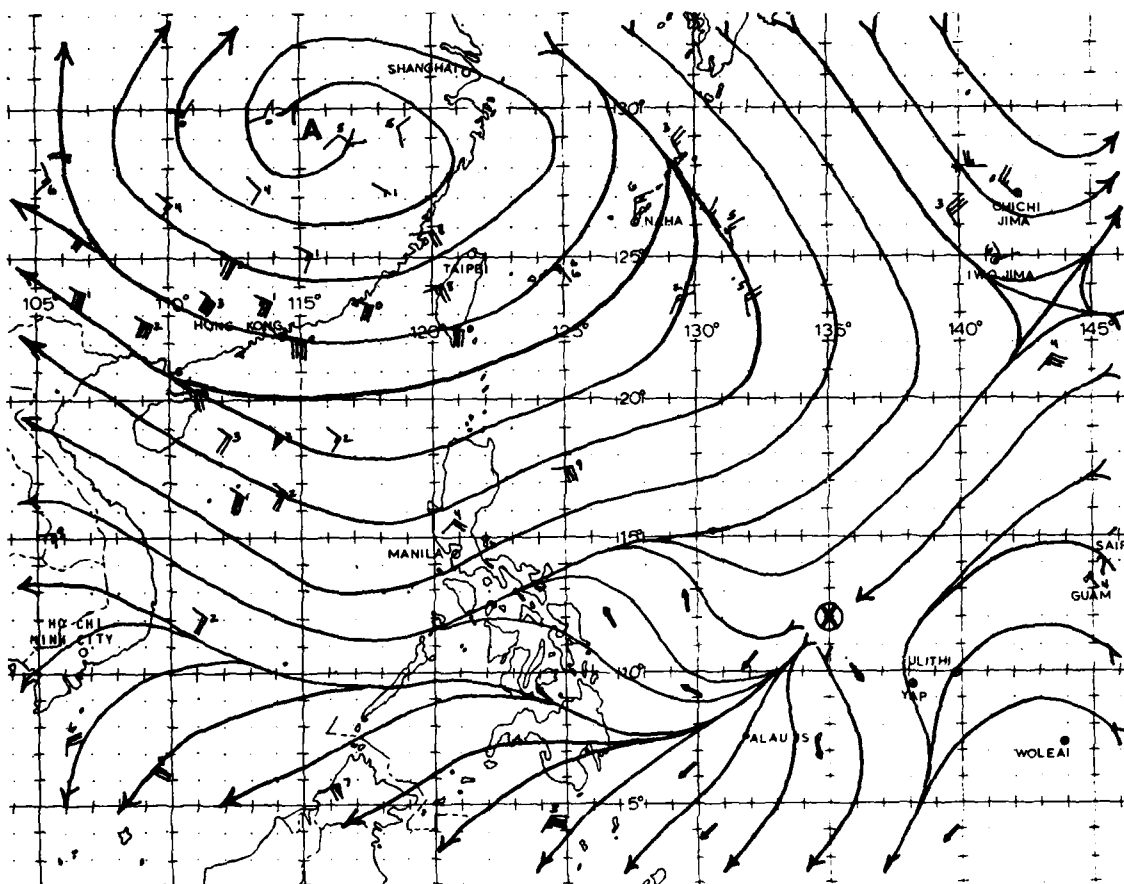


FIGURE 3-07-3. Upper-level streamline analysis at 051200Z July 1979.

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.

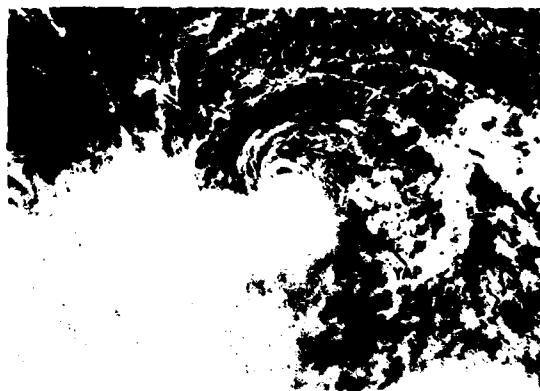


FIGURE 3-07-4. TD 07 (FAVE), 05 July 1979, 1202Z. Strong upper-level northeasterlies have begun to shear off the convection to the southwest. (DMSP Imagery, Moonlight Visual)

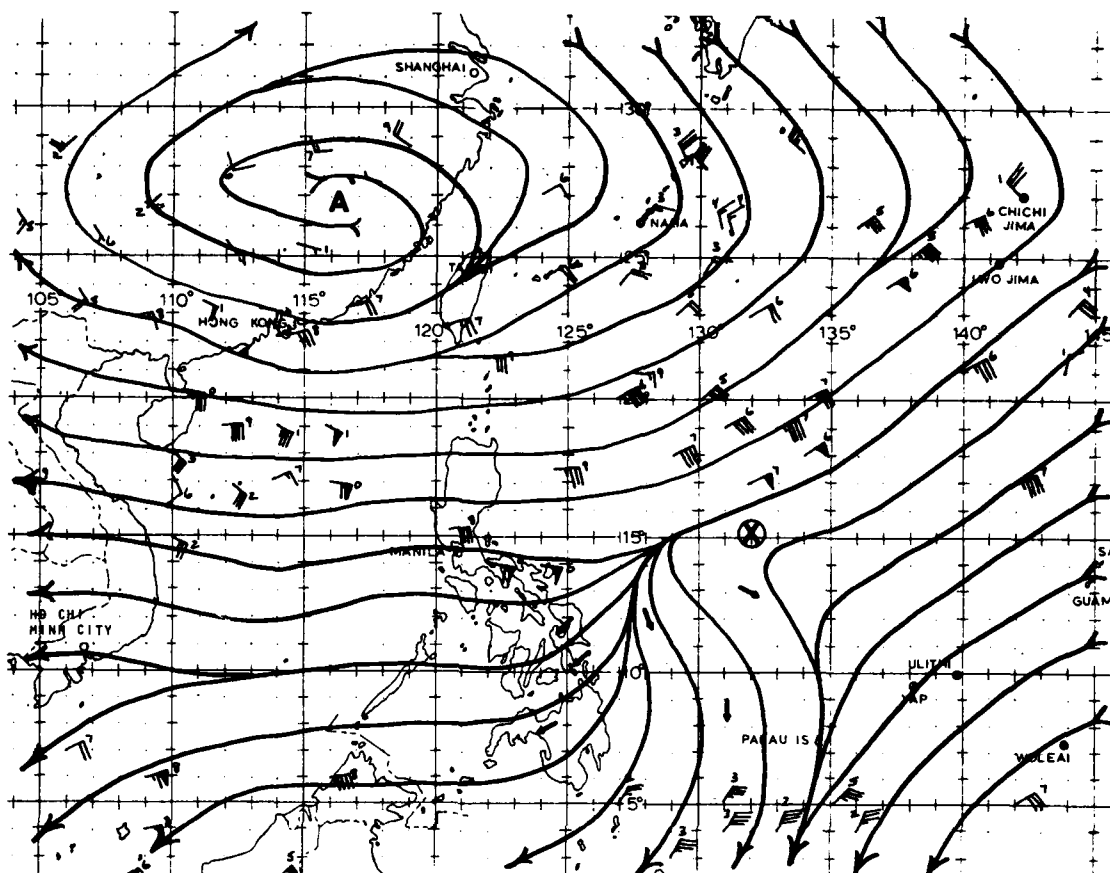


FIGURE 3-07-5. Upper-level streamline analysis at 061200Z July 1979.

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.

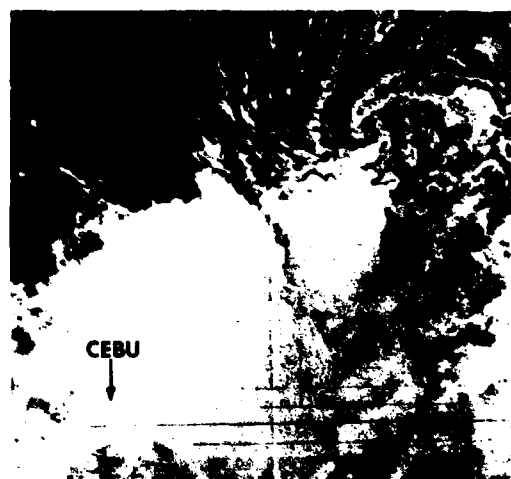
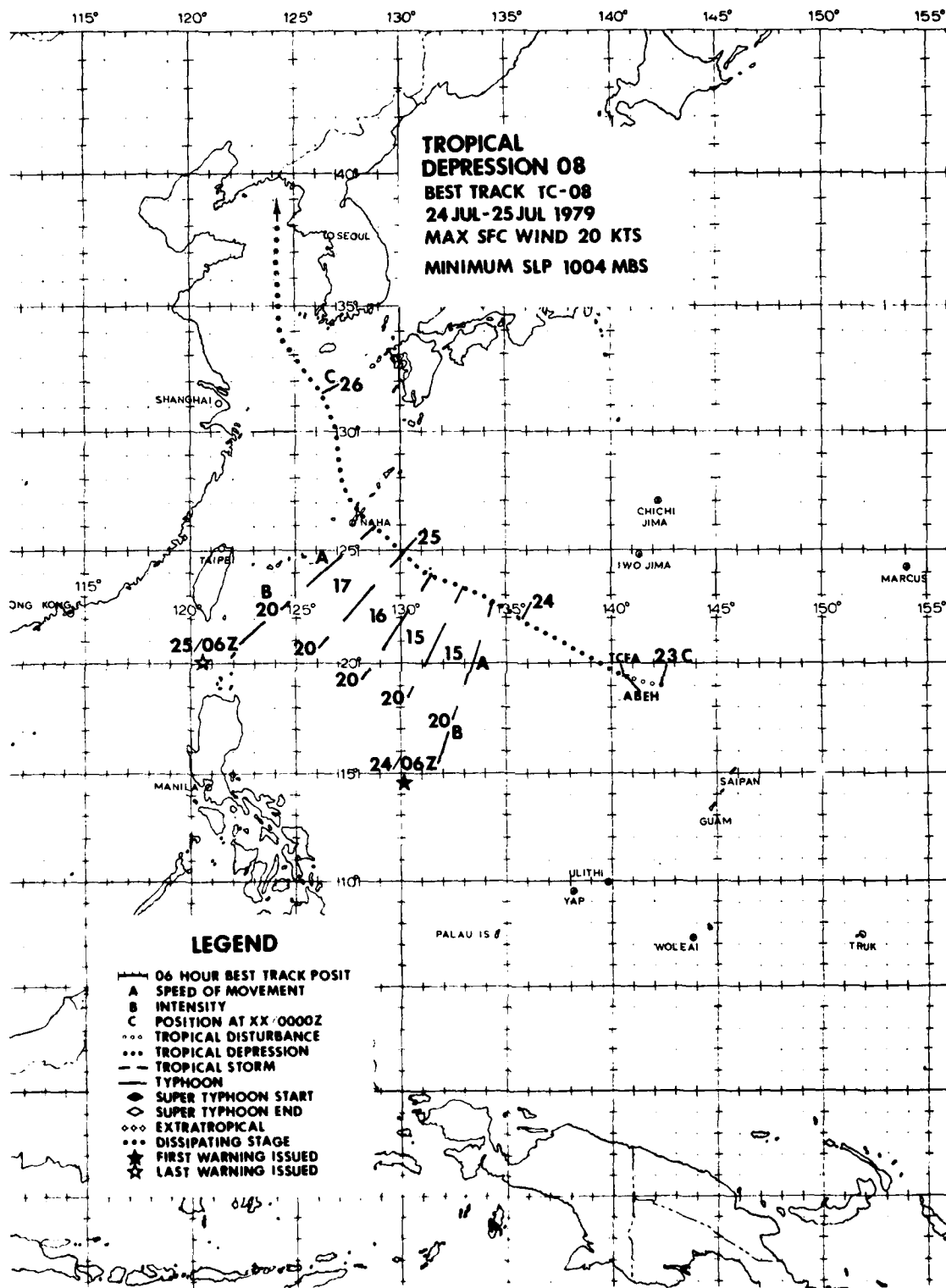


FIGURE 3-07-6. TD 07 (FAVE) is now a fully exposed low-level circulation, 06 July 1979, 1518Z. (DMSP imagery, Moonlight Visual)



TROPICAL DEPRESSION 08

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.

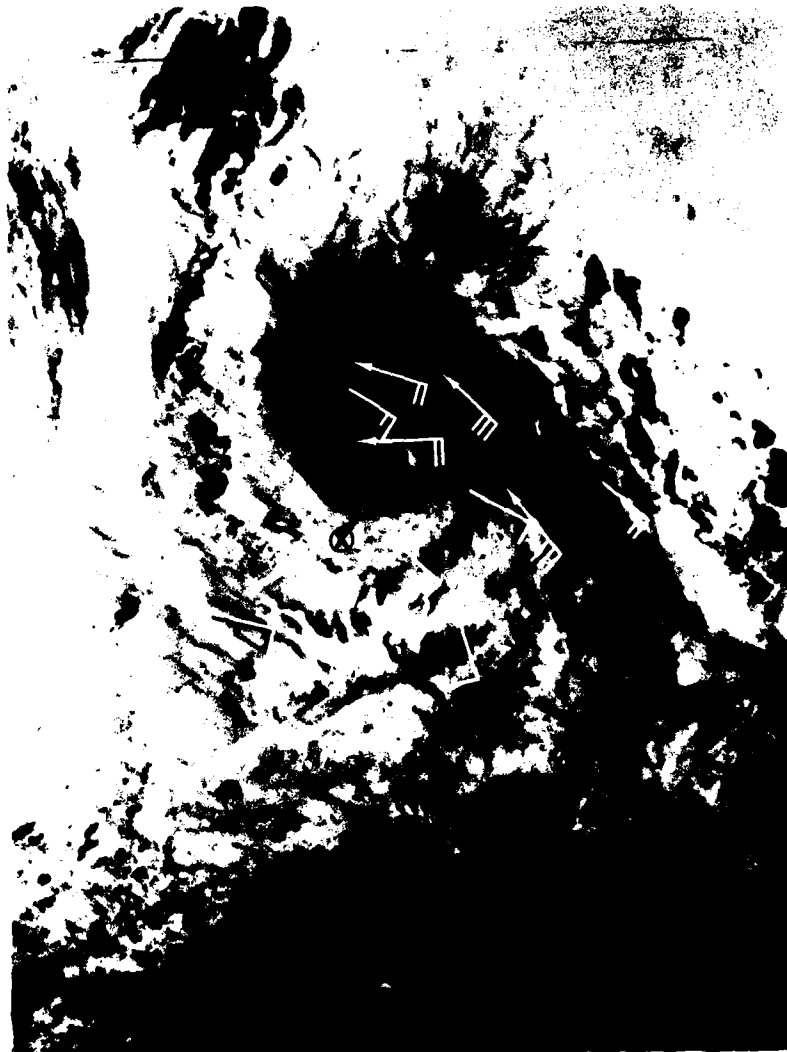
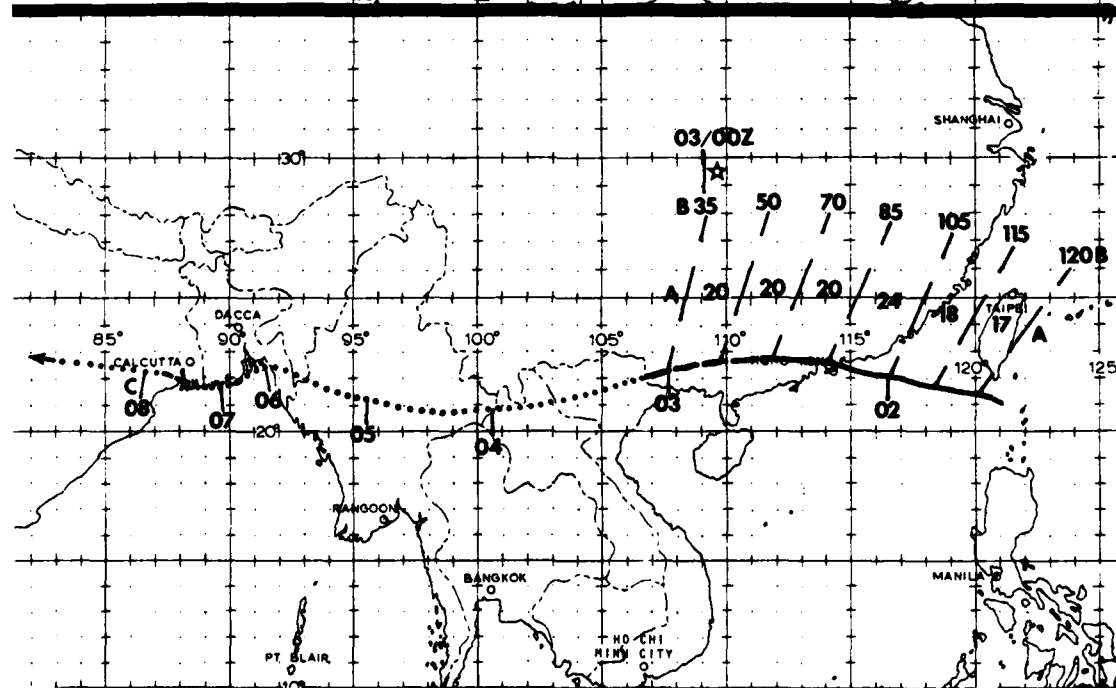
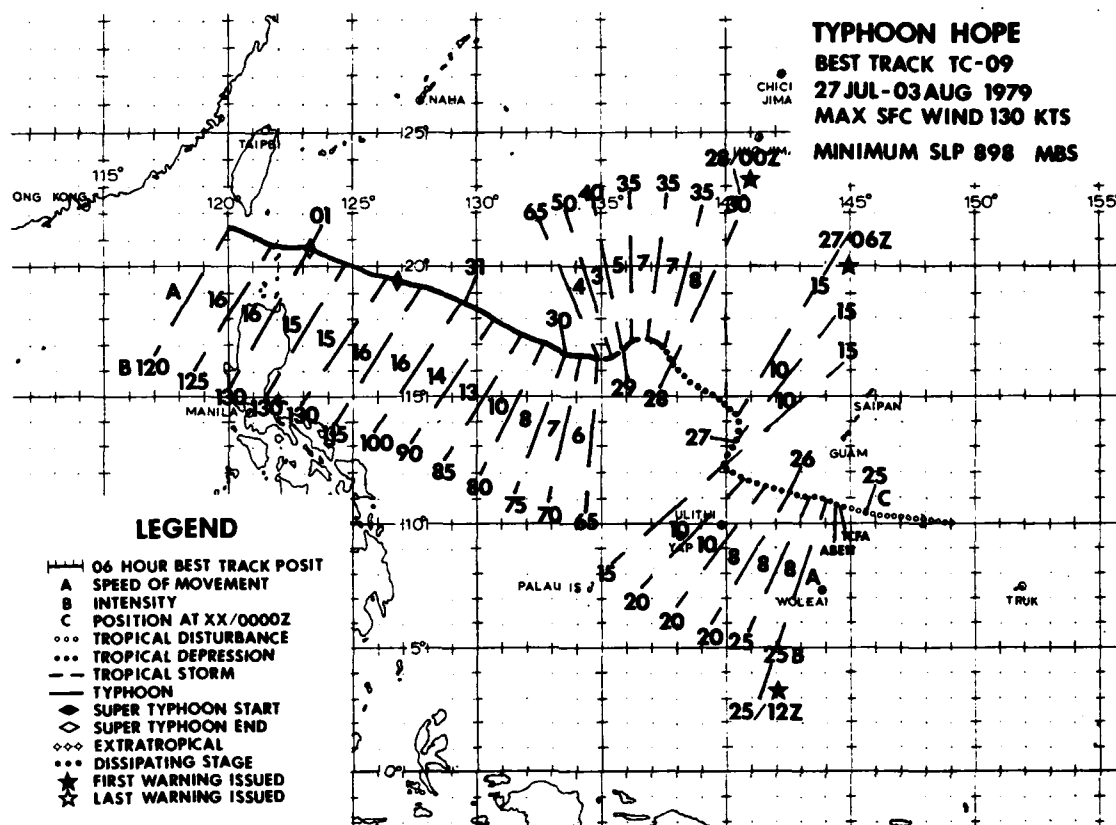


FIGURE 3-08-1. Infrared imagery of TD 08 at maximum intensity of 20 kt (37 m/sec), 24 July 1979, 1244Z. TD 08's 241200Z surface center (●) is depicted relative to surface ship reports (—) and 700 mb aircraft reports (←). (DNMSP imagery)



SUPER TYPHOON HOPE (09)

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.

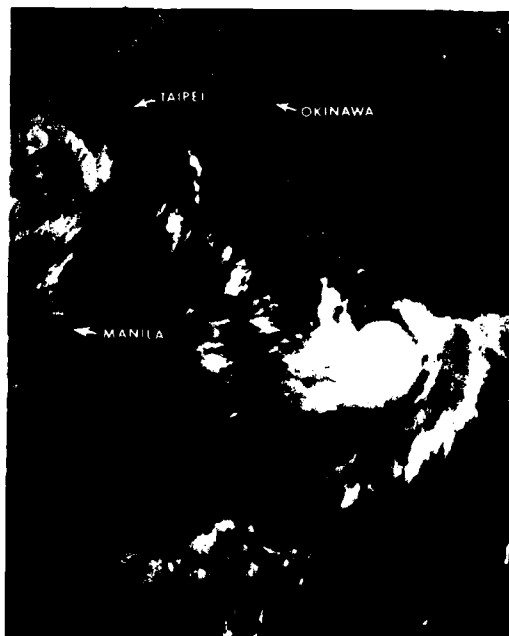


FIGURE 3-09-1. Hope (right) at tropical storm intensity 570 nm (1056 km) northeast of Guam, 29 July 1979, 0219Z. Tropical Storm Gordon (left) is 100 nm (185 km) east of Hong Kong. (DMSP imagery)

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).

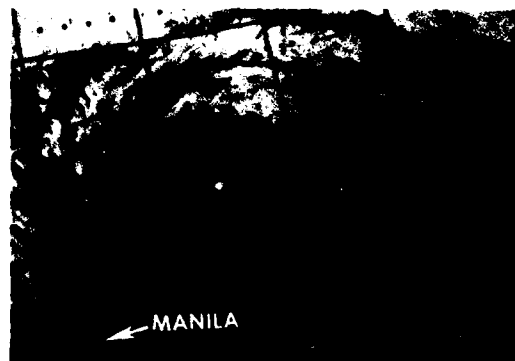


FIGURE 3-09-3. Infrared imagery of Hope just after attaining super typhoon intensity of 130 kt (67 m/sec), 31 July 1979, 1244Z. (DMSP imagery)

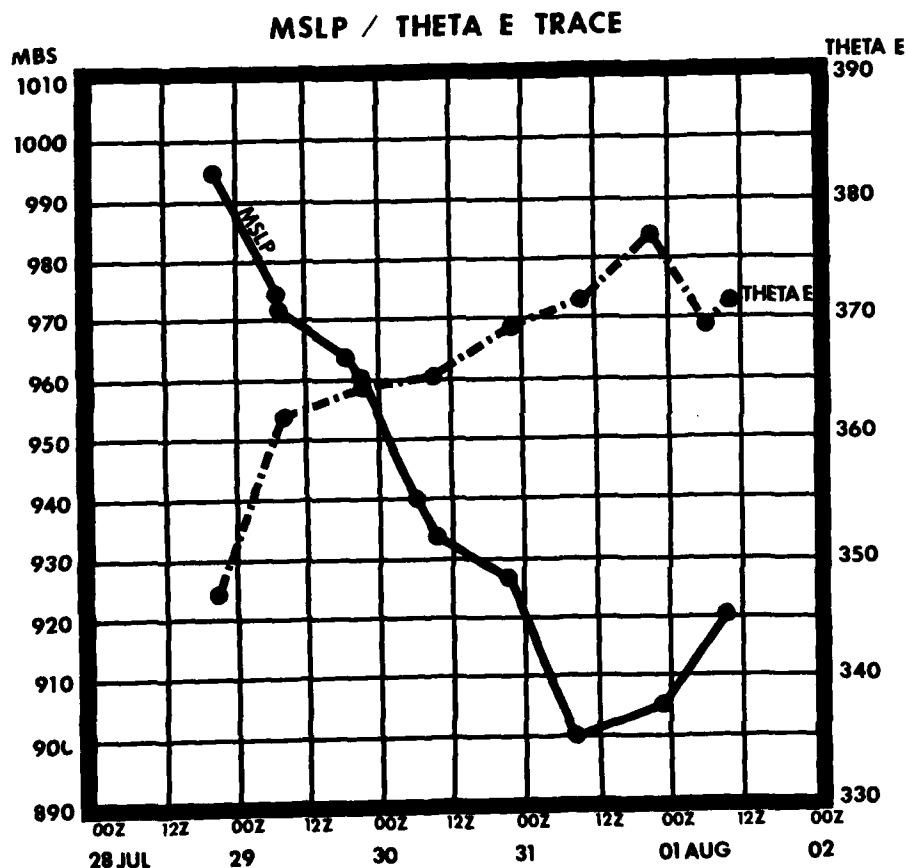


FIGURE 3-09-2. Time cross-section of Hope's minimum sea-level pressure versus equivalent potential temperature (THETA E [θ_e]) derived from aircraft reconnaissance.

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.

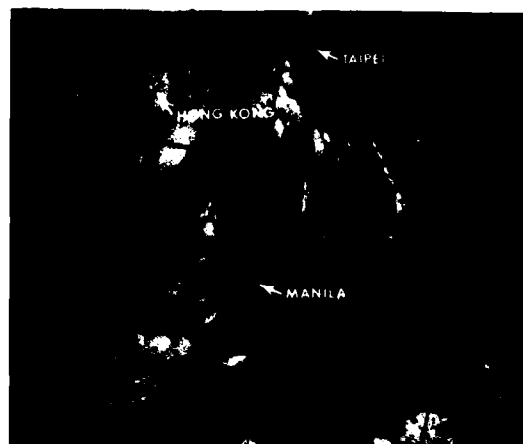
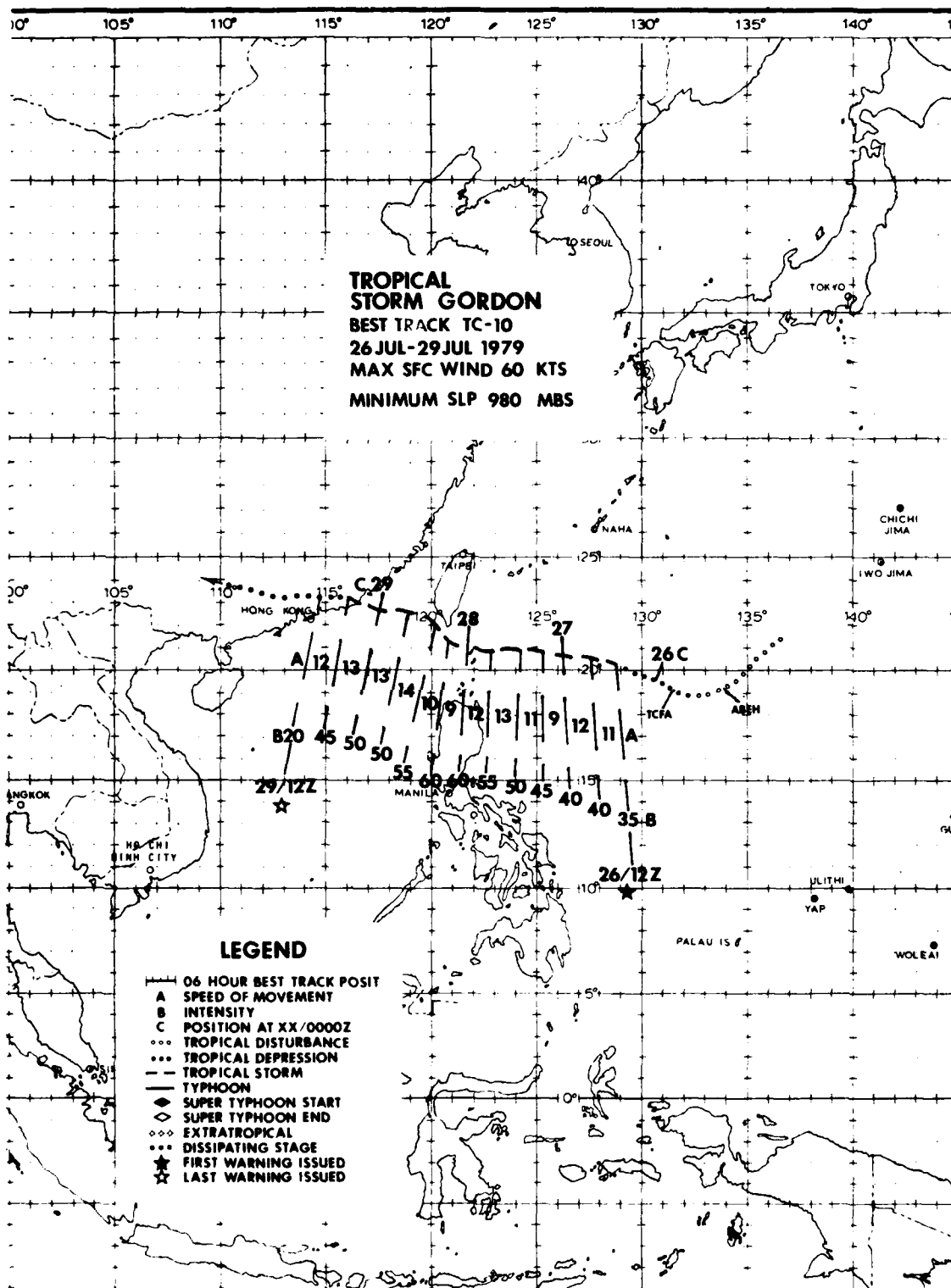


FIGURE 3-09-4. Typhoon Hope at 100 kt (51 m/sec) intensity, 3 hours prior to closest point of approach to Hong Kong, 2 August 1979, 0247Z. (DMSP imagery)

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).

45005 - HONG KONG OBSERVATORY				ST HOPE		DATE:02 JULY 1979 / TIMES:01-10Z			
02/01z	02/02z	02/03z	02/04z	02/05z	02/06z	02/07z	02/08z	02/09z	02/10z
991	989	984	978	965	960	976	983	988	992

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



TROPICAL STORM GORDON (10)

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)

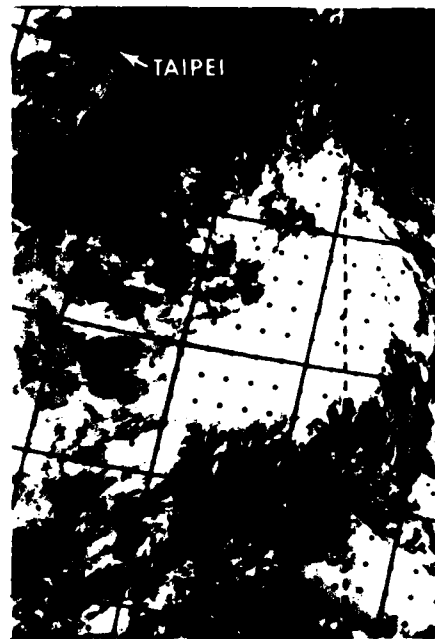
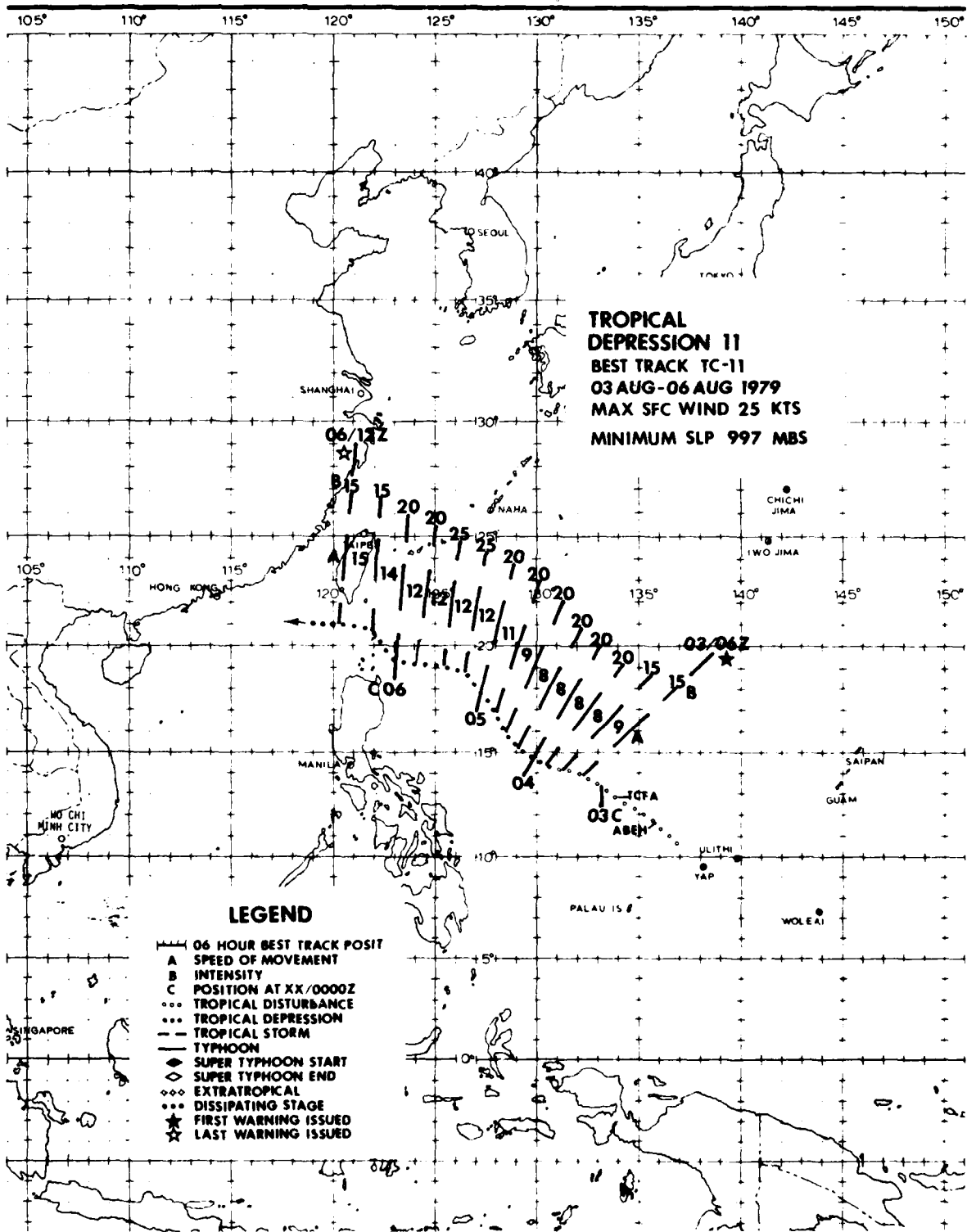


FIGURE 3-10-2. Tropical Storm Gordon 22 hours after Figure 3-10-1 showing increased development, 25 July 1979, 2350Z. A Tropical Cyclone Formation Alert was issued 6 hours prior to this time. (DMSP imagery)



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

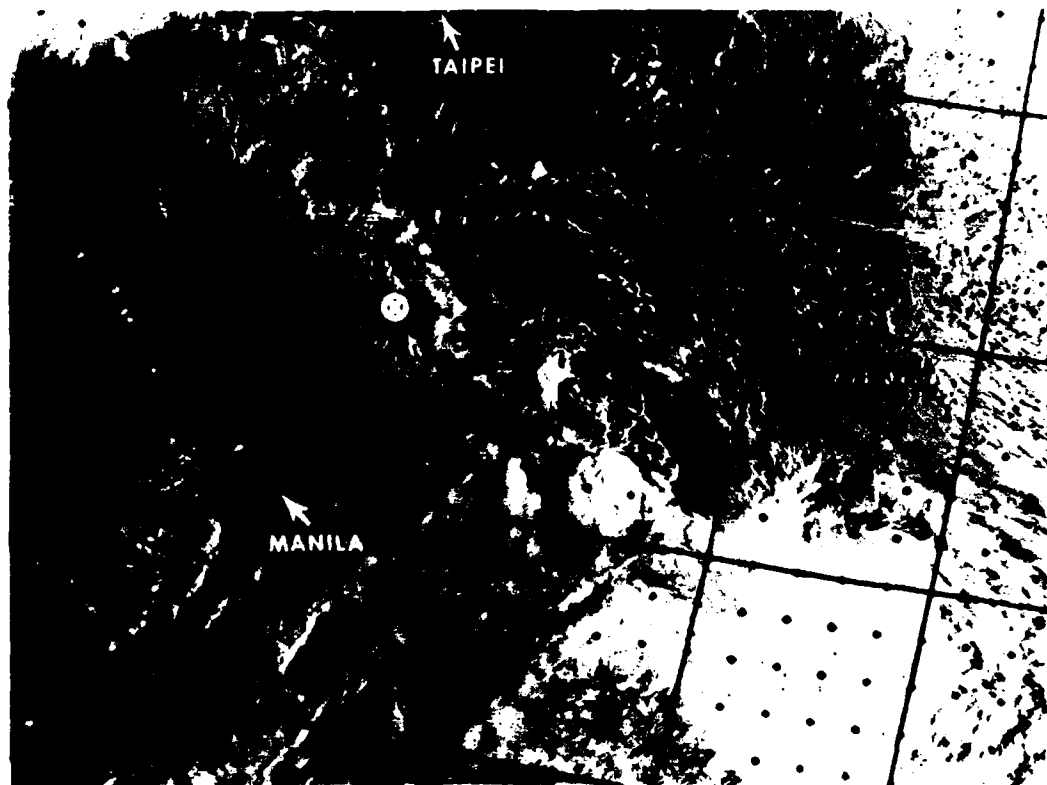
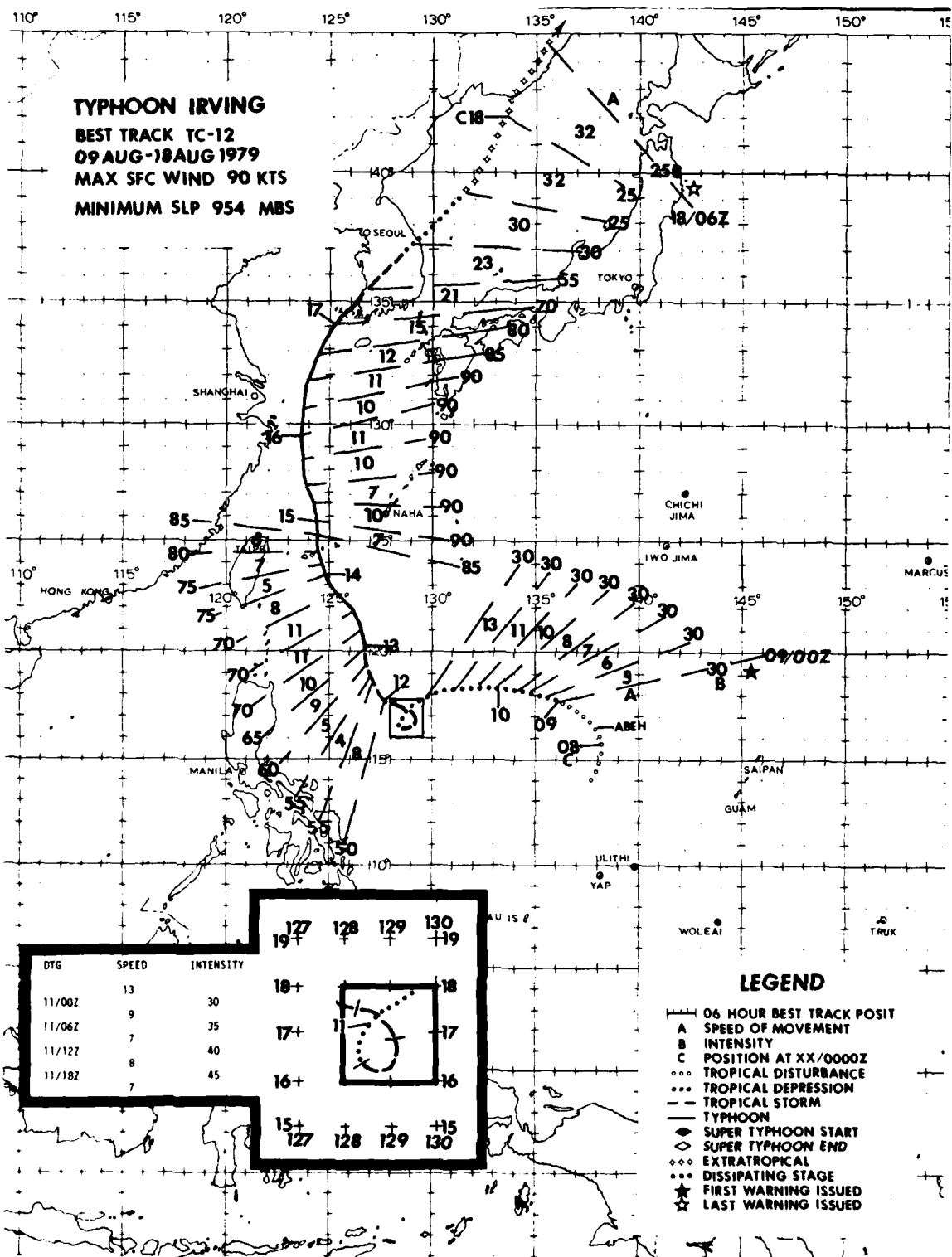


FIGURE 3-11-1. Tropical Depression 11 at 20 kt (10 m/sec) intensity, 5 August 1979, 2153Z. The TD symbol (●) is superimposed at location of surface circulation center as determined by aircraft reconnaissance at 052222Z. Considerable vertical shear existed over the system and was the reason that it did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



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.

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

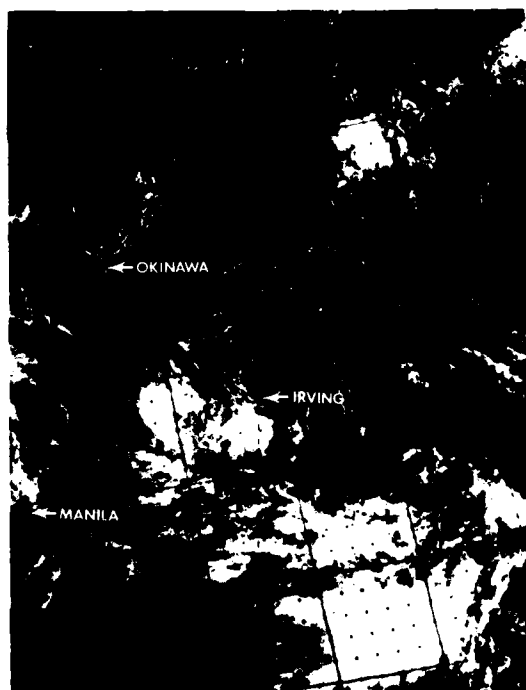


FIGURE 3-12-1. Typhoon Irving as a weak tropical depression with an exposed low-level circulation, 10 August 1979, 0126Z. Prior to intensification, aircraft reconnaissance consistently observed the maximum convection to the west of the surface center. (DMSP imagery)

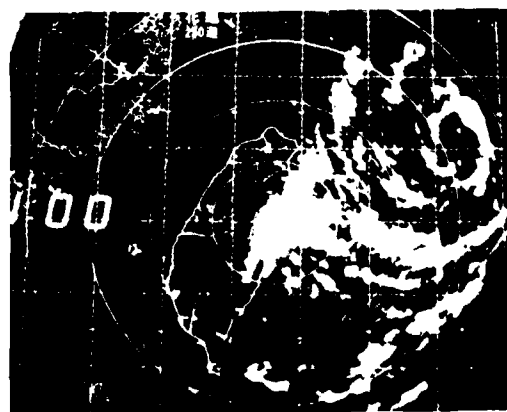


FIGURE 3-12-2. Typhoon Irving as seen by the radar at Haulien, Taiwan. Irving tracked north-northwestward across the southern Ryukyu Islands and was accurately tracked by eight radar sites, 14 August 1979, 1700Z. (Photograph courtesy of the Central Weather Bureau, Taipei, Taiwan)

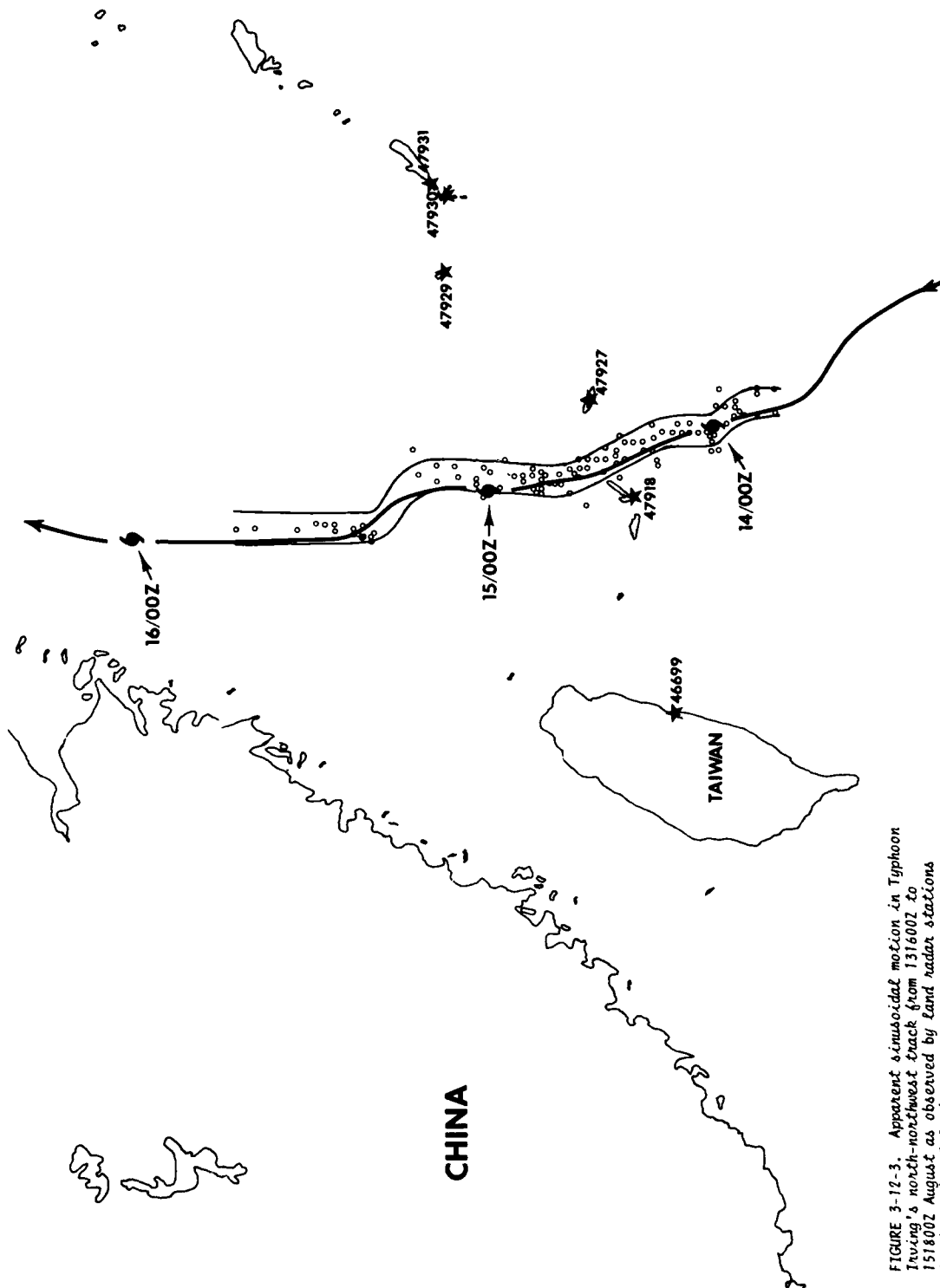


FIGURE 3-12-3. Apparent sinusoidal motion in Typhoon Irving's north-northwest track from 131600Z to 151800Z August as observed by land radar stations in the Ryukyu Islands.

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

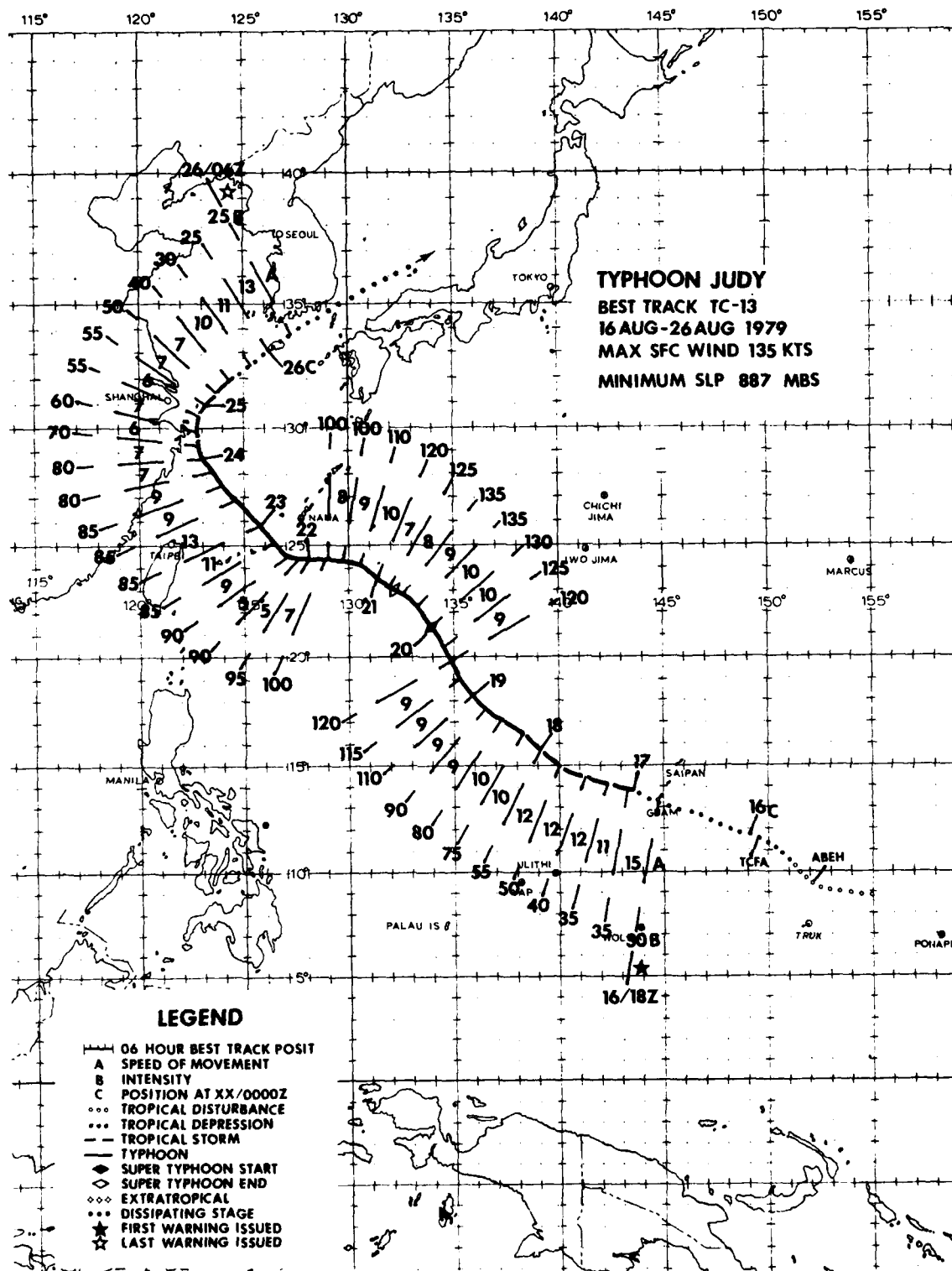
The relationship between Irving's surface and 500 mb centers during the earlier stages of development produced unusually large surface wind radii. Synoptic and aircraft data between 092000Z and 120000Z indicate that Irving's maximum wind band actually existed 150-200 nm (278-370 km) west of the large, 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 JTC'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)



SUPER TYPHOON JUDY (13)

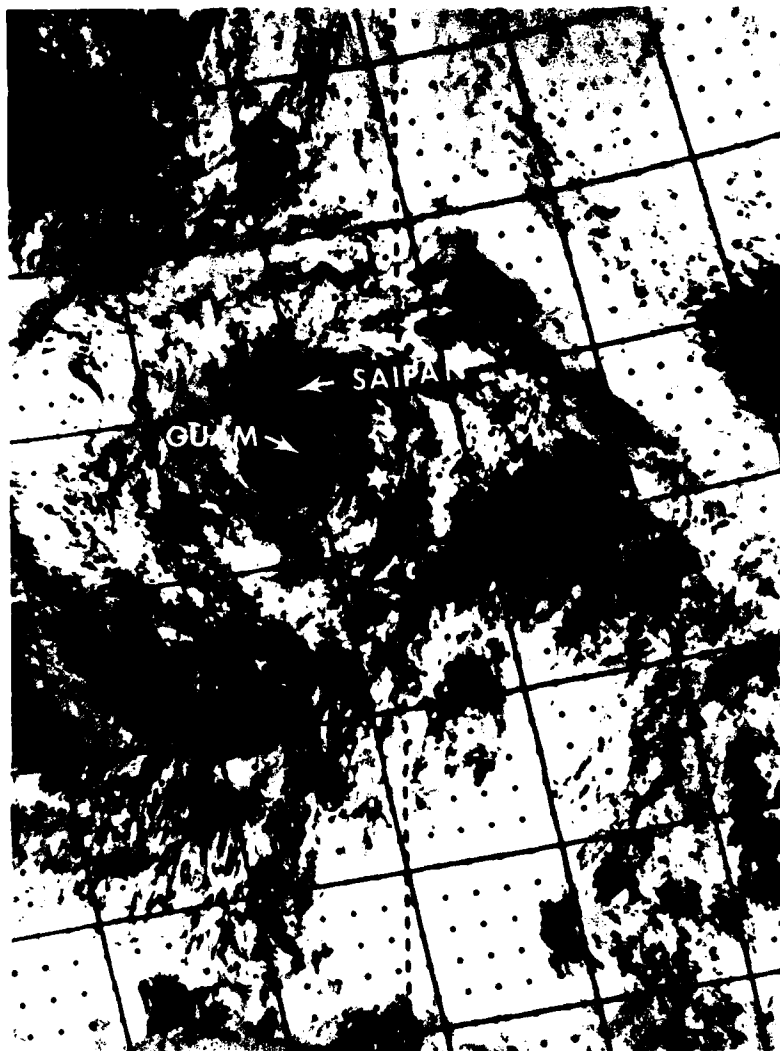


FIGURE 3-13-1. Infrared imagery of tropical disturbance (Judy) while southeast of Guam, 16 August 1979, 1120Z. The star denotes the approximate location of a weak surface center discovered by a reconnaissance aircraft about 4 hours earlier. [DMSP imagery]

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 semi-circle 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.

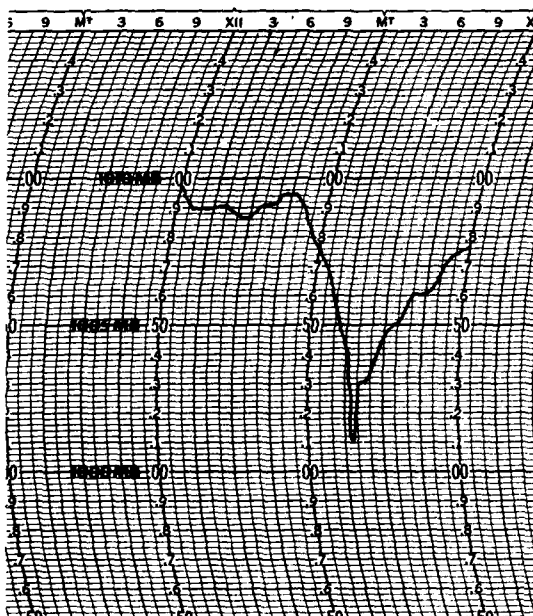


FIGURE 3-13-2. Microbarograph trace recorded at NAVOCEANCOMCEN, Guam during the passage of TD 13 (Judy) at about 161800Z, August 1979.

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.

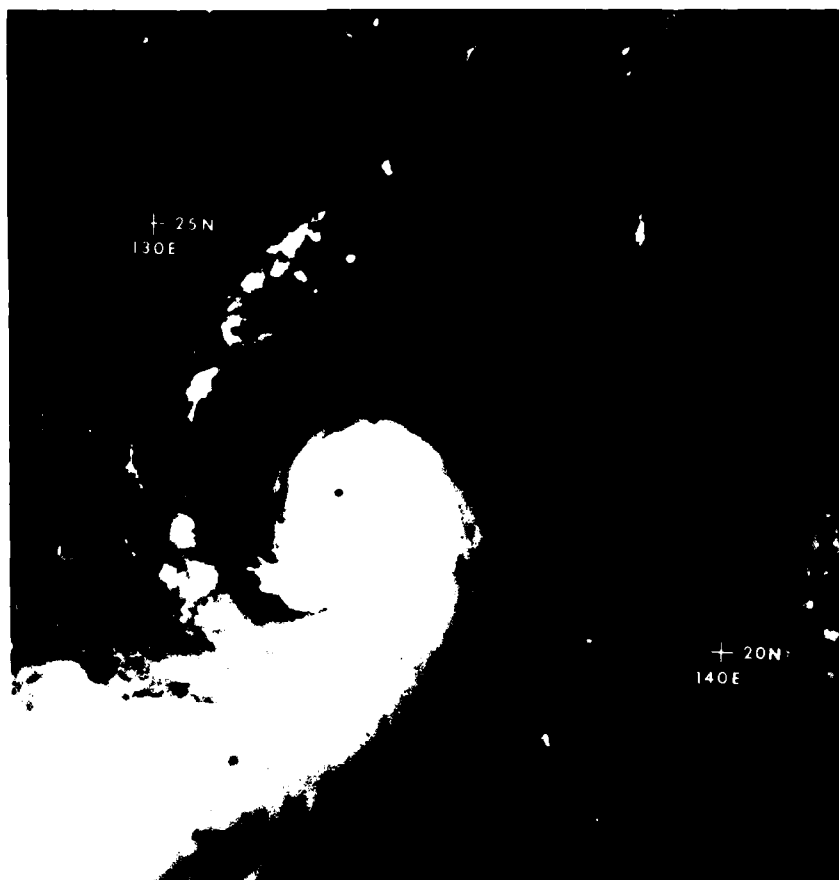
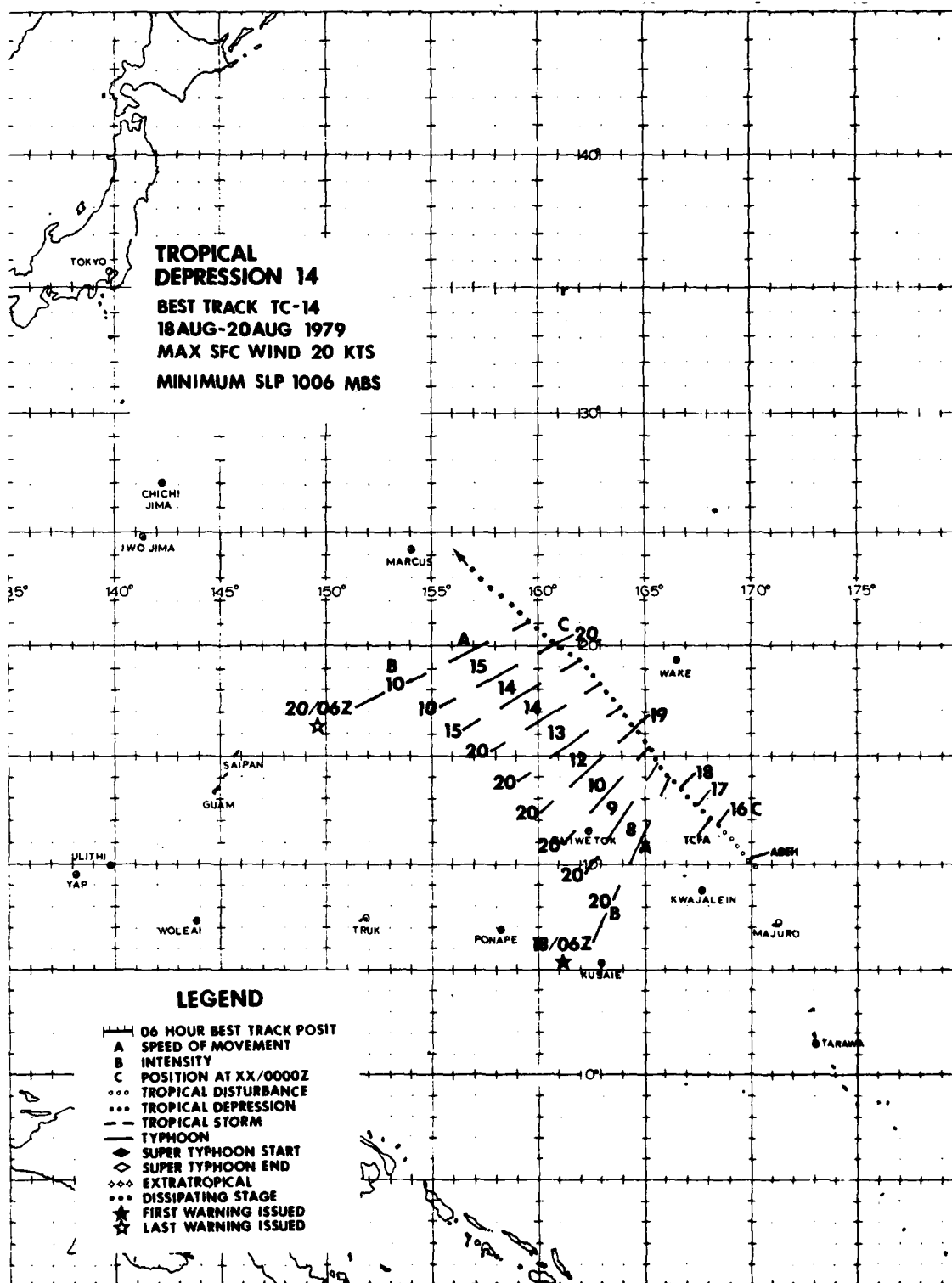
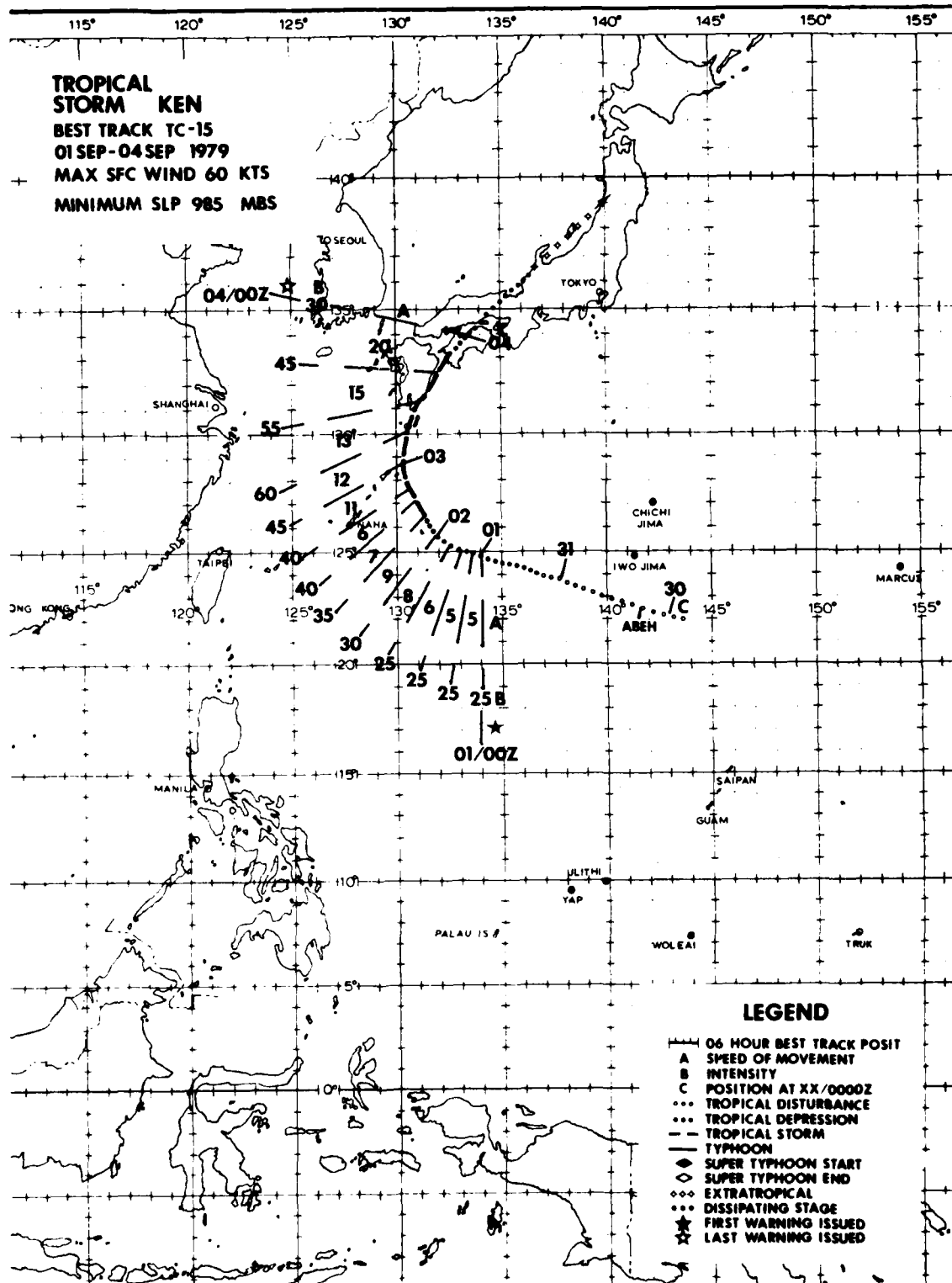
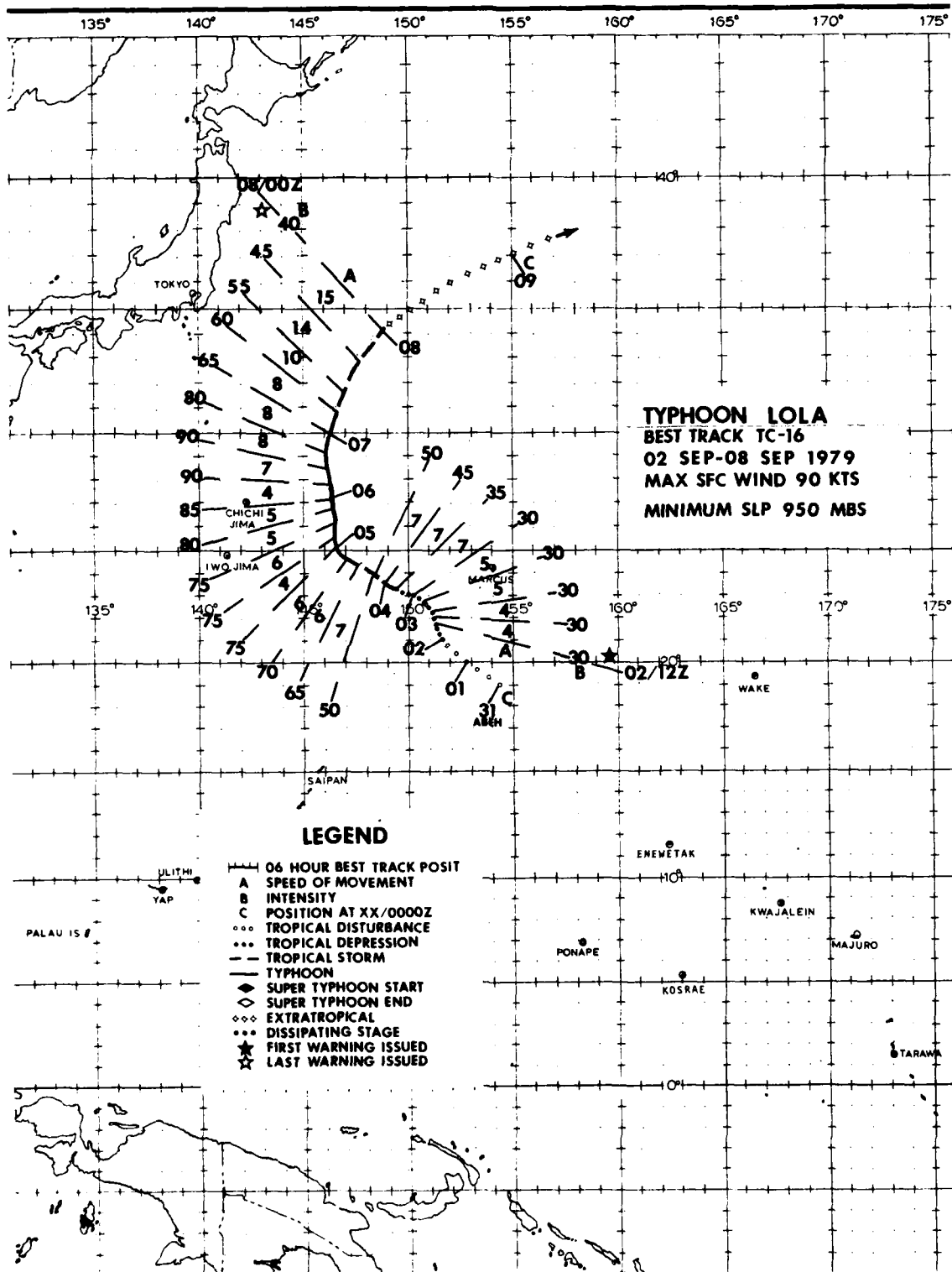


FIGURE 3-13-3. Judy as a super typhoon, 20 August 1979, 0219Z. (DMSP imagery)







TROPICAL 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.

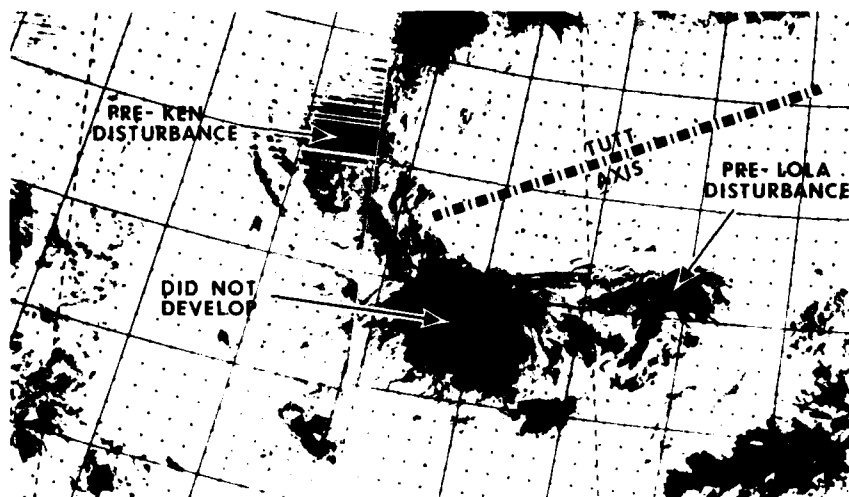


FIGURE 3-16-1. Line of tropical disturbances from which TS Ken and TV Lola eventually developed, 312257Z Aug - 010039Z Sep 1979. (DMSP imagery)

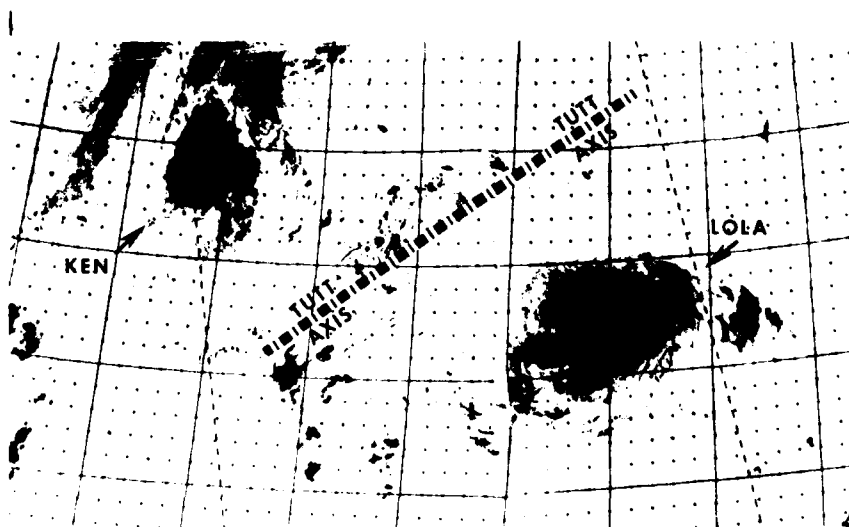
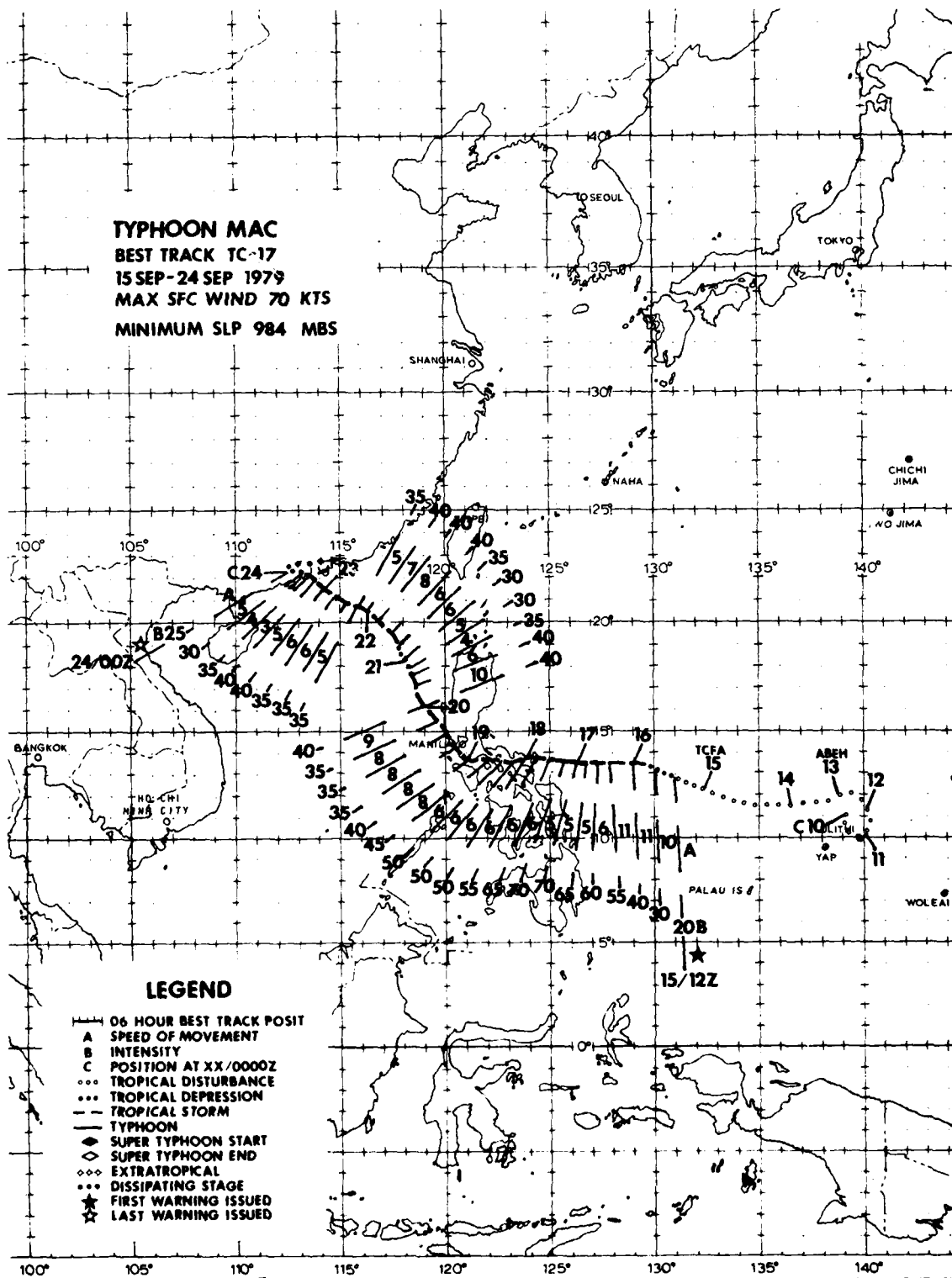


FIGURE 3-16-2. Ken at 45 kt (23 m/sec) intensity and Lola at 36 kt (15 m/sec) intensity, 022221Z - 030003Z Sep 1979. (DMSP imagery)



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 verbatim 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.

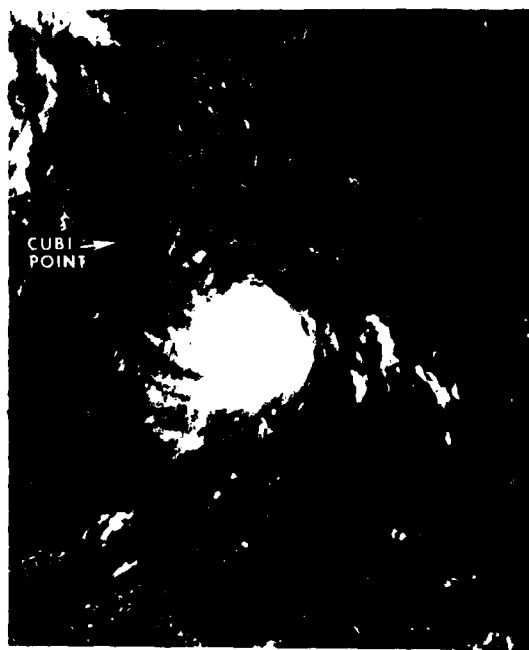
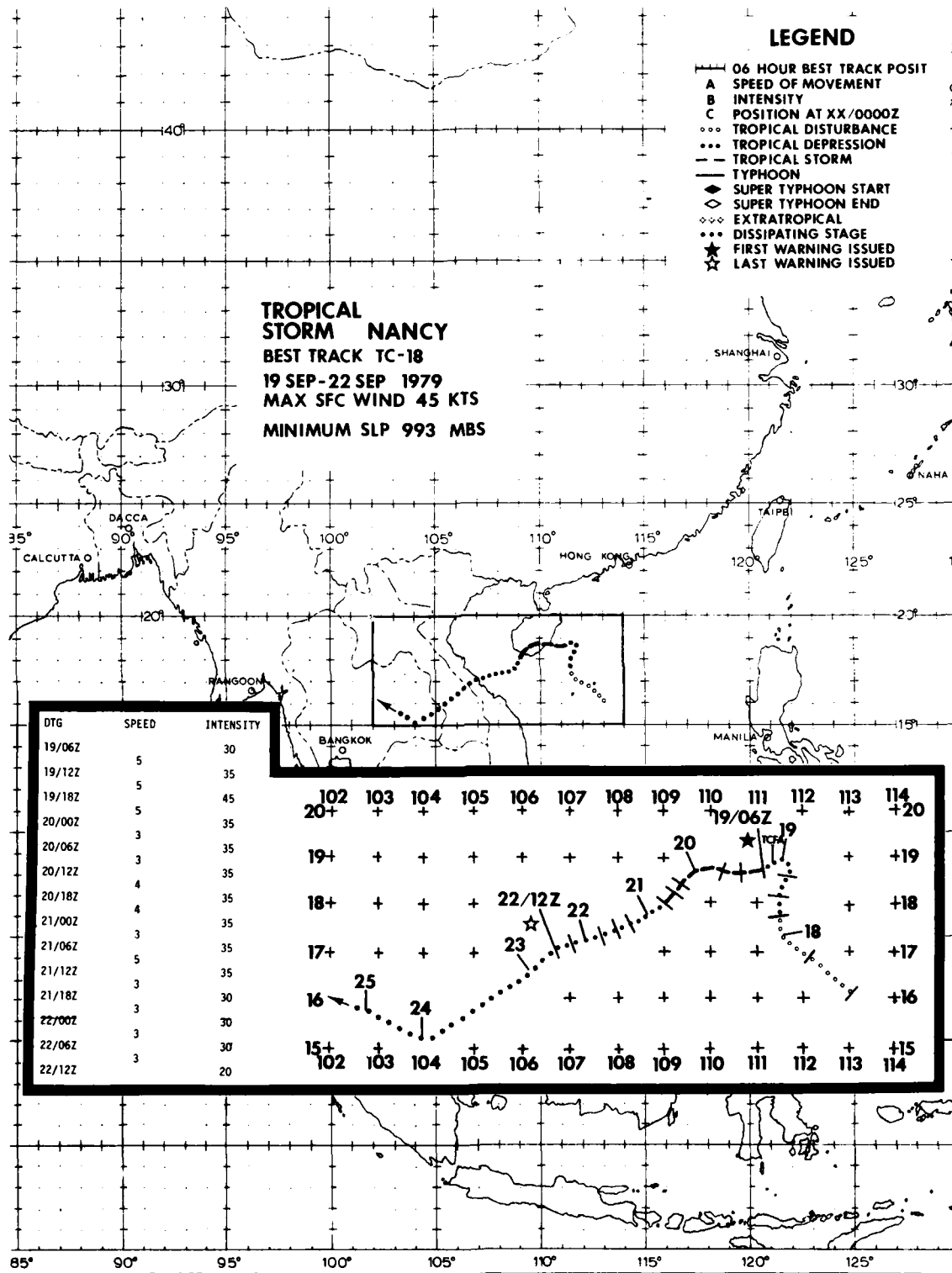


FIGURE 3-17-1. Typhoon Mac after crossing Catanduanes Island, Philippines, 18 September 1979, 0038Z. (DMSP imagery)



TROPICAL STORM NANCY (18)

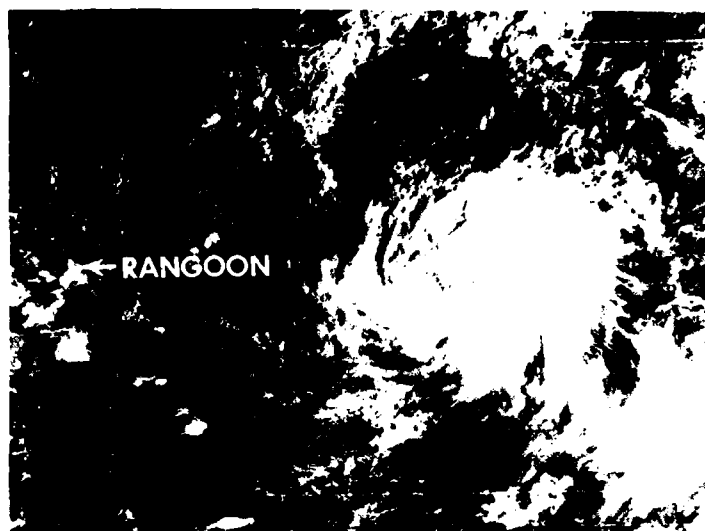


FIGURE 3-18-1. Tropical Storm Nancy at 35 kt (18 m/sec) intensity just after landfall on the southern end of Hai-nan Island, 20 September 1979, 0143Z. (DMSP imagery from Det 8, 1WW, Kadena AB, Okinawa)

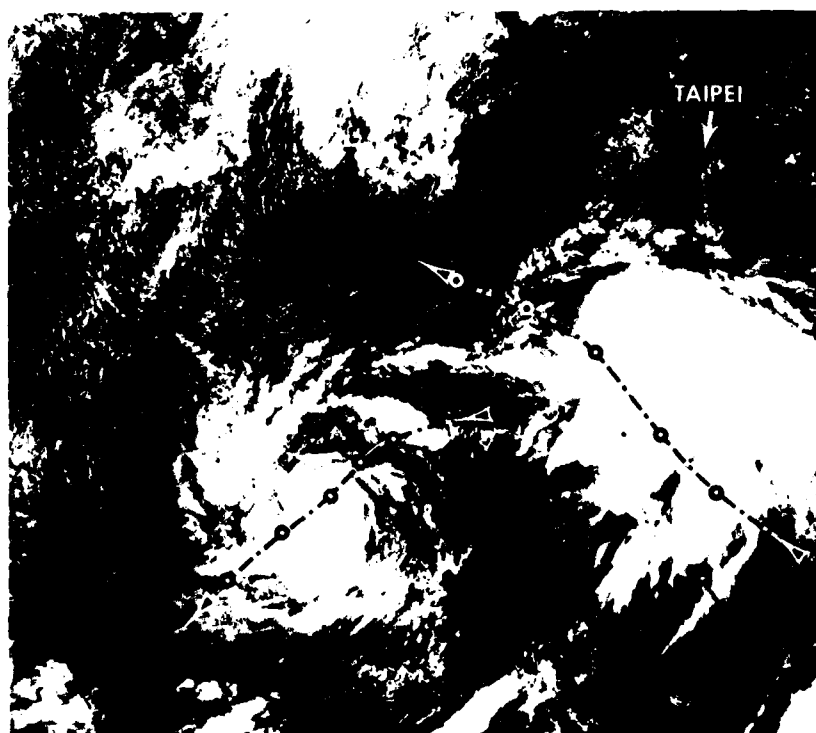
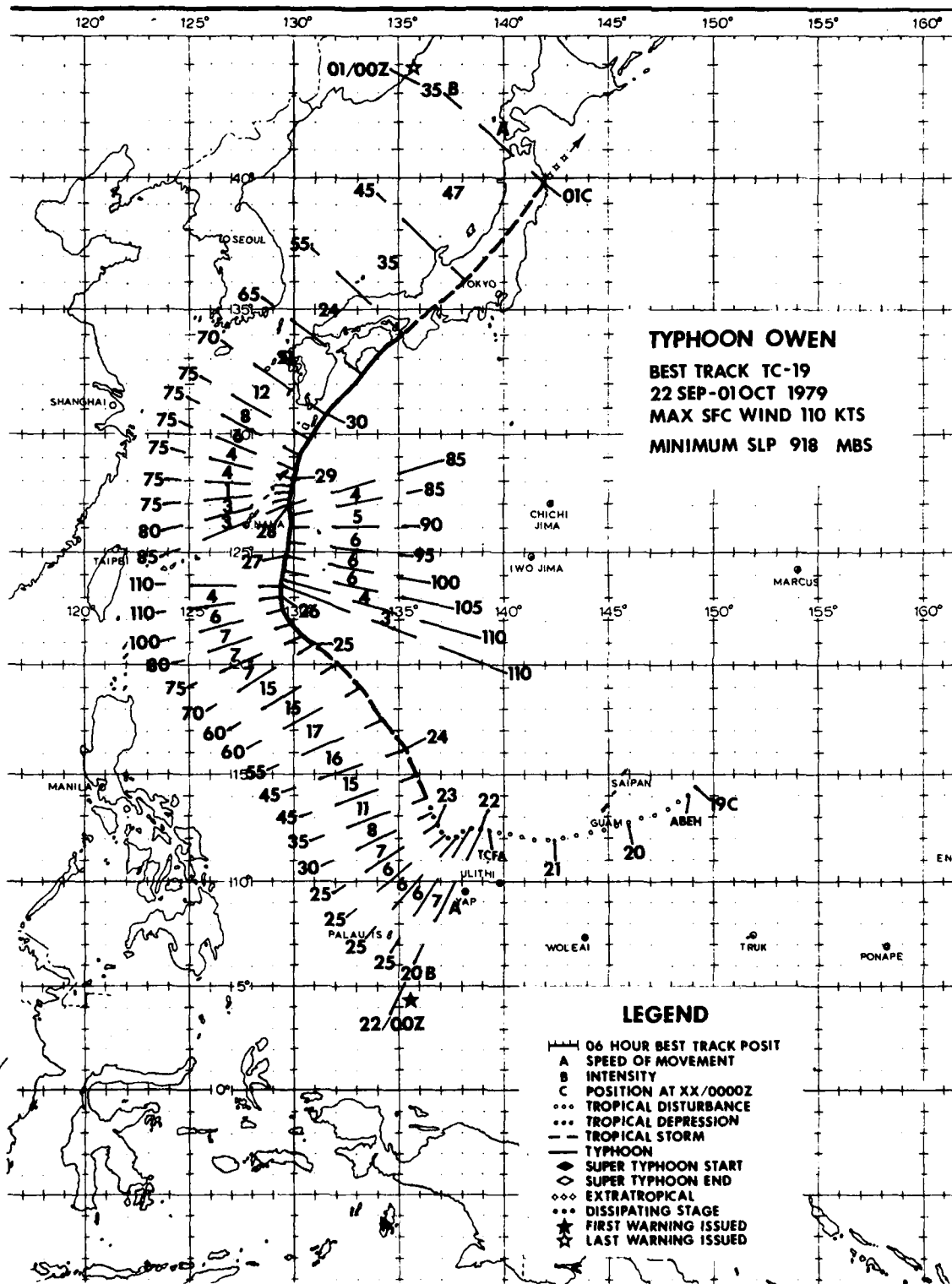


FIGURE 3-18-2. Typhoon Mac and Tropical Storm Nancy undergoing Fujiwhara interaction over the South China Sea, 22 September 1979, 0302Z. The 48-hour tracks before and after picture time are superimposed (Dots bracket 24-hour intervals). (DMSP imagery from Det 5, 1WW, Clark AB, RP)



TYPHOON OWEN (19)

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.

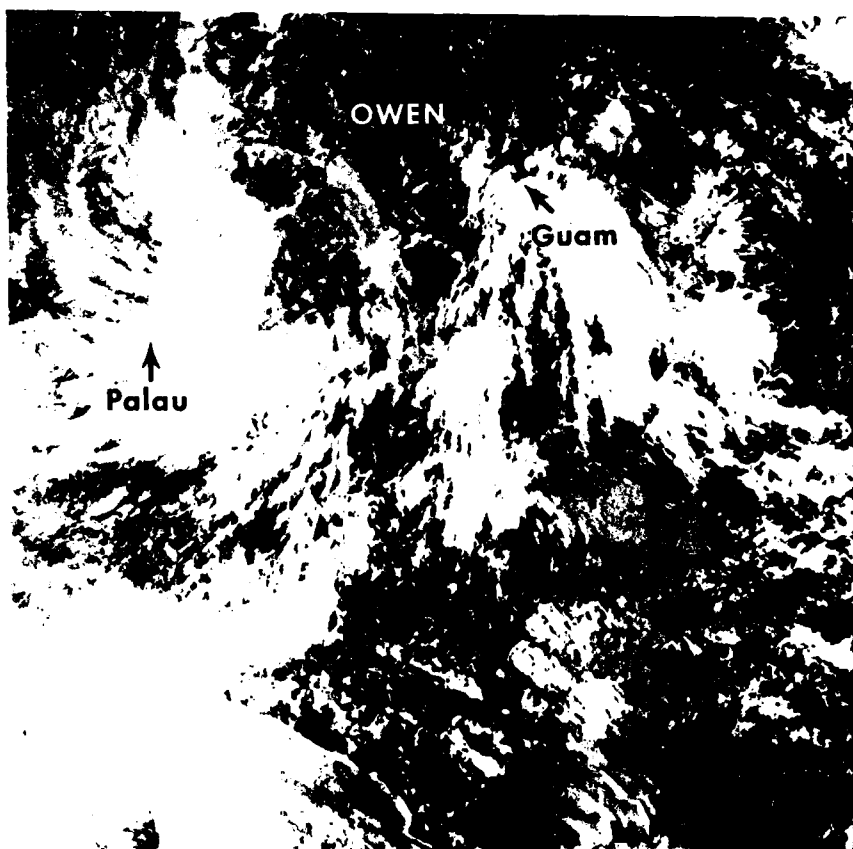


FIGURE 3-19-1. Typhoon Owen as a tropical disturbance, 21 September 1979, 2326Z. (DMSP imagery)

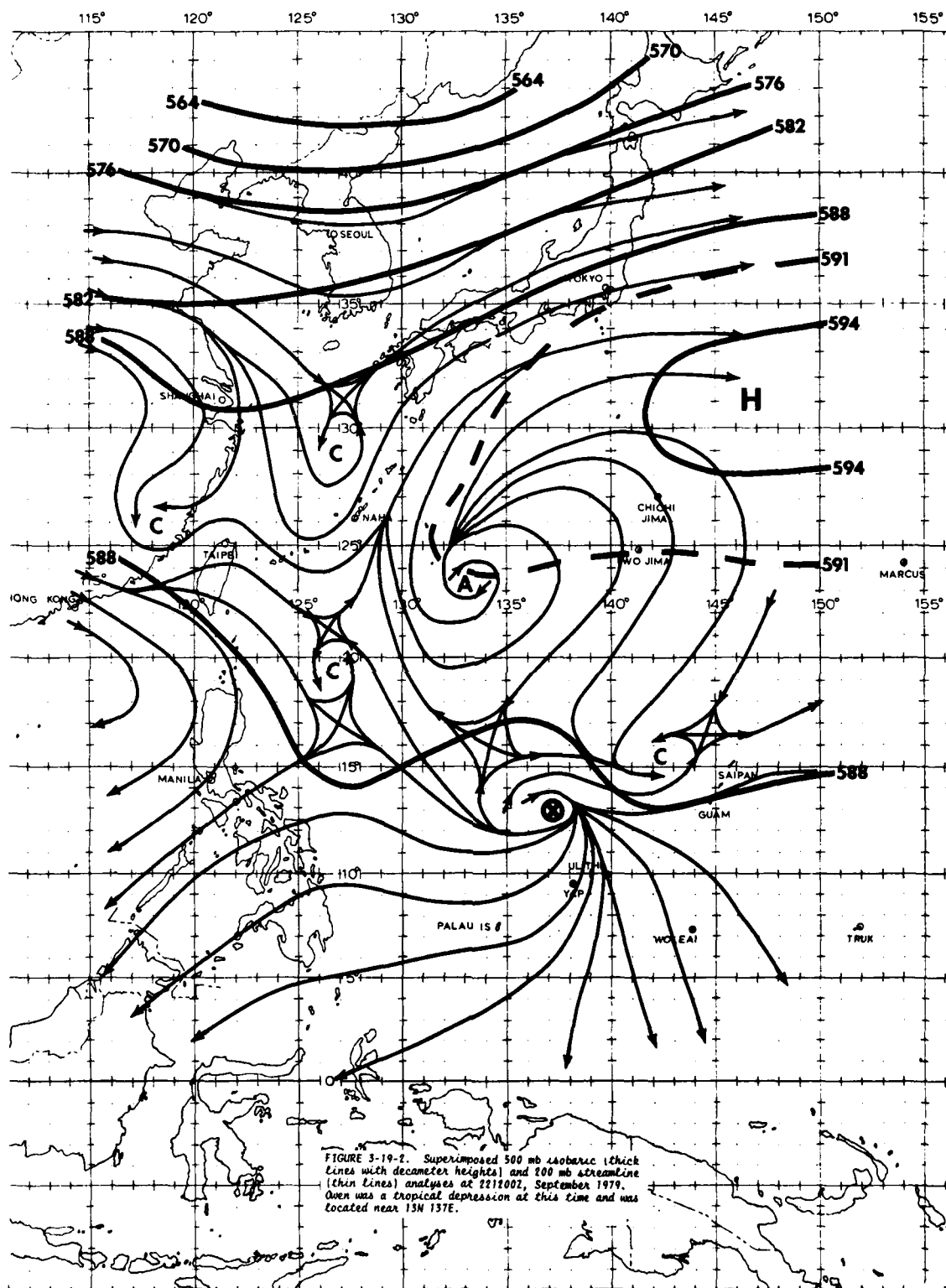
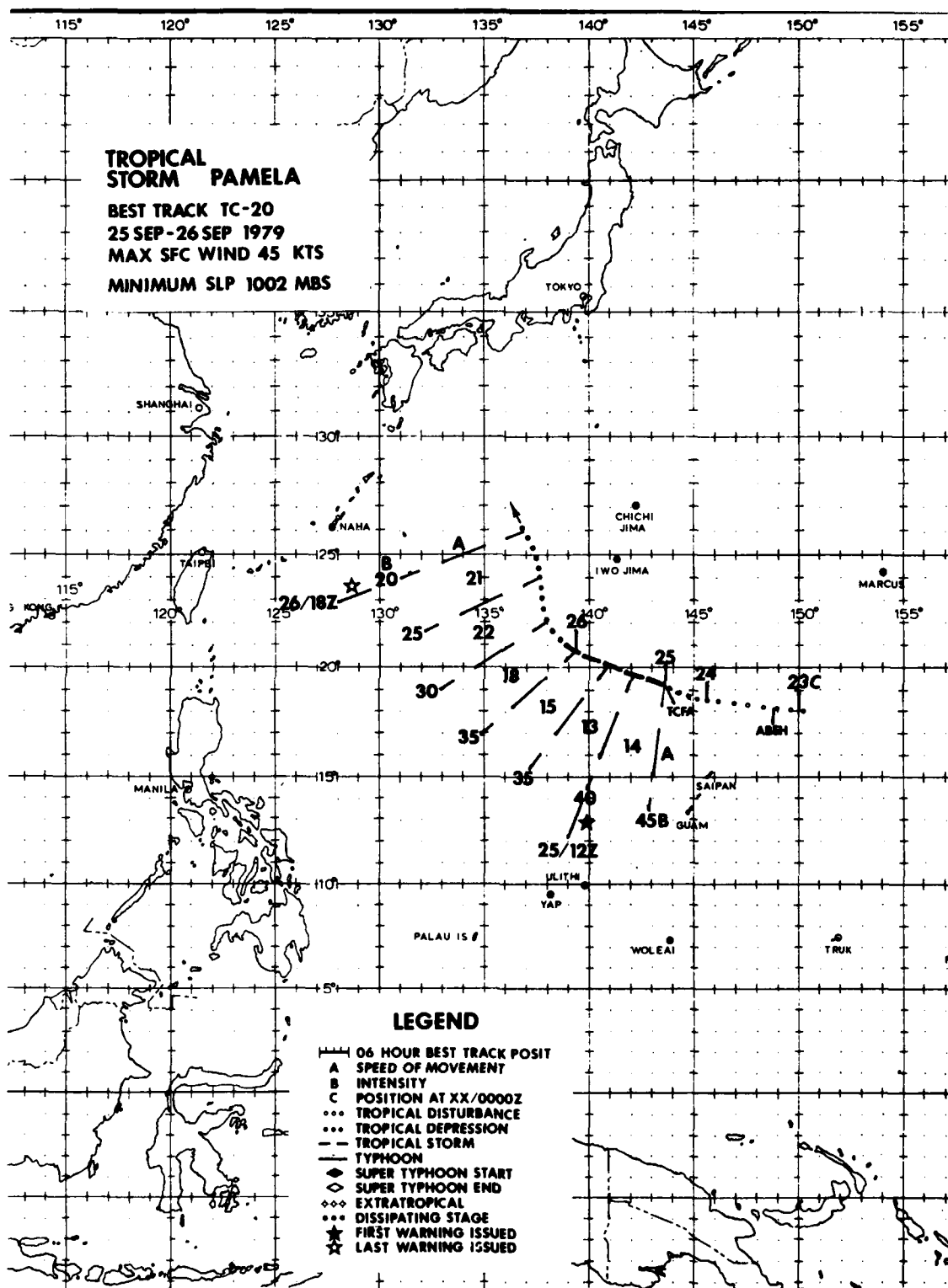




FIGURE 3-19-3. Typhoon Owen at maximum intensity of 110 kt (57 m/sec), 26 September 1979, 0145Z.
(DMSP imagery)



TROPICAL STORM PAMELA (20)

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.

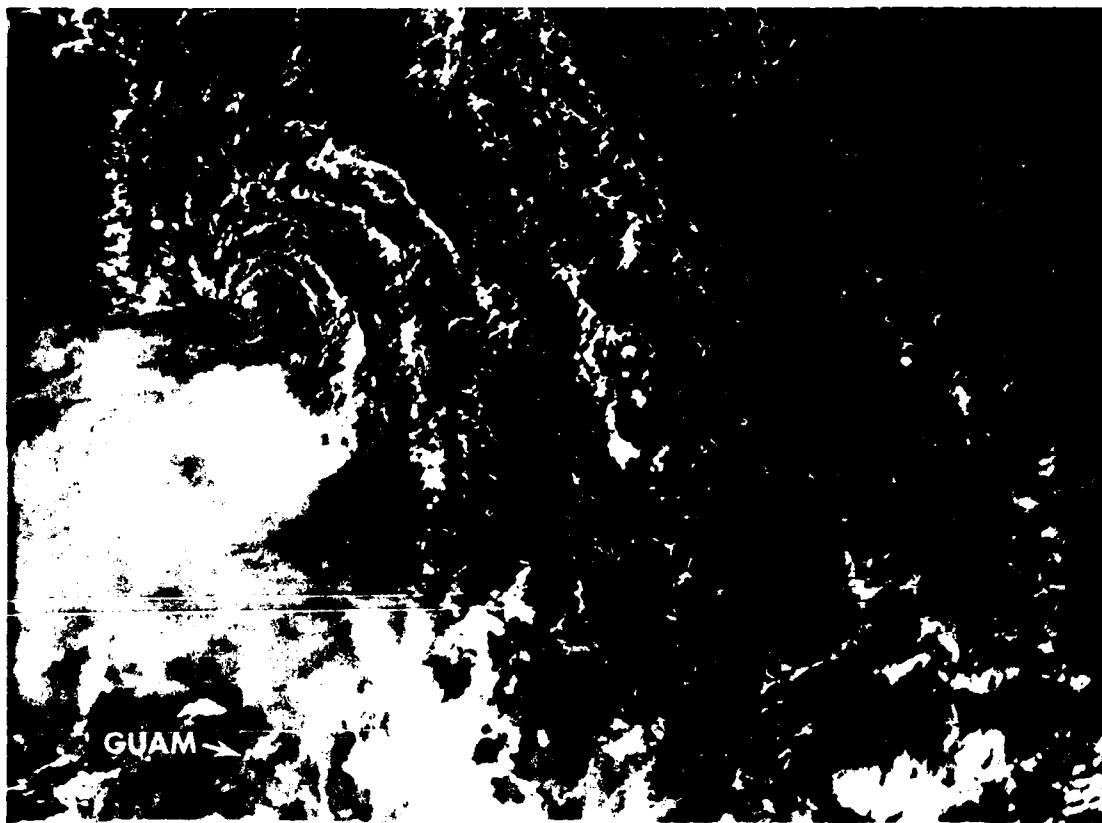
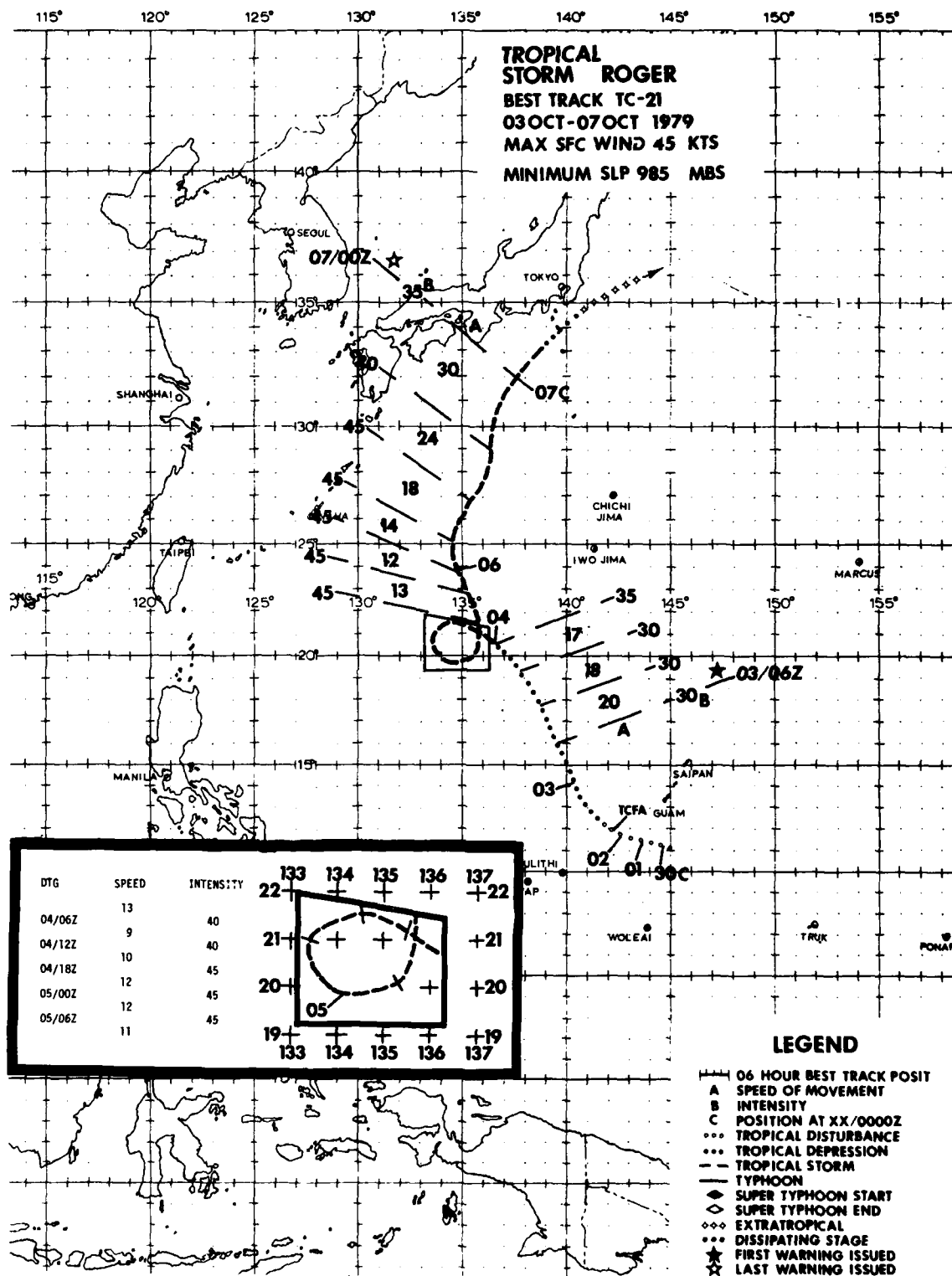


FIGURE 3-20-1. Tropical Storm Pamela with maximum sustained winds of 45 kt (23 m/sec), 24 September 1979, 2232Z. The exposed low-level circulation was a result of strong vertical shear produced by Typhoon Owen. (DMSP imagery)



TROPICAL STORM ROGER (21)

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. Extratropical transition was complete by 070600Z as Roger merged with a cold front south of Japan.

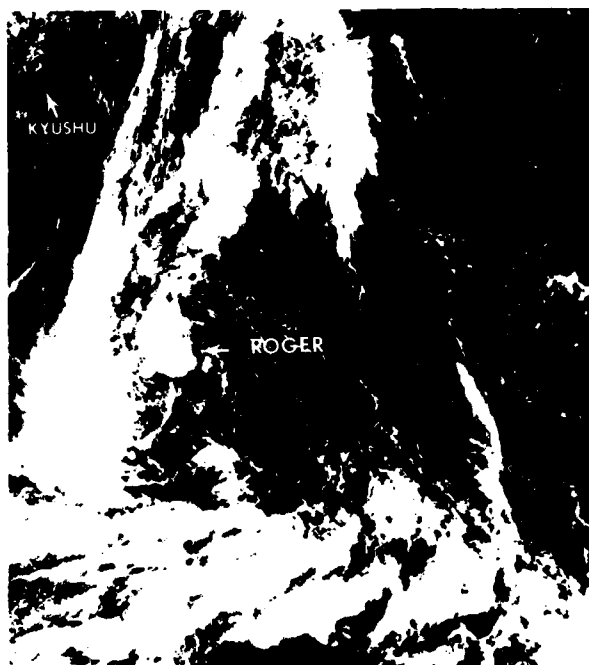
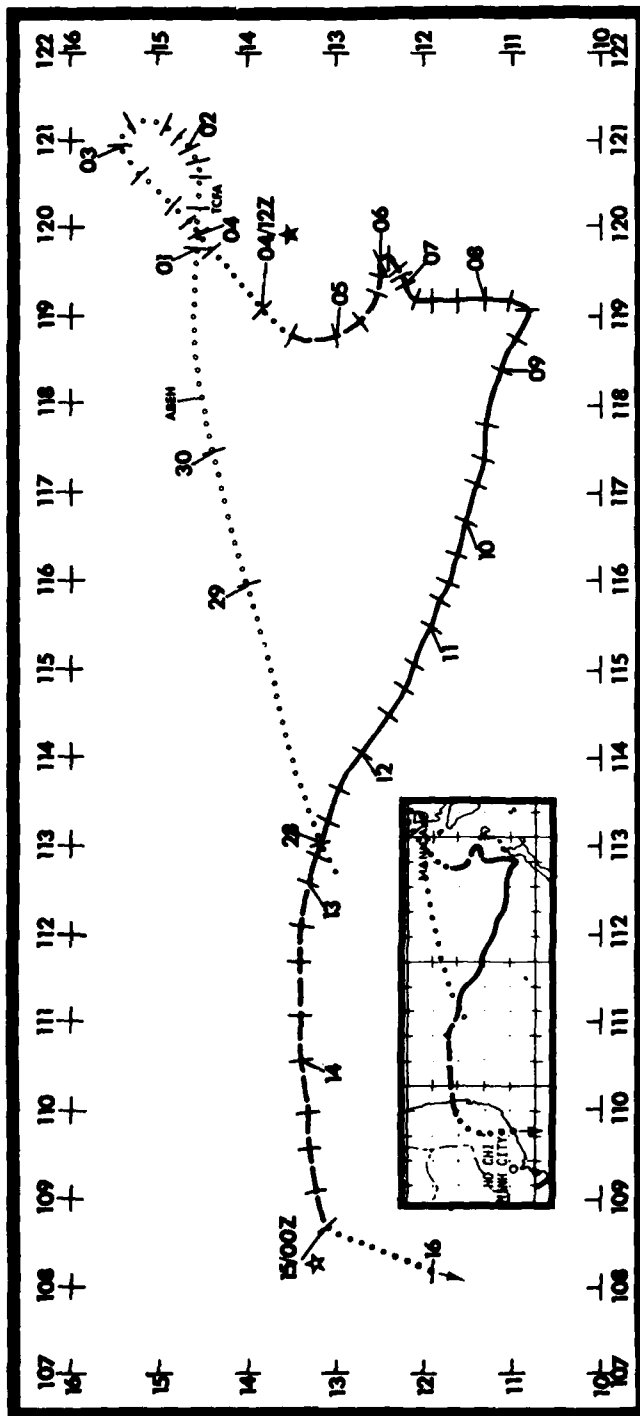


FIGURE 3-21-1. Tropical Storm Roger at 35 kt (18 m/sec) intensity 04 October 1979, 0054Z. (DNMSP imagery)



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

TYPHOON SARAH (22)

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



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)

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.

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

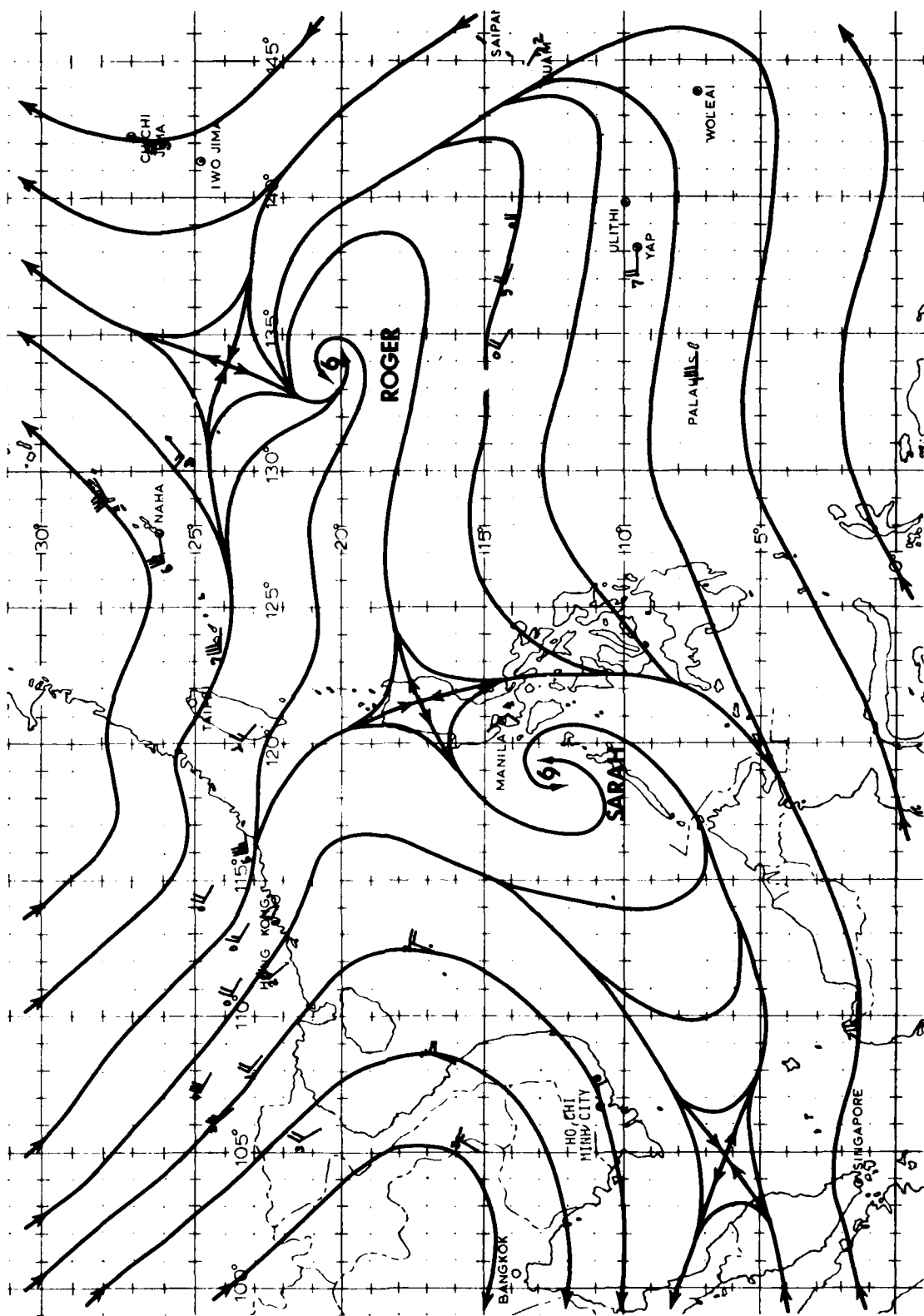
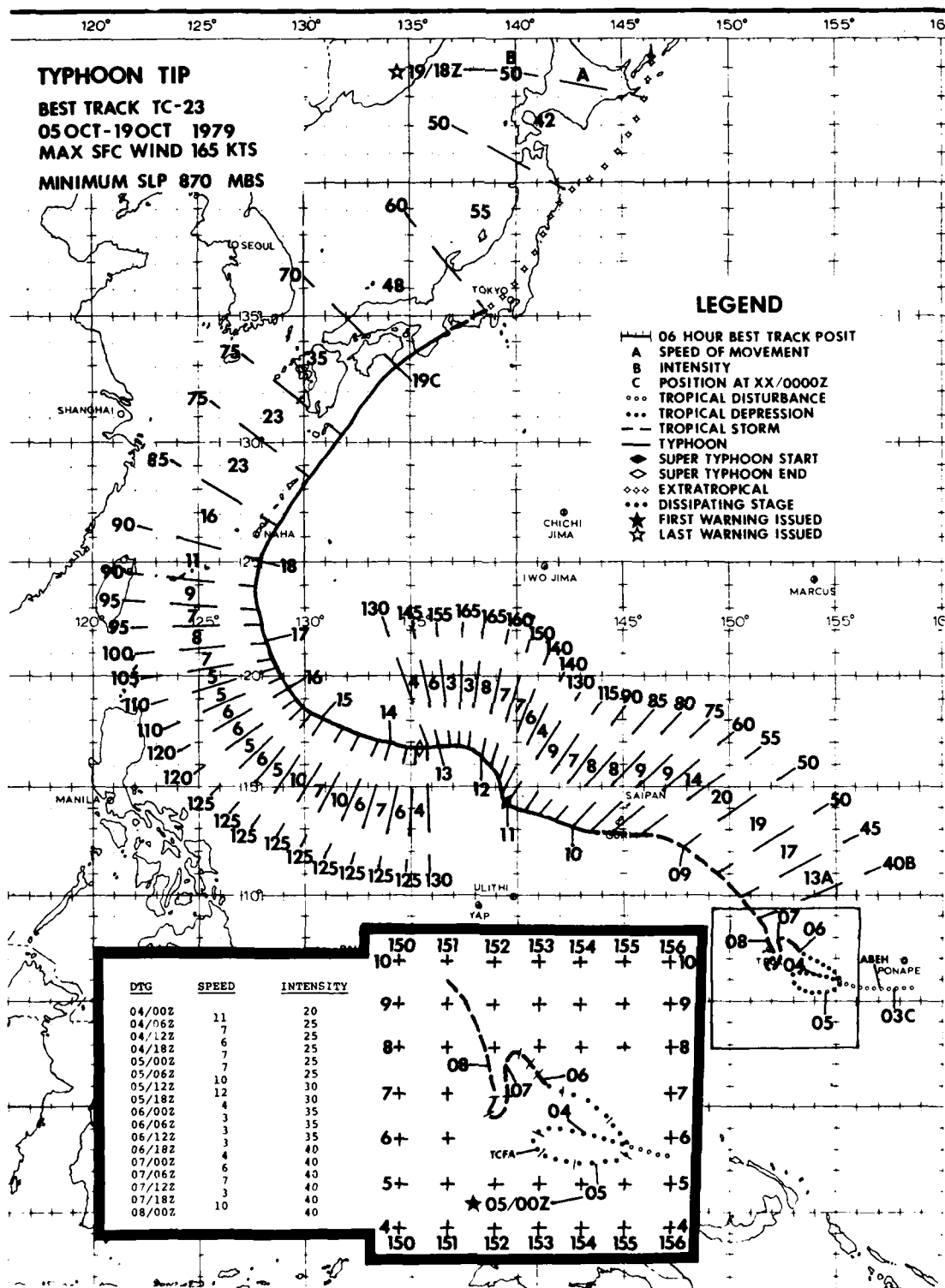


FIGURE 3-22-2. The 050000Z October 1979 500 mb streamline analysis. Wind speeds are in knots.



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

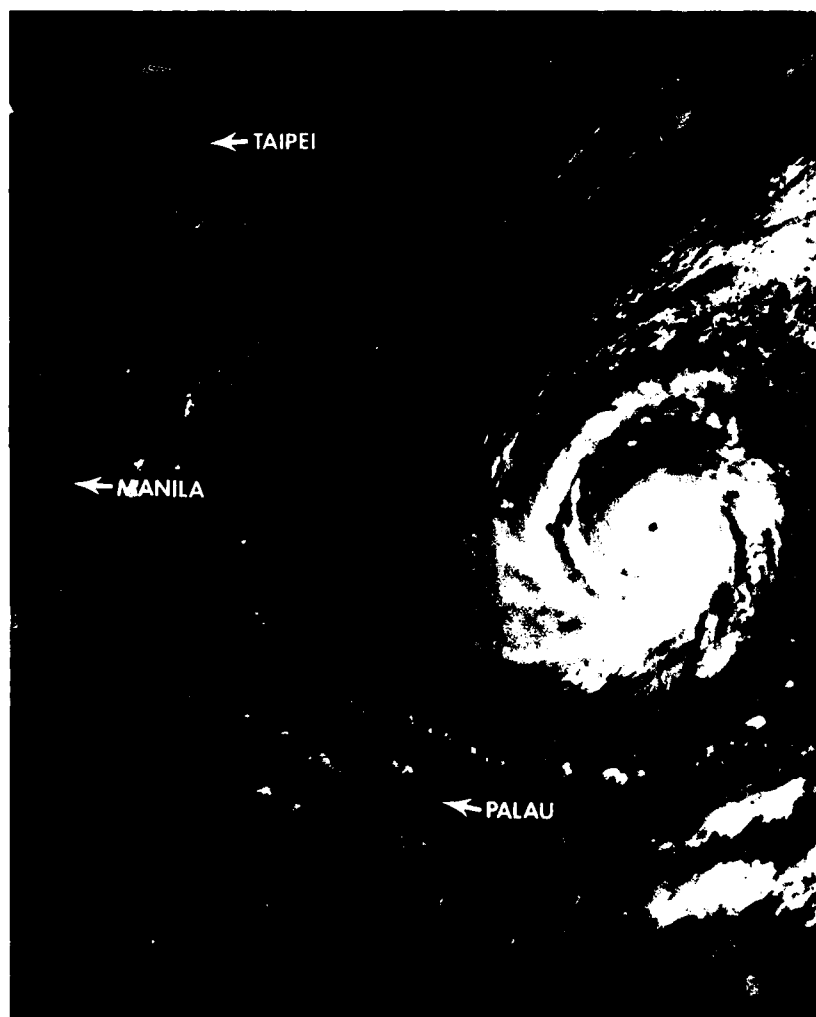


FIGURE 3-23-1. Super Typhoon Tip shortly before the record MSLP of 870 mb was observed by reconnaissance aircraft, 12 October 1979, 0012Z. (DMSF imagery).

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).

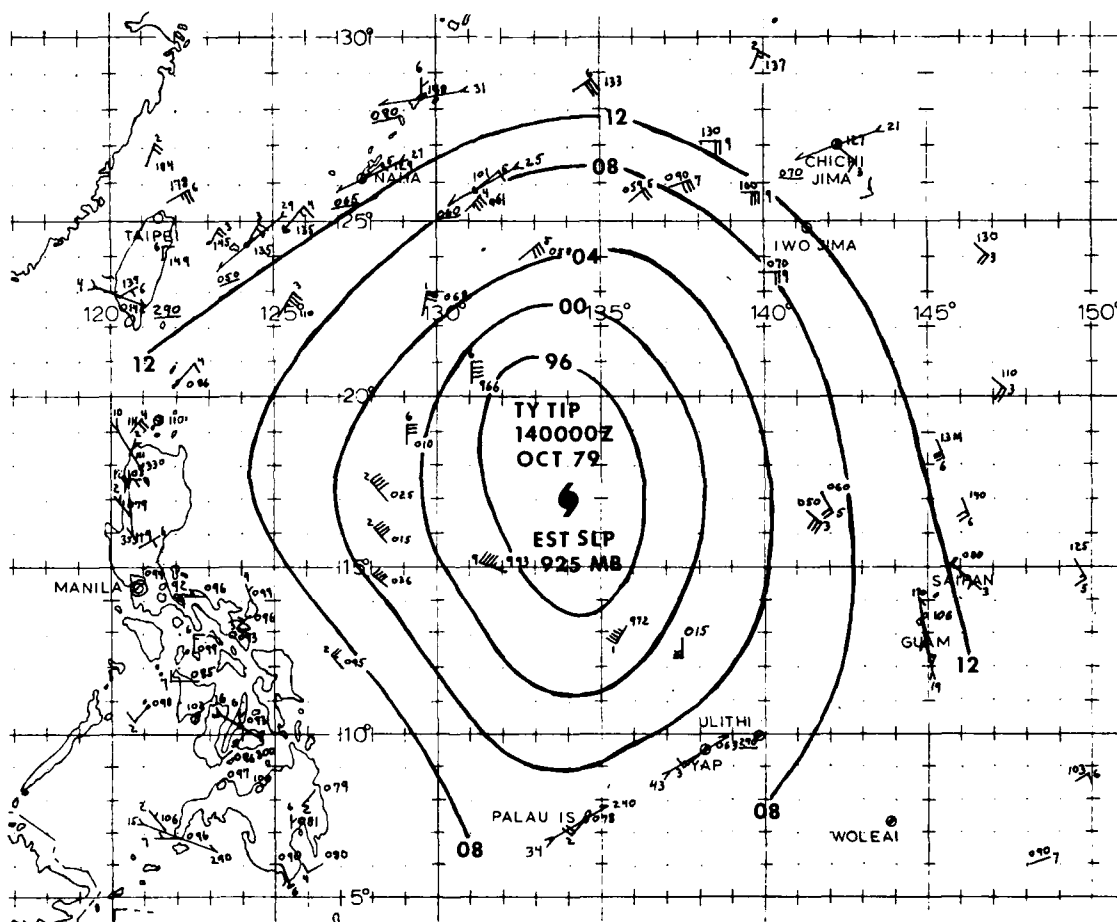


FIGURE 3-23-2. The 140000Z October 1979 surface (—) / gradient-level (ddd) wind data and pressure analysis in the vicinity of Super Typhoon Tip. Wind speeds are in knots.

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

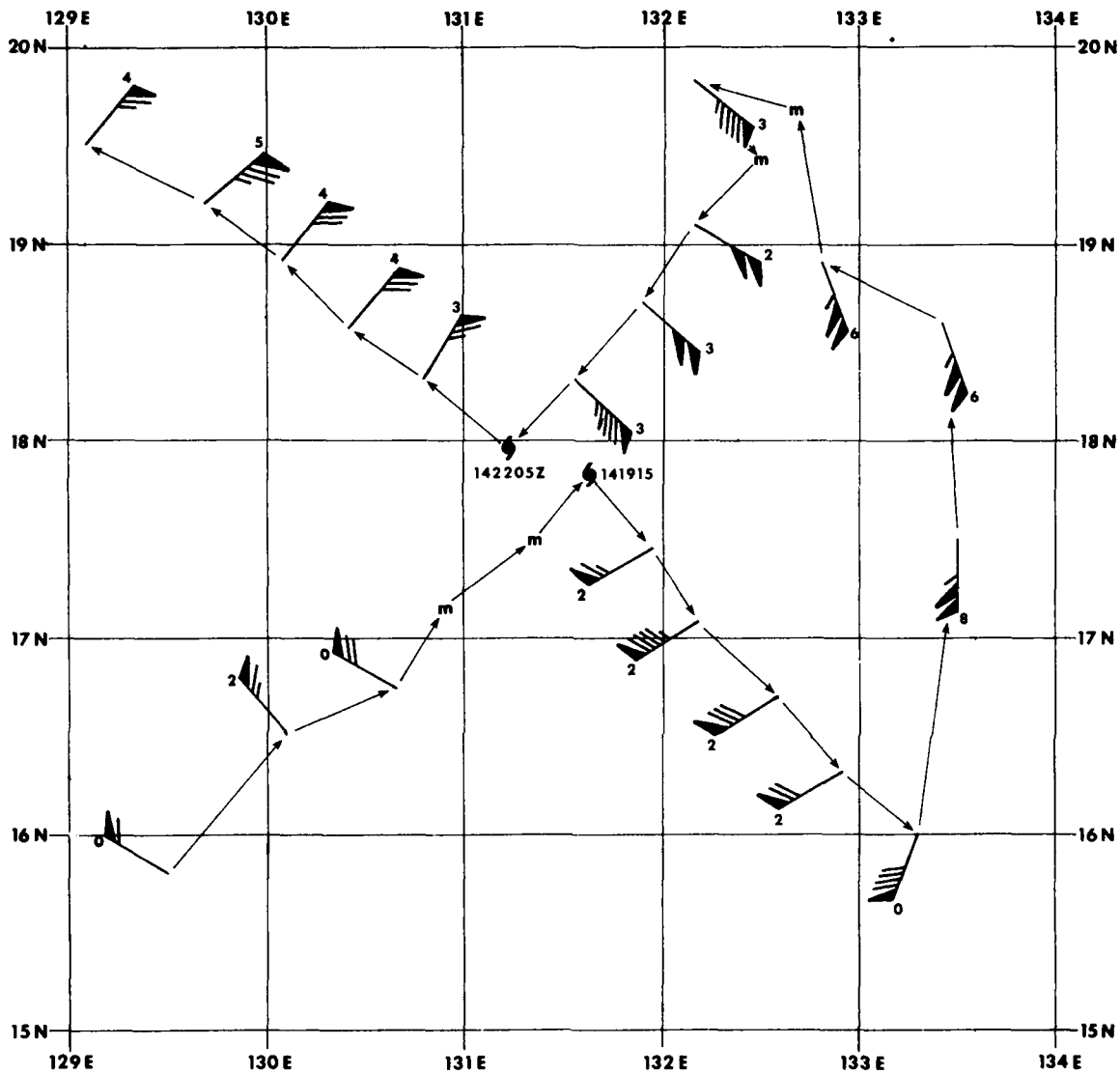


FIGURE 3-23-3. Plot of aircraft reconnaissance data from the 26th mission into Super Typhoon Tip on 15 October 1979. Tip's positions were fixed at 141915Z and 142205Z. Wind barbs are the measured 700 mb winds. The tens digit of the wind direction is also plotted with the wind barbs. An "m" indicates 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).

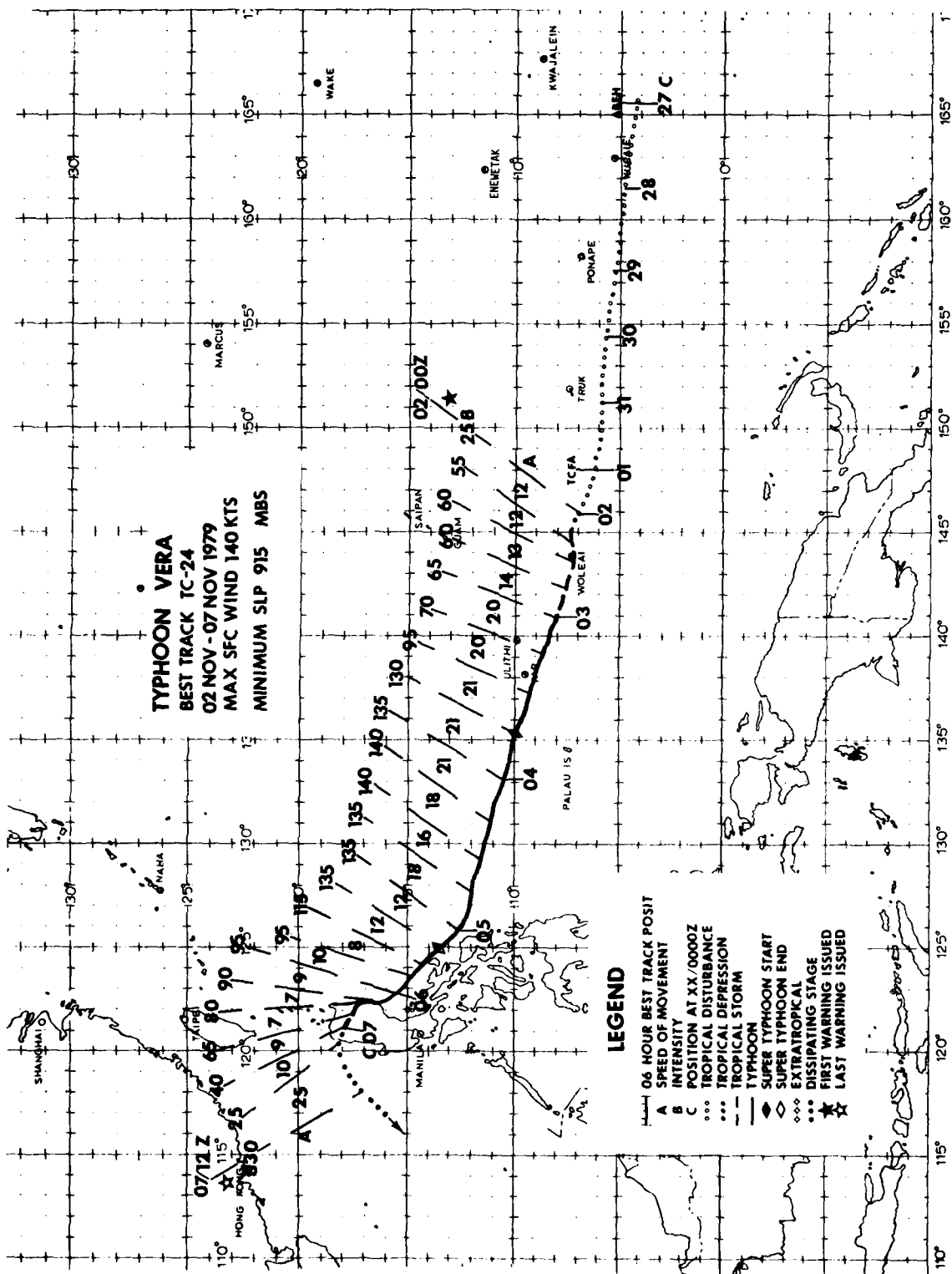
At approximately 190100Z, after reaching a forward speed of between 35 and 45 kt (65 and 83 km/hr), Typhoon Tip, with maximum winds of 70 kt (36 m/sec), made landfall on the Japanese island of Honshu, about 60 nm (111 km) south of Osaka. Synoptic and radar data from stations on the island showed that 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 fared 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 24 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

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



SUPER TYPHOON VERA (24)

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 Tarigdig 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.

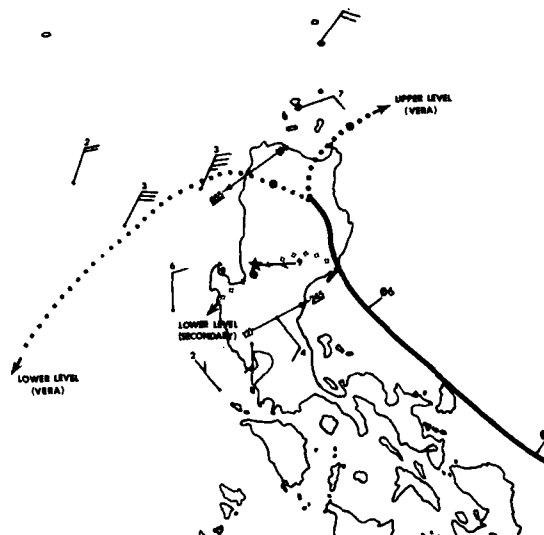
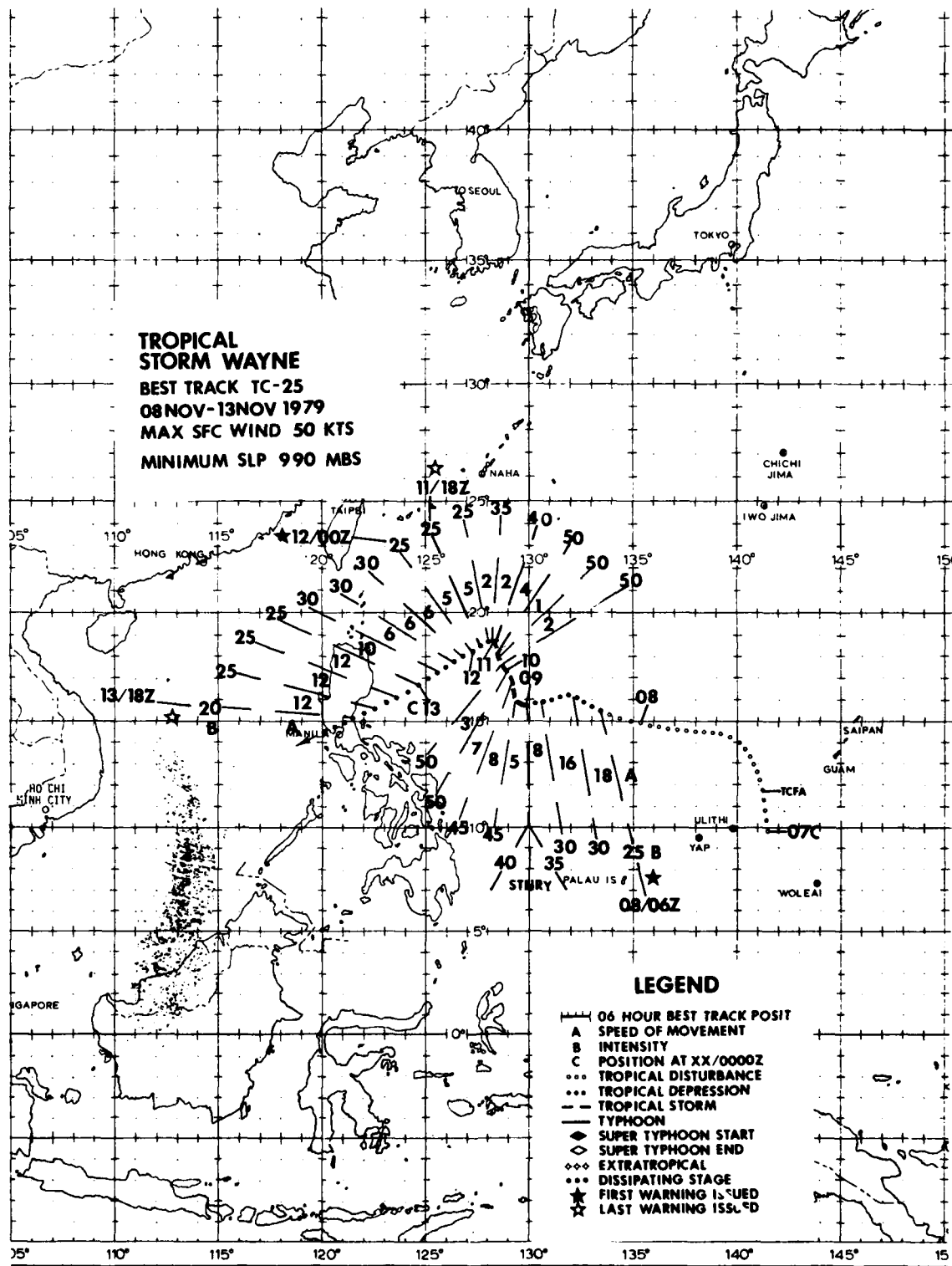


FIGURE 3-24-1. Tracks of low-level and upper-level centers after the upper-level sheared off over northern Luzon. Synoptic and ship reports at 070000Z November indicate secondary low-level center near Baguio (WMO 98328) (indicated by a star). The 070000Z center positions are indicated by solid dots.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



TROPICAL STORM WAYNE

Tropical Storm 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.

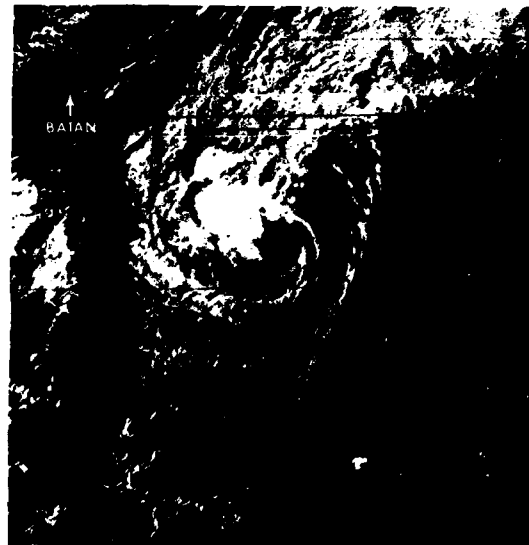


FIGURE 3-25-2. Tropical Storm Wayne weakening due to strong shear as it approached the Philippines, 12 November 1979, 0100Z. (DMSP imagery)

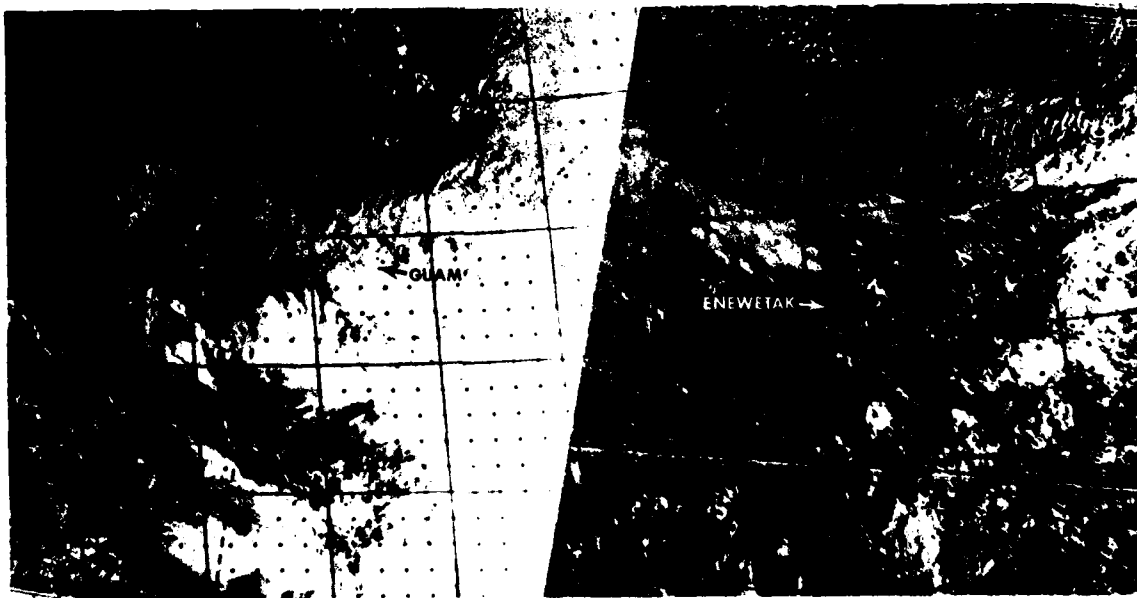
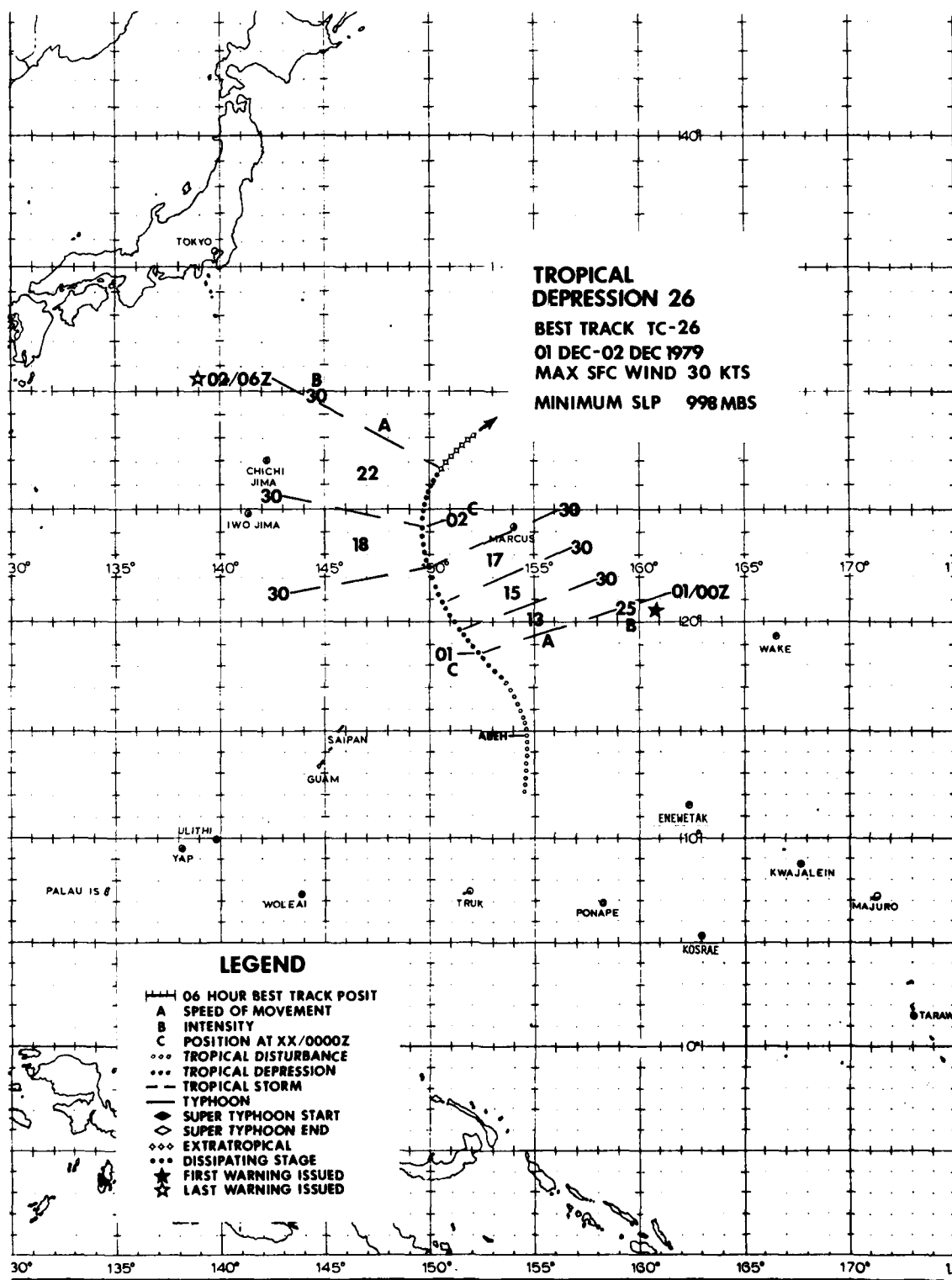


FIGURE 3-25-1. Disturbance stage of Tropical Storm Wayne when the system was mainly a mid-level circulation, 6 November 1979, 1208Z. (DMSP imagery)



TROPICAL DEPRESSION 26

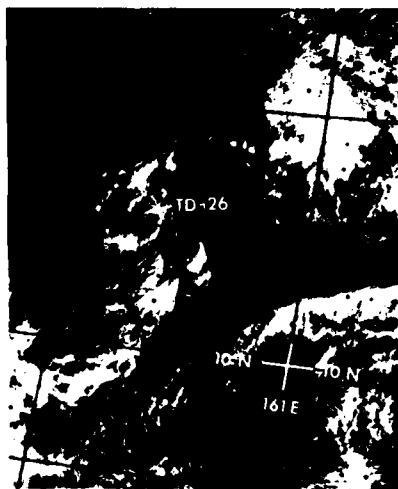


FIGURE 3-26-1. Tropical Depression 26 developed north-northeast of the Truk Islands and appeared to be the surface reflection of a mid-level circulation. Surface data suggest the existence of a weak circulation 400 nm (741 km) northeast of Tropical Depression 26 and a broad circulation (Typhoon Abby)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

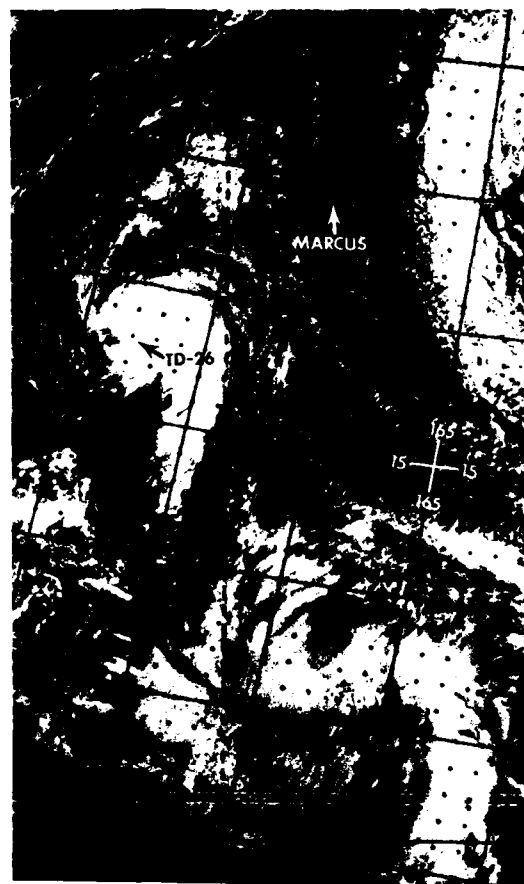


FIGURE 3-26-2. Tropical Depression 26 developed an identifiable surface circulation and intensified as it tracked north-northwestward. A ship, transiting the area, passed through the storm center and reported 35 kt (18 m/sec) winds in heavy showers. Based on synoptic data, the first warning was issued 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)

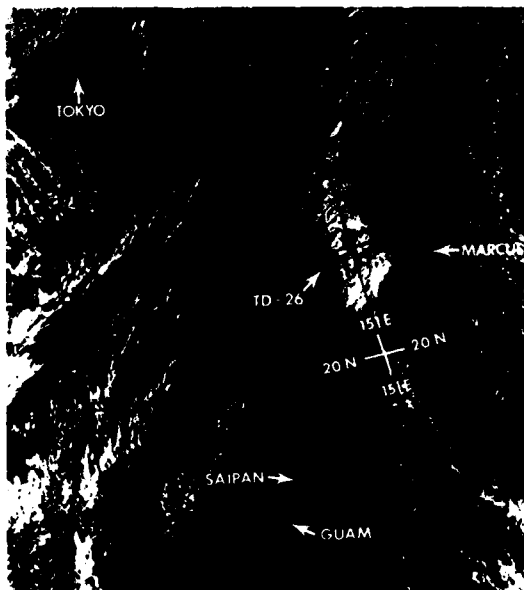
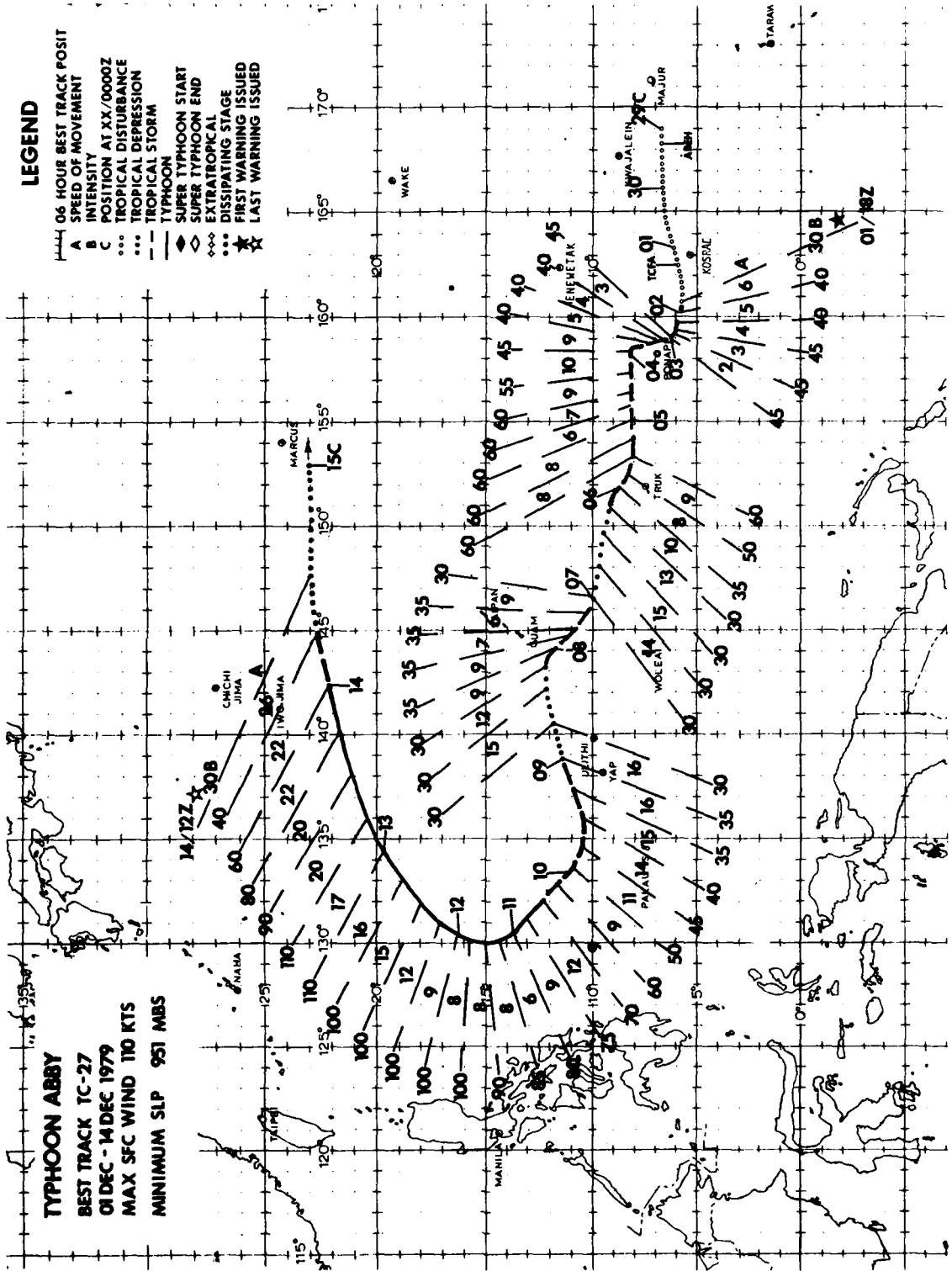


FIGURE 3-26-3. Tropical Depression 26 passed west of Marcus Island and merged with an extratropical frontal boundary. Tropical Depression 26 sheared in the vertical with the low-level exposed surface circulation remaining on the western edge of the convection, 2 December 1979, 0036Z. (DMSP imagery)

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



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. There 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. At 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

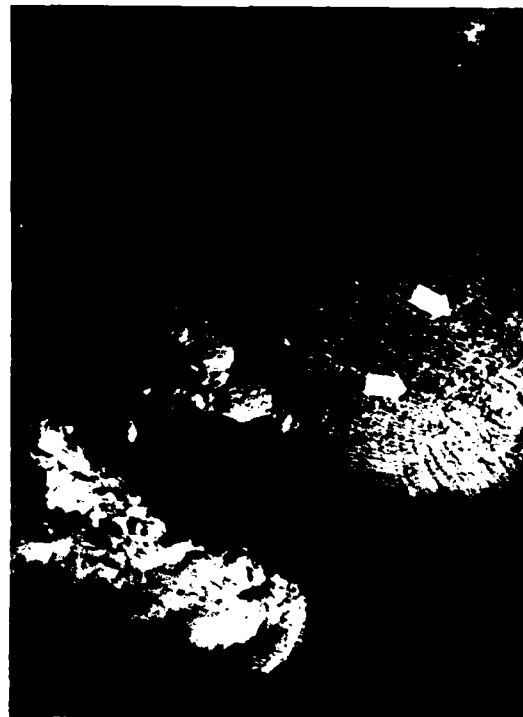
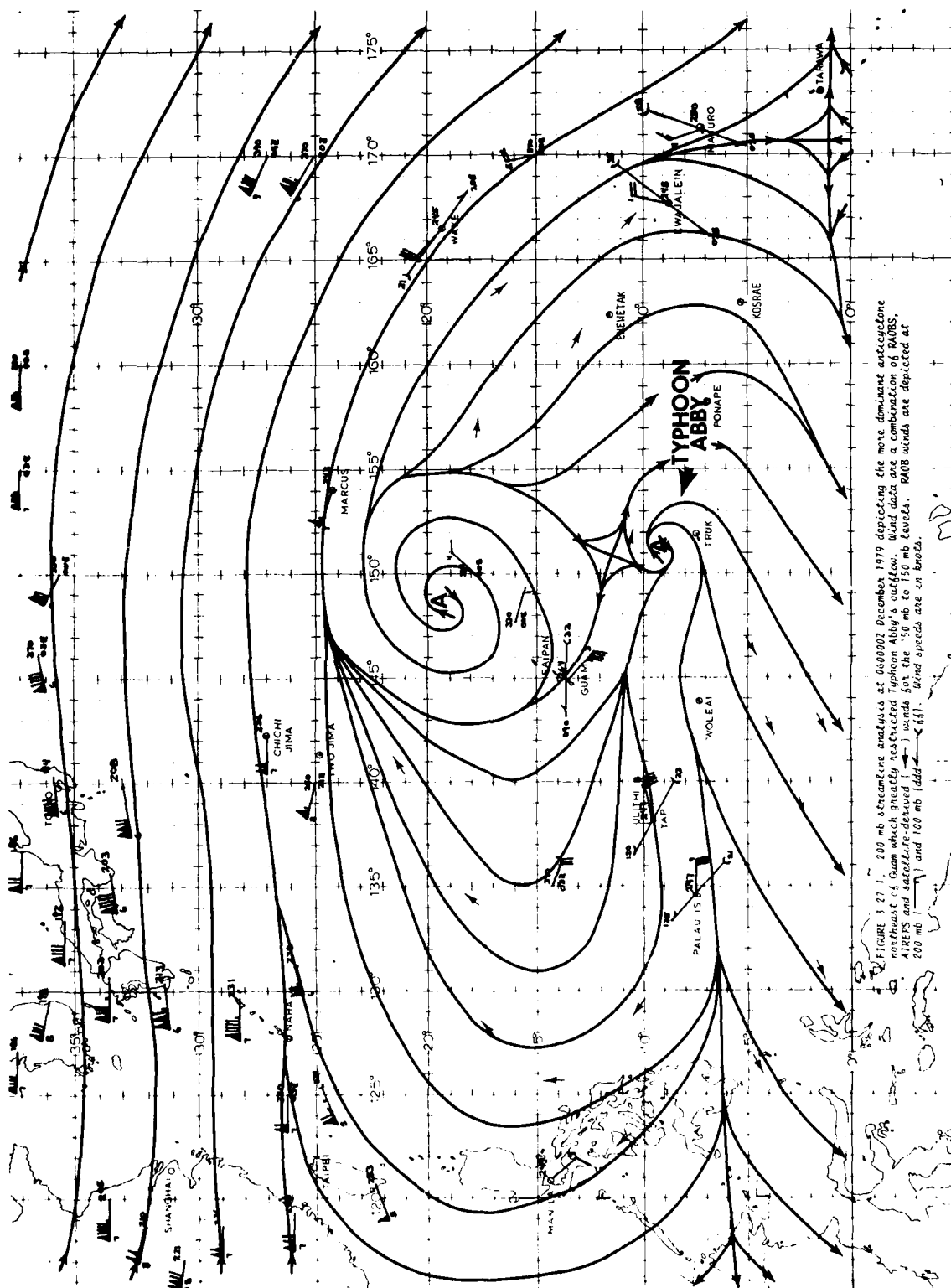


FIGURE 3-27-2. Typhoon Abby's two outflow centers are indicated by arrows, 9 December 1979, 0144Z. (DMSP imagery) Figure 3-27-1 is on next page.

FIGURE 3-27-1 is on following page.



Flight 3-27-1, 200 mb streamlines analyzed at 000000Z December 1979 depicting the more dominant anticyclone northeast of Guam which greatly restricted Typhoon Abby's outflow. Wind data are a combination of RA00S, AIRS and satellite-derived (---) winds for the 50 mb to 150 mb levels. RA00S winds are depicted at 200 mb (---) and 100 mb (---). 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.

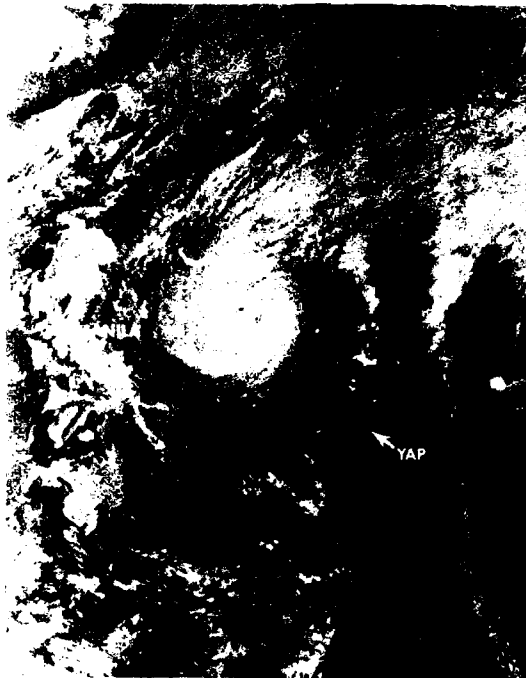


FIGURE 3-27-3. Typhoon Abby just after recurvature, 12 December 1979, 00:12. (DMSP imagery)

¹CHARLES B. STANFIELD, Capt., USAF: MISSION ARWO.

AD-A082 071

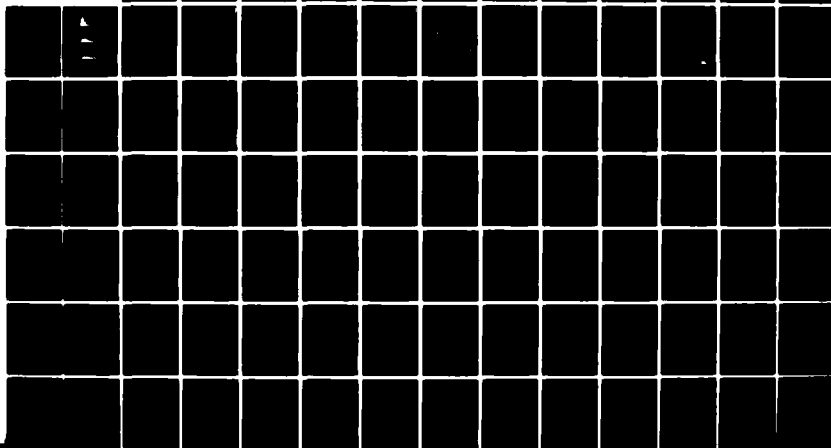
NAVAL OCEANOGRAPHY COMMAND CENTER/JOINT TYPHOON WARNI--ETC F/6 4/2
ANNUAL TYPHOON REPORT 1979.(U)
1979 J W DIERCKS, J K LAVIN, J H BELL

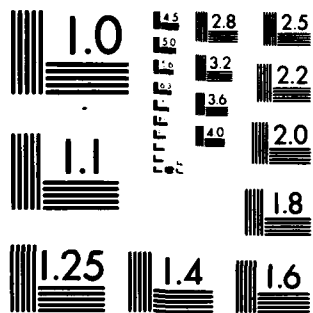
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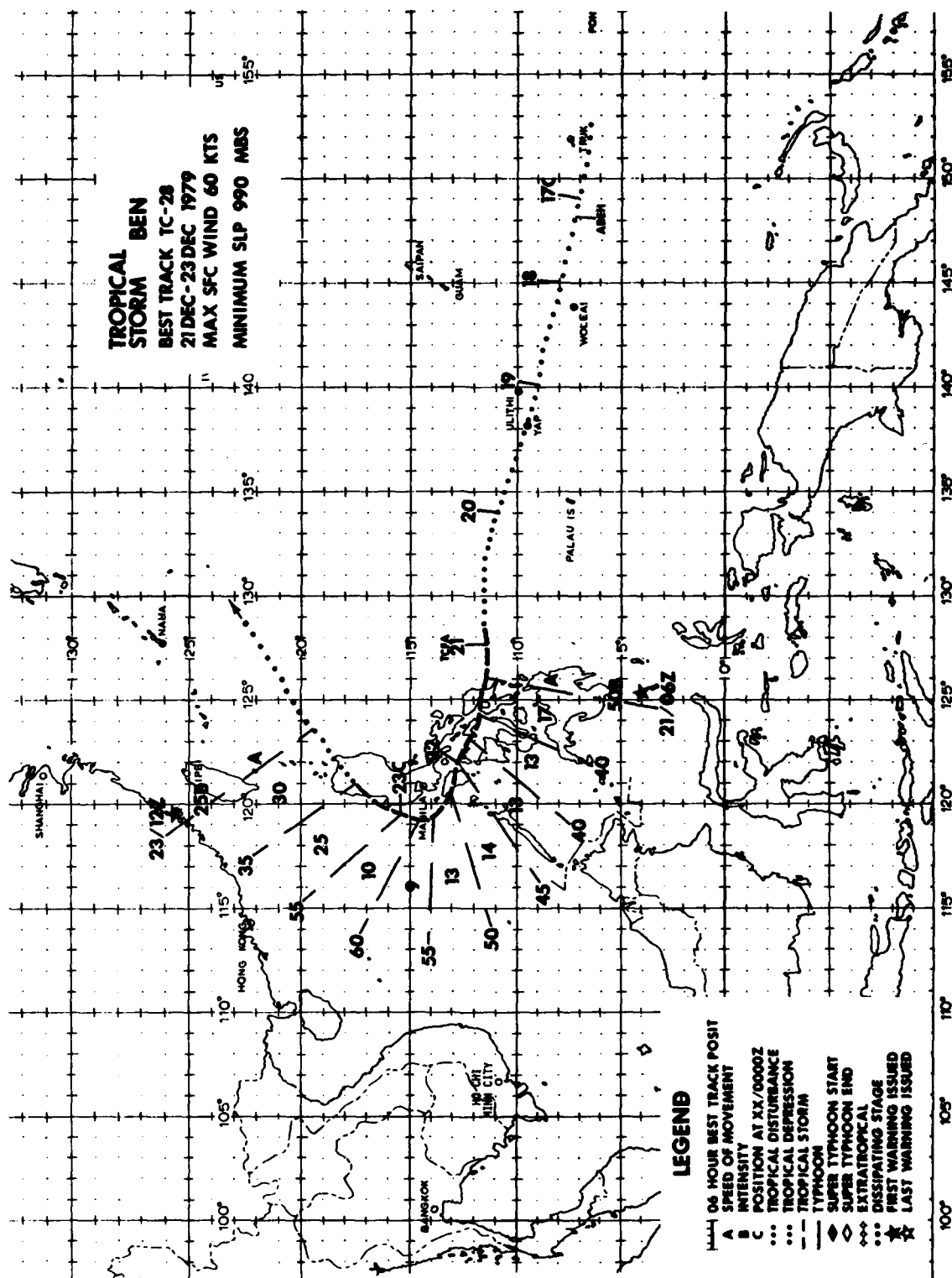
2-13

AVPVT





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



TROPICAL STORM BEN (28)

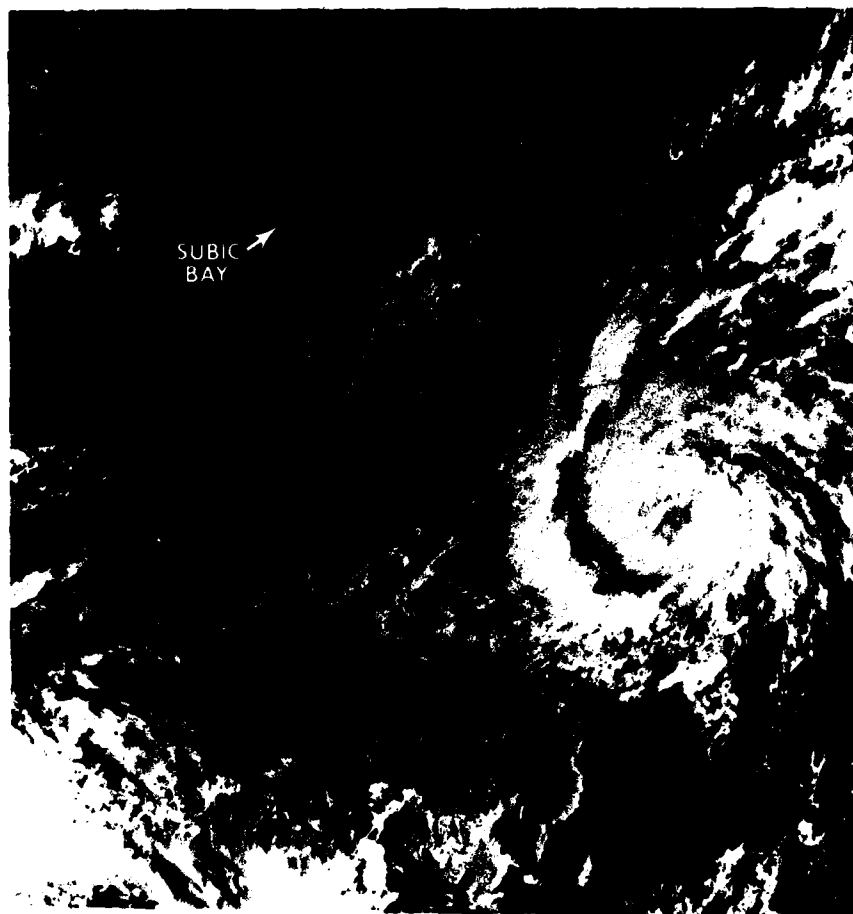


FIGURE 3-28-1. Tropical Storm Ben at 40 kt
(21 m/sec) intensity, 21 October 1979, 0059Z.
Ben was the last tropical cyclone in the western
North Pacific during 1979. (DMSP imagery)

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

<u>CYCLONE</u>	<u>PERIOD OF WARNING</u>	<u>CALENDAR DAYS OF WARNING</u>	<u>MAX SFC WIND</u>	<u>EST MIN SLP</u>	<u>NUMBER OF WARNINGS</u>	<u>DISTANCE TRAVELLED</u>
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.

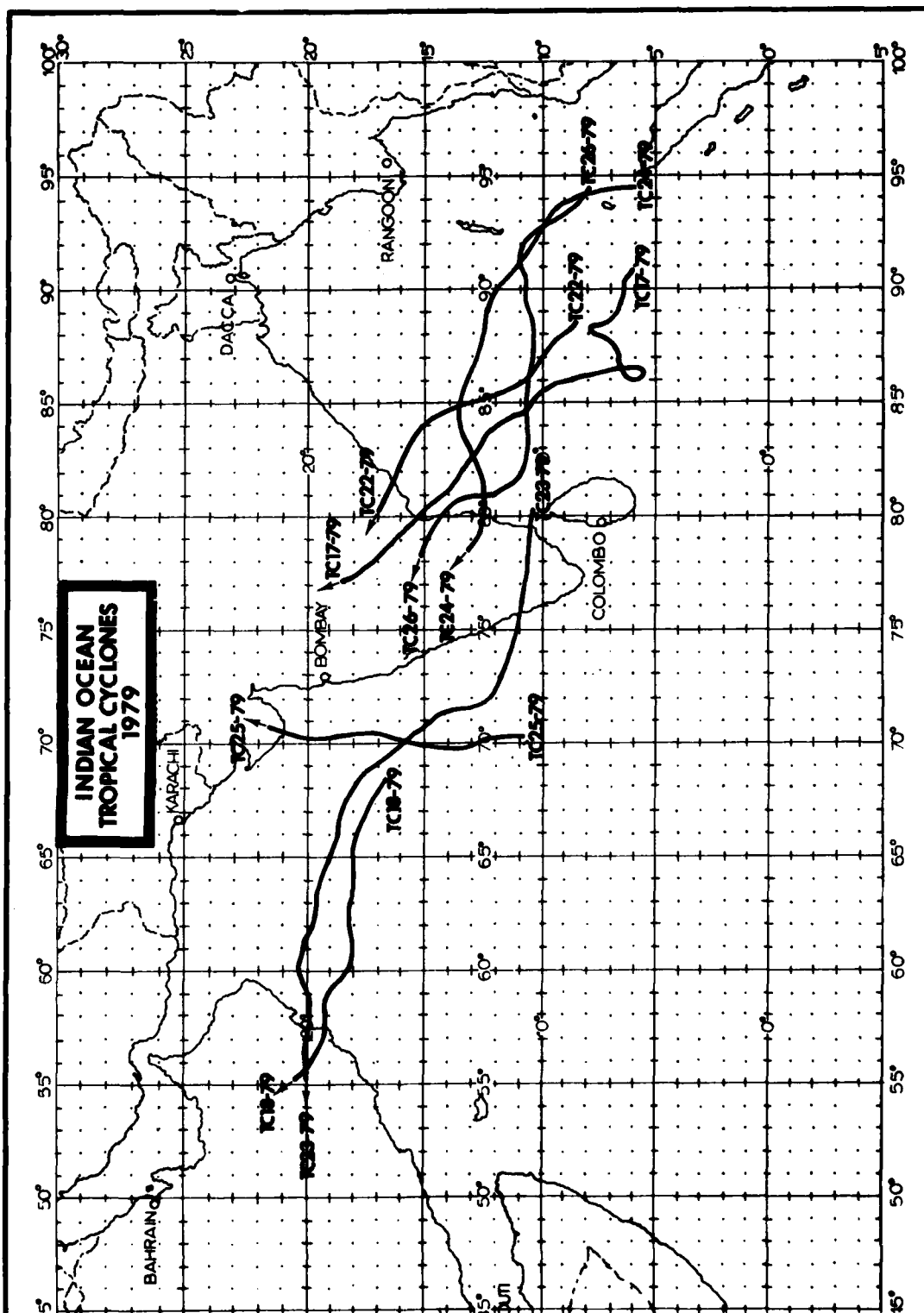
1979 SIGNIFICANT TROPICAL CYCLONE STATISTICS

<u>NORTH INDIAN OCEAN</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
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.



TC 17-79

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)

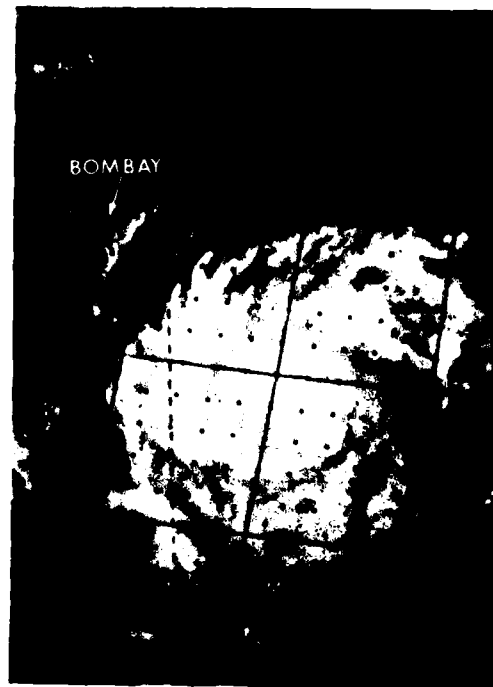
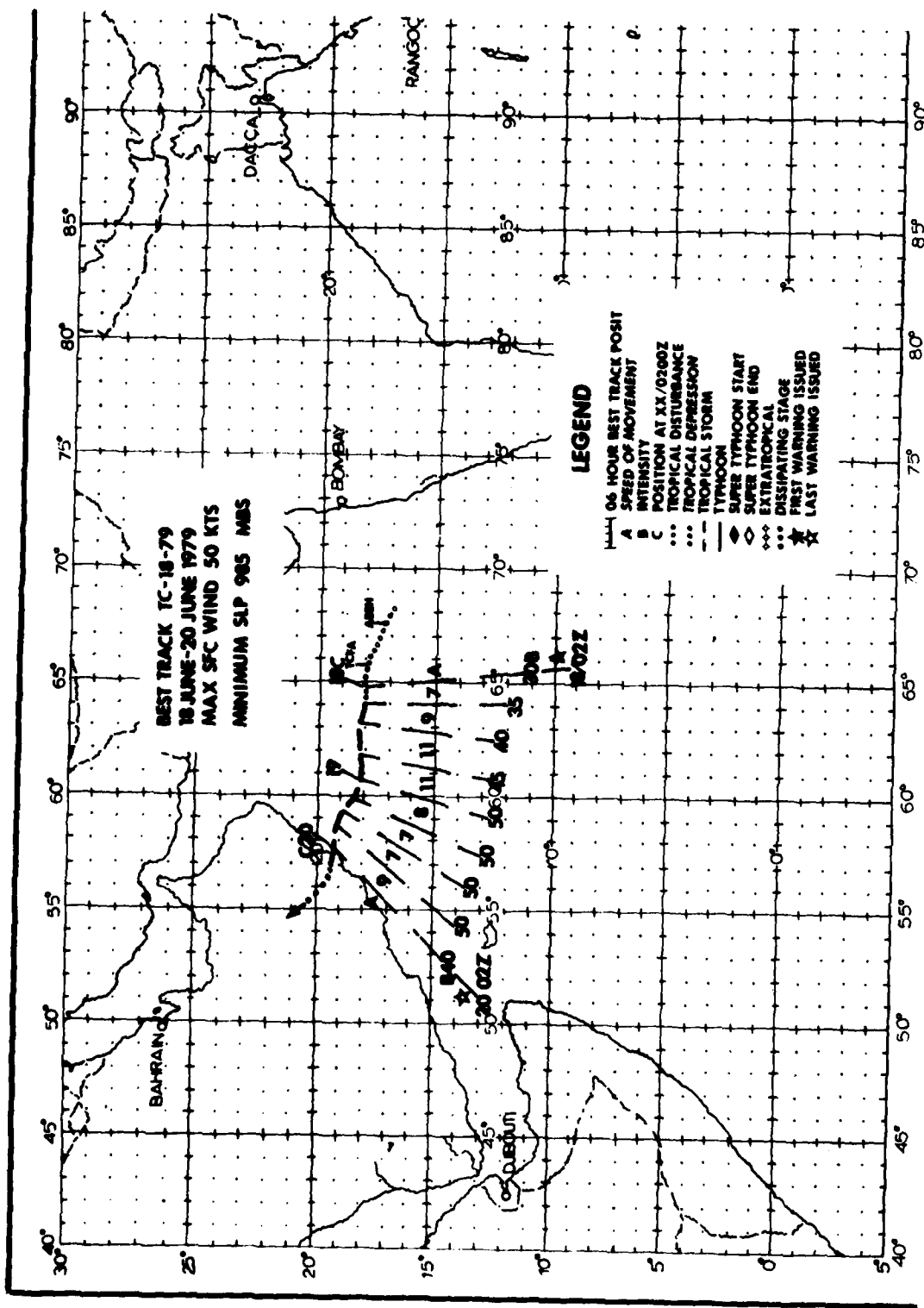


FIGURE 3-30. TC 17-79 just prior to making landfall over east central India with 80 kt (41 m/sec) intensity, 12 May 1979, 0556Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)



TC 18-79

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 forma-

tion, 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.

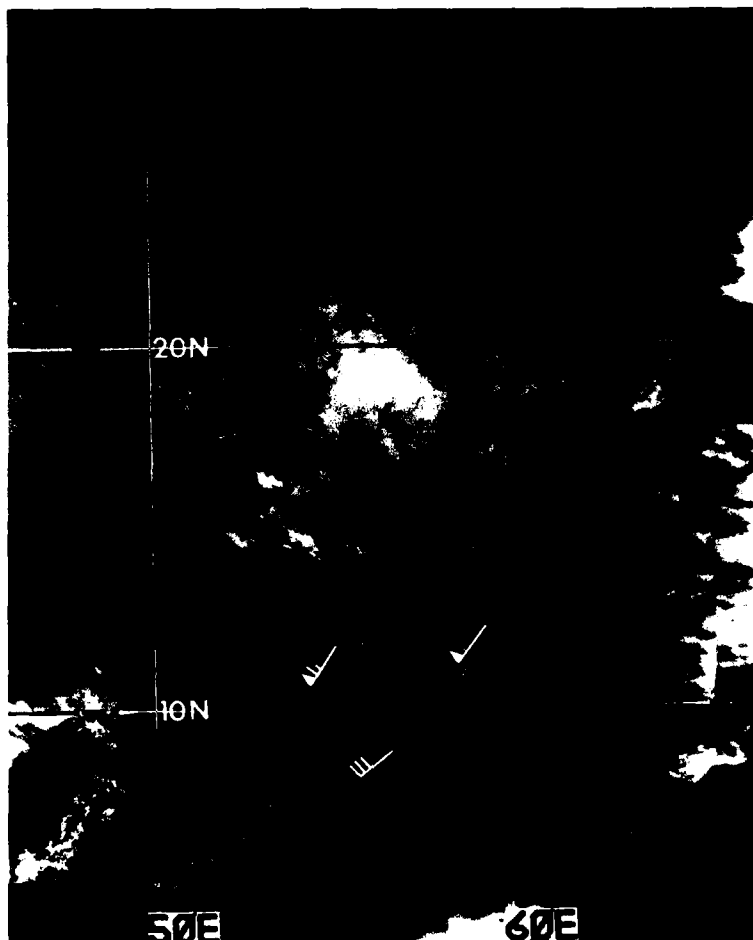
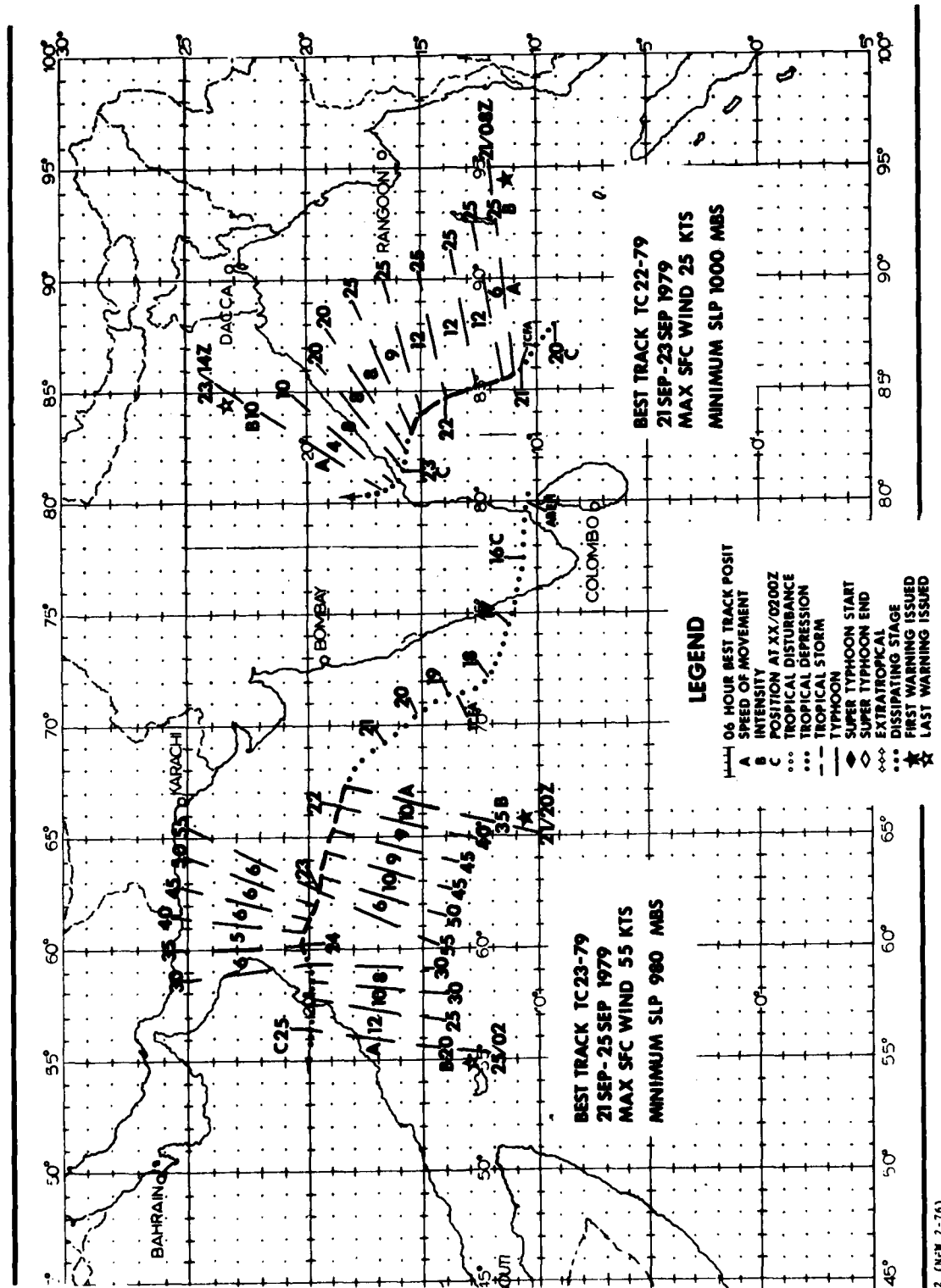
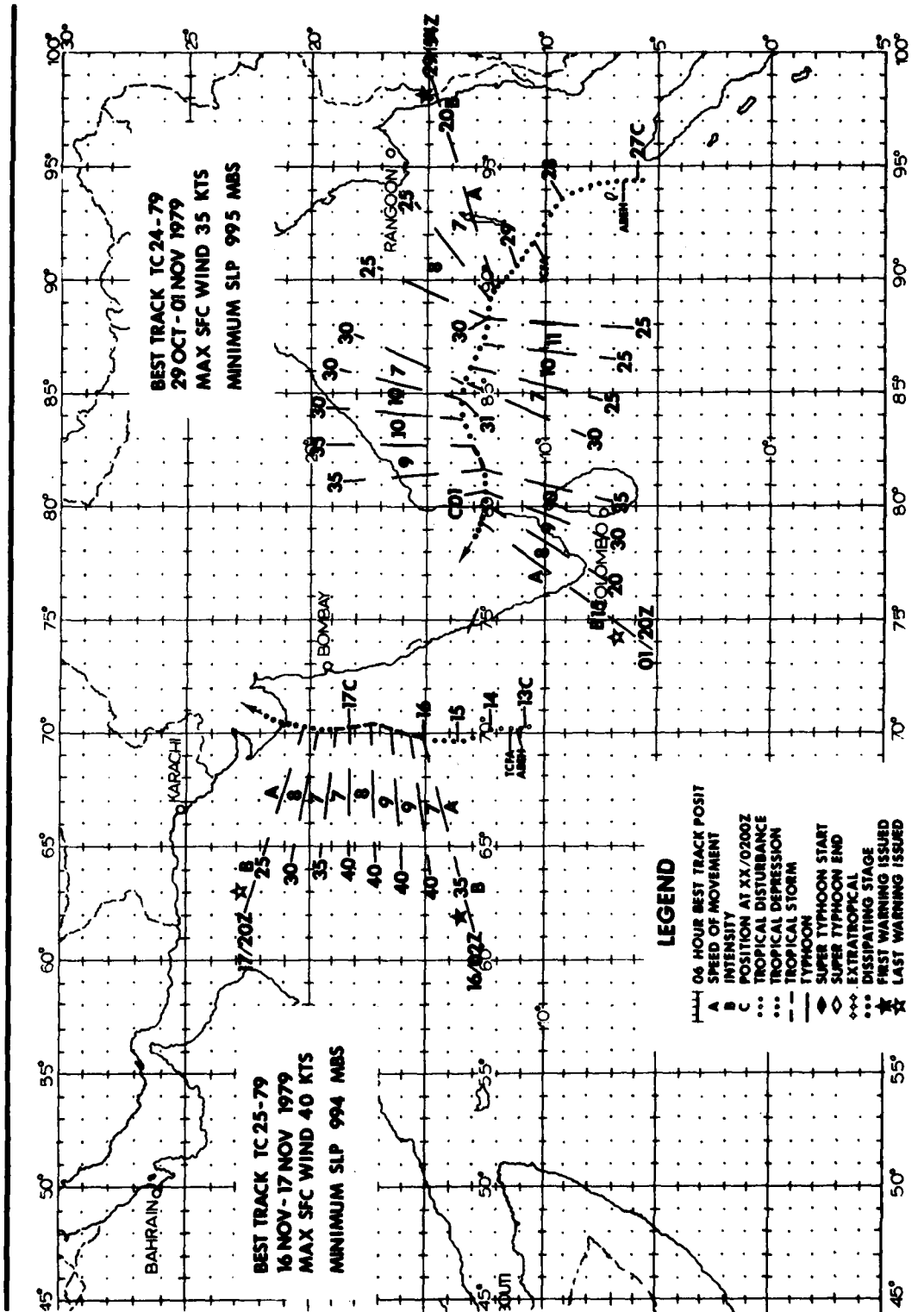
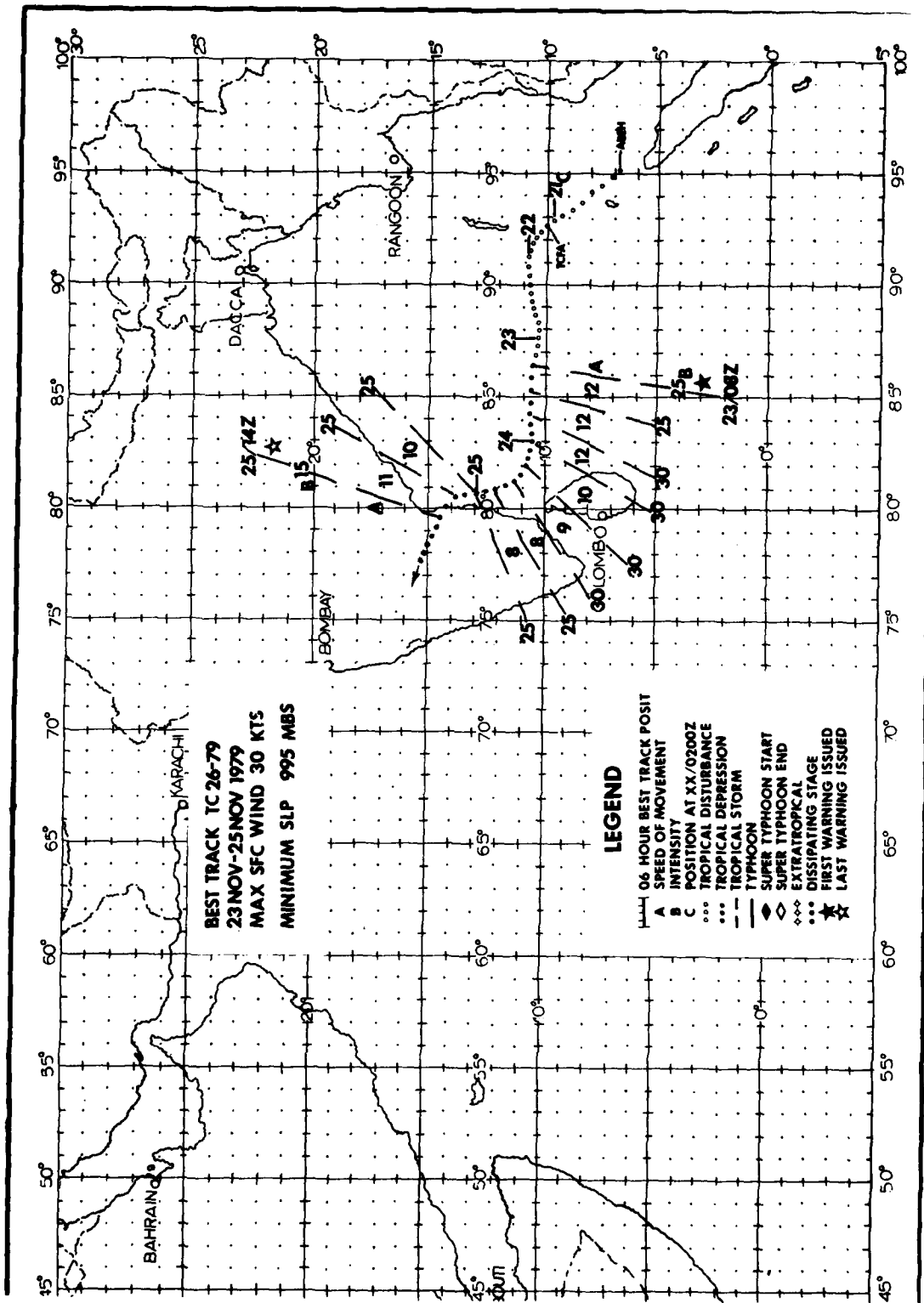


FIGURE 3-31. TC 18-79 located just off the Oman coast with gale force winds to the south, 20 June 1979, 0731Z. Superimposed are ship observations at 200600Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)







TC 26-79

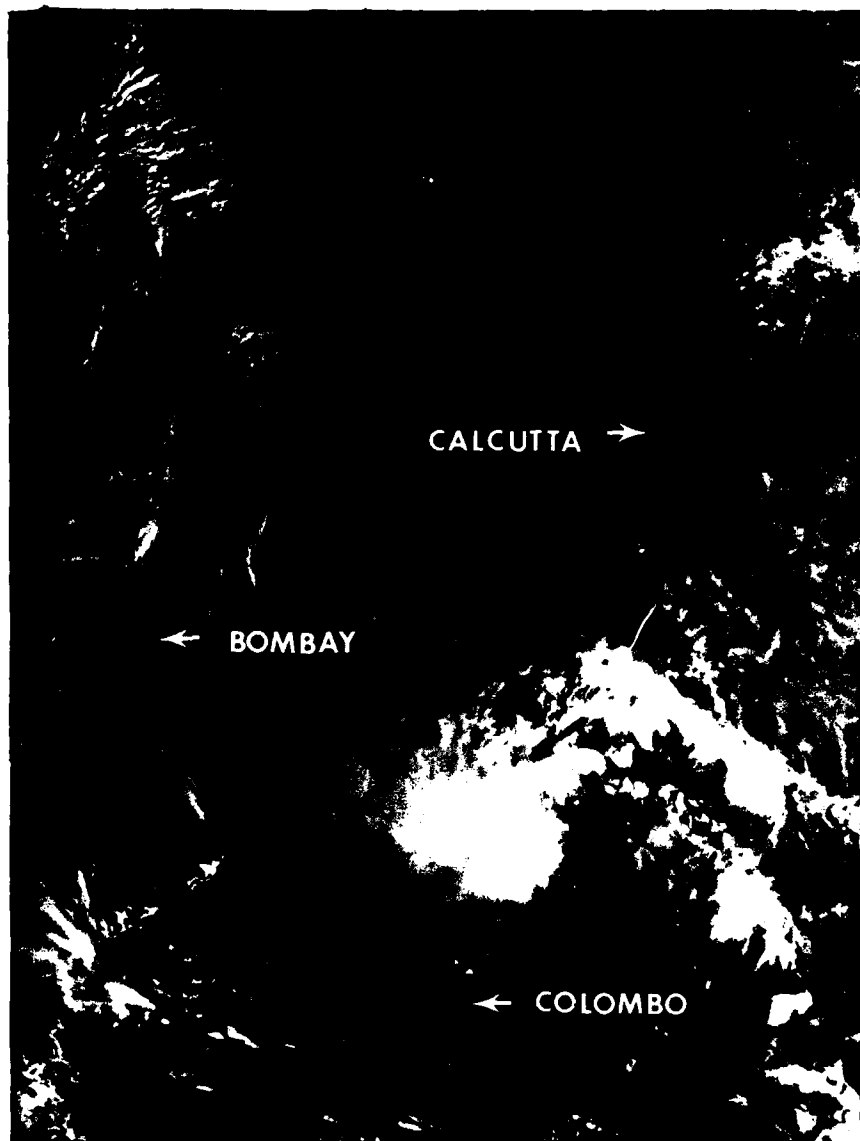


FIGURE 3-32. TC 26-79 as an exposed low-level circulation, 24 November 1979, 0455Z. (DMSP imagery from AFGWC, Offutt AFB, Nebraska)

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.

CYCLONE	WARNING			24 HOUR			48 HOUR			72 HR		
	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.

YEAR	24-HR		48-HR		72-HR	
	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

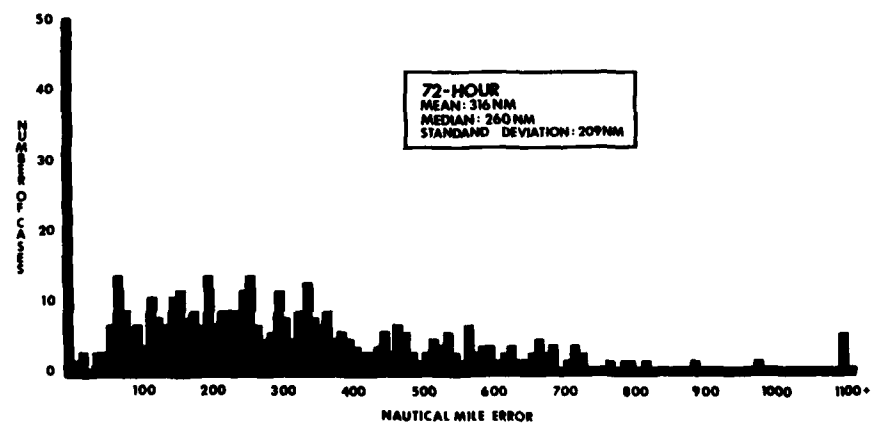
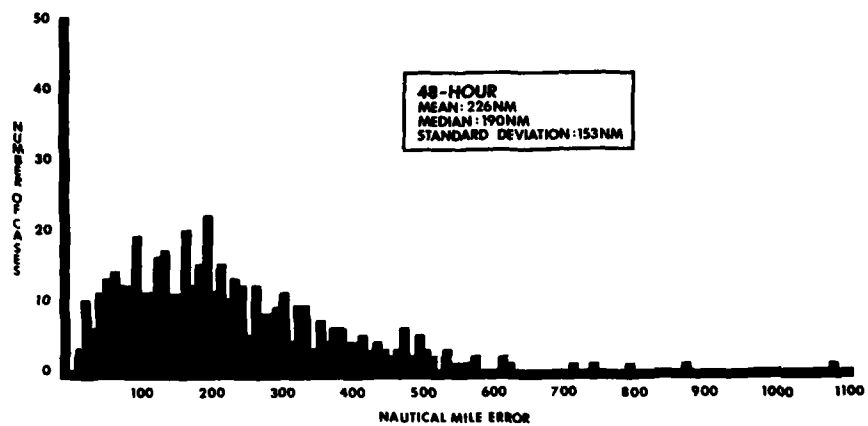
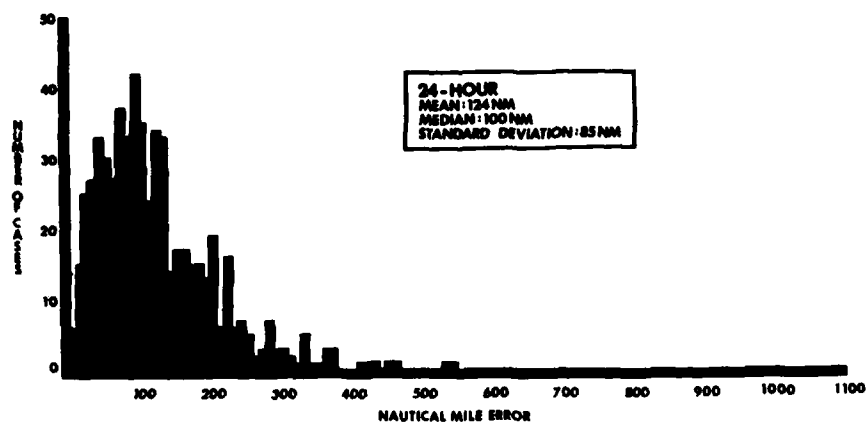


FIGURE 4-1. Frequency distribution of 1979 24-, 48-, and 72-hour forecast vector errors for all significant tropical cyclones in the western North Pacific.

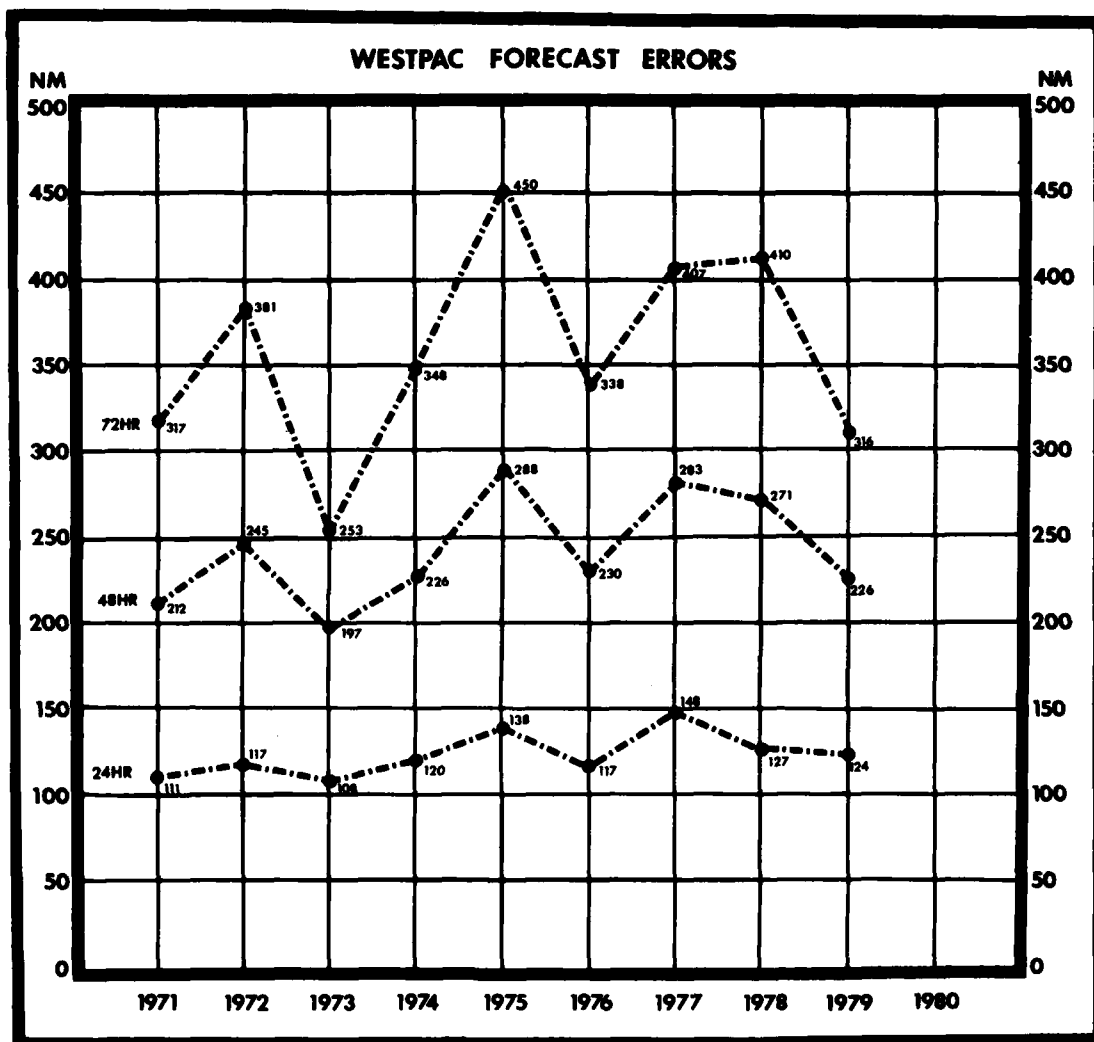


FIGURE 4-2. Annual vector errors (nm) for all cyclones in the western North Pacific.

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 intensi-

fying 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.)

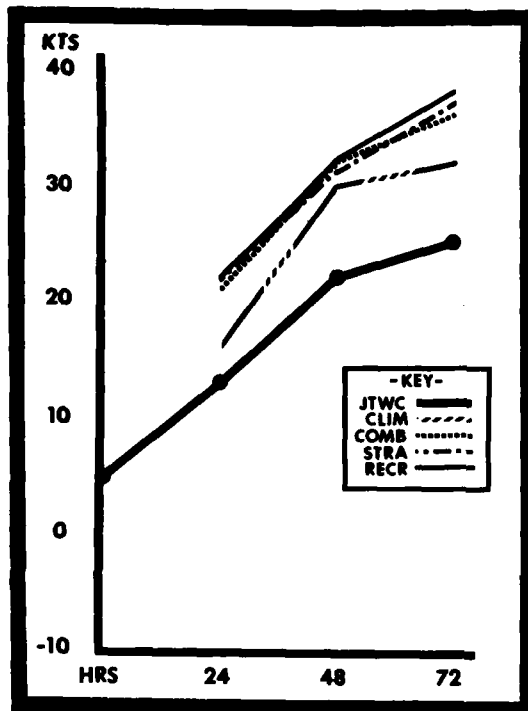


FIGURE 4-3. Comparison of average intensity errors (magnitude) for all cyclones in the western North Pacific.

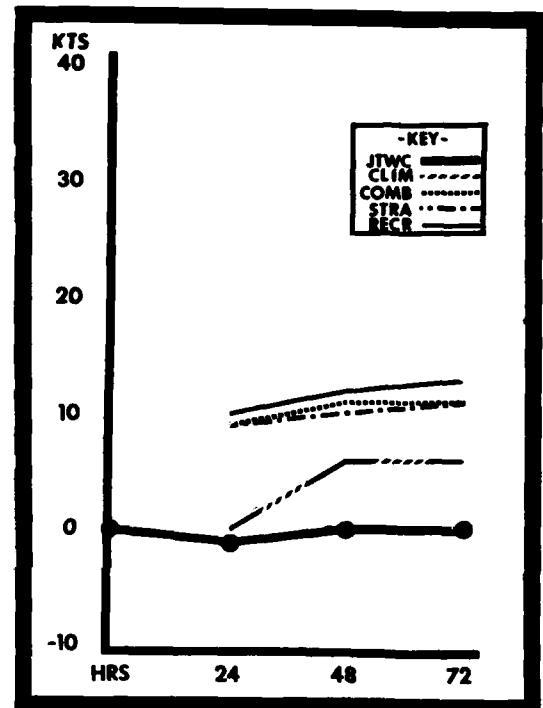


FIGURE 4-4. Comparison of average intensity errors (biases) for all cyclones in the western North Pacific.

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.

CYCLONE	WARNING			24 HOUR			48 HOUR			72 HOUR		
	POSIT ERROR	RT ANGLE °	WINGS	POSIT ERROR	RT ANGLE °	WINGS	POSIT ERROR	RT ANGLE °	WINGS	POSIT ERROR	RT ANGLE °	WINGS
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 21-79	34	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).

YEAR	24-HR		48-HR		72-HR	
	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

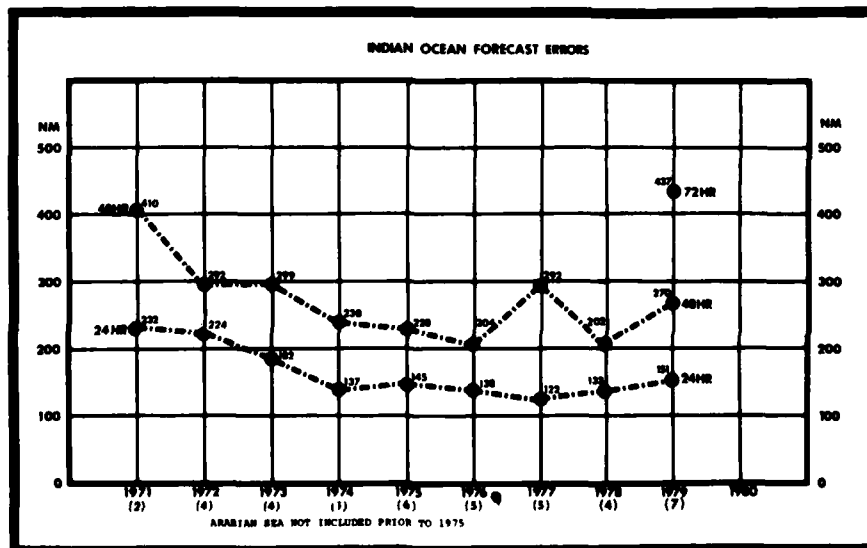


FIGURE 4-5. Annual mean vector errors (nm) for all cyclones in the North Indian Ocean.

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	NH70	NH50	TCMD	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	543 124 138 10	514 153 133 -19	509 139 135 -3	551 135 135 0							
NH70	435 123 159 36	407 150 158 8	399 136 163 26	425 134 160 25	445 158 158 0						
NH50	425 124 158 35	396 152 157 5	389 136 160 25	413 135 159 24	430 159 157 -1	434 157 157 0					
TCMD	121 122 132 10	111 152 134 -16	104 128 146 18	115 127 141 14	96 146 143 -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	584 149 169 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	2-AXIS TECHNIQUE BIAS
Y-AXIS TECHNIQUE BIAS	ERROR DIFFERENCE Y-X

STATISTICS FOR YEAR		48 HR FCSTS									
	JTWC	STRA	RECR	COMB	NH70	NH50	TCMD	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							
NH70	330 222 313 91	340 307 308 1	323 249 318 69	347 243 310 67	359 308 308 0						
NH50	330 220 299 79	339 305 296 -8	320 247 297 50	345 242 297 55	345 310 292 -17	358 295 295 0					
TCMD	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 - SENSITIVE (TYPE 75)
 RECR - RECURVE (TYPE 75)
 COMB - COMBINED (TYPE 75)
 NH70 - HURRY 700-HR PROG
 NH50 - HURRY 500-HR PROG
 TCMD - TROPICAL CYCLONE MODEL (OMB-NM)
 CLIM - CLIMATOLOGY
 XTRP - 12-HOUR EXTRAPOLATION
 HPAC - HURRY OF XTRP AND CLIMATOLOGY

STATISTICS FOR YEAR		72 HR FCSTS							
	JTWC	STRA	RECR	COMB	NH70	NH50	TCMD	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					
NH70	230 325 471 147	260 464 474 10	236 362 488 126	259 352 475 122	267 473 473 0				
NH50	227 329 482 153	258 467 481 14	234 364 488 124	257 355 482 127	259 469 479 10	265 486 486 0			
TCMD	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	64 389 363 -34	218 332 332 0	

STATISTICS FOR YEAR		24 HR FCSTS									
	JTWC	INJA		MH70		MH50		TCMO		XTRP	HPAC
JTWC	63 151 151 0										
INJA	48 134 125 -7	52 127 127 0									
MH70	28 159 173 14	27 132 175 44	30 180 180 0								
MH50	27 158 167 9	26 132 164 32	29 175 173 -1	29 173 173 0							
TCMO	2 43 164 121	2 53 164 111	2 73 164 91	2 64 164 100	2 164 164 0						
XTRP	61 147 146 0	52 127 130 3	30 180 148 -32	29 173 149 -23	2 164 14 -150	65 148 148 0					
HPAC	40 148 135 -12	32 134 128 -5	16 179 146 -31	15 175 148 -26	2 164 43 -120	40 145 135 -9	40 135 135 0				

NUMBER OF CASES

Y-AXIS TECHNIQUE ERROR

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

I. 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 FLENUMOCEANCOMCEN 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 FLENUMOCEANCOMCEN Monterey, California and updated annually.

NEDS/COMPUTER APPLICATIONS

(Staff, NAVOCEANCOMCEN/JTWC)

JTWC's objective techniques have been converted by contractors to execute on FLENUMOCEANCOMCEN 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), Milner (ATR 1976), and Hassebrock (ATR 1977). The Sikora and Milner 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 LWW, 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

1. WESTERN NORTH PACIFIC CYCLONE TRACK DATA

TYPHOON ALICE

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST					
NO/DA/MO	POSIT	WIND		POSIT	WIND			POSIT	WIND	OSI	WIND	POSIT	WIND	OSI	WIND	POSIT	WIND	OSI	WIND		
0101007	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	-0.0	0.0	
0101007	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	-0.0	0.0	
0101122	3.9 149.4	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	-0.0	0.0	
0101107	4.6 149.2	35	4.4	168.7	25	32	-10	6.0	164.4	30	125	7.7	161.3	35	409	-15	4.3	146.9	45	442	-10
0102007	5.2 148.7	40	5.1	168.4	45	13	5	7.1	164.4	35	213	7.4	159.7	40	445	5	4.4	145.2	60	448	5
0102007	5.7 148.2	45	5.4	167.4	50	25	5	7.1	164.4	35	240	7.4	159.5	40	445	5	4.3	144.9	60	447	0
0102122	6.2 147.8	50	6.5	166.4	50	85	0	7.7	161.9	40	378	8.1	157.2	45	571	10	9.2	142.3	65	447	0
0102102	6.7 147.7	55	6.9	167.7	55	12	0	9.2	164.4	45	160	10.7	161.7	40	243	10	11.6	147.0	70	449	5
0103007	7.2 148.0	55	7.2	167.4	55	30	0	9.3	164.7	45	130	10.4	161.6	40	214	15	11.6	146.5	70	446	0
0103007	8.0 148.3	50	7.9	168.4	55	8	5	10.4	169.4	45	123	10.1	169.9	45	415	5	17.6	140.7	60	445	-15
0103127	8.5 148.2	50	8.9	168.9	55	44	5	12.2	164.0	45	201	10.1	169.0	45	443	0	14.9	141.3	50	799	-30
0103102	8.9 148.1	50	9.4	168.0	55	42	5	12.9	167.7	45	220	10.1	169.5	45	479	0	14.8	141.0	50	815	-35
0104002	9.2 148.0	55	9.3	167.8	50	13	-5	10.9	164.0	35	99	12.7	162.6	40	46	-10	13.0	140.6	60	43	-30
0104007	9.4 147.8	55	9.4	167.4	50	17	-5	10.9	164.1	35	123	12.3	162.7	40	170	-15	13.1	140.8	60	137	-35
0104122	9.5 146.4	55	9.7	167.0	50	17	-5	10.9	164.7	35	84	12.3	160.9	40	49	-20	13.4	147.1	60	114	-40
0104102	9.5 146.0	55	9.5	165.0	50	6	-5	10.2	161.0	35	53	10.4	158.0	40	91	-25	11.4	144.0	60	43	-45
0105007	9.5 145.1	55	9.4	165.0	50	4	-5	10.3	161.1	35	59	11.4	157.2	40	49	-30	11.8	143.1	65	19	-45
0105007	9.7 144.4	60	9.7	164.1	55	14	-5	10.4	160.1	40	72	11.7	156.2	40	43	-35	12.0	142.2	65	41	-35
0105122	10.0 143.4	65	10.1	163.2	55	24	-10	10.7	159.2	40	74	11.6	155.3	40	43	-40	12.0	141.3	65	44	-25
0105102	10.6 142.7	65	10.4	162.7	55	0	-10	11.1	159.1	45	68	11.4	155.6	40	73	-35	11.9	141.6	70	152	-15
0106002	11.1 141.7	70	11.2	161.7	55	6	-15	12.7	154.0	45	27	12.4	153.7	40	51	-40	12.0	142.0	70	45	-3
0106007	11.6 140.4	75	11.9	160.4	70	17	-5	13.4	154.7	45	78	12.0	152.8	45	97	-5	12.0	148.6	105	117	30
0106122	12.0 139.4	80	12.0	159.4	75	0	-5	13.4	154.9	40	80	12.4	150.4	100	96	10	12.9	146.3	105	71	35
0106102	12.2 138.4	85	12.3	158.7	80	19	-5	13.4	154.2	40	73	12.7	149.8	100	91	15	12.4	145.0	105	52	30
0107002	12.3 137.4	90	12.3	157.4	85	12	-5	12.0	154.2	45	70	11.6	150.1	105	130	25	11.4	146.1	110	143	35
0107002	12.3 136.4	95	12.3	156.7	90	6	-5	11.4	152.9	105	83	11.5	148.9	110	139	35	11.4	144.8	120	146	40
0107122	12.3 135.4	100	12.2	155.4	95	19	-5	11.9	151.4	110	94	11.5	147.8	115	145	45	11.5	143.8	120	142	40
0107102	12.2 134.4	105	12.5	154.0	105	29	0	12.2	149.3	115	25	12.0	144.0	120	12	45	11.5	139.1	120	48	35
0108002	12.1 133.0	110	12.2	153.1	110	4	0	12.0	144.2	120	19	12.0	143.1	120	13	45	12.0	138.0	115	48	25
0108002	12.0 131.4	100	12.0	151.7	115	12	15	11.9	144.4	120	13	11.9	141.0	115	43	35	12.0	135.5	110	169	15
0108122	12.0 130.2	90	12.0	150.4	115	18	25	11.4	144.3	120	19	11.9	140.0	115	39	35	12.0	134.7	110	102	15
0108102	11.9 129.0	85	11.9	149.1	105	5	20	11.4	143.9	100	21	12.0	138.6	95	71	10	11.5	133.6	95	232	-5
0109002	11.9 127.9	80	11.9	147.7	100	13	20	11.7	142.5	90	30	11.4	137.3	85	98	-5	12.0	131.9	80	110	-20
0109002	12.1 126.4	75	11.9	146.5	95	19	20	11.7	141.4	85	25	11.9	136.4	80	121	-15	12.0	131.3	75	155	-25
0109122	12.1 125.4	70	12.0	145.2	90	13	20	12.1	139.9	75	41	12.3	134.6	75	192	-30	12.4	129.3	60	442	-30
0109102	12.0 124.2	65	12.1	144.0	80	13	5	12.2	138.7	70	64	12.2	133.4	70	255	-40	12.4	128.1	55	512	-25
0110002	11.8 123.0	60	11.9	143.0	80	6	5	11.9	137.9	70	66	12.2	132.7	60	282	-40	12.5	127.4	55	541	-15
0110002	12.1 121.7	55	12.1	141.5	75	12	-5	12.0	136.7	65	129	12.2	131.0	55	367	-45	12.7	125.9	50	443	-45
0110122	12.2 120.4	50	12.2	140.1	75	29	-5	12.1	134.6	65	190	12.4	129.4	55	435	-35	12.8	124.5	50	746	5
0110102	12.2 119.4	45	12.2	139.0	85	47	0	12.2	133.4	65	233	12.4	128.7	55	478	-5	12.9	123.4	60	741	20
0111002	12.4 118.0	40	12.3	138.0	85	4	-5	12.2	132.4	65	241	12.1	132.8	55	706	5	12.5	128.0	60	517	30
0111002	12.7 116.7	35	12.5	137.0	90	26	-5	12.2	131.2	60	198	12.2	129.4	50	485	15	12.2	124.8	45	447	25
0111122	13.1 117.4	30	13.0	137.7	95	9	0	13.4	134.7	60	79	12.4	132.2	40	355	35	0.0	0.0	0	0	0
0111102	13.4 117.4	25	13.3	137.1	95	30	-5	13.1	134.7	60	146	12.4	132.9	40	308	30	0.0	0.0	0	0	0
0112002	13.7 117.3	20	13.9	137.2	90	8	-10	15.4	137.4	40	52	14.2	140.0	30	235	40	0.0	0.0	0	0	0
0112002	14.1 117.0	15	14.2	136.9	90	8	-10	16.2	137.2	30	29	14.5	140.0	20	273	40	0.0	0.0	0	0	0
0112122	14.5 116.4	10	15.2	136.4	85	43	-5	17.4	137.4	20	83	24.0	0.0	0	0	0	0.0	0.0	0	0	0
0112102	15.0 116.4	5	15.2	136.4	80	12	0	17.4	137.9	10	93	24.0	0.0	0	0	0	0.0	0.0	0	0	0
0113002	15.4 116.4	0	15.5	136.4	80	8	10	17.4	138.0	0	124	0.0	0.0	0	0	0	0.0	0.0	0	0	0
0113002	15.8 116.4	5	15.9	136.7	70	13	15	18.1	138.4	55	194	0.0	0.0	0	0	0	0.0	0.0	0	0	0
0113127	16.1 117.3	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	0
0113102	16.1 117.0	40	16.4	137.4	55	34	15	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	0	0.0	0.0	0	0	0
0114002	16.1 116.4	35	16.1	136.4	45	0	15	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	0	0.0	0.0	0	0	0
0114002	16.0 116.0	30	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	0

AVG FORECAST POSIT ERROR
AVG HIGH ANGLE ERROR
AVG INTENSITY MAGNITUDE ERROR
AVG INTENSITY BTAS
NUMBER OF FORECASTS

ALL FORECASTS
WIND 24-HR 48-HR 72-HR
18. 105. 222. 314.
11. 43. 173. 271.
4. 17. 23. 23.
2. 2. 1. -3.
51 47 43 39

Preceding Page BLANK - NO FILM

TYPHOON BESS

RFST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/JA/HA	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	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	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	0	-0.0	0	
031812Z	8.6 147.0	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	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	0	-0.0	0	
031900Z	9.8 145.4	20	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	
031906Z	10.2 144.4	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	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	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	0	-0.0	0	
032000Z	10.5 141.7	30	10.9 141.0	25	27	-5	11.4 134.4	30	13	0	11.4 135.3	40	11.5	-15	11.9 141.7	50	10.5	-25	
032006Z	10.6 140.7	30	10.6 140.5	30	12	0	10.4 134.0	35	14	-5	10.4 131.5	45	14.5	-15	10.9 147.8	55	14.3	-20	
032012Z	10.7 139.0	30	10.5 139.4	30	13	0	10.4 134.4	35	12	0	10.4 131.4	45	10.7	-25	10.9 147.0	55	14.4	-30	
032018Z	11.0 139.2	30	11.0 139.0	30	17	0	11.7 134.4	30	10	0	12.4 132.4	40	11.5	-35	14.0 140.4	45	14.0	-45	
032100Z	11.7 138.4	30	11.2 138.7	30	35	0	11.0 134.1	35	10	0	12.7 132.5	40	24.0	-35	14.1 140.0	45	14.0	-45	
032106Z	12.3 138.0	40	12.3 138.2	35	12	-5	14.7 137.0	45	10.5	0	14.4 137.4	35	17.0	-45	14.0 144.1	30	7.0	-40	
032112Z	12.8 136.0	45	12.4 137.5	40	35	-5	15.3 136.4	50	11.0	0	17.4 138.0	45	11.4	-40	20.2 140.4	35	4.1	-25	
032118Z	13.3 136.1	50	13.6 136.1	45	18	-5	17.0 134.4	50	10	0	10.3 138.4	45	9.2	-45	20.9 142.3	35	4.6	0	
032200Z	13.7 135.4	55	14.1 135.1	55	34	0	17.2 133.0	55	11.7	0	20.0 134.5	60	10.3	-30	21.4 140.4	45	14.0	20	
032206Z	14.1 135.3	60	14.0 135.4	60	13	0	16.0 134.0	75	9.1	-5	17.4 133.1	80	17.5	-10	0.0 0.0	0	-0.0	0	
032212Z	14.7 135.0	70	14.6 134.9	70	9	0	16.5 133.3	85	17.4	0	18.7 133.3	90	44.1	30	0.0 0.0	0	-0.0	0	
032218Z	15.3 134.4	75	15.1 134.6	75	17	0	16.0 133.4	90	21.0	0	10.3 134.1	80	48.6	45	0.0 0.0	0	-0.0	0	
032300Z	16.1 134.7	75	15.4 134.7	75	14	0	18.0 134.7	85	20	-5	20.7 136.8	75	44.0	50	0.0 0.0	0	-0.0	0	
032306Z	17.0 135.2	80	17.0 134.8	80	23	0	20.3 134.5	80	15.1	0	0.0 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	20.4 140.7	60	36	0	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	
032318Z	18.7 136.0	90	18.3 137.1	80	25	-10	21.4 142.1	50	34	14	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	
032400Z	19.5 137.0	90	19.5 137.4	85	6	-5	22.4 142.4	50	35	25	0.0 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	-0.0	0	
032412Z	21.2 140.4	90	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	-0.0	0	
032418Z	22.0 142.3	95	22.1 141.0	65	23	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	
032500Z	22.9 144.3	25	23.4 143.4	30	41	5	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				
MMHG	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	19.	114.	285.	344.
AVG WIND ANGLE ERROR	15.	73.	164.	240.
AVG INTENSITY MAGNITUDE ERROR	5.	10.	32.	71.
AVG INTENSITY BIAS	-0.	-6.	-13.	-24.
NUMBER OF FORECASTS	21	17	13	9

TYPHOON CECIL

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST				
NO/JA/HR	POSIT	WIND	PRES	WIND	PRES	ERRORS		POSIT	WIND	PRES	WIND	POSIT	WIND	PRES	WIND	POSIT	WIND	PRES	WIND	
						WIND	PRES													
040800Z	3.3 143.4	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	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	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	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	0.0	0.0	0.0	
040900Z	4.2 142.4	15	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	
040912Z	5.1 142.7	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	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	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	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	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	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	0.0	0.0	0.0	
041100Z	6.4 139.5	30	6.3	139.7	30	13.0	0.0	7.1	137.7	35	0.0	8.1	134.2	40	50.0	-5.0	4.2	141.2	50.0	-5.0
041106Z	6.5 139.0	30	6.5	139.0	30	0.0	0.0	7.1	134.4	40	30.0	8.4	133.5	45	50.0	0.0	4.5	140.6	55.0	-7.0
041112Z	6.7 138.4	30	6.5	138.4	30	17.0	0.0	7.1	134.7	40	20.0	8.7	133.7	45	21.0	0.0	4.3	140.7	55.0	-10.0
041118Z	6.9 137.8	30	6.5	138.0	30	27.0	0.0	7.1	134.6	40	0.0	7.4	132.8	50	27.0	0.0	4.7	142.7	60.0	-10.0
041200Z	7.0 137.3	35	7.2	137.2	35	13.0	0.0	8.2	134.5	50	45.0	8.2	131.5	60	54.0	5.0	4.9	143.5	70.0	-5.0
041206Z	6.8 136.7	40	7.2	136.5	40	27.0	0.0	8.0	134.5	55	45.0	8.4	130.4	65	70.0	10.0	4.8	147.4	75.0	-5.0
041212Z	7.0 136.0	40	7.0	136.2	40	12.0	0.0	7.4	134.0	55	43.0	8.5	131.4	65	124.0	0.0	4.6	149.4	75.0	-5.0
041218Z	7.2 135.5	45	7.0	135.5	45	12.0	0.0	7.7	133.3	55	51.0	8.4	130.6	65	133.0	-5.0	4.2	147.5	75.0	-20.0
041300Z	7.5 134.8	45	7.2	134.9	45	19.0	0.0	7.8	132.4	55	50.0	8.6	129.7	65	138.0	-10.0	4.5	145.5	75.0	-25.0
041306Z	7.7 134.2	45	7.5	134.4	45	13.0	0.0	8.3	131.9	55	89.0	8.7	129.2	65	143.0	-10.0	10.0	146.0	75.0	-10.0
041312Z	8.0 133.8	45	8.0	133.5	45	5.0	0.0	8.9	131.0	55	103.0	8.4	128.5	65	201.0	-15.0	10.0	145.2	60.0	-10.0
041318Z	8.2 132.4	50	8.2	132.9	45	19.0	-5.0	9.1	130.0	55	95.0	8.4	126.8	65	174.0	-10.0	11.0	144.0	50.0	-10.0
041400Z	8.3 131.4	55	8.3	131.4	55	0.0	0.0	9.3	124.1	65	30.0	10.7	124.4	50	105.0	-10.0	12.4	140.9	50.0	-5.0
041406Z	8.4 130.4	55	8.3	130.4	55	13.0	0.0	9.5	124.7	65	30.0	10.6	123.2	55	113.0	-10.0	11.7	141.3	55.0	-5.0
041412Z	8.5 129.7	65	8.5	129.7	65	5.0	0.0	9.8	124.1	75	62.0	11.1	121.7	60	100.0	0.0	12.1	141.4	65.0	-15.0
041418Z	8.9 128.4	70	8.6	128.2	70	21.0	0.0	9.7	124.2	65	108.0	11.1	120.8	60	132.0	0.0	12.4	145.9	65.0	-15.0
041500Z	9.4 127.5	75	9.1	127.5	75	19.0	0.0	10.3	124.3	70	120.0	11.4	120.9	65	123.0	10.0	12.8	147.2	70.0	-25.0
041506Z	10.1 126.5	75	10.0	126.4	75	9.0	0.0	11.0	123.1	60	42.0	11.0	119.6	65	140.0	10.0	13.8	145.6	70.0	-25.0
041512Z	10.8 125.4	80	10.7	125.4	80	6.0	0.0	12.3	121.8	60	33.0	11.4	118.1	65	247.0	15.0	14.3	144.7	70.0	-25.0
041518Z	11.5 124.4	75	11.5	124.4	75	0.0	0.0	12.8	120.5	60	93.0	11.4	116.6	70	340.0	20.0	17.2	144.9	75.0	-25.0
041600Z	12.0 123.2	70	11.9	123.2	70	6.0	0.0	13.1	119.3	65	163.0	11.4	115.9	70	415.0	25.0	14.5	144.5	75.0	-25.0
041606Z	12.4 122.4	65	12.2	122.4	65	17.0	0.0	13.5	114.4	65	210.0	10.1	115.4	70	473.0	25.0	14.2	145.4	75.0	-25.0
041612Z	12.7 122.2	60	12.8	122.0	60	13.0	0.0	14.0	114.4	65	226.0	10.1	115.8	70	472.0	25.0	17.9	145.3	75.0	-25.0
041618Z	12.9 122.1	60	13.0	121.5	60	35.0	0.0	14.2	114.4	65	250.0	10.1	115.8	70	494.0	25.0	14.3	146.2	75.0	-25.0
041700Z	13.1 122.1	55	12.9	122.0	55	13.0	0.0	13.7	120.9	50	130.0	10.4	119.3	50	349.0	0.0	14.1	140.5	50.0	-5.0
041706Z	13.5 122.3	55	13.3	122.2	55	13.0	0.0	13.8	121.5	50	141.0	10.4	120.0	50	379.0	0.0	14.5	141.3	50.0	-10.0
041712Z	13.9 122.5	50	13.9	122.4	50	4.0	0.0	16.0	122.4	50	73.0	10.1	124.0	55	135.0	5.0	10.2	147.7	60.0	-10.0
041718Z	14.3 122.4	50	14.3	122.5	50	17.0	0.0	16.4	121.0	50	80.0	10.5	125.3	55	156.0	5.0	10.7	144.3	60.0	-15.0
041800Z	14.6 123.1	45	14.6	123.1	45	0.0	0.0	16.2	124.4	55	48.0	10.2	129.0	60	147.0	15.0	10.6	143.7	60.0	-15.0
041806Z	15.0 123.4	45	15.0	123.4	45	12.0	0.0	16.7	124.3	55	50.0	10.4	130.4	60	197.0	20.0	10.0	0.0	0.0	-0.0
041812Z	15.6 124.0	45	15.6	124.1	45	6.0	0.0	17.8	127.1	55	20.0	10.4	131.7	60	149.0	30.0	10.0	0.0	0.0	-0.0
041818Z	16.3 124.4	45	15.9	124.4	45	33.0	0.0	17.9	127.9	55	102.0	10.1	132.8	60	195.0	25.0	10.0	0.0	0.0	-0.0
041900Z	16.9 125.0	50	16.8	125.1	50	4.0	0.0	19.2	124.9	55	108.0	10.1	133.8	60	192.0	25.0	10.0	0.0	0.0	-0.0
041906Z	17.5 125.8	50	17.6	125.9	50	8.0	0.0	19.0	130.1	55	132.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
041912Z	18.2 127.0	50	17.9	126.7	55	29.0	5.0	20.0	131.2	50	180.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
041918Z	19.6 127.8	50	19.6	127.4	50	11.0	0.0	23.8	134.7	40	51.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
042000Z	21.0 129.1	45	21.1	129.1	50	5.0	0.0	24.4	134.4	35	90.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
042006Z	22.1 130.4	40	21.4	130.9	50	24.0	10.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
042012Z	22.8 132.4	30	22.8	132.0	45	22.0	15.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
042018Z	23.0 134.4	25	24.0	134.0	30	64.0	5.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0
042100Z	23.0 136.4	25	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	-0.0

ALL FORECASTS
 JMMG 24-HR 48-HR 72-HR
 AVG FORECAST POSIT ERROR 15. 47. 191. 320.
 AVG RIGHT ANGLE ERROR 11. 62. 131. 215.
 AVG INTENSITY MAGNITUDE ERROR 1. 7. 11. 14.
 AVG INTENSITY RTAS 1. 3. 7. 11.
 NUMBER OF FORECASTS 40 37 33 29

TROPICAL STORM DOT

BEST TRACK				ANALYSIS				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/00/00	POSIT	WIND	PRST	WIND	PRST	WIND	PRST	WIND	PRST	WIND	PRST	WIND	PRST	WIND	PRST	WIND	PRST		
050000	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050006	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050012	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050018	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050024	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050030	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050036	4.9 141.1	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050042	5.3 139.4	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050048	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050054	4.8 136.4	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050100	4.4 135.4	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050106	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050112	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050118	5.8 133.0	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
050124	6.7 132.4	25	0.0 0.0	0	-0.0 0	0.0 0.0	0	-0.0 0	0.0 0.0	0	-0.0 0	0.0 0.0	0	-0.0 0	0.0 0.0	0	-0.0 0		
050130	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
051000	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	0	-0.0 0	0.0 0.0	0	-0.0 0		
051006	8.2 130.4	30	8.2 130.4	20	14	-10	9.4 127.0	25	130	11.4 123.2	20	142	-10	12.5 119.3	25	6	-4		
051012	8.7 129.0	30	8.4 129.4	25	30	-5	10.5 125.4	30	123	11.4 121.6	20	116	-10	13.0 117.7	25	111	-10		
051018	8.9 127.3	30	9.4 127.0	25	46	-5	11.2 121.4	25	102	12.4 119.7	25	43	-5	15.0 116.5	35	219	-5		
051024	9.3 126.0	30	9.0 125.4	25	30	-5	10.7 120.3	25	85	12.1 116.8	30	142	0	14.6 115.9	35	255	-4		
051030	9.7 124.7	25	9.4 124.0	25	13	0	10.5 119.4	25	47	12.4 116.6	30	143	0	15.2 115.8	35	298	0		
051100	9.9 123.4	25	9.9 123.4	25	0	0	10.7 118.3	25	30	13.1 115.1	30	242	-5	15.8 113.3	40	474	15		
051106	10.2 122.2	25	10.2 122.2	25	9	0	11.1 117.3	25	134	13.4 114.4	35	370	-5	16.7 113.0	45	431	20		
051200	10.4 121.4	25	10.5 121.4	25	9	0	12.1 117.2	30	129	14.4 114.4	40	379	0	17.5 114.4	50	441	25		
051206	10.5 120.4	30	10.5 120.4	25	29	-5	12.4 116.4	35	175	15.4 114.5	45	375	10	18.5 116.4	50	440	25		
051212	10.9 119.0	30	10.7 119.1	25	44	-5	12.0 115.4	35	245	16.3 114.3	45	424	20	19.0 116.6	50	459	25		
051218	11.7 119.6	30	11.4 118.0	30	36	-0	15.0 117.0	40	193	18.5 118.6	50	299	25	20.6 122.5	50	240	25		
051300	12.2 119.4	30	12.5 118.7	30	45	0	15.1 117.7	40	167	18.3 119.1	50	277	25	21.0 123.2	50	245	25		
051306	12.5 119.4	30	12.6 118.7	30	41	0	14.3 117.4	40	169	17.1 118.1	50	311	25	20.0 121.4	50	141	25		
051312	13.0 119.4	35	13.1 119.2	35	24	0	15.7 116.4	40	134	18.4 120.7	50	218	25	21.1 124.6	40	255	15		
051318	13.4 119.0	40	13.7 119.3	35	30	-5	16.0 119.7	40	154	18.4 121.3	45	241	20	21.5 125.1	35	129	10		
051400	13.7 120.2	40	13.7 120.2	40	0	0	15.4 121.4	25	80	17.2 124.2	40	119	15	19.8 128.0	45	113	20		
051406	14.0 120.0	35	14.0 120.4	35	12	0	15.4 122.4	30	24	17.7 125.7	45	121	20	0.0 0.0	0	-0.0 0			
051412	14.4 121.4	25	14.2 120.0	25	31	0	15.4 122.4	30	80	17.4 125.5	40	244	15	0.0 0.0	0	-0.0 0			
051418	14.7 122.0	25	14.5 121.4	25	31	0	16.0 124.4	30	95	18.3 126.5	40	307	15	0.0 0.0	0	-0.0 0			
051500	15.1 122.4	25	15.2 122.7	25	4	0	16.4 124.7	30	104	18.4 127.5	35	345	10	0.0 0.0	0	-0.0 0			
051506	15.6 123.3	25	15.4 123.2	25	13	0	17.1 124.1	30	170	0.0 0.0	0	-0.0 0	0	0.0 0.0	0	-0.0 0			
051512	16.2 124.1	25	16.2 124.0	25	6	0	18.4 124.7	30	161	0.0 0.0	0	-0.0 0	0	0.0 0.0	0	-0.0 0			
051518	17.0 125.1	25	16.7 124.4	25	25	0	18.0 127.4	30	225	0.0 0.0	0	-0.0 0	0	0.0 0.0	0	-0.0 0			
051600	17.8 126.2	25	17.6 125.0	25	21	0	0.0 0.0	0	-0.0 0	0.0 0.0	0	-0.0 0	0	0.0 0.0	0	-0.0 0			
051606	18.8 127.4	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 0.0	0	-0.0 0			
051612	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 0.0	0	-0.0 0			
051618	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 0.0	0	-0.0 0			
051700	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 0.0	0	-0.0 0			

ALL FORECASTS				
WIND	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	23.	130.	246.	315.
AVG RIGHT ANGLE ERROR	16.	79.	171.	247.
AVG INTENSITY MAGNITUDE ERROR	2.	4.	13.	14.
AVG INTENSITY BIAS	-2.	3.	10.	13.
NUMBER OF FORECASTS	24	23	20	15

TROPICAL DEPRESSION 05

BEST TRACK				24 HOUR FORECAST ERRORS				48 HOUR FORECAST ERRORS				72 HOUR FORECAST ERRORS			
NO/DA/HR	POSIT	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	
051700Z	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	
051712Z	18.6 114.8	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	
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	
051800Z	17.8 114.0	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	
051800Z	17.4 113.4	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	
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	
051814Z	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	
051900Z	15.4 112.4	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	
051900Z	15.3 112.6	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	
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	
051918Z	15.1 111.0	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	
052000Z	15.0 111.4	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	
052000Z	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	
052012Z	16.5 112.4	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	
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	
052100Z	18.6 113.4	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	
052100Z	19.3 114.4	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	
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	
052118Z	20.4 116.4	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	
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	
052200Z	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	
052212Z	21.7 120.4	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	
052218Z	21.4 122.3	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	
052300Z	22.1 124.1	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	
052300Z	22.5 126.3	30	22.5	126.2	30	0.0	25.7	134.4	25	72.0	0.0	0.0	0.0	0.0	
052312Z	22.8 128.4	30	22.8	128.4	30	13.0	25.4	137.4	25	181.0	0.0	0.0	0.0	0.0	
052318Z	23.6 130.9	30	23.6	130.7	30	21.0	26.5	139.4	25	221.0	0.0	0.0	0.0	0.0	
052400Z	24.9 132.4	25	24.4	133.0	30	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
052400Z	26.6 134.4	25	25.5	134.4	25	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
052418Z	29.6 138.0	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	

ALL FORECASTS

AVG FORECAST POSIT ERROR
AVG RIGHT ANGLE ERROR
AVG INTENSITY MAGNITUDE ERROR
AVG INTENSITY BIAS
NUMBER OF FORECASTS

WMNG	24-HR	48-HR	72-HR
12.	158.	0.	0.
12.	150.	0.	0.
1.	0.	0.	0.
1.	0.	0.	0.
4	3	0	0

TYPHOON ELLIS

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/HR	POSIT	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	
062400Z	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	0.0	0.0	
062406Z	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	0.0	0.0	
062412Z	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	0.0	0.0	
062418Z	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	0.0	0.0	
063000Z	13.2 133.4	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	0.0	0.0	
063006Z	13.4 133.4	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	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	0.0	0.0	
063018Z	13.6 132.4	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	0.0	0.0	
070100Z	13.7 131.9	35	13.4	132.0	35	19.0	14.4	124.4	65	68.0	14.2	127.4	50	139.0	14.2	127.4	50	139.0	
070106Z	13.7 131.3	40	13.4	131.4	40	19.0	14.4	124.0	65	69.0	14.2	126.5	50	137.0	14.4	126.2	60	135.0	
070112Z	13.8 130.4	40	13.4	130.9	40	23.0	15.0	124.7	50	104.0	14.2	126.4	55	139.0	14.7	124.0	60	148.0	
070118Z	13.9 129.4	50	13.4	129.1	50	13.0	14.4	124.4	60	72.0	14.4	121.0	65	173.0	14.8	117.8	50	147.0	
070200Z	14.1 128.7	55	14.1	128.4	55	6.0	14.4	124.3	65	91.0	14.4	121.0	65	170.0	14.8	118.0	50	175.0	
070206Z	14.4 127.4	60	14.2	127.4	55	17.0	14.0	123.4	65	110.0	14.3	120.1	65	191.0	15.0	116.2	55	165.0	
070212Z	15.0 126.9	65	14.9	126.9	55	4.0	16.2	122.7	65	111.0	17.0	117.9	50	149.0	15.0	115.0	55	130.0	
070218Z	15.5 125.9	75	15.4	125.4	65	4.0	16.4	121.4	50	127.0	17.3	117.3	55	171.0	15.5	113.0	60	103.0	
070300Z	16.1 125.0	85	16.0	124.9	85	9.0	17.4	120.4	75	77.0	10.4	117.2	90	162.0	15.5	112.5	65	144.0	
070306Z	16.8 124.2	80	16.4	124.0	90	17.0	18.4	120.1	80	60.0	20.4	116.4	85	167.0	20.4	112.0	75	150.0	
070312Z	17.8 123.2	80	17.6	123.4	85	16.0	20.1	120.2	75	40.0	21.9	116.5	75	154.0	20.4	112.0	0.0	0.0	
070318Z	18.4 122.4	70	18.4	122.1	70	11.0	22.2	118.4	80	127.0	24.1	114.2	65	149.0	15.0	0.0	0.0	0.0	
070400Z	19.0 121.1	65	19.0	121.1	60	0.0	20.4	114.4	60	21.0	21.7	112.6	50	141.0	15.0	0.0	0.0	0.0	
070406Z	19.5 120.2	60	19.4	120.0	60	13.0	20.4	114.4	55	25.0	22.1	111.7	40	149.0	15.0	0.0	0.0	0.0	
070412Z	19.8 119.4	60	19.7	119.0	60	23.0	21.0	114.4	45	49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
070418Z	20.1 117.9	60	20.1	117.0	60	0.0	21.4	113.7	45	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
070500Z	20.2 116.1	55	20.3	116.2	60	4.0	21.4	111.4	50	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
070506Z	20.3 115.2	55	20.2	114.4	60	23.0	21.4	109.7	40	37.0	0.0	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	6.0	0.0	0.0	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	0.0	0.0	
070600Z	21.6 111.4	45	21.1	111.4	35	269.0	0.0	0.0	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	0.0	0.0	

ALL FORECASTS

AVG FORECAST POSIT ERROR
AVG RIGHT ANGLE ERROR
AVG INTENSITY MAGNITUDE ERROR
AVG INTENSITY BIAS
NUMBER OF FORECASTS

WMNG	24-HR	48-HR	72-HR
25.	71.	145.	145.
21.	57.	103.	113.
3.	13.	14.	12.
-0.	-3.	-0.	0.
22	19	14	13

TROPICAL STORM FAYE

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DAT/HR	POSIT	WIND	PRCPT	WIND	PRCPT	WIND	PRCPT	POSIT	WIND	PRCPT	POSIT	WIND	PRCPT	WIND	PRCPT	POSIT	WIND	PRCPT	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	-0.0
062900Z	2.5 144.5	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	-0.0
062906Z	2.6 153.0	15	0.0	0.0	0	-0.0	0	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0
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	-0.0
062918Z	3.2 153.7	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	-0.0
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	-0.0
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	-0.0
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	-0.0
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	-0.0
070100Z	5.3 150.4	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	-0.0
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	-0.0
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	-0.0
070118Z	6.2 147.9	25	6.8 149.2	25	85	0	8.8 148.4	35	148	0	10.7 142.9	35	130	15	17.2 149.2	65	177	35	
070200Z	6.5 146.4	25	6.5 145.8	30	36	5	7.3 141.4	40	139	10	8.2 137.5	50	145	10	9.1 143.3	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	140	15	9.4 142.5	60	143	30	
070212Z	8.0 144.0	25	7.6 144.8	30	25	5	9.4 141.0	40	30	5	10.4 136.8	50	140	15	12.3 142.5	60	144	30	
070218Z	8.6 144.1	30	8.2 143.8	30	30	0	10.4 139.8	40	59	0	11.2 135.5	50	140	20	13.0 141.5	60	142	30	
070300Z	9.0 143.2	30	9.1 143.2	35	5	5	11.1 139.7	50	48	10	12.7 135.5	60	147	30	14.1 141.5	70	147	40	
070306Z	9.4 142.2	35	9.4 142.1	40	25	5	12.2 138.4	60	100	20	14.4 138.2	70	211	50	16.0 140.0	80	217	50	
070312Z	9.7 141.4	35	9.4 141.2	45	13	10	12.2 137.4	65	100	30	15.1 133.5	75	213	50	17.4 142.1	90	207	50	
070318Z	10.0 140.8	40	10.2 139.4	50	72	10	12.1 134.7	70	160	40	15.4 130.7	75	245	50	17.7 142.3	80	240	40	
070400Z	10.3 139.4	40	10.2 140.1	50	13	10	11.4 137.5	70	132	40	13.4 134.1	75	25	50	14.1 140.3	80	47	40	
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	11.0 137.4	50	24	15	12.7 131.7	65	95	40	14.6 129.8	75	175	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	14.1 127.7	75	210	55	0.0	0.0	0	-0.0	
070500Z	10.4 135.4	30	10.0 135.7	55	30	25	10.4 130.8	65	238	40	12.4 126.6	75	170	55	0.0	0.0	0	-0.0	
070506Z	11.1 135.5	25	10.2 134.4	50	75	25	10.0 130.4	55	226	30	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	
070512Z	11.9 135.1	25	11.1 135.1	35	49	10	11.4 132.4	25	250	0	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	
070518Z	12.6 134.4	25	11.5 135.0	35	70	10	12.8 132.4	25	235	0	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	13.0 132.7	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	15.2 131.0	25	14.5 131.1	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	17.0 129.8	20	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	

ALL FORECASTS

	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	35	138	167
AVG RIGHT ANGLE ERROR	21	86	91
AVG INTENSITY MAGNITUDE ERROR	9	21	37
AVG INTENSITY BIAS	9	21	37
NUMBER OF FORECASTS	20	17	14

TROPICAL DEPRESSION 08

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DAT/HR	POSIT	WIND	PRCPT	WIND	PRCPT	WIND	PRCPT	POSIT	WIND	PRCPT	WIND	POSIT	WIND	PRCPT	WIND	POSIT	WIND	PRCPT	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	-0.0
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	-0.0
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	-0.0
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	-0.0
072406Z	22.7 134.4	20	24.3 133.8	20	105	0	28.0 124.2	20	183	0	20.0 119.0	15	196	-5	0.0	0.0	0	-0.0	
072412Z	23.4 133.0	20	23.3 133.0	20	5	0	25.0 127.2	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	24.4 130.4	20	42	0	26.4 124.4	15	249	-5	0.0	0.0	0	-0.0	0.0	0.0	0	-0.0	
072506Z	26.0 128.8	20	25.4 129.5	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

	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	43	105	395
AVG RIGHT ANGLE ERROR	20	70	195
AVG INTENSITY MAGNITUDE ERROR	0	4	5
AVG INTENSITY BIAS	0	1	-5
NUMBER OF FORECASTS	5	6	1

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BEST TRACK				VARYING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
40/04/82	POSIT	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND
0724067	10.2 147.4	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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0724122	10.3 146.3	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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0724187	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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0725007	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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0725062	10.7 144.4	24	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0725127	10.9 144.0	25	11.0 144.1	25	4.0 0.0	12.4 144.4	30	42.0 14.0	12.4 134.4	30	42.0 14.0	12.4 134.4	30	42.0 14.0	12.4 134.4	15.0 14.1	143.2	45.0 247.0	10.0
0725187	11.1 143.3	25	11.1 143.0	25	14.0 0.0	12.4 134.4	30	50.0 14.0	12.4 134.4	30	50.0 14.0	12.4 134.4	30	50.0 14.0	12.4 134.4	10.0 14.0	140.3	45.0 241.0	10.0
0726002	11.2 142.4	20	11.1 142.7	20	19.0 0.0	12.7 134.1	30	92.0 15.0	12.4 134.4	30	92.0 15.0	12.4 134.4	30	92.0 15.0	12.4 134.4	5.0 14.0	140.4	45.0 255.0	5.0
0726067	11.5 141.4	20	11.4 141.5	20	9.0 0.0	12.7 137.4	30	171.0 15.0	12.4 133.4	30	240.0 0.0	14.2 132.2	45.0 246.0	-5.0					
0726127	11.8 140.7	20	11.4 140.8	20	6.0 0.0	13.0 137.0	30	192.0 10.0	14.1 132.7	30	304.0 0.0	14.7 128.5	40.0 245.0	-25.0					
0726182	12.3 139.4	15	12.0 139.7	20	12.0 5.0	13.4 134.7	30	199.0 5.0	14.4 131.4	30	303.0 0.0	14.7 127.0	45.0 247.0	-25.0					
0727002	13.2 140.3	15	12.7 139.7	20	44.0 5.0	14.4 134.4	25	172.0 -5.0	14.0 131.4	30	250.0 -10.0	17.8 127.5	35.0 247.0	-40.0					
0727062	14.2 140.3	15	13.7 140.7	20	34.0 5.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0727122	15.0 139.4	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0727182	15.4 138.4	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0728002	16.1 137.4	30	16.2 137.4	25	6.0 -5.0	18.4 134.4	40	160.0 0.0	18.7 129.4	50	240.0 -25.0	20.3 125.2	60.0 247.0	-40.0					
0728062	16.8 137.5	34	17.5 134.4	25	85.0 -10.0	20.7 134.4	40	259.0 11.0	21.1 133.1	50	449.0 -30.0	24.9 129.5	60.0 249.0	-55.0					
0729122	17.2 136.0	34	19.2 137.2	25	62.0 -10.0	21.4 134.4	35	303.0 30.0	24.0 131.3	45	495.0 -40.0	24.8 127.2	55.0 247.0	-75.0					
0729187	17.1 136.2	34	19.0 136.4	25	114.0 -10.0	22.2 134.4	35	331.0 35.0	24.4 129.8	45	497.0 -45.0	24.8 125.3	55.0 247.0	-75.0					
0730002	16.7 135.7	40	16.4 135.2	30	23.0 -5.0	17.4 132.2	30	85.0 25.0	18.7 128.6	40	145.0 -40.0	19.4 124.3	65.0 245.0	-65.0					
0730062	16.6 135.4	44	16.2 135.1	40	23.0 -10.0	16.7 132.4	30	54.0 30.0	17.1 130.1	40	145.0 -55.0	18.6 127.2	65.0 241.0	-60.0					
0731122	16.5 134.4	45	16.4 134.0	65	9.0 0.0	17.1 132.4	35	39.0 10.0	18.1 129.3	45	192.0 -45.0	20.3 125.7	95.0 241.0	-25.0					
0731182	16.7 134.2	50	16.4 134.4	70	14.0 0.0	17.1 131.4	40	80.0 10.0	18.7 128.7	50	240.0 -45.0	20.6 125.1	95.0 240.0	-20.0					
0733002	16.8 133.4	74	16.3 133.4	75	9.0 0.0	18.0 130.2	40	30.0 10.0	19.7 126.9	100	214.0 -30.0	20.9 122.9	100.0 244.0	-5.0					
0733062	17.1 132.7	80	17.0 132.4	80	4.0 0.0	18.2 129.4	40	121.0 25.0	19.4 126.3	100	269.0 -25.0	21.0 122.3	100.0 247.0	15.0					
0734122	17.4 131.4	85	17.2 132.0	90	17.0 5.0	18.1 129.1	110	197.0 20.0	19.4 125.8	120	374.0 0.0	21.0 121.4	115.0 249.0	65.0					
0734182	18.0 130.4	90	17.5 131.1	95	41.0 5.0	19.0 128.0	110	197.0 20.0	20.2 124.9	120	384.0 5.0	21.3 120.8	110.0 225.0	60.0					
0731007	18.6 129.4	100	19.5 129.3	100	4.0 0.0	20.5 124.4	110	30.0 20.0	22.0 120.0	100	200.0 -5.0	24.0 115.2	75.0 227.0	40.0					
0731062	19.3 127.4	114	19.2 128.0	105	13.0 -10.0	21.7 124.2	110	104.0 15.0	22.4 117.9	80	222.0 -5.0	24.8 113.8	25.0 279.0	-5.0					
0731127	19.6 126.3	110	19.7 126.4	130	13.0 0.0	21.4 120.1	120	0.0 0.0	24.0 115.7	35	213.0 -35.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0731182	20.1 124.7	110	20.1 124.4	130	5.0 0.0	22.0 114.4	120	29.0 5.0	24.0 115.1	25	333.0 -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 0.0 0	0.0 0.0 0	0.0 0.0 0
0801002	20.6 123.2	110	20.7 123.7	140	6.0 0.0	22.4 117.2	40	50.0 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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0801062	20.8 121.4	124	20.4 121.4	125	6.0 0.0	22.7 114.0	75	110.0 10.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0801127	21.5 120.1	120	21.4 120.1	120	8.0 0.0	21.4 114.4	50	150.0 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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0801182	21.7 118.2	115	21.9 118.1	115	15.0 0.0	22.4 114.4	25	225.0 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 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0802002	22.2 116.4	105	22.0 116.4	105	13.0 0.0	22.4 110.4	45	183.0 10.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0802062	22.5 113.0	95	22.4 114.0	90	4.0 5.0	23.1 104.4	30	103.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0802122	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	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0802182	22.6 109.4	50	22.7 110.1	60	24.0 10.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0803002	22.2 107.4	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	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0803062	21.7 115.4	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0803122	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0803182	20.6 101.7	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0804002	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0804062	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0804122	20.7 97.0	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0804182	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0805002	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0
0805062	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	0.0 0.0 0	0.0 0.0 0	-0.0 0.0	0.0 0.0 0	0.0 0.0 0						

TROPICAL STORM GORDON

BEST TRACK				WAKING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/04/03	POSIT	WIND	DIR	POSIT	WIND	DIR	POSIT	WIND	DIR	POSIT	WIND	DIR	POSIT	WIND	DIR	POSIT	WIND	DIR	
072012Z	18.8 112.7	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	
072018Z	19.0 111.5	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	
072000Z	19.3 110.4	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	
072006Z	19.9 109.7	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	
072012Z	20.2 108.7	35	20.2	129.5	30	45	-5	21.8	127.7	45	20.8	-4	24.0	125.2	50	30.5	-5	24.8	
072018Z	20.6 107.5	40	20.5	124.0	30	85	-10	22.5	124.8	45	24.4	11.0	24.7	124.3	50	32.8	0	24.0	
072100Z	20.5 106.2	40	20.6	126.2	35	8	-5	21.8	121.4	45	4.3	0.0	24.0	118.5	50	4.3	0	24.0	
072106Z	20.6 105.1	45	20.7	125.4	40	8	-5	21.7	121.4	50	50.4	0.0	24.4	117.8	50	100	5	24.0	
072112Z	20.8 104.2	50	20.7	124.7	40	8	-10	21.2	119.2	50	64	-4	22.4	115.8	50	48	30	24.0	
072118Z	20.8 102.8	55	20.9	123.1	45	17	-10	21.4	118.1	55	70	5	24.0	0.0	0	0	0	24.0	
072000Z	20.9 121.7	60	20.4	121.5	50	13	-10	20.0	114.2	65	120	14	24.0	0.0	0	0	0	24.0	
072006Z	21.3 120.8	60	20.3	120.5	55	23	-5	20.9	115.4	70	132	24	24.0	0.0	0	0	0	24.0	
072012Z	22.0 120.1	65	22.0	120.2	55	6	0	24.8	114.2	75	211	5	24.0	0.0	0	0	0	24.0	
072018Z	22.5 119.4	60	22.9	119.3	55	33	5	24.0	0.0	0	-0.0	0	24.0	0.0	0	0	0	24.0	
072000Z	22.7 117.4	50	22.4	117.3	50	8	0	24.0	0.0	0	-0.0	0	24.0	0.0	0	0	0	24.0	
072006Z	23.1 116.0	45	23.1	116.2	45	11	0	24.0	0.0	0	-0.0	0	24.0	0.0	0	0	0	24.0	
072012Z	23.1 114.7	20	23.3	115.2	30	30	10	24.0	0.0	0	-0.0	0	24.0	0.0	0	0	0	24.0	

ALL FORECASTS			
WIND	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	23.	120.	173.
AVG RIGHT ANGLE ERROR	12.	90.	121.
AVG INTENSITY MAGNITUDE ERROR	6.	11.	4.
AVG INTENSITY BIAS	-3.	1.	4.
NUMBER OF FORECASTS	17	3	5

TROPICAL DEPRESSION 11

BEST TRACK			WAVING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST		
NO/JA/MD	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
000206	11.7 135.3	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
000212	12.3 136.0	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
000218	12.8 136.0	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
000307	13.8 133.1	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
000307	13.9 132.1	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
000312	14.2 131.3	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
000318	14.5 130.4	20	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0
000407	14.9 129.4	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
000407	15.3 129.1	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
000412	16.0 128.4	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
000418	16.1 128.0	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
000507	17.7 127.6	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
000507	14.6 126.5	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
000512	14.1 125.4	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
000518	14.2 124.1	20	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0	0.0 0.0	0	-0.0	0
000607	14.5 123.1	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
000607	20.6 121.9	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
000612	21.0 120.3	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

ALL FORECASTS

	WIND	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	47.	144.	134.	171.
AVG RIGHT ANGLE ERROR	70.	96.	83.	124.
AVG INTENSITY MAGNITUDE ERROR	7.	9.	14.	16.
AVG INTENSITY RMS	7.	9.	14.	16.
NUMBER OF FORECASTS	14	10	6	3

TYPHOON IRVING

BEST TRACK				WAVING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/JA/MD	POSIT	WIND		POSIT	WIND	DIRT WIND		POSIT	WIND	DIRT WIND		POSIT	WIND	DIRT WIND		POSIT	WIND	DIRT WIND	
000712	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	0	-0.0	0	
000718	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	0	-0.0	0	
000802	15.6 138.1	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	0	-0.0	0	
000807	16.4 138.0	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	0	-0.0	0	
000812	16.8 137.4	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	0	-0.0	0	
000818	17.4 136.4	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	0	-0.0	0	
000902	17.7 136.0	30	17.4 136.0	30	6.0	19.4 132.4	35	10.3	21.0 129.2	45	22.9	15.0	21.5 126.0	55	24.9	21.5 126.0	55	24.9	
000907	18.0 135.4	30	19.3 135.1	30	29.0	21.0 130.1	40	18.8	21.7 126.5	50	34.6	15.0	22.0 118.5	60	42.8	22.0 118.5	60	42.8	
000912	18.2 134.8	30	19.3 135.2	30	23.0	19.7 133.1	40	15.0	21.4 129.5	50	24.6	10.0	21.8 123.5	60	24.6	21.8 123.5	60	24.6	
000918	18.3 134.2	30	18.0 135.0	30	49.0	19.4 134.4	40	28.7	21.7 130.8	50	25.0	20.0	22.3 125.0	60	21.1	22.3 125.0	60	21.1	
001002	18.4 133.3	30	18.5 133.4	25	13.0	19.4 130.4	35	18.5	20.4 126.8	40	14.2	-10.0	21.0 122.5	45	24.2	-10.0	21.0 122.5	45	24.2
001007	18.4 132.2	30	19.4 132.7	25	37.0	20.1 129.4	35	22.4	21.7 126.0	40	17.9	-15.0	22.2 121.3	45	24.1	-15.0	22.2 121.3	45	24.1
001012	18.3 131.1	30	18.7 131.6	20	29.0	19.4 127.4	30	19.4	21.1 123.8	40	17.9	-15.0	21.8 118.5	50	24.2	-15.0	21.8 118.5	50	24.2
001018	18.0 129.7	30	18.7 130.1	30	40.0	19.4 128.7	40	19.8	21.0 121.4	45	32.1	-15.0	21.0 116.9	50	24.2	-15.0	21.0 116.9	50	24.2
001102	17.2 128.4	30	17.3 128.7	30	50.0	17.1 128.4	45	18.7	19.4 120.4	40	16.5	-25.0	19.0 115.5	50	23.2	-25.0	19.0 115.5	50	23.2
001107	16.5 128.4	30	17.0 127.8	30	50.0	17.2 127.4	45	20.0	19.0 119.4	40	17.3	-30.0	20.2 114.5	50	21.3	-30.0	20.2 114.5	50	21.3
001112	16.9 129.0	40	17.2 129.2	35	21.0	18.1 128.4	45	8.8	18.1 121.2	50	36.1	-20.0	19.7 116.7	55	22.1	-20.0	19.7 116.7	55	22.1
001118	17.5 128.4	40	17.9 128.4	40	31.0	19.4 128.4	50	10.8	19.0 120.8	50	33.0	-15.0	19.7 116.7	65	24.7	-15.0	19.7 116.7	65	24.7
001207	17.8 127.4	50	17.5 128.2	55	39.0	18.7 128.4	65	10.3	19.1 121.7	70	32.1	-5.0	19.5 117.5	70	24.5	-5.0	19.5 117.5	70	24.5
001207	18.4 127.1	50	17.4 127.4	55	38.0	19.4 126.4	65	16.8	19.1 120.9	70	36.6	-5.0	19.8 116.7	70	24.7	-5.0	19.8 116.7	70	24.7
001212	18.7 126.0	50	18.5 126.4	55	26.0	19.4 127.4	65	21.3	19.1 119.6	70	40.3	-10.0	19.9 115.5	75	24.3	-10.0	19.9 115.5	75	24.3
001218	19.2 126.4	60	18.8 125.4	55	61.0	19.4 127.4	65	22.6	20.4 118.8	75	43.9	-10.0	19.2 115.5	80	21.3	-10.0	19.2 115.5	80	21.3
001307	20.0 126.7	60	20.1 126.4	65	8.0	23.4 126.4	75	5.8	27.4 127.5	80	14.1	-10.0	20.9 111.0	80	24.9	-10.0	20.9 111.0	80	24.9
001307	21.1 126.4	70	21.1 126.4	70	11.0	25.4 126.4	75	23.6	26.4 128.5	80	24.9	-10.0	21.5 112.9	80	24.3	-10.0	21.5 112.9	80	24.3
001312	22.0 126.0	70	22.0 126.0	70	41.0	25.4 127.0	75	15.0	26.4 129.0	80	30.3	-10.0	31.7 132.9	80	24.7	-10.0	31.7 132.9	80	24.7
001318	22.7 125.2	70	23.2 125.6	70	33.0	27.4 127.1	80	44.3	28.4 129.2	80	46.5	-10.0	35.0 137.0	85	24.3	-10.0	35.0 137.0	85	24.3
001407	23.5 125.0	75	23.5 125.0	70	13.0	27.4 127.0	85	12.6	28.4 127.8	80	27.0	-10.0	36.0 136.6	90	24.4	-10.0	36.0 136.6	90	24.4
001407	24.0 124.8	75	24.1 124.0	75	8.0	27.4 127.2	85	6.6	28.4 127.8	80	16.3	-10.0	34.5 133.0	70	24.4	-10.0	34.5 133.0	70	24.4
001412	24.6 124.4	80	24.4 124.8	80	14.0	30.4 124.7	100	25.2	30.4 126.7	110	14.2	25.0	34.4 129.8	85	16.7	25.0	34.4 129.8	85	16.7
001418	25.2 124.4	80	25.3 124.4	85	8.0	28.4 124.4	105	51.1	31.4 126.2	110	13.6	30.0	36.7 149.5	90	24.1	30.0	36.7 149.5	90	24.1
001507	25.9 124.7	90	25.7 124.4	90	13.0	28.4 124.0	100	60.0	31.4 124.7	100	14.4	30.0	34.6 127.5	80	24.4	30.0	34.6 127.5	80	24.4
001507	26.9 124.1	90	26.5 124.4	90	29.0	29.4 124.2	95	82.4	32.4 125.1	90	24.1	35.0	34.2 128.3	75	24.6	35.0	34.2 128.3	75	24.6
001512	27.5 123.7	90	27.5 123.0	90	11.0	30.4 123.4	95	72.0	32.4 125.1	90	27.0	60.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	
001518	28.5 123.7	90	28.3 123.4	90	13.0	31.4 123.4	95	70.0	32.4 126.0	90	34.5	35.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	
001602	29.6 123.7	90	29.5 123.7	95	6.5	33.4 123.4	85	39.1	34.4 127.7	80	38.7	35.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	
001607	30.6 123.7	90	31.1 123.4	90	30.0	36.4 123.4	80	60.0	34.4 131.5	45	24.2	20.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	
001612	31.7 123.7	90	31.6 123.7	90	6.5	36.4 124.4	80	21.9	35.4 0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001618	32.8 124.0	90	32.9 123.4	80	10.0	37.4 124.4	75	28.9	36.4 0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001702	34.0 125.0	70	34.1 125.0	70	8.0	38.4 124.4	90	29.1	37.4 0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001707	35.6 126.7	50	35.6 126.7	50	19.0	39.4 130.4	85	30.0	38.4 0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001712	37.1 128.0	30	36.6 128.4	30	37.0	0.0 0.0	0	-0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001718	39.5 131.4	20	38.9 131.4	30	36.0	0.0 0.0	0	-0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001802	42.0 133.4	20	42.1 134.1	25	36.0	0.0 0.0	0	-0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		
001807	44.2 135.3	25	44.4 137.0	25	81.0	0.0 0.0	0	-0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0		

ALL FORECASTS

	WIND	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	26.	163.	285.	461.
AVG RIGHT ANGLE ERROR	17.	98.	209.	340.
AVG INTENSITY MAGNITUDE ERROR	7.	11.	15.	28.
AVG INTENSITY RMS	7.	11.	15.	28.
NUMBER OF FORECASTS	34	34	30	25

SUPER TYPHOON JUDY

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/HO	POSIT	WIND		POSIT	WIND	OST WIND		POSIT	WIND	OST WIND		POSIT	WIND	OST WIND		POSIT	WIND	OST WIND	
001512Z	10.5 151.0	14		0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0
001518Z	11.3 150.1	14		0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0
001600Z	11.8 149.0	14		0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0
001606Z	12.3 147.4	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	0.0 0.0	0	-0.0	0.0
001612Z	12.8 146.1	24		0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0
001618Z	13.3 144.7	30		13.6 144.4	35	21.5	16.4 144.3	40	18.9 144.1	40	18.9 144.1	70	18.2 -20	26.1 132.9	85	210 -48			
001700Z	13.8 143.4	34		13.9 142.7	40	13.45	16.4 134.3	60	62.5	10.4 134.5	70	63.40	27.9 131.4	85	144 -44				
001706Z	14.2 142.2	34		14.2 142.0	40	12.5	16.3 137.4	60	52.1	14.4 133.0	70	121.45	20.8 129.0	85	240 -50				
001712Z	14.5 141.1	40		14.6 140.4	45	30.5	16.7 134.4	65	111.1	14.4 130.9	75	221.45	21.1 127.0	85	125 -50				
001718Z	15.0 140.0	50		15.0 139.4	50	35.0	17.1 134.4	65	112.0	14.3 130.0	75	247.50	21.9 126.4	85	112 -40				
001800Z	15.7 139.0	44		15.4 138.9	55	19.0	17.3 134.3	75	101.0	14.3 130.1	85	239.45	21.6 126.7	90	240 -40				
001806Z	16.4 138.2	74		16.0 137.4	60	42.15	18.1 133.1	75	125.0	14.0 124.0	85	244.45	22.5 125.7	90	247 -20				
001812Z	17.1 137.3	40		16.8 137.3	70	18.10	18.7 133.4	85	93.0	14.2 124.1	90	245.45	22.9 125.0	95	224 -45				
001818Z	17.6 136.4	40		17.4 136.4	75	12.15	19.4 132.4	85	121.0	14.1 124.2	90	237.35	24.0 125.3	95	108 -45				
001900Z	18.2 135.4	110		18.2 135.7	110	6.0	20.4 131.3	130	99.0	14.2 124.5	135	106.15	24.3 124.5	135	40 -40				
001906Z	19.0 135.1	114		18.9 135.0	115	8.0	21.3 131.5	130	109.0	14.4 124.0	135	47.25	24.2 124.9	135	131 -45				
001912Z	19.7 134.7	120		19.7 134.4	125	11.5	22.3 131.2	135	81.0	14.0 124.5	135	42.35	27.7 124.7	125	240 -34				
001918Z	20.5 134.4	124		20.2 134.2	130	21.5	22.3 132.1	135	53.0	14.4 130.5	135	48.35	27.3 124.3	125	241 -40				
002000Z	21.3 133.4	130		21.3 133.3	135	0.5	24.4 132.2	135	89.15	14.3 133.2	135	379.40	24.6 127.1	125	240 -40				
002006Z	22.2 133.2	134		22.2 133.2	135	0.0	25.4 131.5	135	97.25	14.3 133.0	135	375.45	30.6 127.2	115	700 -30				
002012Z	22.7 132.4	134		23.1 132.4	135	26.0	26.4 130.7	120	139.20	14.2 130.6	110	340.20	31.8 126.5	95	410 -10				
002018Z	23.1 131.0	124		23.3 131.2	130	40.5	25.1 124.8	115	121.14	14.2 125.3	105	170.20	31.3 126.5	90	242 -10				
002100Z	23.4 131.1	120		23.4 131.0	120	5.0	24.4 124.0	110	6.14	14.2 125.7	100	24.15	30.0 125.8	85	170 -5				
002106Z	24.2 130.4	110		24.0 130.4	115	18.5	24.0 124.0	105	160.14	14.2 127.7	90	176.5	32.5 127.5	85	110 -15				
002112Z	24.3 129.4	100		24.5 129.4	115	12.15	24.4 127.0	100	129.10	14.2 125.7	90	127.5	31.2 126.1	80	109 -20				
002118Z	24.4 128.0	100		24.7 128.7	115	21.15	27.0 124.7	100	118.14	14.2 124.5	90	91.10	31.6 125.1	75	142 -20				
002200Z	24.4 127.4	94		24.4 127.4	90	11.5	25.0 124.4	95	45.0	14.2 122.1	80	71.30	29.9 124.9	75	175 -30				
002206Z	24.4 127.4	90		24.4 127.2	85	16.5	25.4 124.4	90	70.0	14.2 121.0	80	104.20	30.1 123.7	25	215 -25				
002212Z	24.5 127.0	90		24.3 126.8	85	16.5	25.4 124.1	90	151.0	14.2 121.5	80	177.10	30.0 124.0	20	0 -0				
002218Z	25.1 126.3	84		24.4 126.1	80	21.5	26.4 123.3	85	84.0	14.2 121.0	80	114.25	30.0 124.0	20	0 -0				
002300Z	25.8 125.4	84		25.8 125.7	85	5.0	27.0 123.1	70	49.0	14.2 120.0	80	135.15	30.0 124.0	20	0 -0				
002306Z	26.9 124.4	84		26.7 124.4	80	20.5	29.2 121.5	50	58.0	11.7 119.4	25	215.25	30.0 124.0	20	0 -0				
002312Z	27.5 123.7	84		27.5 123.7	80	0.5	30.1 120.7	45	100.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002318Z	28.2 123.2	80		28.0 123.0	80	16.0	30.4 120.1	40	134.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002400Z	28.7 122.0	80		28.4 122.7	70	12.10	31.2 120.3	30	144.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002406Z	29.3 122.4	70		29.5 122.2	65	24.5	32.3 120.2	30	181.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002412Z	29.8 122.4	60		29.9 122.1	55	17.5	32.4 120.4	30	187.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002418Z	30.4 122.7	54		30.6 122.2	55	24.0	32.4 120.2	25	247.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002500Z	30.9 123.1	54		30.9 122.7	50	21.5	32.4 120.2	25	147.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002506Z	31.4 123.4	50		31.4 123.4	45	5.5	34.1 124.3	25	41.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002512Z	31.8 124.2	40		32.0 124.1	40	13.0	34.7 127.2	25	66.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002518Z	32.5 125.1	30		32.3 125.3	35	15.5	0.0 0.0	0	-0.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002600Z	33.2 126.1	24		33.6 126.7	30	39.5	0.0 0.0	0	-0.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002606Z	33.9 127.1	24		34.4 127.4	25	39.0	0.0 0.0	0	-0.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				
002612Z	34.4 128.4	20		0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	14.0 0.0	0	-0.0	30.0 124.0	20	0 -0				

AIR FORECASTS

	WIND	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	19.	105.	173.	277.
AVG RIGHT ANGLE ERROR	12.	81.	139.	217.
AVG INTENSITY MAGNITUDE ERROR	6.	16.	23.	24.
AVG INTENSITY RMS	1.	-7.	-3.	-1.
NUMBER OF FORECASTS	30	36	27	23

TROPICAL DEPRESSION 14

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/HO	POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS		
001800Z	13.5 146.4	14	0.0 0.0	0	-0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0	0	-0.0 0.0		
001806Z	13.9 146.2	20	13.8 146.7	20	4.0	15.1 144.8	30	130.10	14.4 141.0	40	205.30	14.4 141.0	40	205.30	14.4 141.0	40	205.30		
001812Z	14.5 145.4	20	14.6 146.2	20	35.0	16.0 144.0	30	180.10	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
001818Z	15.3 145.2	20	14.4 145.4	20	38.0	16.1 143.7	30	209.14	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
001900Z	16.1 144.4	20	15.7 144.7	20	25.0	17.4 141.0	30	165.20	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
001906Z	17.1 143.0	20	17.0 143.4	20	3.0	19.1 140.3	15	120.4	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
001912Z	18.1 143.0	20	17.9 143.1	20	13.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
001918Z	19.2 142.0	15	18.4 142.2	20	43.5	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
002000Z	20.0 140.0	10	19.5 140.4	20	41.10	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		
002006Z	21.0 149.4	10	19.4 140.1	20	77.10	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0	0.0 0.0	0	-0.0		

AIR FORECASTS

	WIND	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	73.	157.	294.	0.
AVG RIGHT ANGLE ERROR	19.	43.	119.	0.
AVG INTENSITY MAGNITUDE ERROR	3.	12.	30.	0.
AVG INTENSITY RMS	3.	12.	30.	0.
NUMBER OF FORECASTS	9	5	1	1

TROPICAL STORM KEN

BEST TRACK				ARRIVING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HZ	POSIT	WIND		POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND		
000000Z	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000006Z	22.3 141.5	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000012Z	22.4 140.1	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000018Z	23.3 138.0	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000024Z	23.7 137.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000030Z	24.0 136.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000036Z	24.6 135.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000042Z	24.6 134.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000048Z	24.8 134.1	25	25.4 132.4	25.105	0.0	27.4 129.4	35.200	0.0	28.4 128.4	40.980	0.0	29.4 127.4	45.217	-10.0	30.4 126.4	50.217	30.0		
000054Z	24.9 133.4	25	25.2 132.0	25.37	0.0	25.8 130.4	35.60	0.0	27.4 128.4	35.100	-25.0	28.4 127.4	35.100	-25.0	29.4 126.4	35.100	30.0		
000101Z	25.1 133.4	25	25.3 132.4	25.43	0.0	25.8 130.4	35.80	0.0	27.4 128.4	35.100	-25.0	28.4 127.4	35.100	-25.0	29.4 126.4	35.100	30.0		
000107Z	25.3 132.4	25	25.3 131.4	25.43	0.0	26.4 129.4	35.111	0.0	27.4 128.4	35.100	-25.0	28.4 127.4	35.100	-25.0	29.4 126.4	35.100	30.0		
000200Z	25.8 131.4	30	25.5 131.7	30.13	0.0	26.4 129.4	40.151	0.0	27.4 128.4	40.151	0.0	28.4 127.6	40.151	0.0	29.4 126.4	40.151	30.0		
000206Z	26.5 131.2	35	26.2 131.0	30.42	-5.0	28.4 130.4	40.980	0.0	29.4 129.4	40.980	0.0	30.4 130.4	35.100	363.3	10.0	0.0	0.0		
000212Z	27.2 130.4	40	27.2 130.4	40.0	0.0	30.4 130.4	50.61	0.0	31.4 130.4	50.61	0.0	32.4 133.5	35.100	205.3	10.0	0.0	0.0		
000218Z	27.8 130.4	45	28.1 130.4	45.21	5.0	31.4 130.4	50.79	0.0	32.4 130.4	50.79	0.0	33.4 130.4	0.0	0.0	0.0	0.0	0.0		
000300Z	28.8 130.2	45	28.8 130.2	40.13	-5.0	32.4 131.4	55.173	0.0	33.4 131.4	55.173	0.0	34.4 130.4	0.0	0.0	0.0	0.0	0.0		
000306Z	30.0 130.4	45	29.4 130.2	40.16	-20.0	33.4 132.4	60.137	0.0	34.4 131.4	60.137	0.0	35.4 130.4	0.0	0.0	0.0	0.0	0.0		
000312Z	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000318Z	32.5 131.0	65	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000400Z	34.0 133.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000406Z	35.2 134.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0		
000412Z	36.5 136.4	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	0.0 0.0	0.0 0.0	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

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

TYPHOON LOLA

BEST TRACK				ARRIVING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HZ	POSIT	WIND		POSIT	WIND		POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	
000200Z	21.3 141.7	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000206Z	21.5 141.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000212Z	21.8 151.4	30	21.4 151.2	30.11	0.0	24.4 150.4	45.80	0.0	25.4 140.4	45.100	0.0	26.4 150.4	45.700	-20.0	20.1 152.7	45.168	-30.0	-30.0	
000218Z	22.1 151.3	30	22.6 150.7	30.45	0.0	25.2 140.4	45.100	0.0	27.4 151.0	45.777	-25.0	27.4 151.0	45.777	-25.0	30.0 140.2	45.447	-35.0	-35.0	
000300Z	22.4 141.1	30	22.6 150.4	30.62	0.0	23.0 147.4	40.61	-0.0	26.4 145.4	40.70	-25.0	26.4 145.4	40.70	-25.0	24.5 142.0	55.266	-30.0	-30.0	
000306Z	22.8 140.7	30	22.5 150.4	30.21	0.0	23.2 140.4	45.81	-0.0	24.4 147.3	50.81	-25.0	24.4 147.3	50.81	-25.0	24.6 144.6	45.143	-35.0	-35.0	
000312Z	23.1 140.3	30	22.5 150.4	30.37	0.0	23.2 140.4	40.131	-0.0	24.4 147.3	40.171	-35.0	24.6 147.3	40.171	-35.0	24.6 144.6	45.105	-40.0	-40.0	
000318Z	23.4 140.7	35	23.1 150.2	30.33	-5.0	24.4 148.4	35.98	-0.0	24.4 146.8	40.62	-40.0	24.6 146.8	40.62	-40.0	24.6 143.9	45.205	-75.0	-75.0	
000400Z	23.7 140.9	45	23.6 149.1	45.9	0.0	25.2 148.4	40.61	0.0	26.4 148.4	40.70	-15.0	26.4 148.4	40.70	-15.0	24.6 141.7	75.245	10.0	10.0	
000406Z	24.0 140.4	50	24.0 140.4	50.0	0.0	25.4 148.4	45.32	-10.0	27.4 143.6	70.81	-20.0	29.0 141.4	81.20	-20.0	29.0 141.4	75.271	10.0	10.0	
000412Z	24.4 140.7	65	24.3 147.7	65.0	0.0	26.4 148.4	55.72	0.0	27.4 143.6	80.177	-10.0	30.0 141.5	85.206	0.0	30.0 141.5	85.206	0.0	0.0	
000418Z	24.7 140.7	70	24.7 140.4	70.11	0.0	26.4 148.4	60.123	0.0	28.4 141.0	85.218	0.0	31.0 141.5	85.249	0.0	31.0 141.5	85.249	0.0	0.0	
000424Z	25.3 140.7	75	25.2 140.4	75.12	0.0	27.4 148.4	65.133	0.0	29.4 141.0	85.249	0.0	32.0 141.7	85.249	0.0	32.0 141.7	85.249	0.0	0.0	
000430Z	25.6 140.4	75	25.4 140.4	75.34	0.0	27.4 148.4	65.137	0.0	29.4 141.0	85.249	0.0	32.0 141.7	85.249	0.0	32.0 141.7	85.249	0.0	0.0	
000436Z	26.3 146.4	75	26.4 146.4	75.12	0.0	29.4 146.4	80.49	-10.0	32.4 150.0	60.146	10.0	33.0 150.4	60.146	10.0	33.0 150.4	60.146	0.0	0.0	
000442Z	26.8 146.4	80	27.0 146.4	80.13	0.0	29.4 147.4	75.59	-0.0	32.4 151.0	60.147	15.0	33.0 151.0	60.147	15.0	33.0 151.0	60.147	0.0	0.0	
000448Z	27.4 146.4	85	27.3 146.4	80.6	-5.0	29.4 147.4	75.59	-10.0	32.4 150.9	60.143	20.0	33.0 151.0	60.143	20.0	33.0 151.0	60.143	0.0	0.0	
000500Z	27.8 146.4	90	27.9 146.4	90.9	0.0	30.4 147.4	80.69	-20.0	32.4 151.7	60.170	25.0	33.0 151.7	60.170	25.0	33.0 151.7	60.170	0.0	0.0	
000512Z	28.5 146.7	90	28.5 146.4	90.5	0.0	31.1 148.4	75.62	-20.0	32.4 152.2	55.216	25.0	33.0 152.2	55.216	25.0	33.0 152.2	55.216	0.0	0.0	
000518Z	29.3 146.7	80	29.3 146.7	85.0	5.0	31.4 148.4	85.70	-20.0	32.4 152.9	50.216	20.0	33.0 152.9	50.216	20.0	33.0 152.9	50.216	0.0	0.0	
000530Z	30.1 146.4	85	30.2 146.4	85.0	0.0	32.4 148.4	95.119	-0.0	33.4 150.1	40.220	10.0	34.0 150.1	40.220	10.0	34.0 150.1	40.220	0.0	0.0	
000536Z	30.8 146.4	85	30.8 146.4	85.10	0.0	33.4 148.4	95.130	-10.0	34.0 150.1	40.220	10.0	34.0 150.1	40.220	10.0	34.0 150.1	40.220	0.0	0.0	
000542Z	31.7 147.0	85	31.7 147.7	85.10	0.0	33.4 150.4	90.130	-10.0	34.0 150.1	40.220	10.0	34.0 150.1	40.220	10.0	34.0 150.1	40.220	0.0	0.0	
000548Z	33.0 147.7	85	33.0 147.7	85.0	0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000600Z	34.4 140.4	80	34.2 140.4	40.21	0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000606Z	35.1 150.7	35	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000612Z	35.9 151.4	30	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000618Z	36.6 143.4	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
000630Z	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	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	

TYPHOON MAC

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/MN	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
0913007	12.0 170.0	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	0.0	0.0 0.0	0	-0.0	0.0
0913007	12.0 170.0	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	0.0	0.0 0.0	0	-0.0	0.0
0913122	11.9 177.0	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	0.0	0.0 0.0	0	-0.0	0.0
0913182	11.9 177.0	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	0.0	0.0 0.0	0	-0.0	0.0
0914002	11.8 176.0	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	0.0	0.0 0.0	0	-0.0	0.0
0914002	11.8 176.0	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	0.0	0.0 0.0	0	-0.0	0.0
0914122	11.8 176.0	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	0.0	0.0 0.0	0	-0.0	0.0
0914182	12.0 173.0	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	0.0	0.0 0.0	0	-0.0	0.0
0915002	12.3 173.0	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	0.0	0.0 0.0	0	-0.0	0.0
0915002	12.7 171.0	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	0.0	0.0 0.0	0	-0.0	0.0
0915122	12.9 171.0	20	13.0 171.0	20	5	0	14.0 177.0	30	70	30	14.0 170.0	40	147	-25	14.0 170.0	50	172	0	
0915182	13.2 170.0	30	13.3 170.0	20	0	-10	15.1 170.0	30	40	30	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0916002	13.5 170.0	40	13.5 170.0	25	12	-15	15.3 170.0	30	40	40	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0916002	13.7 170.0	50	13.4 170.0	30	0	-5	15.4 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0916122	13.7 170.0	50	14.1 170.0	30	30	-10	15.7 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0916182	13.7 170.0	60	14.3 170.0	30	60	-10	16.1 170.0	30	40	60	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0917002	13.7 170.0	70	14.5 170.0	30	90	-15	16.3 170.0	30	40	70	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0917002	13.7 170.0	70	14.5 170.0	30	90	-15	16.3 170.0	30	40	70	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0917122	13.8 170.0	60	13.4 170.0	30	0	-10	16.4 170.0	30	40	60	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0917182	14.0 170.0	50	13.0 170.0	30	13	0	16.5 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0918002	13.8 173.0	50	14.0 173.0	30	13	5	16.7 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0918002	13.6 173.0	50	14.0 173.0	30	30	5	16.8 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0918122	13.6 172.0	50	13.2 172.0	30	24	5	16.0 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0918182	13.7 172.0	45	13.7 172.0	30	5	5	16.2 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0919002	13.9 171.0	40	13.4 171.0	30	0	0	16.4 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0919002	14.3 170.0	30	13.4 170.0	30	30	5	16.4 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0919122	14.8 170.0	30	14.4 170.0	30	33	0	16.5 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0919182	15.5 170.0	30	14.6 170.0	30	67	0	16.7 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0920002	16.1 170.0	40	16.0 170.0	30	24	-5	17.0 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0920002	17.1 170.0	40	17.2 170.0	30	14	-10	18.0 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0920122	17.6 170.0	30	17.5 170.0	30	13	-5	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	
0920182	17.9 170.0	30	18.3 170.0	30	29	0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	
0921002	18.4 170.0	30	18.3 170.0	30	6	0	20.0 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0921002	19.0 170.0	30	18.4 170.0	30	26	-5	20.5 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0921122	19.5 170.0	40	19.2 170.0	30	29	-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	
0921182	20.1 170.0	40	19.5 170.0	30	42	-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	
0922002	20.5 170.0	40	20.5 170.0	30	6	-10	22.0 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0922002	20.8 170.0	30	21.0 170.0	30	12	-5	22.5 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0922122	20.9 170.0	30	21.3 170.0	30	25	-5	22.5 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0922182	21.2 170.0	30	21.7 170.0	30	11	0	22.1 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0923002	21.5 170.0	40	21.5 170.0	30	11	-5	22.7 170.0	30	40	50	17.0 173.0	40	210	-15	14.0 170.0	40	170	-5	
0923002	21.8 170.0	40	21.8 170.0	30	5	0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	
0923122	22.0 173.0	30	22.7 173.0	30	44	0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	
0923182	22.3 173.0	30	22.3 173.0	30	5	0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	
0924002	22.5 172.0	25	22.5 173.0	25	6	0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	0.0 0.0	0	-0.0	0.0	

ALL FORECASTS

	MMMG	24-48	48-72	72-96
AVG FORECAST POSIT ERROR	23.	93.	194.	278.
AVG 41G-1 ANGLE ERROR	16.	66.	152.	277.
AVG INTENSITY MAGNITUDE ERROR	5.	12.	13.	21.
AVG INTENSITY MAX	-6.	-5.	4.	21.
NUMBER OF FORECASTS	34	27	19	19

TROPICAL STORM NANCY

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/DA/MN	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND
0917122	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0917182	16.0 112.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0918002	17.3 111.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0918002	17.7 111.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0918122	18.1 111.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0918182	18.6 111.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0919002	18.0 111.0	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	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0	0	-0.0 0.0	0.0 0.0
0919002	18.6 111.0	30	18.5 111.0	30	24	-5	20.6 112.0	45	207	10	22.2 110.0	45	306	0	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0919122	18.6 110.0	30	19.4 110.0	45	13	10	19.3 110.0	45	30	10	20.1 108.0	30	179	15	20.6 108.0	35	227	10	19.4 110.0
0919182	18.7 110.0	45	19.3 110.0	30	36	5	20.1 108.0	45	136	10	20.6 107.0	30	192	20	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0920002	18.7 109.0	30	18.7 109.0	40	21	-5	18.5 108.0	30	130	-5	18.2 104.0	25	141	-5	0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0920002	18.4 109.0	15	18.4 109.0	40	26	5	19.3 108.0	35	132	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0920122	18.2 109.0	30	18.4 108.0	35	24	0	18.3 108.0	30	70	-5	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0920182	17.9 109.0	30	18.3 108.0	35	56	0	18.2 108.0	25	120	-5	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0921002	17.7 108.0	30	17.5 108.0	35	36	0	15.0 108.0	20	180	-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
0921002	17.6 108.0	30	17.4 107.0	35	31	0	0.0 0.0	0	-0.0 0.0	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0921122	17.4 107.0	30	17.4 107.0	30	29	0	17.4 108.0	25	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
0921182	17.3 107.0	30	17.7 107.0	30	23	0	0.0 0.0	0	-0.0 0.0	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0922002	17.2 107.0	30	17.3 107.0	25	13	-5	0.0 0.0	0	-0.0 0.0	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0922002	17.1 107.0	30	17.3 106.0	25	17	-5	0.0 0.0	0	-0.0 0.0	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0
0922122	16.9 106.0	20	16.4 106.0	20	24	0	0.0 0.0	0	-0.0 0.0	0	0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0	-0.0 0.0	0.0 0.0	0.0 0.0

TYPHOON OWEN

BEST TRACK				WINDING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/JA/MO	POSIT	WIND		POSIT	WIND		POSIT	WIND	USE	WIND	POSIT	WIND	USE	WIND	POSIT	WIND	USE	WIND	
092200Z	12.6 138.3	20		13.0 138.0	20	58	0	13.4 138.0	40	123	15	14.1 131.8	00	229	15	14.9 128.6	70	141	0
092206Z	12.5 138.1	25		12.9 138.0	25	25	0	13.4 138.0	45	99	15	14.6 131.7	00	229	5	14.9 128.6	70	141	0
092212Z	12.1 137.7	25		12.5 137.1	25	33	0	12.9 138.0	35	141	0	13.4 130.9	05	137	-15	14.5 128.2	55	140	-25
092218Z	12.1 137.2	25		12.3 136.7	25	54	0	12.7 137.7	35	226	-10	13.6 129.1	50	426	-10	14.3 126.0	60	479	-40
092300Z	12.6 146.0	25		12.3 136.7	25	21	0	12.4 136.5	30	226	-10	12.7 131.2	30	407	-35	14.2 128.0	45	445	-55
092306Z	13.3 146.6	30		12.3 136.1	30	66	0	12.4 136.5	45	313	-10	12.4 130.3	35	405	-20	14.3 127.1	60	421	-50
092312Z	13.9 146.2	35		13.3 136.1	45	34	10	13.0 136.1	50	309	-10	14.7 131.6	00	445	-20	14.4 128.2	70	416	-40
092318Z	15.0 145.8	45		13.7 135.6	45	79	0	14.4 135.1	55	334	-5	15.4 129.9	05	411	-35	14.3 128.2	75	416	-40
092400Z	15.1 135.3	45		15.4 135.2	45	19	0	21.0 137.4	00	90	-10	24.4 131.1	05	142	-45	24.4 128.3	70	254	-30
092406Z	17.7 136.3	55		17.4 136.5	55	13	0	22.1 131.4	05	90	-10	24.0 131.3	70	144	-40	24.4 128.2	75	248	-20
092412Z	19.0 133.2	60		19.2 133.4	60	16	0	24.0 130.4	75	179	-5	27.4 130.2	05	240	-25	30.4 128.0	70	247	-20
092418Z	20.1 132.1	60		20.7 132.1	60	38	0	25.4 130.7	75	184	-25	24.7 130.5	05	243	-20	31.0 128.4	70	244	-15
092500Z	21.0 130.7	70		20.9 130.8	70	4	0	23.4 127.0	85	124	-25	24.2 125.4	25	239	-5	24.6 125.6	80	242	-5
092506Z	21.3 130.1	75		21.7 130.0	75	29	0	24.1 127.1	85	120	-25	24.2 125.8	25	214	0	24.3 127.0	75	100	-5
092512Z	22.0 129.8	80		21.9 129.4	80	23	0	24.7 127.0	95	130	-15	27.1 126.5	25	189	5	30.7 128.4	75	132	0
092518Z	22.6 129.4	80		22.4 129.0	80	28	-10	24.0 127.4	100	113	-5	27.4 127.0	25	141	10	30.3 128.0	70	150	-5
092600Z	23.1 129.1	110		23.3 129.2	95	13	-15	25.4 128.7	110	60	10	27.4 130.0	25	49	5	30.3 128.0	70	251	-5
092606Z	23.5 129.2	110		23.7 129.0	100	16	-10	26.0 128.4	110	71	15	24.7 131.1	05	109	5	31.2 125.1	65	344	-10
092612Z	23.8 129.3	110		24.0 129.1	100	15	-10	26.0 128.0	110	43	20	24.4 130.6	25	84	10	30.9 125.5	65	240	-10
092618Z	24.4 129.4	105		24.4 129.4	105	5	0	29.0 130.4	75	150	-10	24.4 132.1	25	135	0	31.1 127.0	55	219	-20
092700Z	24.9 129.4	100		24.4 129.4	100	12	0	26.4 129.4	95	30	10	24.4 131.7	70	99	-5	31.6 127.1	50	120	-30
092706Z	25.5 129.7	95		25.3 129.7	95	12	0	27.3 130.4	90	32	10	20.2 132.7	05	142	-10	32.3 128.0	45	247	-20
092712Z	26.0 129.8	90		25.9 129.0	90	9	0	28.3 131.1	85	80	10	40.4 131.9	05	212	-10	31.3 128.5	45	176	-10
092718Z	26.5 129.8	85		26.4 129.7	85	4	0	29.0 130.8	75	89	0	31.4 133.7	00	149	-15	34.0 128.5	45	133	0
092800Z	27.0 129.8	85		27.1 129.0	85	8	0	29.4 130.7	75	94	0	32.2 133.8	00	144	-10	34.0 128.3	40	207	5
092806Z	27.3 129.8	80		27.5 129.8	80	12	0	30.3 131.1	75	124	0	32.4 135.1	25	103	-10	34.0 0.0	0	0	0
092812Z	27.6 129.8	75		27.7 129.8	75	6	0	29.4 130.0	70	29	-5	32.1 132.0	00	149	5	34.0 0.0	0	0	0
092818Z	27.8 129.8	75		27.7 129.8	75	6	0	29.4 129.4	70	80	-5	31.2 131.2	00	444	15	34.0 0.0	0	0	0
092900Z	28.1 129.0	75		28.0 129.8	75	8	0	29.0 130.4	70	82	0	32.4 132.5	00	411	25	34.0 0.0	0	0	0
092906Z	28.5 129.1	75		28.7 129.8	75	20	0	32.0 131.5	40	80	-25	34.0 0.0	0	0	0	34.0 0.0	0	0	0
092912Z	29.1 130.3	75		29.1 130.2	75	5	0	32.3 131.4	55	197	0	34.0 0.0	0	0	0	34.0 0.0	0	0	0
092918Z	29.8 130.4	75		29.7 130.4	75	6	0	32.3 130.4	50	331	0	34.0 0.0	0	0	0	34.0 0.0	0	0	0
093000Z	30.8 131.5	70		31.0 131.5	70	12	0	35.0 130.7	40	417	-5	34.0 0.0	0	0	0	34.0 0.0	0	0	0
093006Z	32.4 133.1	45		32.0 132.4	70	39	5	0.0 0.0	0	0	0	34.0 0.0	0	0	0	34.0 0.0	0	0	0
093012Z	34.1 135.1	55		33.4 134.4	70	35	15	0.0 0.0	0	0	0	34.0 0.0	0	0	0	34.0 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	34.0 0.0	0	0	0	34.0 0.0	0	0	0
100100Z	39.8 141.0	35		39.4 141.7	35	55	0	0.0 0.0	0	0	0	34.0 0.0	0	0	0	34.0 0.0	0	0	0

A.L. FORECASTS

	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	25	146	250
AVG FORECAST ANGLE ERROR	15	78	154
AVG INTENSITY MAGNITUDE ERROR	2	10	15
AVG INTENSITY BIAS	-0	-3	-4
NUMBER OF FORECASTS	37	33	29

TROPICAL STORM PAMELA

BEST TRACK				WINDING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
NO/JA/MO	POSIT	WIND		POSIT	WIND	JUST WIND		POSIT	WIND	JUST WIND		POSIT	WIND	JUST WIND		POSIT	WIND	JUST 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	
092306Z	18.2 148.4	15		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
092312Z	18.3 147.4	15		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
092318Z	18.5 146.4	15		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
092400Z	18.6 145.4	15		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
092406Z	18.7 145.4	15		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
092412Z	18.8 144.4	20		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
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	
092500Z	19.2 143.4	30		0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	-0	0.0	0.0	0	
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	
092512Z	19.7 142.1	60	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	
092518Z	20.3 140.9	45	19.7 141.1	35	34	0	21.0 138.1	45	307	-25	0	0.0	0.0	0	-0	0.0	0.0	0	
092600Z	20.4 139.4	35	20.4 139.4	35	25	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	21.4 137.0	30	25	0	0.0	0.0	0	0	0	0.0	0.0	0	-0	0.0	0.0	0	
092612Z	24.1 137.4	25	23.4 136.4	30	67	5	0.0	0.0	0	0	0	0.0	0.0	0	-0	0.0	0.0	0	
092618Z	26.0 136.4	20	25.0 136.8	25	0	5	0.0	0.0	0	0	0	0.0	0.0	0	-0	0.0	0.0	0	

A.L. FORECASTS

	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	24	146	0
AVG FORECAST ANGLE ERROR	22	15	0
AVG INTENSITY MAGNITUDE ERROR	1	25	0
AVG INTENSITY BIAS	1	0	0
NUMBER OF FORECASTS	4	2	0

TROPICAL STORM ROGER

NO/JA/MO	HIST TRACK				HANNING				24 HOUR FOMELAST				48 HOUR FOMELAST				72 HOUR FOMELAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
1002007	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	0.0	0.0	0.0	0.0
1002007	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	0.0	0.0	0.0	0.0
1002127	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	0.0	0.0	0.0	0.0
1002187	13.2 140.4	24	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1003007	14.2 140.2	16	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1003007	16.1 139.4	30	19.7	134.8	25	-2.0	18.4	137.1	35	20.1	-4.0	20.4	136.0	45	45.0	22.0	145.0	55	150.0	100
1003127	16.0 138.0	50	19.4	134.1	25	85.0	-2.0	20.2	137.1	35	170.0	-4.0	20.4	136.4	45	194.0	27.2	147.4	55	114.0
1003187	19.4 137.4	30	19.5	134.1	30	29.0	0.0	24.8	134.0	35	265.0	10.0	20.0	137.4	45	347.0	12.0	142.2	35	154.0
1004007	20.0 136.3	36	21.0	134.3	30	24.0	-5.0	26.0	134.4	35	365.0	10.0	31.4	134.3	25	515.0	15.0	144.6	15	546.0
1004007	21.2 135.3	40	21.7	135.2	25	30.0	-5.0	26.4	134.4	30	379.0	4.0	31.4	134.5	30	442.0	-15.0	0.0	0.0	0.0
1004127	21.5 134.4	40	21.6	134.7	40	17.0	0.0	23.7	132.4	30	194.0	4.0	27.0	133.0	35	123.0	10.0	0.0	0.0	0.0
1004187	21.0 133.5	45	22.5	131.4	45	90.0	0.0	25.4	131.4	35	254.0	10.0	20.1	134.5	45	44.0	5.0	0.0	0.0	0.0
1005007	19.4 134.2	45	20.2	133.4	40	25.0	-5.0	23.4	134.7	30	24.0	4.0	20.0	137.8	40	180.0	5.0	0.0	0.0	0.0
1005007	20.3 135.2	45	20.2	134.7	40	29.0	-5.0	23.4	134.7	30	113.0	4.0	20.4	137.9	40	374.0	10.0	0.0	0.0	0.0
1005127	21.5 135.5	45	21.4	135.1	40	23.0	-5.0	27.2	134.1	45	44.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1005187	22.0 135.3	45	22.4	135.8	40	36.0	-5.0	26.7	134.0	40	172.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1006007	23.0 134.7	45	23.0	134.7	40	4.0	-5.0	29.0	134.4	35	135.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1006007	25.2 134.4	45	25.1	134.7	40	17.0	-5.0	31.4	137.9	35	205.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1006127	26.0 135.3	45	26.4	135.3	40	24.0	-5.0	0.0	0.0	0.0	-0.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1006187	29.1 136.2	40	28.4	136.2	40	43.0	0.0	0.0	0.0	0.0	-0.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1007007	32.0 137.4	35	31.4	137.4	35	14.0	0.0	0.0	0.0	0.0	-0.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0
1007007	34.4 140.1	30	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	4.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0

ALL FORECASTS				
MMHG	24-HR	48-HR	72-HR	
AVG FOMELAST POSIT ERROR	12.	105.	251.	303.
AVG RIGHT ANGLE ERROR	19.	93.	104.	174.
AVG INTENSITY MAGNITUDE ERROR	1.	5.	7.	11.
AVG INTENSITY BIAS	-3.	0.	-1.	-1.
NUMBER OF FORECASTS	14	13	9	4

TYPHOON SARAH

BEST TRACK				JAWING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
DATE/TIME	POSIT	WIND	WAVE	POSIT	WIND	WAVE	WAVE	POSIT	WIND	WAVE	WAVE	POSIT	WIND	WAVE	WAVE	POSIT	WIND	WAVE	WAVE
093012Z	14.6 119.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.6 119.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.5 119.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.5 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.5 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.5 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.8 121.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.9 121.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	15.2 121.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	15.0 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	15.0 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	14.8 120.0	14	0.0 0.0	0	-0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
100400Z	14.6 119.0	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	0.0	0.0	0.0	0.0
100406Z	14.2 119.0	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	0.0	0.0	0.0	0.0
100412Z	13.8 119.0	30	14.0 119.0	30	37	0	13.4 118.0	35	80	-4	13.0 110.0	45	55	0	12.5 113.0	40	74	-35	
100418Z	13.5 118.0	35	13.9 119.0	35	38	0	13.4 117.0	50	121	10	12.4 115.0	50	220	0	12.4 113.0	40	74	-35	
100500Z	13.0 118.0	40	13.7 118.0	40	42	0	13.0 114.0	50	160	10	12.7 114.0	50	282	-10	12.2 111.0	40	63	-35	
100506Z	12.7 119.0	40	12.5 118.0	40	31	0	12.5 114.0	40	70	0	11.5 118.0	40	79	-35	10.7 117.0	40	110	-35	
100512Z	12.5 119.0	40	12.5 119.0	40	0	0	12.0 114.0	40	45	-5	11.1 117.0	40	84	-35	10.6 116.0	35	159	-40	
100518Z	12.5 119.0	40	12.1 119.0	40	38	0	11.0 114.0	40	90	0	10.4 117.0	35	136	-40	9.9 116.0	30	141	-45	
100600Z	12.5 119.0	40	12.3 119.0	40	43	0	12.1 114.0	40	41	20	11.5 118.0	35	71	-40	10.8 117.0	30	84	-55	
100606Z	12.4 119.0	40	12.4 119.0	40	12	0	12.4 120.0	35	95	0	12.3 121.0	30	180	-45	12.3 122.0	25	277	-45	
100612Z	12.3 119.0	45	12.4 120.0	35	30	-10	12.4 120.0	35	100	0	12.4 121.0	30	175	-45	0	0	0	0	
100618Z	12.2 119.0	40	12.4 119.0	35	21	-15	12.4 120.0	30	80	0	12.4 121.0	20	147	-55	0	0	0	0	
100700Z	12.2 119.0	40	12.2 119.0	45	0	-15	12.0 119.0	35	50	0	0	0	0	0	0	0	0	0	
100706Z	12.1 119.0	75	12.2 119.0	65	4	-10	11.0 114.0	60	71	0	11.5 116.0	50	43	-40	11.3 114.0	40	119	-70	
100712Z	11.9 119.0	75	12.1 119.0	65	12	-10	11.0 114.0	60	84	0	11.6 116.0	50	56	-40	11.2 114.0	40	93	-60	
100718Z	11.6 119.0	75	12.0 119.0	65	25	-10	11.0 114.0	55	53	20	11.0 116.0	50	17	-45	10.7 114.0	40	84	-60	
100800Z	11.3 119.0	75	11.3 119.0	65	4	-10	11.0 114.0	55	13	0	11.1 117.0	50	62	-60	11.1 116.0	40	76	-60	
100806Z	11.0 119.0	75	11.1 119.0	65	6	-10	10.0 114.0	60	43	0	10.7 116.0	50	57	-55	10.8 115.0	50	78	-60	
100812Z	10.8 119.0	75	10.8 119.0	65	0	-10	10.1 114.0	60	80	0	10.1 116.0	50	93	-45	10.2 114.0	50	119	-75	
100818Z	11.0 118.0	75	10.4 119.0	65	30	-10	10.0 114.0	65	90	0	10.0 116.0	50	117	-45	10.3 115.0	50	129	-75	
100900Z	11.1 118.0	45	10.6 118.0	65	32	-20	10.4 114.0	70	72	0	10.4 114.0	65	95	-35	11.6 112.0	65	127	-10	
100906Z	11.3 117.0	40	11.3 117.0	90	0	0	11.4 114.0	85	21	25	11.4 115.0	80	35	-10	11.8 114.0	80	70	10	
100912Z	11.4 117.0	40	11.5 117.0	90	12	0	11.4 114.0	85	13	0	12.0 114.0	80	29	-5	12.8 112.0	80	79	15	
100918Z	11.4 117.0	45	11.7 116.0	90	21	-5	12.0 114.0	85	50	0	12.4 113.0	80	42	5	13.0 111.0	80	111	15	
101000Z	11.5 116.0	110	11.4 116.0	90	24	-20	11.4 114.0	85	100	0	11.5 111.0	80	175	5	11.5 109.0	80	241	20	
101006Z	11.6 116.0	100	11.6 116.0	100	6	-10	11.0 114.0	100	37	10	12.0 112.0	90	93	20	12.1 110.0	90	126	30	
101012Z	11.7 116.0	100	11.5 115.0	100	8	0	11.0 114.0	100	54	15	12.0 112.0	90	100	25	12.1 110.0	80	126	20	
101018Z	11.8 115.0	100	11.9 115.0	100	30	0	12.0 113.0	100	40	25	12.5 111.0	90	81	25	12.6 109.0	75	100	15	
101100Z	11.9 115.0	100	12.0 115.0	90	4	-10	12.5 114.0	75	25	0	13.0 112.0	70	25	10	13.3 111.0	60	41	5	
101106Z	12.1 115.0	40	12.0 114.0	90	13	0	12.4 113.0	75	55	0	12.6 110.0	70	85	10	12.6 108.0	60	76	10	
101112Z	12.2 114.0	45	12.1 114.0	90	30	5	12.3 111.0	75	95	10	12.4 109.0	60	126	0	12.4 107.0	20	123	-20	
101118Z	12.4 114.0	75	12.5 113.0	85	36	10	13.0 111.0	75	94	0	13.0 109.0	60	105	790	0	0	0	0	
101200Z	12.8 114.0	75	12.4 114.0	80	25	5	12.4 112.0	65	40	0	12.9 111.0	50	79	-5	13.2 109.0	40	75	20	
101206Z	12.9 113.0	70	13.0 113.0	80	13	10	13.4 112.0	65	6	0	13.4 110.0	50	42	0	0	0	0	0	
101212Z	13.1 113.0	65	13.3 113.0	80	13	15	14.0 111.0	65	30	0	14.0 109.0	50	40	15	0	0	0	0	
101218Z	13.2 112.0	65	13.5 112.0	75	29	10	14.4 110.0	65	70	0	14.7 108.0	30	101	-5	0	0	0	0	
101300Z	13.3 112.0	60	13.3 112.0	75	23	15	13.0 110.0	55	26	0	13.1 108.0	30	29	10	0	0	0	0	
101306Z	13.4 112.0	60	13.2 112.0	75	13	15	13.1 110.0	55	13	0	0	0	0	0	0	0	0	0	
101312Z	13.4 111.0	60	13.5 111.0	70	13	10	13.0 109.0	55	30	0	0	0	0	0	0	0	0	0	
101318Z	13.4 111.0	60	13.5 111.0	60	105	0	13.0 108.0	35	47	0	0	0	0	0	0	0	0	0	
101400Z	13.4 110.0	55	13.5 110.0	55	19	0	13.4 108.0	30	21	10	0	0	0	0	0	0	0	0	
101406Z	13.3 110.0	50	13.4 110.0	50	24	0	0	0	0	0	0	0	0	0	0	0	0	0	
101412Z	13.3 109.0	50	13.3 109.0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
101418Z	13.2 109.0	35	13.3 109.0	35	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
101500Z	13.1 108.0	20	13.1 108.0	20	12	0	0	0	0	0	0	0	0	0	0	0	0	0	

ALL FORECASTS

	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	26	41	110
AVG RIGHT ANGLE ERROR	16	40	85
AVG INTENSITY MAGNITUDE ERROR	4	16	47
AVG INTENSITY BIAS	-2	-9	5
NUMBER OF FORECASTS	47	33	34

SUPER TYPHOON TIP

BEST TRACK				ARRIVING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/JA/H	POSIT	WIND		POSIT	WIND	DST WIND		POSIT	WIND	DST WIND		POSIT	WIND	DST WIND		POSIT	WIND	DST WIND	
1004002	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	
1004002	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	
1004122	5.7 153.1	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	
1004182	5.4 153.0	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	
1005002	5.4 154.5	25	5.4 154.5	25	0	0	0	6.4 155.4	30	58	-5	0.0 150.0	35	137	-5	4.3 147.1	45	247	5
1005002	5.7 155.2	25	5.4 155.2	25	6	0	0	7.4 151.7	30	40	-5	0.1 150.9	35	154	-5	10.4 149.0	40	219	5
1005122	6.5 154.4	30	6.1 155.7	25	48	-5	0	7.4 151.7	35	48	-5	0.1 150.9	45	141	5	10.5 142.0	30	148	5
1005182	7.1 153.4	30	6.4 155.2	25	94	-5	0	8.1 151.4	35	27	-4	0.4 150.0	45	194	5	10.5 147.0	50	150	0
1006002	7.3 153.3	35	7.3 153.3	39	12	0	0	8.7 150.2	45	138	-5	0.4 147.6	35	281	15	11.0 145.1	65	173	14
1006002	7.5 153.1	35	7.7 152.4	35	43	0	0	8.9 144.4	45	201	-5	10.1 147.0	35	263	15	11.3 144.4	65	117	10
1006182	7.7 152.0	40	7.7 152.0	35	24	0	0	9.1 150.0	40	0	0	10.1 147.6	35	192	10	11.4 144.9	75	49	5
1006182	7.9 151.4	40	8.1 151.0	40	3	0	0	9.4 150.0	50	224	10	10.7 149.0	40	10	10	12.0 144.0	70	14	5
1007002	7.7 152.1	40	8.0 152.3	40	14	0	0	9.3 151.5	50	122	10	10.7 148.0	40	10	10	12.0 143.0	70	14	-10
1007002	7.0 152.4	40	7.3 152.5	40	13	0	0	8.7 151.5	45	13	-5	0.4 144.4	35	263	0	11.5 146.5	70	110	-15
1007122	6.6 151.0	40	6.9 151.7	40	21	0	0	8.2 149.4	45	114	-5	0.4 147.3	35	251	-5	11.4 144.5	70	241	-20
1007182	6.8 152.1	40	6.7 151.4	40	35	0	0	7.4 149.3	50	209	0	0.4 147.2	60	305	-15	11.0 144.5	75	245	-40
1008002	7.8 151.0	40	6.4 152.1	40	61	0	0	7.7 151.3	65	339	15	0.0 149.3	75	448	-5	10.5 145.4	75	649	-45
1008002	8.9 151.4	40	8.6 151.5	45	19	5	0	11.4 147.2	60	113	-5	14.0 142.6	70	40	-15	14.6 148.0	75	649	-45
1008122	9.8 150.4	45	9.7 150.3	45	19	0	0	12.2 144.0	60	102	0	14.5 141.6	70	56	-20	14.8 147.3	75	141	-45
1008182	11.0 149.5	50	10.7 149.5	50	18	0	0	13.4 144.4	65	120	10	15.7 141.2	70	114	-45	17.7 145.4	75	169	-75
1009002	12.2 147.4	50	12.3 147.4	50	6	0	0	16.0 141.4	65	177	15	10.0 137.2	75	315	-55	21.5 142.3	85	439	-75
1009002	12.7 145.4	50	13.0 146.0	50	21	0	0	15.0 142.4	65	104	20	14.4 136.6	80	288	-60	21.6 141.2	85	445	-80
1009182	13.0 145.4	50	13.1 146.0	50	27	0	0	16.1 139.4	70	107	20	14.4 137.2	80	288	-60	21.6 141.2	85	445	-80
1009182	12.9 143.4	75	12.9 143.2	65	13	-10	0	13.2 138.4	75	113	-40	14.2 133.3	85	375	-65	19.0 148.2	90	445	-45
1010002	13.1 142.4	85	13.0 142.4	80	4	0	0	13.7 134.4	100	76	30	14.6 134.0	115	264	-65	14.7 149.3	130	400	-15
1010002	13.5 141.7	85	13.1 141.4	85	25	0	0	13.0 137.3	105	127	30	14.7 132.4	120	303	-65	14.8 148.6	130	411	0
1010122	13.7 141.1	90	13.7 140.0	95	12	5	0	14.3 134.1	110	80	30	15.1 134.1	125	208	-40	14.2 141.3	130	241	0
1010182	13.9 140.1	115	14.3 140.0	100	30	-15	0	15.4 137.0	115	110	30	14.4 133.5	125	195	-30	17.1 149.0	130	342	5
1011002	14.2 139.5	130	14.3 139.4	100	4	-30	0	15.2 136.3	145	132	15	14.1 132.8	150	196	5	17.4 148.9	160	260	30
1011002	14.5 139.4	140	14.4 139.7	130	13	-10	0	15.2 136.4	150	121	15	14.1 133.2	155	149	25	17.0 140.0	160	260	35
1011122	15.1 139.2	140	14.9 139.2	135	12	-5	0	16.1 137.4	150	53	15	14.4 136.1	155	62	30	14.8 146.7	160	164	15
1011182	15.7 138.0	150	15.4 138.0	135	6	-15	0	17.2 134.4	150	25	-5	14.8 134.8	155	119	30	20.3 143.6	160	191	35
1012002	16.3 138.1	160	16.4 138.3	135	6	-25	0	18.4 134.1	140	114	-5	20.2 134.2	135	141	10	22.1 143.4	130	277	5
1012002	16.8 137.7	165	16.7 137.4	145	8	-20	0	19.4 134.4	140	169	10	21.0 133.2	135	353	10	24.9 144.4	130	443	5
1012122	16.9 137.2	165	17.1 137.2	135	12	-10	0	18.0 134.4	140	136	15	21.1 133.3	130	243	5	24.9 143.0	130	368	5
1012122	16.8 136.0	155	17.3 136.7	140	32	-5	0	18.7 134.0	135	114	10	20.7 133.6	125	211	0	24.0 142.8	120	366	0
1013002	16.7 135.7	130	16.5 135.7	140	17	-5	0	18.1 133.4	140	114	10	18.1 133.4	150	245	10	24.0 142.8	120	366	-10
1013002	16.5 135.7	130	16.6 134.4	140	54	10	4	19.4 137.5	130	124	5	19.4 136.7	140	324	-5	20.9 141.7	110	346	0
1013122	16.7 135.1	125	16.7 135.3	135	0	10	0	16.0 133.0	150	37	-5	17.3 130.0	160	79	-5	14.0 127.1	110	172	0
1013182	16.8 134.4	125	16.7 134.0	130	4	5	0	17.1 132.2	120	38	-5	17.4 129.3	120	61	0	14.0 146.6	110	144	5
1014002	17.0 134.0	125	16.4 134.2	120	17	-5	0	17.3 131.7	110	66	15	14.1 128.9	105	79	-15	14.1 146.2	100	179	0
1014002	17.1 133.5	125	17.2 133.3	120	13	-5	0	18.0 130.4	100	26	25	14.7 127.4	90	44	-20	20.5 144.3	80	240	-15
1014122	17.3 132.5	125	17.1 132.4	120	13	-5	0	17.4 129.0	100	80	25	14.4 125.5	100	215	-10	19.5 142.0	90	345	-5
1014182	17.6 131.4	125	17.5 131.4	120	14	-5	0	18.2 128.1	100	87	25	14.5 124.5	100	232	-5	21.0 141.0	90	406	0
1015002	18.1 130.0	125	18.0 131.0	120	4	-5	0	19.3 128.3	100	45	20	20.5 125.7	100	147	0	22.0 143.0	100	321	10
1015002	18.4 130.4	125	18.5 130.0	115	23	-10	0	20.0 126.4	100	112	10	21.5 124.5	100	195	5	24.0 143.0	95	347	10
1015122	18.6 129.4	125	18.7 129.4	115	4	-10	0	20.0 127.2	100	84	10	21.3 124.6	100	204	5	24.5 143.0	95	411	20
1015122	18.9 129.4	120	19.0 129.0	110	23	-10	0	20.3 126.5	100	111	-5	21.4 124.0	95	238	5	24.3 143.0	90	480	15
1016002	19.0 128.0	110	19.1 128.0	110	16	-5	0	21.0 124.5	100	90	5	21.3 123.5	95	252	10	24.5 145.7	80	490	30
1016002	19.9 128.0	110	20.0 128.0	110	37	0	0	21.0 124.5	100	90	5	22.7 127.7	95	290	10	24.4 144.0	80	490	30
1016122	20.5 128.4	100	20.6 128.7	105	4	-5	0	22.4 127.4	95	12	0	24.4 127.0	90	244	15	24.1 148.4	80	145	10
1016182	20.8 128.4	105	21.1 128.4	100	13	-5	0	23.3 127.4	90	43	0	24.0 127.0	85	363	10	24.6 148.3	80	147	10
1017002	21.5 128.1	100	21.5 128.2	95	6	-5	0	23.0 127.2	90	86	0	24.6 127.3	85	511	15	0.0 0.0	0	0.0	0
1017002	22.4 127.9	95	22.0 127.4	95	25	0	0	24.4 127.0	85	143	0	27.7 127.8	80	746	20	0.0 0.0	0	0.0	0
1017122	23.0 127.4	95	23.2 127.7	90	13	-5	0	24.6 127.4	75	207	0	28.8 129.1	65	1043	15	0.0 0.0	0	0.0	0
1017182	24.0 127.4	90	23.4 127.4	90	12	0	0	26.4 127.4	75	289	0	30.4 129.4	55	1195	15	0.0 0.0	0	0.0	0
1018002	25.1 127.4	90	25.1 127.4	85	0	-5	0	29.2 129.4	70	338	0	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1018002	25.5 128.4	85	26.4 128.4	80	12	-5	0	31.7 131.4	65	431	-5	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1018122	26.4 130.1	75	26.1 130.0	75	19	0	0	34.4 131.4	50	539	0	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1018182	30.3 131.4	75	29.2 131.7	75	24	0	0	36.9 141.4	50	422	0	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1019002	33.0 134.1	70	32.2 134.0	70	14	0	0	0.0 0.0	0	0	0	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1019002	36.2 134.0	60	35.4 134.0	60	54	0	0	0.0 0.0	0	0	0	0.0 0.0	0	0.0	0	0.0 0.0	0	0.0	0
1019122	43.5 145.2	50	41.0 144.7	60	54	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
1019182	43.1 146.5	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	0.0	0

AIR FORECASTS

	WANG	74-1R	48-HR	72-1
AVG FORECAST POSIT FRMR	74.	135.	253.	345.
AVG RIGHT ANGLE ERROR	15.	69.	142.	214.
AVG INTENSITY MAGNITUDE ERROR	5.	10.	17.	22.
AVG INTENSITY BIAS	-3.	-6.	-7.	-7.
NUMBER OF FORECASTS	60	54	52	43

SUPER TYPHOON VERA

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/JA/HA	POSIT	WIND	DIR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR
1102007	7.0 145.4	25	8.5 145.4	20	32	-5	7.0 147.4	30	112	35	7.6 139.4	40	415	-95	8.3 146.4	50	470	-45	
1102067	7.6 144.7	55	7.3 145.4	50	54	-5	8.7 147.7	70	240	0	9.7 140.1	80	541	-60	10.9 147.0	85	722	-50	
1102127	7.2 143.6	50	7.6 144.4	55	81	-5	8.7 141.4	75	279	420	9.4 139.9	85	578	-55	11.2 145.9	95	712	-20	
1102187	7.6 142.2	50	7.3 143.4	55	94	-5	7.8 140.7	75	350	455	8.5 137.6	85	619	-50	9.1 144.4	95	722	0	
1103007	8.0 140.0	55	7.3 141.4	55	64	-10	8.6 134.1	75	222	460	10.2 130.3	85	298	-50	12.6 144.4	95	212	0	
1103067	8.6 139.0	70	4.3 139.0	55	14	-5	11.2 131.7	75	41	465	13.2 125.9	75	49	-60	17.6 142.3	75	78	-15	
1103127	9.2 147.1	65	9.2 137.0	70	4	-25	11.7 129.4	85	30	454	14.7 124.5	80	33	-35	14.7 142.6	75	104	-5	
1103187	10.0 145.1	130	9.4 134.2	55	13	-45	12.5 128.4	110	55	425	15.7 121.9	100	55	5	19.8 142.4	80	137	15	
1104007	10.5 143.0	135	10.5 133.4	125	23	-10	12.6 127.4	130	35	-5	15.3 123.9	120	70	25	19.0 142.2	110	91	70	
1104067	11.1 131.0	140	10.9 131.4	125	24	-15	13.0 124.0	130	24	-5	15.3 122.7	120	64	30	17.8 142.1	110	112	75	
1104127	11.6 129.2	140	11.4 129.1	130	13	-10	14.4 121.5	100	151	415	19.1 121.1	80	140	-20	21.0 148.0	50	470	20	
1104187	12.0 127.7	145	12.4 127.1	130	42	-5	15.7 120.7	100	170	5	19.6 121.8	80	120	15	0.0 0.0	0	-0	0	
1105007	12.7 125.0	135	12.7 125.4	125	5	-10	16.0 120.1	85	141	410	19.3 121.3	80	90	20	0.0 0.0	0	-0	0	
1105067	13.4 124.0	135	13.6 124.7	120	17	-15	16.3 120.4	80	109	410	19.6 122.3	80	142	25	0.0 0.0	0	-0	0	
1105127	14.3 124.1	115	14.2 124.1	120	6	5	17.5 124.4	100	34	20	20.7 126.0	70	508	40	0.0 0.0	0	-0	0	
1105187	14.8 123.4	45	15.0 123.1	120	25	25	18.4 124.4	100	114	54	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1106007	15.5 122.7	45	15.3 122.4	95	13	0	18.7 122.2	60	78	20	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1106067	16.3 122.3	90	16.4 122.5	90	13	0	19.4 124.4	70	205	35	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1106127	17.0 122.2	90	17.1 122.2	90	5	10	20.3 127.1	70	340	40	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1106187	17.6 121.7	45	17.9 121.0	95	15	40	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1107007	17.8 121.2	60	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	
1107067	18.3 120.2	35	19.2 121.4	35	105	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	
1107127	17.0 117.0	30	19.2 121.4	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

	MMNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERRORS	43	148	249	305
AVG LIGHT ANGLE ERRORS	20	69	111	247
AVG INTENSITY MAGNITUDE ERROR	12	28	34	74
AVG INTENSITY BIAS	-3	-10	-14	7
NUMBER OF FORECASTS	23	19	15	11

TROPICAL STORM WAYNE

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/JA/HA	POSIT	WIND	DIR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR	POSIT	WIND	DIR	ERR
1107007	9.9 141.4	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	0
1107067	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	0
1107127	14.4 139.0	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	0
1107187	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	0
1108007	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	0
1108067	15.4 133.4	25	15.3 134.4	25	52	0	18.1 130.1	50	139	10	21.4 130.3	55	235	5	24.8 144.9	45	404	10	0
1108127	16.4 132.1	30	16.3 132.1	30	13	0	19.4 127.4	65	232	20	21.0 126.4	65	221	15	24.5 148.4	40	335	15	0
1108187	16.0 130.4	30	17.1 130.4	30	64	0	19.4 124.4	45	250	0	21.5 124.1	55	321	5	24.8 145.4	35	341	10	0
1109007	15.8 129.9	35	15.0 129.0	35	53	0	18.0 124.1	45	290	-5	22.4 123.5	30	375	-10	0.0 0.0	0	-0	0	0
1109067	15.8 129.9	40	15.4 129.0	35	57	-5	16.3 124.4	25	272	-25	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1109127	16.2 129.7	45	15.4 129.7	45	24	0	16.7 124.4	25	90	5	17.4 123.6	45	272	20	0.0 0.0	0	-0	0	0
1109187	16.9 129.1	45	16.4 129.7	50	33	5	17.4 124.2	60	49	10	19.5 129.5	50	187	25	23.0 143.3	30	450	0	0
1110007	17.5 129.0	50	17.7 129.1	50	21	0	21.2 129.4	60	174	20	24.7 134.9	45	469	20	0.0 0.0	0	-0	0	0
1110067	17.8 128.0	50	18.3 129.2	50	34	0	21.4 129.4	55	183	20	25.3 135.1	45	430	15	0.0 0.0	0	-0	0	0
1110127	18.0 128.7	50	19.6 128.3	50	42	0	20.4 124.4	55	139	30	23.4 127.2	40	351	10	0.0 0.0	0	-0	0	0
1110187	18.2 128.4	50	19.2 128.7	50	6	0	19.4 127.1	55	62	30	22.3 126.2	40	295	10	0.0 0.0	0	-0	0	0
1111007	18.6 128.4	40	19.7 128.4	40	6	0	20.4 124.4	35	162	10	23.4 128.9	30	477	5	0.0 0.0	0	-0	0	0
1111067	18.8 128.4	35	19.0 128.4	35	13	0	20.7 124.3	30	177	0	23.0 128.6	30	491	5	0.0 0.0	0	-0	0	0
1111127	18.9 128.2	25	19.4 128.4	25	14	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1111187	18.7 127.4	25	19.4 128.4	25	40	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1112007	18.3 127.1	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	0
1112067	18.1 126.8	30	19.1 126.8	30	0	0	17.4 124.2	35	110	10	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1112127	17.8 126.2	30	19.0 126.4	30	21	0	17.3 124.4	35	163	10	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1112187	17.4 125.4	30	17.9 126.2	30	50	0	17.4 124.4	30	223	10	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1113007	16.9 124.4	25	17.2 125.4	25	21	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0.0 0.0	0	-0	0	0
1113067	16.7 123.7	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	0
1113127	15.7 122.4	25	15.7 122.4	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
1113187	15.2 121.4	20	15.2 121.4	20	6	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

	MMNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERRORS	27	170	362	443
AVG LIGHT ANGLE ERRORS	14	115	295	413
AVG INTENSITY MAGNITUDE ERROR	0	13	12	0
AVG INTENSITY BIAS	0	10	10	0
NUMBER OF FORECASTS	25	16	12	4

TROPICAL DEPRESSION 26

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HY	POSIT	WIND		POSIT	WIND	DIR	DIR	POSIT	WIND	DIR	DIR	POSIT	WIND	DIR	DIR	POSIT	WIND	DIR	DIR
1129187	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	0.0	0.0 0.0	0.0	0.0	0.0
1130007	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	0.0	0.0 0.0	0.0	0.0	0.0
1130067	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	0.0	0.0 0.0	0.0	0.0	0.0
1130122	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	0.0	0.0 0.0	0.0	0.0	0.0
1130182	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	0.0	0.0 0.0	0.0	0.0	0.0
1201007	18.5 152.3	25		14.7 152.2	25	13.0	0.0	24.5 144.7	10	13.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0
1201067	19.7 151.6	30		13.6 151.6	30	6.0	0.0	25.8 150.0	30	8.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0
1201122	20.9 150.7	30		20.2 151.3	30	33.0	0.0	26.8 151.7	30	8.0	15.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0
1201182	22.5 150.0	30		22.2 150.5	30	31.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0
1202007	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	0.0	0.0 0.0	0.0	0.0	0.0
1202067	26.7 150.6	30		25.8 150.4	30	14.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0	0.0
1202122	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	0.0	0.0 0.0	0.0	0.0	0.0

ALL FORECASTS				
	4MM7	24-42	48-42	72-42
AVG FORECAST POSIT ERROR	21.	55.	0.	0.
AVG HIGH ANGLE ERROR	16.	28.	0.	0.
AVG INTENSITY MAGNITUDE ERROR	0.	5.	0.	0.
AVG INTENSITY HTAS	0.	5.	0.	0.
NUMBER OF FORECASTS	4	3	0	1

TYPHOON ABBY

BEST TRACK				JANUARY				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HO	POSIT	WIND		POSIT	WIND		POSIT	WIND	24H	48H	POSIT	WIND	72H	POSIT	WIND	72H	POSIT	WIND	
1129002	6.5 149.0	15		0.0 0.0 0	0	0.0	0.0 0.0	0	0.0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	
1129067	6.0 148.3	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	0	0.0	0.0 0.0	0	
1129122	6.0 147.7	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	0	0.0	0.0 0.0	0	
1129182	6.7 146.9	15		0.0 0.0 0	0	0.0	0.0 0.0	0	0.0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	
1130002	6.7 146.3	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	0	0.0	0.0 0.0	0	
1130067	6.6 145.4	20		0.0 0.0 0	0	0.0	0.0 0.0	0	0.0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	0.0	0.0 0.0	0	
1130122	6.5 144.9	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	0	0.0	0.0 0.0	0	
1130182	6.3 144.2	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	0	0.0	0.0 0.0	0	
1201002	6.2 143.4	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	0	0.0	0.0 0.0	0	
1201067	5.9 142.8	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	0	0.0	0.0 0.0	0	
1201122	5.8 141.0	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	0	0.0	0.0 0.0	0	
1201182	5.7 140.9	30		5.7 151.1	25	22.0	6.4 150.1	30	7.7	0.0	7.8 150.8	35	24.1	0.0	0.0	4.7 150.4	35	20.7	
1202007	5.8 140.3	40		5.7 150.1	35	13.0	7.0 150.0	45	18.0	0.0	0.1 151.6	50	40.0	15.0	10.5	147.9	80.0	44.6	
1202067	5.9 150.4	40		5.9 150.1	35	42.0	7.5 153.0	50	36.1	10.0	0.4 150.6	55	40.0	10.0	11.0	146.4	80.0	44.9	
1202122	6.0 150.6	45		5.9 150.1	35	30.0	6.7 154.4	60	14.0	10.0	0.1 153.6	60	15.0	0.0	9.9	150.0	80.0	25.0	
1202182	6.1 149.3	45		5.9 150.0	35	24.0	6.0 156.2	70	15.0	10.0	0.4 152.7	60	14.0	0.0	10.7	143.5	85.0	27.6	
1203007	6.4 149.1	45		5.3 150.0	35	5.0	7.0 157.4	65	7.0	20.0	0.4 154.8	60	7.0	20.0	10.5	150.6	90.0	12.7	
1203067	6.5 149.0	40		5.3 150.0	30	12.0	6.7 158.1	75	9.0	20.0	0.4 155.3	60	4.0	20.0	10.2	151.4	90.0	4.4	
1203122	6.8 148.0	40		5.4 150.0	45	25.0	7.5 157.4	65	3.0	0.0	0.4 154.9	60	10.0	20.0	10.2	151.2	90.0	4.0	
1203182	7.3 148.4	40		6.7 150.4	45	34.0	8.0 157.1	60	7.0	0.0	0.2 154.2	75	11.4	25.0	10.5	150.4	90.0	14.0	
1204002	8.1 148.1	45		8.1 150.5	35	12.0	10.0 155.1	65	10.0	0.0	11.3 150.8	75	14.3	40.0	12.5	145.0	90.0	14.5	
1204067	8.2 147.4	45		8.0 150.7	35	4.0	10.0 153.3	65	17.0	0.0	11.4 148.7	75	21.0	45.0	12.6	144.0	90.0	14.5	
1204122	8.2 146.6	40		8.2 150.1	35	14.0	9.0 151.5	65	15.0	0.0	11.6 147.1	75	20.2	45.0	12.8	143.2	90.0	5.5	
1204182	8.2 145.8	40		8.1 150.0	60	5.0	9.0 150.4	70	16.1	20.0	11.8 145.8	65	14.0	35.0	14.2	142.0	95.0	21.0	
1205007	8.2 145.1	40		8.1 150.0	60	7.0	10.0 149.2	70	17.0	35.0	11.8 144.8	65	15.0	35.0	14.7	140.3	95.0	26.0	
1205067	8.1 144.2	40		8.1 150.4	60	17.0	9.4 150.7	70	25.0	40.0	11.2 146.2	65	42.0	50.0	14.0	141.7	95.0	14.6	
1205122	8.0 143.3	40		7.9 150.2	60	13.0	8.7 149.4	70	53.0	40.0	10.8 145.0	65	21.0	50.0	14.0	141.3	95.0	6.7	
1205182	8.3 142.5	40		7.8 150.0	35	42.0	9.2 147.4	65	40.0	35.0	10.8 143.8	60	40.0	45.0	14.0	141.2	90.0	4.0	
1206007	9.4 141.3	35		9.3 151.4	35	42.0	9.2 147.4	60	71.0	30.0	10.5 143.4	60	43.0	25.0	14.5	141.7	55.0	13.0	
1206067	9.2 141.0	40		9.3 150.9	35	14.0	10.0 147.2	70	77.0	15.0	10.4 142.9	40	75.0	10.0	14.6	141.4	30.0	5.4	
1206122	9.5 140.8	40		9.4 150.1	35	30.0	11.0 147.0	70	103.0	15.0	11.5 142.9	45	43.0	15.0	12.0	140.8	35.0	13.3	
1206182	9.8 140.1	30		9.7 149.1	30	54.0	11.3 146.4	60	19.0	15.0	12.3 141.0	45	39.0	15.0	14.5	137.6	30.0	23.3	
1207007	10.0 140.7	30		10.1 149.5	30	71.0	11.0 138.1	40	68.0	0.0	15.1 132.4	30	47.0	0.0	14.0	141.0	20.0	42.0	
1207067	10.2 140.9	45		10.2 143.2	30	159.0	12.0 138.5	40	55.0	10.0	15.0 132.3	30	34.1	0.0	0.0	0.0	0.0	0.0	
1207122	10.6 140.3	45		10.4 141.0	30	134.0	12.0 137.4	45	28.0	15.0	15.7 133.3	30	35.0	0.0	0.0	0.0	0.0	0.0	
1207182	11.0 140.4	45		11.0 140.0	45	12.0	12.0 140.4	40	135.0	15.0	17.0 141.0	30	30.0	0.0	0.0	0.0	0.0	0.0	
1208007	11.7 140.1	35		11.4 140.5	40	29.0	13.5 140.3	35	235.0	0.0	16.2 140.3	20	30.0	0.0	0.0	0.0	0.0	0.0	
1208067	12.1 140.1	30		11.9 140.0	35	37.0	14.3 141.4	30	31.0	0.0	0.0 0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	
1208122	12.2 140.1	30		12.2 140.1	35	0.0	15.2 141.1	20	245.0	0.0	0.0 0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	
1208182	11.4 140.4	15		12.5 140.0	35	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	
1209007	11.8 138.0	35		11.4 139.3	30	23.0	11.0 134.4	25	10.0	0.0	10.4 127.2	20	28.0	0.0	0.0	0.0	0.0	0.0	
1209067	11.0 137.4	45		11.3 137.8	30	30.0	10.0 131.7	15	85.0	0.0	10.4 125.7	30	14.0	0.0	0.0	0.0	0.0	0.0	
1209122	10.3 136.0	40		10.4 135.1	45	53.0	10.0 129.1	40	223.0	0.0	10.1 123.6	30	47.0	0.0	0.0	0.0	0.0	0.0	
1209182	10.5 134.7	45		10.0 133.7	45	64.0	9.0 127.7	40	244.0	0.0	0.0 0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	
1210007	11.3 133.3	30		11.4 133.8	40	22.0	12.4 129.7	70	129.0	0.0	14.0 121.6	75	41.0	0.0	14.3	117.8	50.0	49.0	
1210067	11.7 132.3	40		11.7 132.4	40	22.0	13.2 127.5	75	160.0	0.0	14.2 122.2	35	37.0	0.0	14.4	115.0	50.0	103.0	
1211122	12.3 132.1	70		12.1 132.2	60	13.0	13.7 124.4	75	100.0	0.0	14.2 124.0	75	41.0	0.0	14.0	112.0	50.0	0.0	
1211182	13.1 131.7	75		12.4 131.4	60	21.0	14.4 124.1	75	14.8	0.0	14.6 124.9	75	43.0	0.0	14.5	110.7	50.0	11.1	
1211007	13.7 130.4	80		13.7 130.7	40	6.0	16.0 127.3	60	17.0	0.0	14.6 122.4	65	71.1	0.0	0.0	0.0	0.0	0.0	
1211067	14.2 130.1	85		14.2 130.0	40	7.0	16.6 126.8	60	24.0	0.0	14.6 122.7	65	74.2	0.0	0.0	0.0	0.0	0.0	
1211122	14.0 130.1	80		14.7 129.7	40	22.0	16.7 127.3	60	27.0	0.0	14.7 123.3	65	47.4	0.0	0.0	0.0	0.0	0.0	
1211182	15.7 130.2	75		16.3 130.2	75	6.0	20.3 132.0	70	25.0	0.0	24.0 134.3	60	13.0	0.0	0.0	0.0	0.0	0.0	
1212007	16.6 130.0	70		16.3 130.2	40	4.0	20.0 132.0	60	12.0	0.0	24.0 141.6	65	15.0	0.0	0.0	0.0	0.0	0.0	

121200Z	17.1	141.0	100	17.4	130.0	100	13	0	21.0	134.1	00	130	050	26.0	147.0	30	276	-5	0.0	0.0	0	-0	0
121212Z	18.0	132.0	100	17.9	131.0	95	13	-5	21.4	134.1	00	130	030	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0
121218Z	18.0	133.1	100	18.0	133.2	85	4	-15	23.0	140.1	45	70	030	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0
121300Z	19.8	136.5	110	20.0	136.0	85	25	-25	26.0	147.4	45	130	015	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0
121306Z	20.5	136.2	110	21.1	136.0	80	53	-30	25.0	144.4	35	261	-4	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	26.7	147.2	55	123	24	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0
121318Z	21.8	140.1	90	22.0	140.2	85	13	5	25.4	150.4	45	160	15	0.0	0.0	0	-0	0	0.0	0.0	0	-0	0
121400Z	22.2	142.4	90	22.3	142.4	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	90	22.5	145.0	60	9	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	147.2	30	22.8	147.4	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

	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	31	164	285	378
AVG RIGHT ANGLE ERROR	17	108	198	215
AVG INTENSITY MAGNITUDE ERROR	10	20	30	47
AVG INTENSITY BIAS	2	-2	-1	22
NUMBER OF FORECASTS	52	48	39	25

TROPICAL STORM BEN

BEST TRACK			WINDING			24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	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	
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	
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	
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	
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	
121806Z	8.2	143.0	15	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	
121818Z	8.7	141.6	15	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	
121906Z	9.4	138.4	15	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	
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	
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	
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	
122012Z	11.6	130.0	25	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	
122100Z	11.5	127.4	40	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	125.0	50	8	0	12.0	122.1	35	93	015	14.7	119.3	35	
122112Z	11.8	124.3	40	11.6	124.4	45	21	5	13.0	121.2	35	115	020	15.1	118.8	35	
122118Z	12.2	123.0	40	11.8	122.7	40	30	0	13.7	119.0	35	80	025	0.0	0.0	0	
122200Z	12.7	121.4	45	12.7	121.0	50	6	5	16.3	117.7	40	130	015	0.0	0.0	0	
122206Z	13.0	120.5	50	13.0	120.4	40	6	-10	15.4	116.4	35	281	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	
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	
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	
122306Z	17.6	121.0	35	16.9	119.0	45	75	10	0.0	0.0	0	-0	0	0.0	0.0	0	
122312Z	19.6	123.4	25	18.4	122.1	25	103	0	0.0	0.0	0	-0	0	0.0	0.0	0	

ALL FORECASTS

	24-HR	48-HR	72-HR	
AVG FORECAST POSIT ERROR	34	181	287	0
AVG RIGHT ANGLE ERROR	18	89	14	0
AVG INTENSITY MAGNITUDE ERROR	5	14	5	0
AVG INTENSITY BIAS	-1	-11	5	0
NUMBER OF FORECASTS	10	6	2	0

2. NORTH INDIAN OCEAN CYCLONE TRACK DATA

TC 17-79

NO/DAT/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND		
050508Z	6.3	00.0	14	0.0	0.0	0.0	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	00.0	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	0.0		
050520Z	6.5	00.0	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	0.0		
050602Z	6.6	00.0	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	0.0		
050608Z	7.0	00.0	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	0.0		
050614Z	7.5	00.0	30	7.7	07.7	30	45	0	8.7	08.7	35	120	10.1	04.5	45	243	-15	12.0		
050620Z	7.6	00.0	30	7.4	07.5	30	32	0	8.8	08.5	35	140	10.8	04.1	45	253	-15	12.7		
050702Z	7.1	07.7	35	7.9	08.0	35	49	0	9.4	08.7	45	260	11.2	08.7	55	257	-10	13.3		
050708Z	6.7	07.7	35	7.2	07.7	35	42	0	8.7	07.4	45	170	10.5	08.2	55	185	-10	12.6		
050714Z	6.7	06.4	40	7.6	07.1	40	61	0	9.9	07.0	50	220	11.0	09.0	65	247	5	14.0		
050720Z	6.4	06.1	45	7.5	06.4	45	72	0	9.4	06.4	60	140	11.6	08.7	70	113	10	13.0		
050802Z	5.8	06.0	50	6.9	06.0	50	66	0	7.4	06.7	60	180	11.5	08.0	55	315	-10	9.4		
050808Z	5.9	06.4	60	5.8	06.0	60	30	0	4.9	06.4	65	250	11.4	08.2	70	470	0	5.3		
050814Z	6.5	06.4	60	5.2	05.4	60	98	0	4.0	06.4	65	330	11.4	07.2	70	511	-5	5.5		
050820Z	7.1	06.4	60	5.9	06.7	60	73	0	5.7	06.1	65	275	11.4	04.0	70	439	-5	5.4		
050902Z	7.6	06.3	65	7.3	06.7	65	19	0	8.2	06.7	70	181	11.4	01.5	65	249	-10	9.4		
050908Z	8.2	06.1	65	7.4	05.4	65	30	0	9.0	06.1	70	161	11.4	01.5	65	191	-15	11.0		
050914Z	9.2	05.0	60	8.8	05.4	60	30	0	10.4	06.5	55	110	11.9	01.2	50	111	-35	12.7		
050920Z	10.3	05.3	60	10.4	05.7	60	8	0	12.7	07.7	60	42	11.0	00.0	55	70	-30	13.3		
051002Z	11.2	04.4	65	10.9	04.3	65	25	0	12.3	07.1	60	67	11.0	00.0	101	-20	11.0	0.0		
051008Z	11.7	04.7	70	11.6	03.0	75	19	5	12.5	06.4	65	75	11.1	00.0	112	-25	11.0	0.0		
051014Z	12.3	03.7	75	12.1	03.4	75	21	0	13.7	06.7	65	42	11.0	00.0	120	-10	11.0	0.0		
051020Z	12.7	03.7	75	12.7	03.4	75	12	0	13.7	06.1	65	33	11.0	00.0	120	0	11.0	0.0		
051102Z	13.0	02.7	75	13.1	02.4	80	5	5	14.1	06.0	65	25	11.0	0.0	0	-0	0	0.0		
051108Z	13.4	02.3	80	13.2	02.3	90	12	10	14.7	06.5	105	60	11.0	0.0	0	-0	0	0.0		
051114Z	13.7	01.7	85	14.2	00.0	95	55	10	16.5	06.7	30	70	11.0	0.0	0	-0	0	0.0		
051120Z	14.1	01.7	85	14.1	00.0	95	23	10	16.0	06.5	30	60	11.0	0.0	0	-0	0	0.0		
051202Z	14.5	00.4	90	14.4	00.5	90	18	10	0.0	0.0	0	-0	11.0	0.0	0	-0	0	0.0		
051208Z	15.2	00.1	90	14.8	00.5	85	33	5	0.0	0.0	0	-0	11.0	0.0	0	-0	0	0.0		
051214Z	16.0	00.0	90	15.2	00.0	80	59	0	0.0	0.0	0	-0	11.0	0.0	0	-0	0	0.0		
051220Z	17.0	00.0	90	17.0	00.0	80	0	0	0.0	0.0	0	-0	11.0	0.0	0	-0	0	0.0		

	A/L FORECASTS			
	WMNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	76	139	233	344
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	24	22	18	14

TC 18-79

NO/DAT/HR	BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
061714Z	17.7	06.4	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
061720Z	17.9	05.5	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
061802Z	18.0	04.4	30	18.3	05.3	40	34	10	19.5	04.4	50	230	21.5	05.0	60	426	20	11.0	0.0	0
061808Z	18.0	04.0	35	18.4	04.0	40	56	5	19.4	04.1	55	240	22.0	04.0	60	442	35	11.0	0.0	0
061814Z	18.2	03.1	40	18.2	03.4	45	40	5	19.4	02.7	55	170	22.4	03.5	60	445	40	11.0	0.0	0
061820Z	18.2	01.8	45	18.5	02.4	45	38	0	19.7	02.1	55	40	21.8	02.5	40	100	25	11.0	0.0	0
061902Z	18.0	00.7	50	18.7	01.7	50	70	0	20.0	00.4	50	60	11.0	0.0	0	-0	0	11.0	0.0	0
061908Z	18.4	00.0	50	18.7	00.0	50	14	0	20.7	00.1	50	77	11.0	0.0	0	-0	0	11.0	0.0	0
061914Z	18.8	00.0	50	18.5	00.0	50	50	0	20.2	00.1	25	110	11.0	0.0	0	-0	0	11.0	0.0	0
061920Z	19.1	00.0	50	19.0	00.0	50	29	0	0.0	0.0	0	-0	11.0	0.0	0	-0	0	11.0	0.0	0
062002Z	19.2	00.0	50	19.4	00.0	50	69	10	0.0	0.0	0	-0	11.0	0.0	0	-0	0	11.0	0.0	0
062008Z	19.5	00.0	50	19.8	00.0	50	92	20	0.0	0.0	0	-0	11.0	0.0	0	-0	0	11.0	0.0	0
062014Z	19.8	00.0	50	20.0	00.0	50	35	15	0.0	0.0	0	-0	11.0	0.0	0	-0	0	11.0	0.0	0
062020Z	20.1	00.0	50	20.5	00.0	50	25	10	0.0	0.0	0	-0	11.0	0.0	0	-0	0	11.0	0.0	0

	A/L FORECASTS			
	WMNG	24-HR	48-HR	72-HR
AVG FORECAST POSIT ERROR	48	137	163	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				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	WAVE	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	WIND
092002Z	9.1	47.0	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	0.0	0.0
092008Z	9.7	47.4	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	0.0	0.0
092014Z	10.1	46.4	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	0.0	0.0
092020Z	10.4	46.4	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	0.0	0.0
092102Z	10.7	46.0	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	0.0	0.0
092108Z	11.1	45.4	24	11.0	85.4	25	9.0	12.4	83.4	35	140.0	10.0	14.2	80.9	40	137.0	30.0	0.0	0.0
092114Z	11.6	45.2	24	11.0	84.0	25	79.0	12.2	82.4	35	131.0	10.0	13.1	80.5	40	129.0	30.0	0.0	0.0
092120Z	12.0	45.0	24	12.1	84.0	25	62.0	13.4	83.0	35	130.0	10.0	14.6	80.9	40	145.0	30.0	0.0	0.0
092202Z	14.0	44.7	24	12.5	84.4	30	91.0	13.7	87.4	35	140.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092208Z	14.4	43.0	24	13.5	82.4	30	105.0	14.4	81.1	40	121.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092214Z	15.3	43.1	24	13.0	84.0	30	55.0	16.7	81.4	40	64.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092220Z	15.5	42.2	20	13.4	83.0	30	46.0	18.0	80.2	10.0	54.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092302Z	15.9	41.4	20	16.0	82.2	30	46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092308Z	16.5	40.4	10	16.5	81.4	25	34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092314Z	16.6	40.4	10	17.0	80.4	15	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092320Z	17.1	40.3	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	0.0	0.0

ALL FORECASTS
 WIND 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 RAS 6. 16. 30. 0.
 NUMBER OF FORECASTS 10 7 3 0

TC 23-79

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	WAVE	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	WIND	POSIT	WIND	WAVE	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	0.0	0.0
091808Z	12.5	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	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	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	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	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	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	0.0	0.0
091920Z	15.0	70.4	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	0.0	0.0
092002Z	15.3	70.4	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	0.0	0.0
092008Z	15.6	70.2	24	0.0	0.0	0.0	0.0	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	69.0	24	0.0	0.0	0.0	0.0	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	69.4	24	0.0	0.0	0.0	0.0	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	24	0.0	0.0	0.0	0.0	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	24	0.0	0.0	0.0	0.0	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	0.0	0.0
092120Z	18.4	67.2	34	19.2	68.0	30	97.0	20.1	64.4	40	294.0	22.0	68.6	45	449.0	24.0	19.0	20	716.0
092202Z	18.6	66.2	40	18.7	68.7	30	142.0	20.2	64.4	40	331.0	22.7	68.9	45	510.0	10	24.5	19.7	20
092208Z	19.0	65.3	44	19.2	65.7	40	26.0	20.2	63.4	45	80.0	20.4	61.6	45	119.0	15	0.0	0.0	0.0
092214Z	19.3	64.3	44	19.4	64.4	40	25.0	19.4	61.3	50	13.0	20.5	58.0	0	57.0	0.0	0.0	0.0	0.0
092220Z	19.6	63.3	50	19.4	63.7	50	25.0	20.1	59.7	70	51.0	20.4	55.9	20	119.0	0.0	0.0	0.0	0.0
092302Z	19.7	62.7	54	19.6	62.7	65	6.0	20.4	58.4	60	73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092308Z	19.9	62.0	50	19.4	61.7	65	14.0	20.7	57.4	65	107.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092314Z	20.0	61.4	45	20.0	63.4	35	118.0	21.3	64.1	20	362.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092320Z	20.2	60.4	40	20.3	60.3	35	18.0	22.1	57.7	20	126.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092402Z	20.3	60.1	34	20.5	59.4	35	33.0	0.0	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	59.4	30	20.4	58.4	30	61.0	0.0	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	58.4	30	20.3	58.4	25	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
092420Z	20.0	57.4	24	19.8	58.0	25	18.0	0.0	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	56.4	20	20.0	57.4	15	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

ALL FORECASTS
 WIND 24-HR 48-HR 72-HR
 AVG FORECAST POSIT ERROR 48. 160. 253. 773.
 AVG RIGHT ANGLE ERROR 21. 97. 186. 620.
 AVG INTENSITY MAGNITUDE ERROR 4. 16. 13. 1.
 AVG INTENSITY RAS 1. 6. 1. 0.
 NUMBER OF FORECASTS 14 9 5 2

TC 24-79

BEST TRACK				VARYING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND	WST	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	
102902Z	11.1	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	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	0.0	
102914Z	12.2	89.4	20	12.5	89.4	20	21.0	0.0	16.7	89.4	40	25.0	15.0	91.9	30	41.0	-5.0	14.8	
102920Z	12.4	89.0	24	13.5	89.0	25	66.0	0.0	16.0	89.2	40	25.7	14.0	90.2	30	42.0	-5.0	0.0	
103002Z	12.4	88.2	24	13.6	88.7	25	77.0	0.0	15.4	87.4	35	19.2	5.0	17.4	87.5	40	40.0	10.0	
103008Z	12.0	87.1	24	12.6	88.2	25	65.0	0.0	13.2	84.7	30	16.3	0.0	14.1	84.9	35	20.5	15.0	
103014Z	13.1	86.2	24	12.5	87.0	25	105.0	0.0	12.0	84.4	30	21.0	-4.0	14.4	85.1	35	34.5	20.0	
103020Z	13.4	85.4	30	13.0	86.4	25	58.0	-5.0	14.0	83.4	35	12.1	0.0	0.0	0.0	0.0	0.0	0.0	
103102Z	13.5	84.0	30	13.4	84.4	25	30.0	-5.0	15.7	80.4	35	16.7	5.0	0.0	0.0	0.0	0.0	0.0	
103108Z	13.4	83.0	30	13.8	83.4	30	33.0	0.0	15.8	80.1	25	19.7	5.0	0.0	0.0	0.0	0.0	0.0	
103114Z	13.0	82.8	34	13.0	82.8	30	54.0	-5.0	15.1	79.3	20	14.3	5.0	0.0	0.0	0.0	0.0	0.0	
103120Z	12.7	81.0	34	13.8	82.4	30	72.0	-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	80.0	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	0.0	
110108Z	12.5	80.1	20	12.7	79.0	20	17.0	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	14	12.7	79.4	15	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

AFL FORECASTS			
WINDG	24-HR	48-HR	72-HR
48.	190.	482.	1074.
26.	142.	332.	907.
2.	6.	11.	0.
-2.	4.	7.	0.
13	3	5	1

AVG FORECAST POSIT ERROR
AVG RIGHT ANGLE ERROR
AVG INTENSITY MAGNITUDE ERROR
AVG INTENSITY BIAS
NUMBER OF FORECASTS

TC 25-79

BEST TRACK				VARYING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
MO/DA/HR	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	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	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	0.0	0.0
111414Z	13.0	69.0	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	0.0	0.0
111420Z	13.3	69.4	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	0.0	0.0
111502Z	13.6	69.4	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	0.0	0.0
111508Z	13.9	69.4	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	0.0	0.0
111514Z	14.2	69.4	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	0.0	0.0
111520Z	14.6	69.4	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	0.0	0.0
111602Z	15.0	69.0	34	15.0	70.0	40	6.0	5.0	17.0	70.3	45	7.0	5.0	10.5	71.4	60	12.1	45.0	0.0
111608Z	15.6	70.0	40	14.6	69.7	40	62.0	0.0	15.4	69.0	45	19.1	10.0	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	0.0	15.4	69.0	45	23.9	15.0	0.0	0.0	0.0	0.0	0.0	0.0
111620Z	17.3	70.4	40	17.3	70.4	40	23.0	0.0	20.2	74.7	0.0	25.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0
111702Z	18.2	70.2	40	18.1	71.4	40	74.0	0.0	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	34	17.9	71.0	35	115.0	0.0	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	0.0	0.0
111720Z	20.3	70.2	24	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	0.0	0.0
111802Z	21.3	70.4	14	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

AFL FORECASTS			
WINDG	24-HR	48-HR	72-HR
50.	189.	121.	0.
26.	103.	73.	0.
1.	14.	45.	0.
1.	1.	45.	0.
4	4	1	0

AVG FORECAST POSIT ERROR
AVG RIGHT ANGLE ERROR
AVG INTENSITY MAGNITUDE ERROR
AVG INTENSITY BIAS
NUMBER OF FORECASTS

TC 26-79

BEST TRACK				WARNING ERRORS				24 HOUR FORECAST ERRORS				48 HOUR FORECAST ERRORS				72 HOUR FORECAST ERRORS				
NO/DA/HA	POSIT	WIND		POSIT	WIND	DST	WIND	POSIT	WIND	UCL	WIND	POSIT	WIND	DST	WIND	POSIT	WIND	DST	WIND	
112014Z	8.0	94.2	14	0.0	0.0	0	0.0	0.0	0.0	0	-0.0	0.0	0.0	0.0	0	0.0	0.0	0	-0.0	0.0
112020Z	8.0	93.4	14	0.0	0.0	0	0.0	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	92.4	14	0.0	0.0	0	0.0	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	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	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	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	0.0
112208Z	10.8	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	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	0.0
112220Z	10.5	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	0.0
112302Z	10.4	87.4	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	0.0
112308Z	10.6	86.5	25	10.0	88.0	25	95	0	10.7	84.4	30	170	0	11.4	81.8	35	162	10	0.0	0.0
112314Z	10.7	85.4	25	10.3	87.1	30	103	5	11.7	84.4	35	150	5	12.0	80.9	35	145	20	0.0	0.0
112320Z	10.7	84.3	30	10.6	84.0	35	19	5	11.8	80.4	45	30	20	0	0	0	0	0	0	-0.0
112402Z	10.6	83.0	30	11.0	82.5	35	38	5	12.7	74.4	25	124	0	0	0	0	0	0	0	-0.0
112408Z	10.8	82.0	30	10.6	81.4	35	17	5	11.7	77.0	20	256	-5	0	0	0	0	0	0	-0.0
112414Z	11.4	81.3	30	11.0	80.4	35	47	5	0.0	0.0	0	-0	0	0	0	0	0	0	0	-0.0
112420Z	12.2	80.9	25	11.9	79.4	30	74	5	0.0	0.0	0	-0	0	0	0	0	0	0	0	-0.0
112502Z	12.9	80.4	25	11.9	79.4	30	92	5	0.0	0.0	0	-0	0	0	0	0	0	0	0	-0.0
112508Z	13.8	80.5	25	13.4	80.0	25	29	0	0.0	0.0	0	-0	0	0	0	0	0	0	0	-0.0
112514Z	14.5	79.7	14	14.5	79.4	20	4	5	0.0	0.0	0	-0	0	0	0	0	0	0	0	-0.0

ALL FORECASTS			
MMMG	24-HR	48-HR	72-HR
42	148	163	0
AVG HIGH-ANGLE ERROR	21	23	21
AVG INTENSITY MAGNITUDE ERROR	4	6	15
AVG INTENSITY RIAS	4	4	15
NUMBER OF FORECASTS	10	5	2

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	ACCR	UNPAK CODE	SATELLITE	COMMENTS	SITE
* 1	310900	13.0N 172.7E	PCN 6		DMC97A		PGTW
2	011236	13.0N 170.4E	PCN 6		DMC97A		PGTW
3	011419	13.0N 167.3E	PCN 6	T2.5/2.5	DMC977	INIT JMS	KGWC
4	012151	13.0N 164.0E	PCN 6	T2.0/2.0	DMC97A	INIT JMS	PGTW
* 5	012336	13.0N 165.5E	PCN 6		DMC97A		KGWC
6	020351	13.0N 167.5E			GNFS1		PHIK
7	020901	13.0N 167.0E	PCN 6		DMC977		PGTW
8	021218	13.0N 167.0E	PCN 6		DMC97A		PGTW
9	021400	13.0N 167.4E	PCN 6		DMC977		KGWC
10	022133	13.0N 167.7E	PCN 6	T2.0/2.0 /50.0/24HRS	DMC97A		PGTW
11	022318	13.0N 167.3E	PCN 2		DMC97A		KGWC
12	020741	13.0N 168.0E	PCN 6		DMC977		PGTW
13	031200	13.0N 168.3E	PCN 6	T3.5/3.5 /01.0/20HRS	DMC97A		KGWC
14	031440	13.0N 167.1E	PCN 6		DMC977		PHIK
15	032116	13.0N 168.0E	PCN 6	T3.0/3.0 /01.0/24HRS	DMC97A		PGTW
16	032150	13.0N 168.0E			GNFS1		PHIK
17	040042	13.0N 167.0E	PCN 5		DMC97A		PGTW
18	040350	13.0N 167.1E			GNFS1		PHIK
19	040957	13.0N 167.4E	PCN 6		DMC97A		PGTW
20	042002	13.0N 165.6E	PCN 4		DMC977		PGTW
21	042058	13.0N 165.5E	PCN 4	T3.5/3.5 /00.5/24HRS	DMC97A		PGTW
22	040024	13.0N 165.0E	PCN 3		DMC97A		PGTW
23	040350	13.0N 164.5E			GNFS1		PHIK
24	040939	13.0N 167.7E	PCN 6		DMC97A		PGTW
25	051305	13.0N 167.6E	PCN 6		DMC97A		PGTW
26	051443	13.0N 167.4E	PCN 4	T4.0/4.0 /00.5/23HRS	DMC977		PGTW
27	060006	13.0N 161.7E	PCN 1		DMC97A		PGTW
28	060923	13.0N 160.0E	PCN 2		DMC977		PGTW
29	060922	13.0N 150.7E	PCN 2		DMC97A		PGTW
30	061247	13.0N 150.2E	PCN 2		DMC97A		PGTW
31	061923	13.0N 150.1E	PCN 1		DMC977		PGTW
32	062205	13.0N 157.9E	PCN 1	T5.0/5.0 /01.0/24HRS	DMC97A		PGTW
33	062348	13.0N 157.4E	PCN 2		DMC97A		PGTW
34	070350	13.0N 157.0E			GNFS1		PHIK
35	070804	13.0N 154.3E	PCN 2		DMC977	CI UP	PGTW
36	071013	13.0N 154.6E			GNFS1		PHIK
37	071047	13.0N 154.7E	PCN 2		DMC97A		PGTW
38	071230	13.0N 154.3E	PCN 2		DMC97A		PGTW
39	072147	13.0N 157.2E	PCN 1	T6.0/6.0 /01.0/24HRS	DMC97A		PGTW
40	080112	13.0N 152.5E	PCN 1		DMC97A		PGTW
41	080926	13.0N 151.2E	PCN 5		DMC977		PGTW
42	080926	13.0N 152.1E	PCN 6		DMC977	INIT JMS	RODN
43	081029	13.0N 151.0E	PCN 5		DMC97A		PGTW
44	081353	13.0N 150.1E	PCN 2		DMC97A		PGTW
45	082025	13.0N 148.6E	PCN 5		DMC977		PGTW
46	080854	13.0N 147.5E	PCN 4	T4.5/5.5 /01.5/27HRS	DMC97A		PGTW
47	080906	13.0N 145.7E	PCN 6		DMC977		PGTW
48	091011	13.0N 145.7E	PCN 6		DMC97A		PGTW
49	091325	13.0N 145.2E	PCN 6		DMC97A		PGTW
50	092254	13.0N 147.3E	PCN 1	T3.5/4.5 /01.0/23HRS	DMC97A		PGTW
51	100217	13.0N 142.6E	PCN 1		DMC97A		PGTW
52	100946	13.0N 140.7E	PCN 6		DMC977		RODN
53	100946	13.0N 140.9E	PCN 6		DMC977		PGTW
54	101136	13.0N 140.4E	PCN 1		DMC97A		PGTW
55	101317	13.0N 140.1E	PCN 2		DMC97A		PGTW
56	102127	13.0N 130.3E	PCN 1	T4.0/4.5 /00.5/19HRS	DMC977		RPWK
57	102127	13.0N 130.3E	PCN 2	T3.5/3.5 /50.0/23HRS	DMC977		PGTW
58	102236	13.0N 130.1E	PCN 2		DMC97A		PGTW
59	110159	13.0N 134.7E	PCN 1		DMC97A		PGTW
60	111008	13.0N 130.0E	PCN 1		DMC977	CI UP	RODN
61	111008	13.0N 130.0E	PCN 1		DMC977		PGTW
62	111118	13.0N 137.0E	PCN 2		DMC97A		PGTW
63	111441	13.0N 137.7E	PCN 1		DMC97A		PGTW
64	112107	13.0N 137.5E	PCN 2		DMC977		PGTW
65	112108	13.0N 137.4E	PCN 2		DMC977		RODN
66	112218	13.0N 137.1E	PCN 2	T3.5/3.5 /50.0/25HRS	DMC97A		PGTW
67	120141	13.0N 137.1E	PCN 1	T4.0/4.0 /50.0/24HRS	DMC97A		RPWK
68	120141	13.0N 137.1E	PCN 1		DMC97A		PGTW
69	120948	13.0N 134.6E	PCN 6		DMC977		RPWK
70	120949	13.0N 134.3E	PCN 6		DMC977		PGTW
71	121100	13.0N 134.2E	PCN 6		DMC97A		PGTW
72	121423	13.0N 134.4E	PCN 4		DMC97A		PGTW
73	122048	13.0N 134.6E	PCN 5		DMC977		PGTW
74	122343	13.0N 134.7E	PCN 3	T3.5/3.5 /50.0/24HRS	DMC97A		PGTW
* 75	130928	13.0N 137.5E	PCN 4		DMC977		PGTW
* 76	130929	13.0N 137.6E	PCN 2		DMC977		RODN
* 77	131042	13.0N 137.7E	PCN 6		DMC97A		PGTW
78	131405	13.0N 137.4E	PCN 6		DMC97A		PGTW

• 19	142028	14.24	144.1E	PCN 6	DWGRPT	RODN
60	142028	14.14	134.1E	PCN 5	DWGRPT	PGTW
61	142325	14.14	134.4E	PCN 5	DWGRPT	PGTW
62	140105	14.04	134.4E	PCN 3	DWGRPT	PGTW
• 63	140909	14.44	144.7E	PCN 6	DWGRPT	RODN
84	140909	14.24	134.4E	PCN 6	DWGRPT	PGTW
65	142307	17.14	137.1E	PCN 3	DWGRPT	PGTW

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70043 HGT	085 MSLP	MAX-RFC-WND VEL/RRG/RND	MAX-FLT-LVL-WND DIR/VEL/RRG/RND	ACFTY NAV/MET	EYE SHAPE	EYE-ORIEN- DIAM/TATION	EYE TEMP (C) DIR/ IN/ OP/CCT	WSN NO.
1	020115	5.74 144.5E	1500FT	946	65 100	35	220 72 140	35 5 2			+25 +25 +25	1
2	021520	4.54 147.6E	700MM	944	984		640 60 240	30 12 5			+12 +15 +11	2
3	030553	7.24 144.0E	700MM	9771		55 120	15 210 60 140	24			+15 + 8	3
4	030310	7.74 144.3E	700MM	9934	982	45 060	40 140 52 060	35 2 2			+13 +15 +10	3
5	040210	4.34 147.4E	700MM	9942	983	55 310	45 040 53 310	45 2 4			+13 +17 + 8	6
6	041523	4.54 144.2E	700MM	9931	983		110 54 200	40 4 5			+11 +11 +11	7
7	041302	10.34 147.3E	700MM	9847	972		130 74 040	30			+16 +14	10
8	041423	10.44 147.1E	700MM	9825	969		100 79 100	20 10 3	CIRCULAR	35	+13 +15 +13	10
9	040259	11.54 141.0E	700MM	9807	964	95 340	14 100 70 340	20 4 4	ELLIPTICAL	30 20 010	+10 +16 +10	11
10	041213	12.14 154.2E	700MM	9763	963		120 87 030	27			+17 +11	12
11	041427	12.24 154.0E	700MM	9767	961		040 88 300	10 4 5	ELLIPTICAL	25 15 030	+12 +15 +13	12
12	070008	12.34 157.6E	700MM	9674				4 4				13
13	070256	12.44 157.0E	700MM	9645	949	80 010	20 170 102 040	20 4 4	CIRCULAR	27	+14 +10 +13	13
14	071407	12.54 154.7E	700MM	9541	937		170 96 090	24 15 4	CIRCULAR	17	+13 +10 +11	14
15	071820	12.24 154.2E	700MM	9470	930		070 126 010	14			+21 +10	14
16	072040	12.24 151.5E	700MM	9477	928	100 330	5 040 105 360	15 14 2	CIRCULAR	15	+15 +24 +10	14
17	080010	12.24 157.8E	700MM	9544	938	100 170	170 115 140	10			+22 +12	15
18	080247	12.14 152.4E	700MM	9537	935	130 060	20 140 115 060	10 4 4	CIRCULAR	15	+13 +20 +12	15
19	081302	12.24 144.8E	700MM	9690	954		120 60 090	30			+24 + 8	16
20	041508	11.94 144.6E	700MM	9743	957		040 80 360	21 3 4	ELLIPTICAL	25 15 020	+ 8 +23 + 8	16
21	082219	11.94 144.1E	700MM	9773	944	110 250	10 330 30 270	60 4 4	CIRCULAR	30	+12 +23 +13	17
22	082022	11.94 147.4E	700MM	9771	964	30 180	10 030 75 300	10 4 4	CIRCULAR	30	+11 +23 +10	17
23	080801	12.14 144.6E	700MM	9845	974	95 210	130 107 050	14			+23 + 9	18
24	080840	12.14 144.1E	700MM	9857			000 94 230	20 4 4			+10 +22 +10	18
25	081634	12.14 144.8E	700MM	9840	973		140 90 040	10 2 4	CIRCULAR	35	+12 +10 +11	19
26	082054	11.74 147.6E	700MM	9842	970	60 030	50 110 87 030	30 4 4	ELLIPTICAL	25 16 040	+12 +15 +10	20
27	100445	12.24 141.4E	700MM	9804	965	65 090	20 140 99 090	10 4 2	CIRCULAR	20	+13 +18	21
28	101742	12.34 139.2E	700MM	9684	953		340 86 280	14 4 4	CIRCULAR	17	+12 +13 +14	23
29	102105	12.34 139.2E	700MM	9644	949		040 90 330	30			+20 +13	23
30	102010	12.54 134.5E	700MM	9604	943	45 160	15 100 105 010	30 4 4	CIRCULAR	13	+12 +21 +12	23
31	111245	11.34 137.6E	700MM	9597			100 80 100	15			+15 + 5	24
32	111530	11.34 137.3E	700MM	9563	938		000 85 340	14 10 4	CIRCULAR	10	+12 +21 + 6	24
33	120104	11.94 137.1E	700MM	9673		120 150	8 220 110 150	14			+21 +10	25
34	120254	14.04 137.0E	700MM	9625	946	120 150	8 220 110 150	14 4 3	CIRCULAR	12	+11 +22 +11	25
35	121459	14.44 134.5E	700MM	9789	965		130 84 050	4 4 5	CIRCULAR	10	+10 +16 +11	26
36	121504	15.14 134.5E	700MM	9784	943		120 90 090	2				26
37	120213	15.24 134.7E	700MM	9781	961		100 83 360	7 10 3	CIRCULAR	13	+11 +17 +11	26
38	140028	15.44 134.4E	700MM	9859		40 030	35 110 65 030	10 4 4			+23	27
39	140253	15.74 134.7E	700MM	9425	977	55 090	15 090 40 340	60 4 2	CIRCULAR	10	+12 +10	27
40	141226	14.14 137.2E	700MM	9459	985		170 67 100	20			+10 +10	28
41	141517	14.34 137.2E	700MM	9417	989		040 57 260	30 4 4			+13 +20 +10	28
42	140004	14.54 134.7E	700MM	9124	1005	50 330	20 140 45 040	60			+18 + 7	29
43	140300	14.14 134.2E	700MM	9145		30 150	30 140 35 340	90 4 5			+16 +15 + 4	29

RAJAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RAJAR	ACFTY	EYE SHAPE	EYE DIAM	RAJAR-CODE	RAJAR-TUOFF	COMMENTS	RAJAR POSITION	RTF WND NO.
1	010330	7.74 144.2E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
2	010620	4.44 144.0E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
3	010730	4.24 144.2E	LAND	FAIR					PERL FVF	8.74 147.7E	01346
4	010830	4.34 144.2E	LAND	FAIR					PERL CNTN	8.74 147.7E	01346
5	010930	4.54 144.2E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
6	011130	4.64 144.2E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
7	012230	4.14 147.7E	LAND	FAIR					PERL CNTN	8.74 147.7E	01346
8	040130	4.34 147.4E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
9	040530	4.44 147.6E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
10	040730	4.64 147.4E	LAND	GNDD					PERL FVF	8.74 147.7E	01346
11	040900	4.44 147.5E	LAND	GNDD					PERL FVF	8.74 147.7E	01346
12	040830	4.54 147.5E	LAND	GNDD					PERL FVF	8.74 147.7E	01346
13	040900	4.44 147.2E	LAND	GNDD					PERL FVF	8.74 147.7E	01346
14	040930	4.54 147.1E	LAND	FAIR					PERL FVF	8.74 147.7E	01346
15	041000	4.44 147.1E	LAND	FAIR					PERL FVF	8.74 147.7E	01346
16	041100	4.54 144.9E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
17	041130	4.54 144.8E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
18	040435	12.34 144.4E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
19	040510	12.34 144.7E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
20	040535	12.34 144.7E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346
21	040610	12.34 144.5E	LAND	PNDR					PERL CNTN	8.74 147.7E	01346

22	000535	12.74	144.4E	LAND	PQDR
23	000705	12.74	144.3E	LAND	PQDR
24	000735	12.74	144.2E	LAND	PQDR
25	000805	12.64	144.2E	LAND	PQDR
26	000935	12.74	144.8E	LAND	FAIR
27	030910	12.74	144.8E	LAND	PQDR
28	000935	12.64	144.7E	LAND	FAIR
29	001010	12.64	144.7E	LAND	PQDR
30	001035	12.74	144.7E	LAND	FAIR
31	001105	12.64	144.5E	LAND	FAIR
32	001135	12.74	144.3E	LAND	FAIR
33	001205	12.74	144.3E	LAND	GOOD
34	001235	12.74	144.2E	LAND	FAIR
35	001310	12.74	144.0E	LAND	GOOD
36	001335	12.74	144.9E	LAND	GOOD
37	001410	12.74	144.8E	LAND	FAIR
38	001435	12.64	144.7E	LAND	FAIR
39	001510	12.64	144.7E	LAND	FAIR
40	001535	12.64	144.6E	LAND	FAIR
41	001510	12.64	144.5E	LAND	FAIR
42	001635	12.74	144.4E	LAND	FAIR

28
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HALL CLN VSSL 204-N	13.64	144.9E	Q1210
HALL CLN VSSL 204-NNE	13.64	144.9E	Q1210
HALL CLN VSSL 204-N	13.64	144.9E	Q1210
HALL CLN VSSL 204-NNE	13.64	144.9E	Q1210
HALL CLN 204-NNE	13.64	144.9E	Q1210
HALL CLN 204-N	13.64	144.9E	Q1210
HALL CLN 204-NNE	13.64	144.9E	Q1210
HALL CLN 204-NNE	13.64	144.9E	Q1210
HALL CLN 204-N	13.64	144.9E	Q1210
HALL 204-NNE	13.64	144.9E	Q1210
HALL 204-N	13.64	144.9E	Q1210
GOOD FTR WALL CLN OPEN E-204	13.64	144.9E	Q1210
GOOD FTR WALL CLN OPEN ENE-204	13.64	144.9E	Q1210
HVV ATTENUATION	13.64	144.9E	Q1210
HVV ATTENUATION	13.64	144.9E	Q1210
HVV ATTENUATION	13.64	144.9E	Q1210
HVV ATTENUATION	13.64	144.9E	Q1210
HVV ATTENUATION	13.64	144.9E	Q1210

TYPHOON AREA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACFT	UNIQUE CODE	SATELLITE	COMMENTS	SITE
1	141103	10.4N 141.5E	PCN 5		DMSP3A		PGTW
2	140903	10.4N 141.0E	PCN 6	T0.0/0.0	DMSP3A	INII JDS	PGTW
3	142315	10.0N 141.0E	PCN 6	T1.5/1.5 /01.5/23HRC	DMSP3A		PGTW
4	141157	10.4N 142.5E	PCN 6		DMSP3A		PGTW
5	141306	10.4N 142.0E	PCN 6		DMSP3A		PGTW
6	142103	10.4N 142.0E	PCN 6	T2.5/2.5 /01.0/23HRC	DMSP3A		PGTW
7	142258	10.4N 142.1E	PCN 5		DMSP3A		PGTW
8	200108	10.5N 141.7E	PCN 5		DMSP3A		PGTW
9	200148	11.2N 142.2E	PCN 5	T1.5/1.5	DMSP3A	INII JDS	RPNK
10	200943	10.4N 140.1E	PCN 6		DMSP3A		PGTW
11	201140	10.4N 139.9E	PCN 5		DMSP3A		PGTW
12	201430	11.2N 139.4E	PCN 6		DMSP3A		PGTW
13	202043	11.0N 139.9E	PCN 6		DMSP3A		PGTW
14	202240	11.4N 139.0E	PCN 5	T3.5/3.5 /01.0/24HRC	DMSP3A		PGTW
15	210130	11.3N 139.0E	PCN 4		DMSP3A		PGTW
16	210130	11.3N 139.0E	PCN 5	T4.5/2.5 /01.0/24HRC	DMSP3A		RPNK
17	210923	12.4N 137.0E	PCN 4		DMSP3A		PGTW
18	210924	12.1N 137.3E	PCN 4		DMSP3A		RPNK
19	211122	12.7N 137.3E	PCN 4		DMSP3A		PGTW
20	211411	12.3N 136.7E	PCN 3		DMSP3A		PGTW
21	212043	11.3N 138.7E	PCN 6		DMSP3A		NOON
22	220004	11.4N 134.9E	PCN 4	T4.0/4.0 /00.5/25HRC	DMSP3A		PGTW
23	220112	11.3N 134.0E	PCN 4		DMSP3A		PGTW
24	220112	11.3N 134.3E	PCN 5	T3.5/3.5	DMSP3A	INII JDS	RPNK
25	221104	11.4N 135.0E	PCN 1		DMSP3A		PGTW
26	221353	11.0N 135.1E	PCN 5		DMSP3A		PGTW
27	221353	11.0N 134.7E	PCN 5		DMSP3A		PGTW
28	222144	11.4N 134.9E	PCN 2	T4.0/4.0 /50.0/22HRC	DMSP3A		PGTW
29	222346	11.0N 134.9E	PCN 1		DMSP3A		PGTW
30	222355	11.5N 134.9E	PCN 1		DMSP3A		PGTW
31	222355	11.3N 134.1E	PCN 1	T4.0/4.0	DMSP3A	INII JDS	PGTW
32	221025	12.5N 134.7E	PCN 1		DMSP3A		PGTW
33	221228	12.3N 134.0E	PCN 1		DMSP3A		PGTW
34	221228	12.1N 134.3E	PCN 1		DMSP3A		RKSD
35	221517	12.3N 134.4E	PCN 1		DMSP3A		RPNK
36	221517	12.1N 134.4E	PCN 2		DMSP3A		PGTW
37	222125	12.1N 137.7E	PCN 1	T3.5/4.0 /00.5/24HRC	DMSP3A		PGTW
38	222328	12.3N 137.4E	PCN 4		DMSP3A		PGTW
39	240216	10.4N 139.5E	PCN 5		DMSP3A		PGTW
40	240217	10.7N 139.9E	PCN 5	T3.0/4.0 /02.0/24HRC	DMSP3A		RPNK
41	240217	11.4N 139.5E	PCN 5	T3.0/3.0	DMSP3A	INII JDS	RKSD
42	241005	21.2N 140.1E	PCN 5		DMSP3A	CI JDS	PGTW
43	241005	20.3N 140.0E	PCN 5		DMSP3A		RKSD
44	241210	21.3N 140.0E	PCN 5		DMSP3A		PGTW
45	241317	21.5N 141.3E	PCN 6		DMSP3A		PGTW
46	242104	21.7N 141.0E	PCN 5	T1.5/2.5 /02.0/24HRC	DMSP3A		PGTW
47	242105	21.2N 141.1E	PCN 5	T1.5/2.5 /01.5/14HRC	DMSP3A		RKSD

AIRCHART FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT	70042	705	MAX-SFC-WND	MAX-FLT-LVL-WND	ACFT	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C)	WIND
1	200254	10.4N 141.1E	1500F1		1005	75 100	60 040	50 300	40	2	4	1
2	200330	10.7N 140.0E	700MM								0.24 0.25 0.23 0.25	1
3	200455	10.4N 140.3E	700MM	1089	1001	70 050	50 110	30 050	120	4	10	2
4	201200	10.4N 140.0E	700MM	1101	1002		240	23 160	60	4	10	2
5	201433	10.4N 140.0E	700MM	1090	1004		340	32 310	30	4	11	2
6	210213	11.3N 138.5E	700MM	1032	994	35 140	40 070	46 340	54	4	4	4
7	211300	11.1N 134.1E	700MM	2970	987		170	61 080	30	2	4	4
8	211744	11.3N 134.0E	700MM	2945	984							5
9	212006	11.3N 134.0E	700MM	2922	981		220	63 150	40	10	4	5
10	220020	11.4N 134.0E	700MM	2819	969	75 090	70 140	40 130	60	2	2	7
11	220025	11.2N 134.0E	700MM	2764	963	55 130	45 200	49 140	30	2	2	8
12	210607	12.1N 134.2E	700MM	2731	959	80 120	15 070	78 340	24	4	2	4
13	220835	12.6N 134.0E	700MM	2747	961	70 140	10 200	128 140	15	4	2	4
14	221942	12.4N 134.9E	700MM	2841	977		140	63 130	20			10
15	222122	12.1N 137.3E	700MM	2867	974	120 270	15 270	110 230	4	7	2	10
16	240616	20.4N 139.2E	700MM	2994	989	110 110	15 200	120 160	14	2	4	11
17	240954	20.4N 139.0E	700MM	2999	990	100 110	10 200	106 170	14	2	10	11

RAJAW FIXES

FIX NO.	TIME (Z)	FIX POSITION	WIND	ACFT	EYE SHAPE	EYE DIAM	WIND-COUE	COMMENTS	WIND POSITION	WIND NO.
1	211200	12.7N 134.9E	SHIP	0700				WIND NW AT 6 ANOTS	13.1N 137.3E	4444

TYPHOON CECIL

KATEL 111 FJAS

FIA NO.	TIME (Z)	FIX POSITION	ACRY	UNRAK CODE	SATELLITE	COMMENTS	STLE
1	092225	16.04 147.0E	PCV 5	10.0/0.0	DMR01A	INIT JGS	PGTH
2	092300	16.04 147.0E	PCV 6	10.0/0.0 /50.0/24HRS	DMR01A		PGTH
3	092331	16.04 147.0E	PCV 6	11.0/1.0 /01.5/24HRS	DMR01A		PGTH
4	101212	16.04 146.0E	PCV 6		DMR01A		PGTH
5	102316	16.04 136.0E	PCV 5	11.5/1.5 /00.5/24HRS	DMR01A		PGTH
6	110910	16.04 136.0E	PCV 6		DMR01A		PGTH
7	110911	16.04 136.0E	PCV 6		DMR01A	INIT JGS STORM ON EDGE OF DATA	ROUN
8	111155	16.04 136.0E	PCV 5		DMR01A		PGTH
9	111436	16.04 136.0E	PCV 6		DMR01A		PGTH
10	111636	16.04 136.0E	PCV 6		DMR01A	INIT JGS	PGTH
11	112151	16.04 137.0E	PCV 5	13.0/3.0 /01.5/24HRS	DMR01A		PGTH
12	112256	16.04 137.0E	PCV 5		DMR01A		PGTH
13	120136	16.04 136.0E	PCV 5	13.0/3.0	DMR01A	INIT JGS	ROUN
14	120136	16.04 136.0E	PCV 5		DMR01A		PGTH
15	120136	16.04 136.0E	PCV 5	13.0/3.0	DMR01A	INIT JGS	PGTH
16	121616	16.04 136.0E	PCV 5		DMR01A		PGTH
17	121616	16.04 136.0E	PCV 5		DMR01A		ROUN
18	122131	16.04 136.0E	PCV 5	13.0/3.0 /50.0/24HRS	DMR01A		PGTH
19	130020	16.04 136.0E	PCV 5		DMR01A		PGTH
20	130250	16.04 136.0E	PCV 5		DMR01A		PGTH
21	131011	16.04 136.0E	PCV 6		DMR01A		PGTH
22	131114	16.04 136.0E	PCV 6		DMR01A		PGTH
23	131307	16.04 136.0E	PCV 5		DMR01A		PGTH
24	131359	16.04 136.0E	PCV 6		DMR01A		ROUN
25	131359	16.04 136.0E	PCV 5		DMR01A		PGTH
26	132111	16.04 136.0E	PCV 5		DMR01A		PGTH
27	140002	16.04 136.0E	PCV 5	13.5/3.5 /00.5/24HRS	DMR01A		PGTH
28	140239	16.04 136.0E	PCV 5	14.0/4.0	DMR01A	INIT JGS	ROUN
29	140239	16.04 136.0E	PCV 5		DMR01A		PGTH
30	140239	16.04 136.0E	PCV 5	13.5/3.5	DMR01A	INIT JGS	PGTH
31	140352	16.04 136.0E	PCV 6		DMR01A		PGTH
32	141203	16.04 136.0E	PCV 6		DMR01A		PGTH
33	141520	16.04 136.0E	PCV 6		DMR01A		PGTH
34	141521	16.04 136.0E	PCV 5		DMR01A		ROUN
35	141521	16.04 136.0E	PCV 5		DMR01A		PGTH
36	142233	16.04 136.0E	PCV 5	14.5/4.5 /01.0/24HRS	DMR01A		PGTH
37	142346	16.04 136.0E	PCV 5		DMR01A		PGTH
38	140221	16.04 136.0E	PCV 5		DMR01A		PGTH
39	140221	16.04 136.0E	PCV 5	14.5/4.5 /01.0/24HRS	DMR01A		PGTH
40	140332	16.04 136.0E	PCV 5		DMR01A	SPLIT PASS	PGTH
41	141225	16.04 136.0E	PCV 5		DMR01A		PGTH
42	141502	16.04 136.0E	PCV 5		DMR01A		PGTH
43	141502	16.04 136.0E	PCV 5		DMR01A		ROUN
44	142213	16.04 136.0E	PCV 5	14.0/4.5 /40.5/24HRS	DMR01A		PGTH
45	142213	16.04 136.0E	PCV 5	13.0/4.0 /41.5/24HRS	DMR01A		PGTH
46	140203	16.04 136.0E	PCV 5	14.0/4.0	DMR01A	INIT JGS	ROUN
47	140203	16.04 136.0E	PCV 5		DMR01A		PGTH
48	140203	16.04 136.0E	PCV 5		DMR01A		PGTH
49	141053	16.04 136.0E	PCV 5		DMR01A		PGTH
50	141053	16.04 136.0E	PCV 5		DMR01A		ROUN
51	141053	16.04 136.0E	PCV 5		DMR01A		PGTH
52	141206	16.04 136.0E	PCV 5		DMR01A		PGTH
53	141444	16.04 136.0E	PCV 5		DMR01A		ROUN
54	141444	16.04 136.0E	PCV 5		DMR01A		PGTH
55	142153	16.04 136.0E	PCV 5	14.0/4.0 /50.0/24HRS	DMR01A		PGTH
56	142153	16.04 136.0E	PCV 5	14.5/4.5 /01.5/24HRS	DMR01A		PGTH
57	170050	16.04 136.0E	PCV 5	14.5/4.5 /01.5/24HRS	DMR01A		PGTH
58	170326	16.04 136.0E	PCV 5		DMR01A		PGTH
59	171033	16.04 136.0E	PCV 5		DMR01A		PGTH
60	171033	16.04 136.0E	PCV 5		DMR01A		PGTH
61	171332	16.04 136.0E	PCV 5		DMR01A		ROUN
62	171426	16.04 136.0E	PCV 5		DMR01A		PGTH
63	171608	16.04 136.0E	PCV 5		DMR01A		PGTH
64	171608	16.04 136.0E	PCV 5		DMR01A		ROUN
65	172133	16.04 136.0E	PCV 5		DMR01A	N/A DATA TO TERMINATOR	PGTH
66	180032	16.04 136.0E	PCV 5	12.5/3.5 /41.5/24HRS	DMR01A		PGTH
67	180308	16.04 136.0E	PCV 5	13.0/4.0 /41.5/24HRS	DMR01A		PGTH
68	180308	16.04 136.0E	PCV 5	13.0/4.0 /41.5/24HRS	DMR01A		ROUN
69	181013	16.04 136.0E	PCV 5		DMR01A		PGTH
70	181314	16.04 136.0E	PCV 5		DMR01A		ROUN
71	181549	16.04 136.0E	PCV 5		DMR01A		PGTH
72	181549	16.04 136.0E	PCV 5		DMR01A		ROUN
73	180014	16.04 136.0E	PCV 5	13.5/3.5 /01.0/24HRS	DMR01A		PGTH
74	180249	16.04 136.0E	PCV 5	13.0/3.0 /50.0/24HRS	DMR01A		PGTH
75	180249	16.04 136.0E	PCV 5		DMR01A		PGTH
76	180753	16.04 136.0E	PCV 5		DMR01A	CI DATA	PGTH
77	181531	16.04 136.0E	PCV 5		DMR01A		ROUN
78	181531	16.04 136.0E	PCV 5		DMR01A		PGTH
79	182357	16.04 136.0E	PCV 5	12.5/3.5	DMR01A	INIT JGS	ROUN
80	182357	16.04 136.0E	PCV 5	13.0/3.5 /40.5/24HRS	DMR01A		PGTH
81	200733	16.04 136.0E	PCV 5		DMR01A	CI DATA	PGTH
82	201230	16.04 136.0E	PCV 5		DMR01A		PGTH
83	201230	16.04 136.0E	PCV 5		DMR01A		PGTH
84	201513	16.04 136.0E	PCV 5		DMR01A		PGTH
85	201513	16.04 136.0E	PCV 5		DMR01A		ROUN
86	201513	16.04 136.0E	PCV 5		DMR01A		PGTH
87	202338	16.04 136.0E	PCV 5		DMR01A	EXPUSE ILC SYSTEM DISSTATION	PGTH

AIRCRAFT FIXES

FLA NO.	TIME (Z)	FIX POSITION	FLT INL	THU 44	DBS	MAX-SFC-WND	MAX-IRG-WND	MAX-FLT-LVL-WND	APPRY	EYE SHAPE	EYE ORIENT	BYF TEMP (F)	WSN
				MUT	MSLP	VEL/IRG/WND	DIR/VEL/IRG/WND	NAV/MFI				DP/SEC	NO.
1	142353	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
2	142414	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
3	142428	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
4	142440	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
5	142451	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
6	142510	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
7	142524	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
8	142538	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
9	142552	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
10	142606	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
11	142620	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
12	142634	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
13	142648	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
14	142662	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
15	142676	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
16	142690	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
17	142704	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
18	142718	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
19	142732	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
20	142746	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
21	142760	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
22	142774	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
23	142788	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
24	142802	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
25	142816	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
26	142830	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
27	142844	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26
28	142858	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4	CIRCULAR	+11 +16 +11	26
29	142912	14.44 134.7E	700MM	1000	1000	30 290	5 240	30 120	30	4 4		+11 +16 +11	26

RAJAN FIXES

FLA NO.	TIME (Z)	FIX POSITION	RAJAN	APPRY	EYE SHAPE	EYE DIAM	RAJAN-CODE	COMMENTS	NADAR POSITION	CLIFF WND NO.
							ASWAN TOWFF			
1	142700	14.44 134.7E	LAND	PHOW	CIRCULAR	14		EYE	15.2N 120.6E	08397
2	142730	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
3	142755	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
4	142820	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
5	142845	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
6	142870	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
7	142895	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
8	142920	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
9	142945	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
10	142970	14.44 134.7E	LAND	PHOW	CIRCULAR	14		SPIRAL RAND	15.2N 120.6E	08397
11	143000	14.44 134.7E	LAND	PHOW	CIRCULAR	14		EYE ANTE 20/15	15.2N 120.6E	08397
12	143030	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
13	143060	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
14	143090	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
15	143120	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
16	143150	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
17	143180	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
18	143210	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
19	143240	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
20	143270	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
21	143300	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
22	143330	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
23	143360	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
24	143390	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
25	143420	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
26	143450	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
27	143480	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
28	143510	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
29	143540	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
30	143570	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
31	143600	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
32	143630	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
33	143660	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
34	143690	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
35	143720	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
36	143750	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
37	143780	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
38	143810	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
39	143840	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
40	143870	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
41	143900	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
42	143930	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
43	143960	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
44	143990	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
45	144020	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
46	144050	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
47	144080	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
48	144110	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
49	144140	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
50	144170	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397
51	144200	14.44 134.7E	LAND	PHOW	CIRCULAR	14			15.2N 120.6E	08397

TROPICAL STORM DOT

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	ORIGIN CODE	SATELLITE	COMMENTS	SITE
1	042235	4.0N 147.7E	PCN 5	T0.0/0.0	DWSP3A	INIT JDS	PGTW
2	041116	4.2N 147.3E	PCN 5		DWSP3A		PGTW
3	042217	4.2N 147.6E	PCN 5	T0.0/0.0 /50.0/24HRS	DWSP3A		PGTW
4	042138	4.5N 148.0E	PCN 5	T0.0/0.0 /50.0/24HRS	DWSP3A		PGTW
5	041222	4.0N 136.0E	PCN 5		DWSP3A		PGTW
6	042323	4.0N 134.1E	PCN 5	T1.0/1.0 /01.0/24HRS	DWSP3A		PGTW
7	040147	4.1N 134.0E	PCN 5		DWSP3A		PGTW
8	040958	4.2N 137.4E	PCN 5		DWSP3A		PGTW
9	041204	7.2N 134.2E	PCN 5		DWSP3A		PGTW
10	041428	7.4N 137.7E	PCN 5		DWSP3A		PGTW
11	042059	7.3N 137.0E	PCN 5		DWSP3A	NOT AVAIL: EDGE OF DATA	PGTW
12	042305	7.9N 137.7E	PCN 5		DWSP3A	NOT AVAIL: EDGE OF DATA	PGTW
13	140129	7.4N 131.0E	PCN 5		DWSP3A	NOT AVAIL: EDGE OF DATA	PGTW
14	140310	4.1N 134.0E	PCN 5	T1.5/1.5	DWSP3A	INIT JDS	RPMK
15	140938	4.4N 129.0E	PCN 5		DWSP3A		PGTW
16	141146	4.4N 129.1E	PCN 5		DWSP3A		PGTW
17	141410	4.4N 128.7E	PCN 5		DWSP3A		PGTW
18	141411	4.4N 127.0E	PCN 5		DWSP3A		RODN
19	142219	4.3N 124.1E	PCN 5		DWSP3A	N/A OVER LAND	PGTW
20	142219	4.4N 124.0E	PCN 5	T2.5/2.5 /01.0/10HRS	DWSP3A		RPMK
21	140029	4.1N 124.7E	PCN 5		DWSP3A	N/A OVER LAND	PGTW
22	140252	4.4N 124.5E	PCN 5		DWSP3A	N/A OVER LAND	PGTW
23	140252	4.4N 124.5E	PCN 5		DWSP3A		RPMK
24	141059	4.4N 127.0E	PCN 5		DWSP3A		RPMK
25	141100	10.0N 127.0E	PCN 5		DWSP3A		RODN
26	141310	4.4N 127.0E	PCN 5		DWSP3A		RPMK
27	141523	4.1N 127.0E	PCN 5		DWSP3A		RPMK
28	141534	4.2N 127.1E	PCN 5		DWSP3A		RODN
29	142159	11.2N 127.0E	PCN 5		DWSP3A	N/A DUE TO TERMINATOR	PGTW
30	142159	10.4N 127.4E	PCN 5	T1.5/2.5 /01.0/24HRS	DWSP3A		RPMK
31	140011	10.7N 121.5E	PCN 5	T1.5/1.5	DWSP3A		PGTW
32	140234	10.4N 121.2E	PCN 5		DWSP3A		PGTW
33	140339	10.4N 119.2E	PCN 5		DWSP3A		PGTW
34	140440	10.4N 120.4E	PCN 5		DWSP3A		RODN
35	141252	10.7N 120.1E	PCN 5		DWSP3A		PGTW
36	141515	11.7N 119.0E	PCN 5		DWSP3A		PGTW
37	141515	11.3N 119.4E	PCN 5		DWSP3A		RODN
38	142139	12.1N 119.4E	PCN 5		DWSP3A	N/A DUE TO TERMINATOR	PGTW
39	142139	12.1N 119.4E	PCN 5		DWSP3A		RPMK
40	142353	12.0N 119.0E	PCN 5	T3.0/3.0	DWSP3A		RODN
41	142353	12.1N 119.0E	PCN 5	T2.0/2.0 /00.5/24HRS	DWSP3A		PGTW
42	140215	12.2N 119.9E	PCN 5		DWSP3A		RODN
43	140215	12.3N 119.0E	PCN 5		DWSP3A		PGTW
44	141020	13.1N 119.5E	PCN 5		DWSP3A	CI UP & AILING EYE	PGTW
45	141020	13.1N 119.5E	PCN 5		DWSP3A		RPMK
46	141235	13.1N 119.0E	PCN 5		DWSP3A	CI UP & AILING EYE	PGTW
47	141457	13.5N 119.5E	PCN 5		DWSP3A		PGTW
48	141457	13.3N 119.3E	PCN 5		DWSP3A		RPMK
49	142300	13.7N 120.1E	PCN 5		DWSP3A		RPMK
50	142301	13.4N 120.1E	PCN 5	T2.5/3.0 /00.5/24HRS	DWSP3A		RODN
51	140117	14.2N 120.1E	PCN 5		DWSP3A		RODN
52	140117	14.0N 120.3E	PCN 5	T1.5/1.5	DWSP3A	INIT JDS	RPMK
53	140339	13.3N 120.1E	PCN 5		DWSP3A		RODN
54	140339	13.4N 120.3E	PCN 5		DWSP3A		RPMK
55	141000	14.1N 120.6E	PCN 5		DWSP3A		PGTW
56	141000	14.0N 120.6E	PCN 5		DWSP3A		RPMK
57	141217	14.0N 121.1E	PCN 5		DWSP3A		RODN
58	141217	14.2N 121.0E	PCN 5		DWSP3A	PSDL SECONDARY 14.0N 119.7E	PGTW
59	141439	14.3N 121.4E	PCN 5		DWSP3A	SECONDARY AT 14.5N 121.0E	PGTW
60	141439	13.4N 121.0E	PCN 5		DWSP3A		RPMK
61	142240	15.2N 122.5E	PCN 5	T0.0/1.0 /01.5/24HRS	DWSP3A		RPMK
62	142241	15.1N 122.3E	PCN 5	T1.0/2.0 /01.5/24HRS	DWSP3A		RODN
63	140059	15.3N 122.0E	PCN 5		DWSP3A		RODN
64	140320	15.2N 122.7E	PCN 5		DWSP3A		RODN
65	140320	14.4N 127.2E	PCN 5	T1.0/1.5 /00.5/24HRS	DWSP3A		RPMK
66	141121	14.2N 127.9E	PCN 5		DWSP3A		RPMK
67	141159	14.2N 127.9E	PCN 5		DWSP3A		PGTW
68	141159	14.4N 127.0E	PCN 5		DWSP3A		RODN
69	141420	14.4N 124.4E	PCN 5		DWSP3A		PGTW
70	142220	14.4N 124.1E	PCN 5	T1.7/1.0	DWSP3A	INIT JDS	PGTW
71	140441	14.3N 124.4E	PCN 5	T1.0/1.0 /50.0/24HRS	DWSP3A		RODN

ATCRAFT FIXES

FIA NO.	TIME (Z)	FIX POSITION	FLT LVL	700MM HGT	DRS MSLP	MAX-SFC-WND VEL/IRG/HNG	MAX-FLT-LVL-WND DTM/VEL/HNG/HNG	ACFTY NAV/HFT	EYE SHAPE	EYE ORIENT- DIRECTION	EYE TEMP (C) DUTY IN/ DP/SGT	WSN NO.
1	120313	17.2N 120.5E	700MM	2090	1002	25 160 55	210 34 100 70	2 40			+10 +10	4
2	120209	17.2N 118.4E	700MM	2011		30 180 50	240 30 100 50	1 2			+14 +12 +10	5
3	120117	17.4N 120.0E	700MM	2974	986		020 35 100 15	2 2	ELLIPTICAL	30 20 360	+14 +15 +10	6
4	120100	17.7N 120.2E	700MM	2952		15 340 30	110 32 300 15	1 2				6
5	120314	17.4N 120.5E	700MM	2035		15 100 30	340 39 270 47	1 2	ELLIPTICAL	30 20 360	+13 +12	6
6	120120	17.2N 125.5E	1500FT			25 310 120	210 32 310 90	10 4			+24 +24	8
7	120232	17.4N 125.5E	700MM	3127	1004	25 140 40	140 28 290 30	10 4			+11 +11 +9	8

RAJAH FIXES

FIA NO.	TIME (Z)	FIX POSITION	HADAR	ACFTY	EYE SHAPE	EYE DIAM	RAINMM-CODE ASWAK TDUFT	COMMENTS	HADAR POSITION	SITE WND NO.
1	120233	17.7N 120.1E	LAND	PRUH	CIRCULAR	20		PSHL CENTER	15.2N 120.6E	08127
2	120303	17.4N 120.1E	LAND	PRUH	CIRCULAR	20			15.2N 120.6E	08127
3	120330	17.4N 120.1E	LAND	PRUH	CIRCULAR	20			15.2N 120.6E	08327
4	120033	17.4N 120.2E	LAND	FAIR	CIRCULAR	20			15.2N 120.6E	08327
5	120105	17.3N 120.2E	LAND	FAIR	CIRCULAR	25		CNTR STNMY SINCE LAST REPORT	15.2N 120.6E	08327
6	120135	17.4N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	08327
7	120205	17.3N 120.2E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	08327
8	120235	17.3N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	08127
9	120305	17.3N 120.3E	LAND	FAIR	CIRCULAR	25			15.2N 120.6E	08327
10	120410	17.3N 120.4E	LAND	GRUD	CIRCULAR	25			15.2N 120.6E	08327
11	120432	17.0N 120.7E	LAND	GRUD	CIRCULAR	25			15.2N 120.6E	08327
12	120346	17.4N 121.4E	LAND	PRUH	CIRCULAR			EYE DIAM UNK	15.2N 120.6E	08127

SYNOPTIC FIXES

FIA NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	VFAREST DATA (NM)	COMMENTS
1	121200	26.0N 120.0E	25	120	
2	170000	27.3N 131.0E	25	60	
3	171200	27.0N 140.5E	25	60	

TROPICAL DEPRESSION 05

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	ORIGIN CODE	SATellite	COMMENTS	SITE
1	210311	18.3N 114.2E	PCN 5	T1.5/1.5	DMSD14	INIT JMS	RPMK
2	220035	21.4N 118.0E	PCN 3	T1.0/1.0	DMSD14	INIT JMS	PGTW
3	220253	21.4N 118.3E	PCN 3	T1.5/1.5 /50.0/24HRS	DMSD14		RPMK
4	220253	22.1N 118.4E	PCN 3	T1.5/1.5	DMSD14	INIT JMS	RODN
5	210018	22.0N 124.8E	PCN 3	T2.5/2.5 /01.5/24HRS	DMSD14		PGTW
6	210235	22.2N 124.3E	PCN 4		DMSD14		PGTW
7	210235	22.0N 124.5E	PCN 3	T2.5/2.5 /01.0/24HRS	DMSD14		RODN
8	211022	22.4N 124.0E	PCN 3		DMSD17		PGTW
9	211022	22.7N 124.0E	PCN 3		DMSD17		RKSO
10	211254	22.4N 124.0E	PCN 3		DMSD14	PSN BASED ON CR BANDS	PGTW
11	211516	22.9N 124.7E	PCN 5		DMSD14		RODN
12	211516	23.2N 124.8E	PCN 5		DMSD17		PGTW
13	212121	24.1N 132.0E	PCN 5	T1.5/2.5 /#1.0/21HRS	DMSD17		PGTW
14	212121	24.4N 131.5E	PCN 5	T2.0/2.0	DMSD17	INIT JMS/UPR IWL	RPMK
15	240000	24.4N 132.7E	PCN 5		DMSD14		PGTW
16	240216	25.4N 131.1E	PCN 3		DMSD14		PGTW
17	240216	25.1N 131.8E	PCN 3	T1.0/1.0	DMSD17	INIT JMS	RKSO
18	241000	27.7N 134.0E	PCN 5		DMSD17		PGTW
19	241002	24.0N 134.7E	PCN 5		DMSD17		RODN
20	241002	27.1N 134.0E	PCN 5		DMSD17		RKSO

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCR	EYE SHAPE	EYE DIAM	RADAR CODE ASMAN TDOFF	COMMENTS	RADAR POSITION	SITE VMO NO.
1	210200	22.2N 124.1E	LAND				21022 50511		24.8N 125.3E	47927
2	210200	22.2N 124.1E	LAND				10023 50710		24.3N 124.2E	47910
3	210400	22.3N 124.7E	LAND				21012 50914		24.8N 125.3E	47927
4	210400	22.3N 124.7E	LAND				20042 50812		24.3N 124.2E	47910
5	210500	22.4N 124.0E	LAND				10072 50810		24.8N 125.3E	47927
6	210500	22.4N 124.0E	LAND				15/41 50814		24.3N 124.2E	47910
7	210500	22.4N 124.2E	LAND				22012 50814		24.8N 125.3E	47927
8	210500	22.4N 124.2E	LAND				20701 50911		24.3N 124.2E	47910
9	210700	22.4N 124.6E	LAND				24042 50822		24.8N 125.3E	47927
10	210900	22.4N 124.9E	LAND				24011 50810		24.8N 125.3E	47927
11	211500	23.4N 124.5E	LAND				1/111 40522		26.1N 127.7E	47927

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 114.0E	15	60	

TYPHOON ELLIE

SATELLITE FIXES

FLA NO.	TIME (Z)	FIX POSITION	ACQRY	ORBITAL CODE	SATELLITE	COMMENTS	SITE
1	240019	9.3N 130.3E	PCN 5	T0.0/0.0	DWSP1A	INIT JDS	PGTW
2	241119	9.0N 131.7E	PCN 5		DWSP1A		PGTW
3	241441	8.9N 130.0E	PCN 6		DWSP1A		PGTW
4	270001	9.0N 130.4E	PCN 6	T0.0/0.0 /50.0/24HRC	DWSP1A	POSSIBLE SECONDARY 10.8N 130.4E	PGTW
5	270200	8.7N 130.3E	PCN 6		DWSP1A		PGTW
6	270847	8.6N 130.5E	PCN 5		DWSP1A		PGTW
7	271102	8.7N 130.4E	PCN 6		DWSP1A		PGTW
8	272128	11.3N 130.9E	PCN 6		DWSP1A		PGTW
9	272343	11.4N 130.7E	PCN 5		DWSP1A		PGTW
10	240141	11.4N 130.6E	PCN 5		DWSP1A		PGTW
11	241008	12.1N 130.4E	PCN 6		DWSP1A		PGTW
12	241225	12.9N 130.6E	PCN 6		DWSP1A		PGTW
13	241423	13.2N 130.7E	PCN 6		DWSP1A		PGTW
14	242325	12.5N 130.0E	PCN 5	T0.0/0.0 /50.0/24HRC	DWSP1A		PGTW
15	241208	12.9N 130.6E	PCN 6		DWSP1A		PGTW
16	242307	13.7N 130.2E	PCN 5	T0.0/0.0 /50.0/24HRC	DWSP1A		PGTW
17	301150	13.7N 130.6E			DWSP1A		PGTW
18	301346	13.9N 130.3E	PCN 6		DWSP1A		PGTW
19	302208	13.7N 130.7E	PCN 5	T1.0/1.0 /01.0/21HRC	DWSP1A		PGTW
20	010031	13.5N 130.4E	PCN 6		DWSP1A		PGTW
21	010227	13.2N 131.5E	PCN 5		DWSP1A		PGTW
22	010227	12.9N 131.3E	PCN 5	T2.0/2.0	DWSP1A	INIT JDS	RPWK
23	011050	13.7N 131.0E	PCN 5		DWSP1A	CI UP	PGTW
24	011050	13.9N 130.4E	PCN 6		DWSP1A	UPR LVL MITFION	RODN
25	011313	13.9N 130.7E	PCN 6		DWSP1A		PGTW
26	011313	13.7N 130.7E	PCN 6		DWSP1A		RODN
27	011509	13.9N 130.2E	PCN 6		DWSP1A		PGTW
28	011509	13.6N 130.1E	PCN 5		DWSP1A	UPR LVL ANTI/RAMING	RPWK
29	012148	14.7N 129.1E	PCN 5		DWSP1A		PGTW
30	050013	14.5N 129.4E	PCN 5	T3.0/3.0 /02.0/24HRC	DWSP1A		RODN
31	050137	14.6N 129.0E	PCN 1	T4.5/4.5 /00.5/24HRC	DWSP1A		RPWK
32	050155	14.1N 129.3E	PCN 5		DWSP1A		PGTW
33	050209	14.5N 129.1E	PCN 3		DWSP1A		RPWK
34	050509	14.5N 129.5E	PCN 5		DWSP1A		RODN
35	050209	14.6N 129.1E	PCN 3	T4.0/4.0	DWSP1A	INIT JDS	RODN
36	051029	15.0N 127.1E	PCN 4		DWSP1A	CI UP	PGTW
37	051255	15.1N 126.6E	PCN 6		DWSP1A		PGTW
38	051450	15.1N 126.6E	PCN 5		DWSP1A		RPWK
39	051451	15.3N 126.4E	PCN 5		DWSP1A		PGTW
40	052128	15.9N 125.0E	PCN 5		DWSP1A		RPWK
41	052129	15.3N 125.3E	PCN 5	T4.0/4.0 /01.0/21HRC	DWSP1A		PGTW
42	052356	16.0N 125.0E	PCN 5		DWSP1A		PGTW
43	050137	14.2N 124.9E	PCN 1	T5.0/5.0 /02.0/24HRC	DWSP1A		RPWK
44	051009	17.4N 123.4E	PCN 6		DWSP1A		PGTW
45	051237	17.4N 122.9E	PCN 6		DWSP1A		PGTW
46	051432	19.1N 122.6E	PCN 6		DWSP1A		PGTW
47	051432	14.1N 123.1E	PCN 6		DWSP1A		RPWK
48	052249	19.6N 110.5E	PCN 3	T4.4/3.5 /01.0/21HRC	DWSP1A		RODN
49	052249	14.7N 121.5E	PCN 5	T3.0/4.0 /02.0/21HRC	DWSP1A		RPWK
50	040300	18.3N 120.6E	PCN 5		DWSP1A		RPWK
51	040314	19.5N 120.4E	PCN 3		DWSP1A	EXPUSEU ILCC	RODN
52	041131	19.9N 110.4E	PCN 4		DWSP1A		RODN
53	041555	20.1N 110.0E	PCN 3		DWSP1A	EXPUSEU ILCC NF OF DENSE CONV	RPWK
54	041555	20.2N 110.1E	PCN 3		DWSP1A		RODN
55	042230	20.1N 114.3E	PCN 5	T3.4/3.5 /00.5/24HRC	DWSP1A		RPWK
56	040101	20.0N 114.0E	PCN 3		DWSP1A		RPWK
57	050255	20.1N 115.8E	PCN 3		DWSP1A		RODN
58	050256	20.2N 115.9E	PCN 3	T4.5/4.5 /01.0/24HRC	DWSP1A		RODN
59	041110	20.4N 114.3E	PCN 3		DWSP1A		RODN
60	041110	20.4N 114.5E	PCN 4		DWSP1A	EXPUSEU ILCC	RPWK
61	041343	20.6N 113.7E	PCN 3		DWSP1A	WELL JFTMED ILCC	RODN
62	041537	20.7N 113.7E	PCN 3		DWSP1A		RPWK
63	042210	21.7N 111.0E	PCN 5		DWSP1A	N/A DUE TO TERMINATOR	PGTW
64	042210	21.5N 111.7E	PCN 5		DWSP1A		RPWK
65	040043	21.5N 111.4E	PCN 5	T2.5/2.5 /02.4/24HRC	DWSP1A		RODN
66	040237	21.4N 110.0E	PCN 5		DWSP1A		RKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	TOUW4 HGT	DBS MSLP	MAX-SFC-WND VEL/ARG/WNG	MAX-FLT-LVL-WND DTW/VEL/DBW/4NR	ACFRY NAV/MPT	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) DUT/ 1V/ DP/SET	ASN NO.
1	302003	11.3N 112.4E	700MM	7084	1000		140 19 040 30	R 12				3
2	302202	11.3N 112.7E	700MM	7085	1000	40 270 15	140 32 080 60	R 3			+12 +10 +10	3
3	011339	11.3N 120.1E	700MM	2444	984		140 55 070 60	N 5			+13 +13	4
4	012150	14.1N 120.1E	700MM	2451	981	35 180 15	240 60 180 15	N 5	CIRCULAR	40	+18 +19 + 9	4
5	020539	14.1N 127.7E	700MM	2857		55 020 40	100 95 020 35	N 5			+17 +12	5
6	020915	14.7N 127.4E	700MM	2858	974	50 120 20	040 62 310 45	N 5	ELLIPTICAL	35 25 100	+11 +17 +12	5
7	021933	14.7N 126.6E	700MM	2739	971		210 74 130 60	N 5			+15 +10	6
8	022157	14.7N 126.3E	700MM	2724	955	100 130 20	230 32 130 20	N 5	ELLIPTICAL	30 20 090	+14 +17 +10	6
9	030544	14.3N 124.1E	700MM	2750	961	40 030 40	110 98 030 40	N 6			+18 +14	7
10	030906	17.3N 127.9E	700MM	2731	956	50 150 50	040 88 360 30	N 6	ELLIPTICAL	30 20 070	+15 +19 +14	7
11	040952	19.5N 110.4E	700MM	2979	984	70 100 5	200 50 160 20	2 1			+18 +17	9
12	042156	20.2N 114.7E	700MM	3011	982	75 150 10	140 62 240 10	1 2			+13 +13 + 9	10

DATA FIXES

FIX NO.	TIME (Z)	FIX POSITION	HADAR	ACFRY	EYE SHAPE	EYE DIAM	WIND-COUE ASWAW DUOFF	COMMENTS	HADAR POSITION	SITE WND NO.
1	030500	14.3N 127.6E	LAND					PROBABLY EYE	14.1N 123.0E	08440
2	030700	17.0N 124.0E	LAND				41111 51111	SPIRAL OVERLAY	16.3N 120.6E	08321
3	031400	17.9N 123.5E	LAND				11111 52911		16.3N 120.6E	08321
4	031500	17.9N 123.1E	LAND				34421 62911		16.3N 120.6E	08321
5	031600	14.4N 122.5E	LAND				34411 52920		16.3N 120.6E	08321
6	040000	14.0N 121.3E	LAND				34451 52712		16.3N 120.6E	08321
7	040100	14.0N 121.2E	LAND				10001 79997	EYE 75 PERCENT CIRCULAR	16.3N 120.6E	08321
8	040200	14.3N 120.5E	LAND				10011 79997	EYE FIXED CIRCULAR OPEN 40	16.3N 120.6E	08321
9	040500	14.4N 120.2E	LAND				41111 51111		16.3N 120.6E	08321
10	040500	19.5N 110.7E	LAND				45111 51111		22.3N 114.2E	45005
11	040510	20.7N 114.3E	LAND				45011 72810		22.3N 114.2E	45005
12	041700	21.0N 113.2E	LAND				45011 72810		22.3N 114.2E	45005
13	041930	21.2N 112.5E	LAND				45011 72810		22.3N 114.2E	45005
14	042100	21.5N 112.3E	LAND				45011 72810		22.3N 114.2E	45005

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	200000	7.0N 141.0E	15	150	
2	201200	7.0N 140.0E	15	120	
3	270500	14.4N 134.3E	20	100	
4	280000	12.0N 134.0E	15	60	BRN43 F-W THOUGH
5	281200	14.0N 134.5E	20	100	BRN43 F-W THOUGH
6	300000	11.5N 131.5E	25	140	BRN43 F-W THOUGH
7	300500	14.0N 132.0E	25	150	BRN43 F-W THOUGH

TROPICAL STORM FAYE

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	DVDRK CODE	SATELLITE	COMMENTS	SITE
1	202307	2.0N 152.3E	PCN 5	T0.0/0.0	DMSP-3A	INIT JDS	PGTW
2	201346	3.6N 151.7E	PCN 6		DMSP-3A		PGTW
3	202247	5.6N 151.1E	PCN 5	T1.0/1.0 /01.0/24HRS	DMSP-3A		PGTW
4	010908	5.7N 150.2E	PCN 6		DMSP-3A	CI SAME	PGTW
5	011132	6.1N 150.0E	PCN 6		DMSP-3A		PGTW
6	011328	6.6N 149.7E	PCN 6		DMSP-3A		PGTW
7	012007	6.3N 147.3E	PCN 6		DMSP-3A		PGTW
8	020209	7.6N 146.2E	PCN 5	T2.0/2.0 /01.0/24HRS	DMSP-3A		PGTW
9	020948	7.9N 145.0E	PCN 6		DMSP-3A	CI SAME	PGTW
10	021114	7.9N 144.4E	PCN 5		DMSP-3A		PGTW
11	021309	8.0N 144.5E	PCN 6		DMSP-3A		PGTW
12	022128	9.0N 143.6E	PCN 5	T3.0/3.0	DMSP-3A	INIT JDS	PGTW
13	022129	9.2N 142.4E	PCN 6		DMSP-3A		PGTW
14	022356	9.6N 142.5E	PCN 5		DMSP-3A		PGTW
15	021009	9.3N 140.7E	PCN 6		DMSP-3A	EDGE OF DATA	PGTW
16	021055	9.7N 140.3E	PCN 6		DMSP-3A	EDGE OF DATA	PGTW
17	021432	10.0N 139.6E	PCN 6		DMSP-3A		PGTW
18	021432	10.0N 140.1E	PCN 6		DMSP-3A		PGTW
19	022109	10.6N 139.3E	PCN 5	T3.0/3.0 /50.0/24HRS	DMSP-3A		PGTW
20	022338	10.3N 139.3E	PCN 5		DMSP-3A		PGTW
21	040118	10.3N 139.4E		T4.0/4.0 /01.0/24HRS	DMSP-3A		PGTW
22	040132	10.5N 139.5E	PCN 3		DMSP-3A	EXPUSED ILCC	PGTW
23	040132	10.6N 140.2E	PCN 4	T3.0/3.0	DMSP-3A	INIT JDS	PGTW
24	040949	10.6N 139.7E	PCN 6		DMSP-3A		PGTW
25	041219	10.6N 138.1E	PCN 4		DMSP-3A		PGTW
26	041413	10.7N 137.1E	PCN 6		DMSP-3A		PGTW
27	041414	10.5N 136.7E	PCN 5		DMSP-3A		PGTW
28	042048	10.3N 136.0E	PCN 6		DMSP-3A	UPR LVL CNTR 10.5N 135.0E	PGTW
29	042320	10.5N 136.5E	PCN 5		DMSP-3A		PGTW
30	050114	10.3N 136.9E	PCN 3	T3.0/3.0 /50.0/24HRS	DMSP-3A		PGTW
31	050114	10.1N 136.1E	PCN 3	T3.0/3.0 /50.0/24HRS	DMSP-3A		PGTW
32	050928	11.6N 136.0E	PCN 4		DMSP-3A	EXPUSED ILCC	PGTW
33	051201	11.9N 136.4E	PCN 4		DMSP-3A	EXPUSED ILCC	PGTW
34	051355	11.9N 136.2E	PCN 4		DMSP-3A		PGTW
35	051355	12.0N 136.9E	PCN 3		DMSP-3A	EXPUSED ILCC	PGTW
36	051355	12.3N 136.0E	PCN 4		DMSP-3A		PGTW
37	052210	12.3N 134.0E	PCN 3	T2.0/3.0 /41.0/21HRS	DMSP-3A		PGTW
38	062302	13.1N 133.7E	PCN 3		DMSP-3A		PGTW
39	060237	13.7N 133.4E	PCN 3		DMSP-3A		PGTW
40	060237	13.6N 133.3E	PCN 3	T2.0/3.0 /41.0/24HRS	DMSP-3A		PGTW
41	060309	15.0N 132.4E	PCN 6		DMSP-3A		PGTW
42	061144	15.2N 132.0E	PCN 4		DMSP-3A		PGTW
43	061518	15.6N 131.5E	PCN 4		DMSP-3A		PGTW
44	061519	15.6N 131.3E	PCN 3		DMSP-3A		PGTW
45	070026	17.3N 129.6E	PCN 3	T0.0/1.0 /42.0/24HRS	DMSP-3A		PGTW
46	071308	17.7N 127.2E	PCN 6		DMSP-3A	CI UP	PGTW
47	080008	19.6N 126.4E	PCN 5	T0.0/0.0 /50.0/24HRS	DMSP-3A		PGTW
48	081250	20.2N 126.3E	PCN 5		DMSP-3A		PGTW

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70043 MGT	DBS MSLP	MAX-SFC-WND VEL/ARB/RNG	MAX-FLY-LVL-WND DIR/VEL/DHG/RNG	ACCR	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C)	USN NO.
1	012300	6.1N 146.5E	1500FT		1008							1
2	020852	7.6N 145.5E	1500FT		1004	20 120 45 280	20 160 30 2	5				2
3	020845	7.6N 145.3E	1500FT		1004	25 200 50 280	25 200 100 4	5				2
4	021309	8.0N 144.5E	700MM	1094								3
5	022050	9.0N 143.6E	1500FT		1001	40 270 15 240	37 270 15 4	2				3
6	040910	9.5N 141.6E	700MM	1084	998	45 270 40 360	55 270 40 4	7				3
7	042014	10.1N 140.6E	700MM	1085	998	50 170 30 140	46 040 70 4	3				4
8	040804	10.5N 138.5E	700MM	1097	1001	50 180 45 110	55 050 50 4	5				5
9	042122	10.2N 136.0E	700MM	1033	991	45 170 15 040	40 320 120 3	3	ELLIPTICAL	5 13 090		6
10	050804	11.3N 136.4E	1500FT		994	30 240 10 230	30 140 7 4	4				7
11	051925	11.6N 136.6E	700MM	1100		220	33 130 60 4	5				8
12	052200	12.6N 137.3E	1500FT		1004	10 180 140 230	40 180 140 4	10				9
13	060717	13.9N 137.7E	1500FT		1001							11
14	070534	16.0N 127.5E	700MM	1117		10 090 70 170	20 090 70 4	5				12

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	WFAREAST DATA (MM)	COMMENTS
1	201200	3.0N 155.0E	15	150	EQUATORIAL DOUBLE-VORTICE INTERACTION
2	200000	2.5N 154.0E	15	80	EQUATORIAL DOUBLE-VORTICE INTERACTION
3	201200	3.0N 157.5E	15	130	EST 451P 1000MM
4	200000	3.5N 157.0E	15	90	EST 451P 1000MM
5	201200	4.0N 157.0E	15	150	SFC TRF MW-SE

TROPICAL DEPRESSION 08

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACQRY	UVN2AK CODE	SATFILLITE	COMMENTS	SITE
1	202339	5.3W 134.4E	PCN 5	T0.0/0.0	DMSD1A	INIT OBS	PGTH
2	211220	0.3W 134.5E	PCN 5		DMSD1A	CI 5486/11PR 1VI	PGTH
3	221202	11.5W 130.8E	PCN 6		DMSD1A		PGTH
4	222302	14.4W 130.6E	PCN 5	T1.0/1.0	DMSD1A	INIT OBS/LLC 735N 1407E	PGTH
5	231012	20.2W 130.4E	PCN 6		DMSD1A		PGTH
6	231144	20.3W 130.9E	PCN 6		DMSD1A		PGTH
7	231303	20.5W 130.7E	PCN 6		DMSD1A		PGTH
8	231328	20.5W 130.6E	PCN 5		DMSD1A		PGTH
9	232111	22.0W 137.0E	PCN 5	T1.0/1.0 /50.0/27HRC	DMSD1A		PGTH
10	232245	22.4W 134.6E	PCN 5		DMSD1A		PGTH
11	240145	23.2W 134.1E	PCN 5		DMSD1A		PGTH
12	240209	23.4W 134.5E	PCN 5	T1.0/1.0	DMSD1A	INIT OBS	PGTH
13	240210	23.7W 134.8E	PCN 5		DMSD1A		PGTH
14	240251	24.4W 134.0E	PCN 5		DMSD1A		PGTH
15	241244	24.9W 131.0E	PCN 6		DMSD1A		PGTH
16	241307	24.3W 131.5E	PCN 6		DMSD1A		PGTH
17	241451	25.2W 132.9E	PCN 5		DMSD1A		PGTH
18	241451	25.0W 131.0E	PCN 5		DMSD1A	INIT NIGHTTIME OBS	ROON
19	240008	25.4W 130.9E	PCN 5	T0.0/1.0 /W1.0/27HRC	DMSD1A	POSSIBLE SECONDARY 27.0W 130.3E	PGTH
20	240126	26.2W 130.4E	PCN 5		DMSD1A		PGTH
21	240151	26.4W 130.1E	PCN 5		DMSD1A		PGTH
22	240151	26.4W 129.0E	PCN 5	T1.0/1.0	DMSD1A	INIT OBS	ROON
23	241226	30.7W 127.0E	PCN 5		DMSD1A		PGTH
24	241250	30.7W 127.5E	PCN 5		DMSD1A		PGTH
25	241433	30.4W 127.4E	PCN 5		DMSD1A		PGTH
26	242350	31.4W 124.7E	PCN 5	T4.0/4.0	DMSD1A	INIT OBS	AKSO
27	242350	31.0W 124.5E	PCN 5	T2.0/2.0-/D2.0/24HRC	DMSD1A		PGTH
28	240133	32.4W 124.4E	PCN 5		DMSD1A		PGTH
29	240314	32.4W 124.3E	PCN 3		DMSD1A		AKSO

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	Y0043 OBS MGT	MSLP	MAX-SFC-WND VEL/HRG/RWG	MAX-FLT-LVL-WND WIND/VEL/HRG/RWG	ACQRY NAV/WFT	EYE SHAPE	EYE ORIEN- TION/TATION	KYC TEMP (C) DUT/ 14/ DP/KCT	WSN NO.
1	241016	21.1W 133.5E	700MB	1127	1004	15 110 120	140 15 060 10	2 10			10 + 3 + 8	1

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	240000	21.5W 134.0E	15	60	
2	241200	21.5W 133.0E	20	60	
3	240000	24.5W 130.0E	20	60	
4	241200	24.0W 127.5E	20	60	
5	240000	31.0W 124.5E	15	60	
6	241200	31.0W 124.0E	15	60	
7	270000	34.0W 124.0E	14	60	

SUPER TYPHOON HOPE

CATELITE FIXES

FLA NO.	TIME (Z)	FLA POSITION	ACFRY	UVZAR CODE	SATellite	COMMENTS	SITE
1	240151	10.5N 144.2E	PCN 5	T1.0/1.0	DWSP74	INIT JMS	
2	240152	10.5N 144.4E	PCN 6		DWSP77		PGTW
3	241100	10.3N 142.7E	PCN 5		DWSP74		PGTW
4	241226	10.6N 142.6E	PCN 5		DWSP70		PGTW
5	241433	11.2N 147.1E	PCN 6		DWSP74		PGTW
6	242350	11.6N 148.8E	PCN 6	T1.0/1.0 /50.0/2PHRE	DWSP74		PGTW
7	240107	11.6N 148.5E	PCN 5		DWSP70		PGTW
8	240133	11.5N 148.5E	PCN 5		DWSP74		PGTW
9	240133	11.7N 148.1E	PCN 6	T1.0/1.0-	DWSP74	INIT JMS	RODM
10	240912	11.7N 148.1E	PCN 6		DWSP77		PGTW
11	241207	12.0N 130.0E	PCN 5		DWSP74		PGTW
12	241232	12.0N 130.9E	PCN 6		DWSP74		PGTW
13	241414	11.3N 130.5E	PCN 5		DWSP74		PGTW
14	241414	11.3N 140.4E	PCN 5		DWSP74	INIT NIGHTTIME DMS	PGTW
15	270008	11.6N 140.7E	PCN 3		DWSP74		RPNK
16	270114	11.6N 140.5E	PCN 5	T0.0/1.0 /W1.0/24HRE	DWSP74		PGTW
17	270114	11.6N 140.6E	PCN 5	T1.0/1.0 /W1.0/24HRE	DWSP74		RODM
18	270551	14.7N 130.3E	PCN 6		DWSP77		PGTW
19	272319	14.7N 134.0E	PCN 5	T1.0/1.0 /01.0/24HRE	DWSP74	EXPUSED ILCC	PGTW
20	240237	17.2N 134.5E	PCN 6		DWSP74		PGTW
21	241012	14.2N 134.5E	PCN 6		DWSP77	BASED ON HPR 1VL	PGTW
22	241013	17.7N 137.4E	PCN 5		DWSP77		RPNK
23	241156	14.0N 137.4E	PCN 6		DWSP74		PGTW
24	241310	14.3N 136.3E	PCN 5		DWSP74		PGTW
25	241337	14.6N 136.8E	PCN 6		DWSP74		RPNK
26	242112	17.1N 134.2E	PCN 7	T2.0/2.0 /01.0/2PHRE	DWSP77		PGTW
27	242257	14.6N 136.7E	PCN 5		DWSP74		PGTW
28	240151	14.6N 136.9E	PCN 5	T3.0/3.0	DWSP70	INIT JMS	PGTW
29	240219	14.1N 136.7E	PCN 5		DWSP74		RPNK
30	240219	14.2N 136.6E	PCN 5	T3.0/3.0	DWSP74		PGTW
31	240130	14.5N 134.1E	PCN 6		DWSP74	INIT JMS	RODM
32	241252	14.7N 134.9E	PCN 5		DWSP70	CI UP	PGTW
33	241500	14.2N 134.7E	PCN 6		DWSP74		PGTW
34	241500	14.7N 134.7E	PCN 6		DWSP74		PGTW
35	300014	14.6N 131.3E	PCN 3		DWSP74		RODM
36	300020	14.7N 131.4E	PCN 5	T4.0/4.0 /02.0/21HRE	DWSP74		RODM
37	300132	14.6N 131.4E	PCN 3	T4.0/4.0 /01.0/24HRE	DWSP70		PGTW
38	300133	14.7N 131.3E	PCN 3		DWSP74		RPNK
39	300201	14.6N 131.3E	PCN 1	T4.5/4.5 /01.5/24HRE	DWSP74		PGTW
40	300201	14.9N 131.2E	PCN 2		DWSP74		RODM
41	300932	17.0N 130.1E	PCN 3		DWSP77		PGTW
42	301233	17.7N 131.6E	PCN 3		DWSP70		PGTW
43	301233	17.4N 132.0E	PCN 3		DWSP74		RODM
44	301301	17.2N 131.7E	PCN 4		DWSP70		PGTW
45	301441	17.7N 131.3E	PCN 1		DWSP74		PGTW
46	301442	17.7N 131.4E	PCN 1		DWSP77		PGTW
47	302213	14.5N 120.7E	PCN 1	T5.5/5.5 /01.5/21HRE	DWSP77		AKSO
48	302213	14.5N 120.5E	PCN 3	T5.0/5.0 /01.0/2PHRE	DWSP77		RPNK
49	310002	14.4N 120.3E	PCN 1		DWSP74		PGTW
50	310114	14.4N 120.9E	PCN 1		DWSP70		PGTW
51	311053	14.3N 124.6E	PCN 2		DWSP77		PGTW
52	311244	14.7N 124.9E	PCN 1		DWSP74		PGTW
53	311355	14.7N 124.9E	PCN 2		DWSP70		PGTW
54	311355	14.7N 124.6E	PCN 1		DWSP70		RPNK
55	311423	14.4N 124.5E	PCN 1		DWSP74		RODM
56	311424	14.4N 124.7E	PCN 1		DWSP74		PGTW
57	312153	20.5N 121.7E	PCN 1	T6.5/6.5 /01.5/24HRE	DWSP77		RODM
58	312153	20.5N 121.7E	PCN 1	T6.5/6.5 /01.0/24HRE	DWSP77		PGTW
59	312153	20.5N 121.7E	PCN 1	T6.5/6.5	DWSP77	INIT JMS	RPNK
60	312344	20.6N 121.3E	PCN 1		DWSP74		RODM
61	010236	20.7N 122.6E	PCN 1		DWSP70		PGTW
62	010236	20.4N 122.4E	PCN 1		DWSP70		RPNK
63	011033	21.3N 120.6E	PCN 2		DWSP77		RODM
64	011033	21.4N 119.5E	PCN 1		DWSP70		PGTW
65	011336	21.4N 119.6E	PCN 1		DWSP70		PGTW
66	011336	21.5N 119.5E	PCN 1		DWSP70		RPNK
67	011408	21.4N 119.5E	PCN 1		DWSP70		RODM
68	011547	21.7N 119.6E	PCN 1		DWSP74		RPNK
69	012314	22.0N 117.1E	PCN 1	T5.5/6.5 /W1.0/24HRE	DWSP74		RODM
70	020217	22.4N 115.7E	PCN 1	T5.0/5.5 /W1.5/24HRE	DWSP70		RPNK
71	020247	22.1N 115.3E	PCN 1		DWSP74		PGTW
72	020247	22.3N 115.3E	PCN 1	T5.0/6.0 /W1.5/24HRE	DWSP74		PGTW
73	021155	22.4N 112.4E	PCN 4		DWSP77		RODM
74	021155	22.7N 111.1E	PCN 3		DWSP77		RPNK
75	021528	22.7N 110.8E	PCN 4		DWSP74		RODM
76	021528	22.7N 107.9E	PCN 6		DWSP74		PGTW
77	022254	21.4N 109.4E	PCN 5	T3.5/4.5 /W1.5/24HRE	DWSP77		RPNK
78	022254	22.4N 109.8E	PCN 5	T2.0/2.0	DWSP77	INIT JMS	RODM

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT IFL	70043 HGT	385 MSLP	MAX-SFC-WVD VEL/ARG/RWS	MAX-FLT-LVL-WND DIR/VEL/DRG/ANG	ACCRV NAV/MET	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) DIR/ 1% JP/5KT	USN NO.
1	240328	10.4N 144.5E	1500F1		1005	25 110 120	070 38 310 120	4 10			+25 +23 23	1
2	240413	11.2N 147.4E	1500F1	1003	1000	25 050 50	140 28 070 40	4 10			+25 +21 28	2
3	240509	11.4N 141.7E	700MM	1001	1000	15 050 30	140 31 050 90	1 25			+11 + 9	3
4	240513	11.4N 141.3E	700MM	1001	1002	15 130 100	140 17 130 120	4 25			+12 +13 + 9	3
5	241830	12.3N 139.8E	700MM	1008			270 50 300 30				+10 + 7	4
6	242025	12.5N 140.0E	1500F1			10 080 50	170 30 210 30	10 10			+25 +23	4
7	272307	14.1N 137.9E	700MM	1096	999	50 120 15	140 30 120 15	4 4			+12 +11 28	5
8	281933	14.3N 134.7E	700MM	1052			110 41 070 120	4 5			+17 + 9	6
9	242052	14.7N 134.7E	700MM	1047	905	40 100 30	140 49 270 20	4 2			+11 +13 +10	6
10	240715	14.6N 134.5E	700MM	1065		75 140 20	040 50 310 30	4 1			+15 +10	7
11	240320	14.6N 134.2E	700MM	1064	972	70 130 20	170 72 040 30	2 1	CIRCULAR	8	+18 +17 +10	7
12	241808	14.7N 134.1E	700MM	1074	965		220 68 110 14	4 3			+15 +15	8
13	240231	14.4N 137.8E	700MM	1045	961	40 360 10	040 75 360 20	4 1	ELLIPTICAL	5 3 340	+13 +15 +15	8
14	300515	17.1N 132.7E	700MM	1056		85 090 15	170 45 090 15	4 5			+19 +13	9
15	300525	17.1N 132.4E	700MM	1059	934	95 170 12	270 80 170 12	1 1	ELLIPTICAL	8 6 160	+17 +15 +15	10
16	301339	14.2N 130.2E	700MM			40 220 50	010 75 300 25	2 5	ELLIPTICAL	10 8 140	+11 +15 +16	10
17	302225	14.6N 129.7E	700MM	1047	926	45 140 5	170 110 030 15	4 2	ELLIPTICAL	10 8 140	+11 +15 +16	10
18	310648	14.3N 127.4E	700MM	1021	912	95 360 20	040 130 360 15	4 7	CIRCULAR	15	+15 +16	11
19	310710	14.6N 124.9E	700MM	1025	908	100 360 10	120 147 020 10	4 5	CIRCULAR	14	+12 +27 +12	11
20	312148	20.5N 127.7E	700MM	1023	902	140 110 20	140 134 110 20	4 4	CIRCULAR	20	+18 +20 +17	12
21	010745	21.0N 121.1E	700MM	1065	917	95 060 30	140 120 200 20	4 1	CIRCULAR	14	+16 +15 +16	13
22	010906	21.2N 120.8E	700MM	1081	920	100 060 20	140 86 240 50	4 1	CIRCULAR	16	+19 +17 +17	13

RAJAN FIXES

FIX NO.	TIME (Z)	FIX POSITION	NAVAR	ACCRV	EYE SHAPE	EYE DIAM	RAJAN-CODE ASWAVE TOWFF	COMMENTS	NAVAR POSITION	SITE WMO NO.
1	010000	20.5N 121.0E	LAND				714/1 ////		14.2N 122.7E	08731
2	010100	20.7N 122.9E	LAND				714/1 53023		25.1N 121.0E	46406
3	010150	20.7N 122.5E	LAND				707/1 52716		14.2N 122.7E	08731
4	010300	20.5N 122.2E	LAND				707/1 52914		14.2N 122.7E	08731
5	010350	20.7N 122.0E	LAND						14.2N 122.7E	08731
6	010500	20.5N 121.0E	LAND						22.0N 120.3E	46744
7	010500	20.7N 122.0E	LAND				754/1 52519		14.2N 122.7E	08731
8	010500	20.5N 121.5E	LAND						20.0N 121.0E	46406
9	010500	20.5N 121.5E	LAND						14.2N 122.7E	08731
10	010500	20.5N 121.5E	LAND						24.0N 121.0E	46406
11	010500	20.7N 121.5E	LAND						22.0N 120.3E	46744
12	010500	21.0N 121.0E	LAND						25.1N 121.0E	46406
13	010550	20.7N 121.3E	LAND				754/1 52912		14.2N 122.7E	08731
14	010700	20.5N 121.5E	LAND						22.0N 120.3E	46744
15	010700	21.1N 121.5E	LAND						24.0N 121.0E	46406
16	010700	20.5N 121.0E	LAND						25.1N 121.0E	46406
17	010900	21.2N 121.3E	LAND						24.0N 121.0E	46406
18	010930	20.5N 120.8E	LAND				7//// ////	SPIRAL OVERLAY 15 DEGREES	10.3N 120.6E	08371
19	010930	21.2N 121.0E	LAND						22.0N 120.3E	46744
20	010930	21.1N 120.2E	LAND						22.0N 120.3E	46744
21	010930	21.3N 120.4E	LAND						25.1N 121.0E	46406
22	010930	20.5N 120.2E	LAND				4//// ////	SPIRAL OVERLAY 15 DEGREES	10.3N 120.6E	08371
23	011000	21.2N 120.4E	LAND						24.0N 121.0E	46406
24	011000	21.3N 120.7E	LAND						22.0N 120.3E	46744
25	011200	21.5N 120.1E	LAND						22.0N 120.3E	46744
26	011300	21.4N 119.7E	LAND						22.0N 120.3E	46744
27	011400	21.4N 119.4E	LAND						22.0N 120.3E	46744
28	011500	21.4N 119.0E	LAND						22.0N 120.3E	46744
29	011600	21.7N 118.7E	LAND						22.0N 120.3E	46744
30	011700	21.7N 118.4E	LAND						22.0N 120.3E	46744
31	011900	21.7N 118.1E	LAND						22.0N 120.3E	46744
32	011440	21.3N 119.1E	LAND						22.0N 120.3E	46744
33	011900	21.7N 117.9E	LAND						24.0N 121.0E	46406
34	012000	21.7N 117.7E	LAND						22.0N 120.3E	46744
35	012100	21.4N 117.4E	LAND						22.0N 120.3E	46744
36	012100	21.4N 117.5E	LAND						22.0N 120.3E	46744
37	020100	22.3N 114.2E	LAND				10303 ////		22.3N 114.2E	45005
38	020100	22.5N 114.1E	LAND				//// ////		22.3N 114.2E	45005
39	020200	22.4N 114.7E	LAND				24/// 53032		22.0N 120.3E	46744
40	020300	22.4N 114.2E	LAND				//// ////		22.3N 114.2E	45005
41	020300	22.4N 114.2E	LAND						22.3N 114.2E	45005
42	020400	22.5N 114.0E	LAND						22.3N 114.2E	45005
43	020400	22.4N 114.0E	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

FLA NO.	TIME (Z)	FIX POSITION	ACCR	UNUSAK CODE	SATELLITE	COMMENTS	SITE
1	240932	11.2N 134.1E	PCV 6		DMSP47	INIT NIGHTTIME OBS	PGTW
2	241225	11.2N 133.7E	PCV 5		DMSP46		PGTW
3	241250	11.1N 133.6E	PCV 5		DMSP46		PGTW
4	241433	11.1N 134.3E	PCV 5		DMSP46		PGTW
5	242212	11.2N 134.3E	PCV 5	11.0/1.0	DMSP47		PGTW
6	242300	11.2N 134.3E	PCV 5		DMSP46		PGTW
7	240107	11.3N 134.4E	PCV 5		DMSP40		PGTW
8	240133	11.3N 134.1E	PCV 5		DMSP46		PGTW
9	240133	11.2N 134.4E	PCV 5	12.0/2.0	DMSP46	INIT OBS	ROOM
10	241232	11.1N 134.4E	PCV 5		DMSP46	CI UP	PGTW
11	241346	11.2N 134.2E	PCV 5		DMSP46		PGTW
12	241414	11.2N 134.4E	PCV 5		DMSP46		PGTW
13	242332	11.2N 134.3E	PCV 3	12.0/2.0 /01.0/25HRS	DMSP46		PGTW
14	242330	11.2N 134.2E	PCV 3	12.0/2.0	DMSP46	INIT OBS	ROOM
15	242355	11.2N 134.0E	PCV 5		DMSP46	PARTIALLY EXPOSED LLCC	ROOM
16	242355	11.2N 134.2E	PCV 3	12.0/2.0	DMSP46	INIT OBS	ROOM
17	242356	11.2N 134.7E	PCV 5	13.0/3.0 /01.0/25HRS	DMSP46	CI UP	PGTW
18	241033	11.2N 134.7E	PCV 5		DMSP46		PGTW
19	241329	11.2N 134.6E	PCV 3		DMSP46		PGTW
20	241537	11.2N 134.4E	PCV 5		DMSP46		ROOM
21	241537	11.2N 134.1E	PCV 5		DMSP46		ROOM
22	240056	11.2N 134.7E	PCV 3	14.0/4.0 /01.0/25HRS	DMSP46		ROOM
23	240211	11.2N 134.4E	PCV 1		DMSP47		PGTW
24	240237	11.2N 134.2E	PCV 1	14.0/4.0 /02.0/24HRS	DMSP46	BANJING TYPE FVE	PGTW
25	240237	11.2N 134.4E	PCV 1	13.5/3.5 /01.5/24HRS	DMSP46		ROOM
26	241013	11.2N 134.7E	PCV 5		DMSP47	CI SAME	PGTW
27	241310	11.2N 134.4E	PCV 5		DMSP46		PGTW
28	241310	11.2N 134.4E	PCV 5		DMSP46		ROOM
29	241338	11.2N 134.4E	PCV 5		DMSP46		ROOM
30	241519	11.2N 134.4E	PCV 5		DMSP46		PGTW
31	242253	11.2N 134.4E	PCV 5	12.5/3.5 /01.5/25HRS	DMSP47		ROOM
32	242253	11.2N 134.6E	PCV 5	13.0/3.0	DMSP47	INIT OBS	ROOM
33	240038	11.2N 134.7E	PCV 1	14.0/4.0 /01.5/25HRS	DMSP46		ROOM
34	240151	11.2N 134.4E	PCV 1		DMSP46		ROOM
35	240219	11.2N 134.4E	PCV 1	13.0/3.5 /01.5/24HRS	DMSP46		ROOM
36	240219	11.2N 134.4E	PCV 1		DMSP46		ROOM
37	241136	11.2N 134.4E	PCV 5		DMSP47		ROOM
38	241136	11.2N 134.4E	PCV 5		DMSP47		ROOM
39	241319	11.2N 134.1E	PCV 3		DMSP46		ROOM
40	241320	11.2N 134.1E	PCV 5		DMSP46	CI UUDN	ROOM

AIRCRAFT FIXES

FLA NO.	TIME (Z)	FIX POSITION	FLT LVL	UNUSAK CODE	OBS	MAX-SFC-WND VEL/DIR/MB/MS	MAX-1000-FPM VEL/DIR/MB/MS	ACCR NAV/MT	EYE SHAPE	EYE ORIENTATION	REF TEMP (C) DIR/1W DP/SECT	WIND NO.
1	240927	11.2N 134.7E	1500FT	7005	397	30 050 20	120 45 050 20	4 4			+25 +25 +25 29	2
2	242036	11.2N 134.7E	700MM	7005	394	50 120 30	120 39 050 170	4 4				3
3	242152	11.2N 134.4E	700FT	7005	394	50 120 30	080 35 320 60	4 3				3
4	240910	11.2N 134.4E	700MM	7005	394	50 130 40	070 40 330 35	4 2				4
5	240940	11.2N 134.4E	700MM	7005	391	40 020 50	110 54 020 120	4 4			+12 +11 +11	5
6	241336	11.2N 134.4E	700MM	7005	393		110 51 400 28	4 2			+12 +12	5
7	242152	11.2N 134.4E	700MM	7005	391	50 040 30	140 53 040 30	0 2	CIRCULAR	5	+11 +17 +14	5
8	241050	11.2N 134.4E	700MM	7005	375	45 150 30	200 45 140 120	2 4	ELLIPTICAL	40 25 010	+11 +15 +11	6

RAVAN FIXES

FLA NO.	TIME (Z)	FIX POSITION	WIND	ACCR	EYE SHAPE	EYE DIAM	WIND-CODE	WIND-TIME	COMMENTS	WIND POSITION	SITE WIND NO.
1	242250	11.2N 134.4E	LA-0							25.1N 121.6E	46400
2	240200	11.2N 134.7E	LA-0							25.1N 121.6E	46400
3	240300	11.2N 134.1E	LA-0							25.1N 121.6E	46400
4	240400	11.2N 134.1E	LA-0							22.0N 120.3E	46700
5	240500	11.2N 134.1E	LA-0							22.0N 120.3E	46700
6	240700	11.2N 134.4E	LA-0							22.0N 120.3E	46700
7	240900	11.2N 134.7E	LA-0							22.0N 120.3E	46700
8	240900	11.2N 134.6E	LA-0							22.0N 120.3E	46700
9	241000	11.2N 134.4E	LA-0							22.0N 120.3E	46700
10	241100	11.2N 134.4E	LA-0							22.0N 120.3E	46700
11	241200	11.2N 134.4E	LA-0							22.0N 120.3E	46700
12	241300	11.2N 134.4E	LA-0							22.0N 120.3E	46700
13	241400	11.2N 134.7E	LA-0							22.0N 120.3E	46700
14	241500	11.2N 134.4E	LA-0							22.0N 120.3E	46700
15	241500	11.2N 134.4E	LA-0							22.0N 120.3E	46700
16	241700	11.2N 134.4E	LA-0							22.0N 120.3E	46700
17	241800	11.2N 134.4E	LA-0							22.0N 120.3E	46700
18	241900	11.2N 134.4E	LA-0							22.0N 120.3E	46700
19	242000	11.2N 134.1E	LA-0							22.0N 120.3E	46700
20	242100	11.2N 134.4E	LA-0							22.0N 120.3E	46700
21	240000	11.2N 134.7E	LA-0							22.0N 120.3E	46700
22	240300	11.2N 134.4E	LA-0							22.0N 120.3E	46700
23	240500	11.2N 134.4E	LA-0							22.0N 120.3E	46700
24	240600	11.2N 134.4E	LA-0							22.0N 120.3E	46700
25	241020	11.2N 134.4E	LA-0							22.0N 120.3E	46700

TROPICAL DEPRESSION 11

CATELITIF FIXES

FIA NO.	TIME (Z)	FIX POSITION	ACRY	DOZAK CODE	SATFILLITE	COMMENTS	SITE
1	021317	12.1N 134.3E	PCN 6		DWSP30	INIT NIGHTTIME OBS	PGTW
2	020220	11.4N 131.2E	PCN 5	TU-1/0.0	DWSP34	INIT OBS	PGTW
3	020953	13.9N 130.4E	PCN 6		DWSP37		PGTW
4	020953	14.5N 131.0E	PCN 6		DWSP37		RPMK
5	021150	14.2N 130.2E	PCN 6		DWSP34		PGTW
6	021258	14.4N 130.3E	PCN 5		DWSP30		PGTW
7	021510	13.3N 128.9E	PCN 5		DWSP35		RODN
8	021510	14.9N 130.3E	PCN 6		DWSP34		PGTW
9	040032	15.0N 127.7E	PCN 5	T0.0/0.0 /50.0/22HRC	DWSP34		PGTW
10	040139	15.7N 128.1E	PCN 5		DWSP30		PGTW
11	040210	15.2N 128.1E	PCN 5	T0.0/0.0	DWSP34	INIT OBS	RODN
12	040210	15.4N 128.1E	PCN 5		DWSP35		PGTW
13	040933	14.9N 127.0E	PCN 6		DWSP37		PGTW
14	041239	14.4N 128.3E	PCN 5		DWSP34		PGTW
15	041314	14.5N 128.3E	PCN 5		DWSP34		PGTW
16	041451	14.5N 128.0E	PCN 5		DWSP34		PGTW
17	041451	14.2N 125.9E	PCN 5		DWSP35		RPMK
18	042214	17.9N 126.2E	PCN 5		DWSP37		PGTW
19	040014	17.7N 127.8E	PCN 5	T2.0/2.0 /02.0/24HRC	DWSP34		PGTW
20	040120	17.7N 128.0E	PCN 3		DWSP34		PGTW
21	040151	17.3N 128.0E	PCN 3		DWSP35		PGTW
22	040151	18.0N 128.9E	PCN 5	T1.0/1.0+/01.0/24HRC	DWSP34		RODN
23	041256	14.9N 128.2E	PCN 3		DWSP34	EXPUSEU ILCC	PGTW
24	041402	12.2N 125.2E	PCN 6		DWSP34		RODN
25	041433	14.0N 125.8E	PCN 3		DWSP35		PGTW
26	042153	14.9N 122.8E	PCN 5	T2.0/2.0 /50.0/22HRC	DWSP37	INIT OBS	RPMK
27	042153	19.3N 121.6E	PCN 5	T1.0/1.0	DWSP34		PGTW
28	042356	14.9N 122.9E	PCN 5		DWSP34		RODN
29	040243	19.3N 121.5E	PCN 5	T1.0/1.0 /50.0/25HRC	DWSP34		RODN
30	040314	19.3N 121.4E	PCN 5		DWSP35		RODN
31	040314	19.3N 121.5E	PCN 5		DWSP35		RPMK
32	041034	21.1N 122.0E	PCN 5	T0.0/0.0	DWSP37	INIT OBS	RKSO
33	041317	21.0N 119.6E	PCN 5		DWSP30		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLI LVL	TU042 HGT	OBS MSLP	MAX-GFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND DTW/VEL/BMG/KMG	ACRY NAV/MET	EYE SHAPE	EYE ORIENTATION	WV TEMP (C) DIR/ T/W DP/SECT	WSN NO.
1	020615	14.0N 122.1E	700MH	1090	1003	10 230 48	220 15 060 48	5 5			.11 + 9 28	2
2	022200	14.7N 120.9E	700MH	1070	1004	15 150 50	040 12 330 10	5 5			.15 + 8 28	2
3	042126	17.3N 127.6E	1500FT	1001	997	30 180 60	220 30 180 35	4 15			.25 +23 28	4
4	040915	14.0N 125.9E	1500FT	997	25 060 50	110 25 060 60	5 5				.25 +25	5
5	042130	14.9N 122.8E	700MH	1090	1001	240 25 150 10	7 10				.25 +25 27	6
6	042222	14.3N 121.4E	1500FT	1007	20 360 4	040 15 330 5	4 2					6

SYNOPTIC FIXES

FIA NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	VFAREST DATA (NM)	COMMENTS
1	020600	12.0N 136.0E	15	120	
2	040600	20.7N 121.9E	15	30	

TYPHOON IRVING
SATELLITE FIXES

FILE NO.	TIME (Z)	STA POSITION	ACQRY	UNIQUE CODE	SATELLITE	COMMENTS	SITE
1	071220	14.14 137.9E	PCN 6		DMC07A		PGTW
2	080023	14.14 134.1E	PCN 6	T0.0/0.0	DMC07A	INIT JDS	PGTW
3	081202	14.44 137.9E	PCN 3		DMC07A		PGTW
4	082303	17.74 136.6E	PCN 5	T1.0/1.0 /01.0/23HRC	DMC07A		PGTW
5	082219	17.94 136.9E	PCN 5		DMC07A		PGTW
6	080933	14.34 135.5E	PCN 6		DMC07A		PGTW
7	081144	14.34 134.3E	PCN 3		DMC07A		PGTW
8	081500	17.44 134.6E	PCN 3		DMC07A		PGTW
9	081500	17.74 134.6E	PCN 3		DMC07A		PGTW
10	081500	17.74 134.6E	PCN 3		DMC07A		PGTW
11	082214	14.44 137.3E	PCN 4		DMC07A		PGTW
12	100026	14.44 137.2E	PCN 3	T1.0/1.0 /50.0/25HRC	DMC07A		PGTW
13	100127	14.44 137.1E	PCN 3		DMC07A		PGTW
14	100127	14.44 137.1E	PCN 3	T1.0/1.0	DMC07A	INIT JDS	PGTW
15	100913	14.34 137.0E	PCN 6		DMC07A		PGTW
16	100913	14.44 137.2E	PCN 6		DMC07A		PGTW
17	101226	14.34 131.4E	PCN 3		DMC07A		PGTW
18	101307	17.54 131.4E	PCN 6		DMC07A		PGTW
19	101642	14.14 129.0E	PCN 5		DMC07A		PGTW
20	101642	14.34 130.2E	PCN 5		DMC07A		PGTW
21	101642	17.34 130.1E	PCN 3		DMC07A		PGTW
22	102154	17.44 129.6E	PCN 3		DMC07A		PGTW
23	102154	17.44 129.6E	PCN 5	T1.0/1.0	DMC07A	INIT JDS	PGTW
24	110004	14.74 129.7E	PCN 5	T2.0/2.0 /01.0/24HRC	DMC07A		PGTW
25	110108	14.74 129.6E	PCN 5		DMC07A		PGTW
26	110142	14.44 129.4E	PCN 5		DMC07A		PGTW
27	110142	14.74 129.6E	PCN 6		DMC07A		PGTW
28	111034	14.44 129.5E	PCN 6		DMC07A		PGTW
29	111250	17.14 129.2E	PCN 5		DMC07A		PGTW
30	111349	17.24 129.2E	PCN 6		DMC07A		PGTW
31	111423	17.34 129.3E	PCN 5		DMC07A		PGTW
32	111423	17.14 130.6E	PCN 5		DMC07A		PGTW
33	112134	17.54 124.1E	PCN 5	T4.5/2.5 /01.5/24HRC	DMC07A		PGTW
34	112134	17.34 124.7E	PCN 5		DMC07A		PGTW
35	112351	17.44 127.6E	PCN 3	T3.0/3.0 /01.0/24HRC	DMC07A	INIT JDS	PGTW
36	120230	17.44 127.7E	PCN 5	T3.0/3.0	DMC07A		PGTW
37	120230	17.74 127.0E	PCN 5		DMC07A		PGTW
38	120305	17.44 127.6E	PCN 5		DMC07A		PGTW
39	121015	14.74 127.0E	PCN 5		DMC07A	CI UP	PGTW
40	121232	14.74 126.7E	PCN 5		DMC07A		PGTW
41	121340	14.44 126.3E	PCN 6		DMC07A		PGTW
42	121330	17.94 126.6E	PCN 5		DMC07A		PGTW
43	121537	14.44 126.3E	PCN 5		DMC07A		PGTW
44	122114	14.34 126.7E	PCN 5		DMC07A		PGTW
45	122333	20.04 127.1E	PCN 5	T4.5/4.5 /01.5/24HRC	DMC07A		PGTW
46	130211	20.04 126.9E	PCN 3	T4.0/4.0 /01.0/24HRC	DMC07A		PGTW
47	130211	20.44 127.0E	PCN 3	T4.0/4.0 /01.5/24HRC	DMC07A		PGTW
48	130247	20.34 126.9E	PCN 3		DMC07A		PGTW
49	130247	20.74 127.0E	PCN 3		DMC07A		PGTW
50	130354	21.44 126.4E	PCN 4		DMC07A		PGTW
51	130354	21.44 126.7E	PCN 6		DMC07A		PGTW
52	131214	22.14 125.9E	PCN 5		DMC07A		PGTW
53	131311	22.34 125.4E	PCN 5		DMC07A		PGTW
54	131528	22.44 125.4E	PCN 3		DMC07A		PGTW
55	131528	22.74 125.4E	PCN 5		DMC07A		PGTW
56	132234	23.64 125.1E	PCN 5	T5.0/5.0 /01.0/21HRC	DMC07A		PGTW
57	132235	23.04 125.1E	PCN 5		DMC07A		PGTW
58	140056	23.34 124.0E	PCN 5		DMC07A		PGTW
59	140152	23.34 125.1E	PCN 1	T4.5/4.5 /00.5/24HRC	DMC07A		PGTW
60	140152	23.44 124.9E	PCN 3	T5.0/4.0 /00.5/24HRC	DMC07A		PGTW
61	140152	23.74 125.1E	PCN 3	T4.5/4.5	DMC07A	INIT JDS	PGTW
62	140228	23.44 124.9E	PCN 1		DMC07A		PGTW
63	140228	23.44 125.0E	PCN 1		DMC07A		PGTW
64	141115	24.74 125.0E	PCN 2		DMC07A		PGTW
65	141116	24.54 124.7E	PCN 2		DMC07A		PGTW
66	141252	24.74 124.9E	PCN 1		DMC07A		PGTW
67	141252	24.54 124.6E	PCN 3		DMC07A		PGTW
68	141348	24.54 124.5E	PCN 2		DMC07A		PGTW
69	141510	24.44 124.5E	PCN 3		DMC07A		PGTW
70	142214	24.44 124.8E	PCN 1	T5.5/4.5 /00.5/24HRC	DMC07A		PGTW
71	142215	24.44 124.7E	PCN 1		DMC07A		PGTW
72	140034	24.44 124.4E	PCN 3	T4.0/4.0 /00.5/21HRC	DMC07A		PGTW
73	140034	24.44 124.4E	PCN 3	T5.0/4.0 /00.5/21HRC	DMC07A		PGTW
74	140133	24.44 124.6E	PCN 3	T5.0/4.0 /50.0/24HRC	DMC07A		PGTW
75	140209	24.74 124.7E	PCN 3		DMC07A		PGTW
76	140210	24.44 124.4E	PCN 3		DMC07A		PGTW
77	140210	24.74 124.3E	PCN 3		DMC07A		PGTW
78	141055	27.24 123.8E	PCN 1		DMC07A		PGTW
79	141055	27.24 123.8E	PCN 2		DMC07A	PSN BADEN ON FVF	PGTW
80	141233	27.54 123.7E	PCN 1		DMC07A		PGTW
81	141233	27.64 123.6E	PCN 1		DMC07A		PGTW
82	141314	27.54 123.7E	PCN 1		DMC07A		PGTW
83	141320	27.54 123.8E	PCN 1		DMC07A		PGTW
84	141451	24.14 124.0E	PCN 3		DMC07A		PGTW
85	141451	27.34 123.8E	PCN 3		DMC07A		PGTW

85	140134	29.1N	121.4E	PCN 1	T5.0/5.0-740.0/24HRC	DMSP 17	
87	140155	29.2N	121.7E	PCN 1	T5.0/5.5 /40.5/24HRC	DMSP 17	PGTW
88	140200	29.7N	121.9E	PCN 1		DMSP 17	RPMK
89	140139	31.4N	121.7E	PCN 2		DMSP 17	PGTW
90	140151	30.1N	121.7E	PCN 1		DMSP 17	PGTW
91	140151	30.1N	121.5E	PCN 1	T5.0/5.0 /01.0/24HRC	DMSP 17	PGTW
92	140256	30.2N	121.7E	PCN 1	T5.0/5.0 /50.0/24HRC	DMSP 10	RK50
93	140256	30.1N	121.6E	PCN 1		DMSP 10	RODM
94	141035	31.3N	121.7E	PCN 1		DMSP 17	RK50
95	141035	31.6N	121.7E	PCN 1		DMSP 17	RPMK
96	141302	31.7N	121.8E	PCN 3		DMSP 17	RK50
97	141302	31.7N	121.8E	PCN 3		DMSP 17	PGTW
98	141356	32.5N	124.0E	PCN 3		DMSP 17	RK50
99	141431	32.2N	121.9E	PCN 3		DMSP 17	RODM
100	141432	32.2N	121.7E	PCN 3		DMSP 17	PGTW
101	141433	32.2N	121.8E	PCN 3		DMSP 17	RPMK
102	142134	33.5N	124.9E	PCN 3	T3.0/4.0-742.0/20HRC	DMSP 17	RK50
103	142135	33.5N	124.6E	PCN 3		DMSP 17	RK50
104	170002	33.9N	125.4E	PCN 3	T4.5/5.5 /40.5/21HRC	DMSP 17	RODM
105	170002	34.1N	125.2E	PCN 3		DMSP 17	RK50
106	170132	34.2N	125.7E	PCN 3	T3.0/4.0-742.0/27HRC	DMSP 17	PGTW
107	170132	34.3N	124.7E	PCN 3		DMSP 17	RK50
108	170226	34.5N	124.9E	PCN 3		DMSP 17	RK50
109	170237	34.4N	124.9E	PCN 3		DMSP 17	RPMK
110	171015	34.4N	124.3E	PCN 3		DMSP 17	RK50
111	171015	34.5N	124.2E	PCN 3		DMSP 17	PGTW
112	171015	34.4N	124.3E	PCN 3		DMSP 17	RPMK
113	171244	37.3N	129.1E	PCN 3		DMSP 17	RK50
114	171244	37.6N	129.0E	PCN 3		DMSP 17	PGTW
115	171337	37.4N	129.8E	PCN 3		DMSP 17	RPMK
116	171337	37.7N	130.0E	PCN 3		DMSP 17	RK50
117	171555	34.5N	130.9E	PCN 5		DMSP 17	PGTW
118	171556	34.5N	131.1E	PCN 5		DMSP 17	RK50
119	172114	41.5N	131.1E	PCN 5	T2.5/3.5 /42.0/22HRC	DMSP 17	RPMK
120	172114	41.5N	131.9E	PCN 5	T1.5/2.5 /41.5/24HRC	DMSP 17	RK50
121	172345	41.9N	131.5E	PCN 5		DMSP 17	RPMK
122	180114	43.5N	134.5E	PCN 5		DMSP 17	RK50
123	180218	42.9N	134.6E	PCN 5		DMSP 17	RPMK
124	180218	44.0N	135.1E	PCN 5		DMSP 17	RK50

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT I/L	70043 HGT	OBS MSLP	MAX-SFC-WIND VEL/ARG/RNG	MAX-FL1-LVL-4000 FT/VEL/DIR/4000	ACCRV NAV/MFT	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) DIR/ 1M/ 3P/5CT	WSR NO.
1	090008	17.4N 134.0E	1500FT	1077	996	45 220 35	740 15 220 20	3 1				1
2	090928	14.1N 134.5E	1500FT	1037	994	20 100 35	100 30 100 35	4 4			+13 +14 +25 29	2
3	091926	17.4N 134.6E	700MM	1074	998	20 100 35	100 30 100 35	4 4			+20 +25 +24	3
4	092122	14.3N 131.8E	1500FT	1074	998	20 270 70	140 20 270 70	4 12			+12 + 8	3
5	100716	14.1N 131.6E	700MM	1067	994	30 030 10	120 15 030 10	2 4			+25 +25 29	3
6	100914	14.4N 131.8E	700MM	1066	994	30 330 20	110 17 330 15	2 4				4
7	102207	17.4N 129.2E	1500FT	1065	996	30 210 50	110 30 050 120	4 4			+15 + 5	4
8	110512	16.4N 129.6E	700MM	1014	992	45 290 150	140 31 290 400	4 4			+20 +28	5
9	110812	17.7N 129.2E	700MM	994	984	25 290 30	120 28 290 120	2 4			+13 + 9	6
10	111316	17.3N 129.4E	700MM	992	989	50 190 120	140 45 090 60	4 10			+15 +12 + 8	7
11	112145	17.5N 129.3E	700MM	985	985	50 190 120	140 45 090 60	4 10			+14 +12	7
12	120716	14.5N 127.2E	700MM	907	979	55 280 55	140 48 280 65	2 4			+15 +13 + 9	7
13	120918	14.5N 127.0E	700MM	904	980	55 110 35	140 60 310 94	2 4			+13 + 8	8
14	121944	14.3N 127.2E	700MM	870	975	65 130 120	140 65 050 120	4 4			+11 +10 +11	8
15	122222	14.7N 124.4E	700MM	880	975	65 130 120	140 65 130 135	4 4			+16 +10	9
16	130644	21.2N 124.7E	700MM	843	972	70 020 120	140 61 020 110	4 1			+14 +15 +10	10
17	130908	21.5N 124.7E	700MM	833	969	75 130 30	170 52 330 100	4 2			+15 +15 +15	10
18	131312	21.8N 124.1E	700MM	774	964	70 230 30	220 53 130 60	4 4			+19 +11	11
19	132149	21.2N 124.3E	700MM	770	960	70 230 30	220 56 230 90	4 4			+14 +17 +12	11
20	140500	24.0N 124.4E	700MM	732	959	65 260 30	120 68 030 60	1 1			+20 +13	12
21	140950	24.2N 124.4E	700MM	717	954	75 130 150	210 63 140 40	1 4	CIRCULAR	30	+14 +19 +16	12
22	142143	24.5N 124.4E	700MM	705	956	75 130 150	220 65 140 140	10 6	CIRCULAR	30	+15 +15 +12	13
23	140520	27.0N 124.7E	700MM	711	957	60 020 120	110 65 020 60	10 5	CIRCULAR	20	+15 +16	14
24	140905	27.1N 121.9E	700MM	700	956	60 020 120	110 65 020 60	10 5	CIRCULAR	20	+14 +15 +16	14
25	142151	24.2N 124.4E	700MM	700	956	60 150 20	220 61 150 30	10 5	CIRCULAR	20	+14 +15 +16	15

DATA FIXES

FIX NO.	TIME (Z)	FIX POSITION	HAZAR	ACCRV	EYE SHAPE	EYE DIAM	HAZAR-COUE ACQUAN TOUFF	COMMENTS	HAZAR POSITION	QTF NO. NO.
1	131500	22.4N 124.4E	LAND				41112 11111		24.3N 124.2E	47918
2	131700	23.0N 124.4E	LAND				41112 43611		24.3N 124.2E	47918
3	131730	24.7N 124.3E	LAND	PTUM		4N	41112 52016	EYE HAZAR 3315	24.3N 124.3E	47918
4	131900	23.0N 124.1E	LAND				41112 51111		24.3N 124.2E	47918
5	131900	23.0N 124.1E	LAND				41112 51111		24.3N 124.3E	47918
6	131900	21.2N 124.3E	LAND				41112 51111		24.3N 124.3E	47918
7	131900	22.4N 124.1E	LAND				41112 51111		24.3N 124.2E	47918
8	132000	21.2N 124.3E	LAND				41112 51111		24.3N 124.2E	47918
9	132000	21.2N 124.3E	LAND				41112 51111		24.3N 124.2E	47918
10	132030	21.2N 124.3E	LAND	PTUM		4N	41112 52000		24.3N 124.3E	47918
11	132100	21.2N 124.1E	LAND				41112 52800		24.3N 124.3E	47918
12	132100	21.2N 124.3E	LAND				41112 51111		24.3N 124.3E	47918
13	132200	21.3N 124.2E	LAND				41112 53300		24.3N 124.2E	47918
14	132200	21.1N 124.1E	LAND				41112 51800		24.3N 124.2E	47918
15	132200	21.2N 124.3E	LAND	PTUM		4N	41112 53314	EYE HAZAR 0614	24.3N 124.3E	47918
16	132300	21.1N 124.0E	LAND				41112 53314		24.3N 124.3E	47918
17	132300	21.4N 124.2E	LAND				41112 73404		24.3N 124.2E	47918
18	132300	21.4N 124.1E	LAND	PTUM		4N	41112 73404	EYE HAZAR 3115	24.3N 124.3E	47918

19	140000	21.40	124.0E	LAND	P70H	EN	5/112 52911	EVE MNUA 3115	24.00	125.3E	47997
20	140000	21.40	124.0E	LAND			7/114 50000		24.30	124.2E	47918
21	140000	21.30	124.0E	LAND					24.00	125.3E	47997
22	140030	21.30	124.0E	LAND	P70H	EN		EVE MNUA 3220	24.00	125.3E	47997
23	140100	21.50	124.0E	LAND	P70H	EN		EVE MNUA 3215	24.00	125.3E	47997
24	140100	21.50	124.0E	LAND			7/114 53215		24.00	125.3E	47997
25	140100	21.50	124.0E	LAND			6/112 53108		24.30	124.2E	47918
26	140100	21.50	124.0E	LAND			6/113 05210		24.00	121.0E	46900
27	140200	21.50	124.0E	LAND	P70H	EN		EVE STNR	24.00	125.3E	47997
28	140200	21.40	124.7E	LAND			6/112 52511		24.30	124.2E	47918
29	140200	21.40	124.7E	LAND			6/114 52705		24.00	125.3E	47997
30	140200	21.40	124.0E	LAND			7/114 52421		24.00	121.0E	46900
31	140300	21.40	124.0E	LAND			6/114 50415		24.00	125.3E	47997
32	140300	21.40	124.7E	LAND			6/112 72905		24.30	124.2E	47918
33	140300	21.70	124.0E	LAND			7/114 50120		24.00	121.0E	46900
34	140400	21.90	124.1E	LAND			7/114 50103		24.00	121.0E	46900
35	140400	21.70	124.0E	LAND			6/112 50315		24.30	124.2E	47918
36	140400	21.90	124.0E	LAND			6/114 50200		24.00	125.3E	47997
37	140500	24.20	124.0E	LAND			7/114 53420		24.00	125.3E	47997
38	140500	24.00	124.0E	LAND			6/113 53514		24.00	125.3E	47997
39	140500	21.30	124.0E	LAND			6/112 53611		24.30	124.2E	47918
40	140500	24.30	124.0E	LAND			7/114 53407		24.00	121.0E	46900
41	140500	24.10	124.0E	LAND			6/113 50308		24.00	125.3E	47997
42	140500	24.10	124.0E	LAND	G70U	EN		EVE MNUA 3335	24.00	125.3E	47997
43	140500	24.10	124.7E	LAND			6/112 73612		24.30	124.2E	47918
44	140700	24.10	124.7E	LAND			7/113 52714		24.00	125.3E	47997
45	140700	24.20	124.0E	LAND	G70U	EN		EVE MNUA 3205	24.00	125.3E	47997
46	140700	24.20	124.0E	LAND			7/114 52407		24.00	121.0E	46900
47	140700	24.10	124.7E	LAND			6/112 73315		24.30	124.2E	47918
48	140900	24.10	124.7E	LAND			11/14 52105		24.00	121.0E	46900
49	140900	24.10	124.0E	LAND	G70U	EN		EVE STNR	24.00	125.3E	47997
50	140900	24.10	124.7E	LAND			6/112 73305		24.30	124.2E	47918
51	140900	24.10	124.7E	LAND			6/113 50000		24.00	125.3E	47997
52	140900	24.30	124.0E	LAND			7/113 50316		24.00	125.3E	47997
53	140900	24.20	124.0E	LAND			6/113 70004		24.30	124.2E	47918
54	141000	24.60	124.7E	LAND			7/113 53114		24.00	125.3E	47997
55	141100	24.50	124.7E	LAND			6/113 73507		24.30	124.2E	47918
56	141100	24.50	124.0E	LAND	FAIR	EN	6/113 63008	EVE MNUA 3220	24.00	125.3E	47997
57	141100	24.50	124.5E	LAND			6/113 50108		24.00	125.3E	47997
58	141200	24.50	124.0E	LAND			7/113 50108	EVE MNUA 3220	24.00	125.3E	47997
59	141200	24.50	124.5E	LAND	FAIR	EN	6/113 73407		24.00	125.3E	47997
60	141200	24.50	124.0E	LAND				EVE MNUA 3220	24.00	125.3E	47997
61	141200	24.50	124.0E	LAND					24.30	124.2E	47918
62	141235	24.10	124.0E	LAND	P70H	EN		EVE MNUA 3220	24.00	125.3E	47997
63	141235	24.40	124.2E	LAND	P70H	EN		EVE MNUA 3220	24.00	125.3E	47997
64	141300	24.40	124.5E	LAND	FAIR	EN	7/113 53608		24.00	125.3E	47997
65	141300	24.40	124.0E	LAND			6/113 53007		24.30	124.2E	47918
66	141300	24.70	124.0E	LAND			6/113 73005		24.00	127.0E	47991
67	141300	24.50	124.7E	LAND				EVE MNUA 3220	24.00	125.3E	47997
68	141310	24.50	124.4E	LAND	P70H	EN		EVE MNUA 3220	24.00	125.3E	47997
69	141400	24.40	124.5E	LAND	FAIR	EN	6/113 53605		24.00	125.3E	47997
70	141400	21.90	124.0E	LAND			6/113 73404		24.00	125.3E	47997
71	141400	24.70	124.0E	LAND					24.30	124.2E	47918
72	141445	24.40	124.0E	LAND	P70H	EN	6/113 73208		24.00	125.3E	47997
73	141500	24.40	124.5E	LAND			6/113 53211		24.00	125.3E	47997
74	141500	24.40	124.5E	LAND				EVE MNUA 3220	24.00	125.3E	47997
75	141500	25.10	124.3E	LAND	FAIR	EN	6/113 52705		24.00	125.3E	47997
76	141600	24.90	124.4E	LAND			7/114 52720		24.00	121.0E	46900
77	141600	25.00	124.2E	LAND			6/113 73306		24.30	124.2E	47918
78	141600	24.90	124.0E	LAND				EVE MNUA 3610	24.00	125.3E	47997
79	141600	25.20	124.4E	LAND	FAIR	EN	7/113 53311		24.00	125.3E	47997
80	141700	25.10	124.3E	LAND			6/112 73407		24.30	124.2E	47918
81	141700	25.00	124.5E	LAND				EVE MNUA 3510	24.00	125.3E	47997
82	141700	24.30	124.3E	LAND	FAIR	EN	6/113 53410		24.00	125.3E	47997
83	141700	25.10	124.4E	LAND			6/112 73608		24.30	124.2E	47918
84	141800	25.20	124.3E	LAND				EVE MNUA 3610	24.00	125.3E	47997
85	141900	25.20	124.5E	LAND					24.00	125.3E	47997
86	141900	25.30	124.4E	LAND	FAIR	EN		EVE MNUA 3610	24.00	125.3E	47997
87	141910	25.10	124.4E	LAND	FAIR	EN			24.00	125.3E	47997
88	141935	24.50	124.5E	LAND	P70H	EN	10/15 50316		24.00	127.0E	47991
89	141900	25.40	124.3E	LAND				EVE MNUA 3220	24.00	125.3E	47997
90	141900	25.30	124.2E	LAND	FAIR	EN		EVE STNR	24.00	125.3E	47997
91	142000	25.30	124.2E	LAND	FAIR	EN	7/113 50000		24.00	125.3E	47997
92	142000	25.30	124.2E	LAND			6/112 73507		24.00	125.3E	47997
93	142000	24.40	124.4E	LAND				P70H CNTR	24.30	124.2E	47918
94	142010	25.10	124.3E	LAND	P70H	EN	7/114 50509		24.00	127.0E	47991
95	142100	25.50	124.3E	LAND			6/112 73207		24.00	121.0E	46900
96	142100	25.40	124.4E	LAND				EVE MNUA 3610	24.00	125.3E	47997
97	142100	25.40	124.2E	LAND	FAIR	EN	7/113 50508		24.00	125.3E	47997
98	142100	25.40	124.3E	LAND				P70H CNTR	24.00	127.0E	47991
99	142135	25.50	124.2E	LAND	P70H	EN	6/113 50607		24.00	125.3E	47997
100	142200	25.50	124.4E	LAND			6/113 73303		24.30	124.2E	47918
101	142200	25.40	124.4E	LAND			7/114		24.00	121.0E	46900
102	142200	25.40	124.3E	LAND				EVE MNUA 3605	24.00	125.3E	47997
103	142200	25.50	124.3E	LAND	P70H	EN		P70H CNTR	24.00	127.0E	47991
104	142210	25.30	124.2E	LAND	P70H	EN		P70H CNTR	24.00	125.3E	47997
105	142235	24.30	124.4E	LAND	P70H	EN	6/112 73403		24.30	124.2E	47918
106	142300	24.50	124.4E	LAND			6/113 50311		24.00	125.3E	47997
107	142300	25.70	124.4E	LAND				EVE MNUA 3210	24.00	125.3E	47997
108	142300	21.90	124.3E	LAND	P70H	EN		P70H CNTR	24.00	127.0E	47991
109	142310	25.40	124.2E	LAND	P70H	EN		EVE MNUA 0220	24.00	125.3E	47997
110	140000	25.30	124.5E	LAND	P70H	EN	6/113 51415		24.30	124.2E	47918
111	140000	25.90	124.5E	LAND			6/112 70104		24.00	127.0E	47991
112	140000	25.40	124.4E	LAND							
113	140010	25.50	124.3E	LAND	P70H	EN					

114	150035	24.0N	124.3E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991
115	150100	24.0N	124.3E	LAND	PHUM	EVE MNRV 3220	26.3N	125.8E	47995
116	150135	24.2N	124.5E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47997
117	150200	24.6N	124.5E	LAND		47999 53611	26.4N	125.3E	47997
118	150200	24.2N	124.3E	LAND	PHUM	EVE MNRV 3620	26.3N	125.8E	47999
119	150235	24.6N	124.5E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991
120	150300	24.5N	124.4E	LAND		47997 53414	26.4N	125.3E	47997
121	150300	24.6N	124.3E	LAND	PHUR	EVE MNRV 3620	26.3N	125.8E	47999
122	150310	24.7N	124.7E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991
123	150500	27.9N	125.0E	LAND	GHUU	EVE MNRV 3120	24.4N	125.3E	47997
124	150600	27.2N	124.9E	LAND		47997 53226	24.4N	125.3E	47997
*125	150635	27.7N	124.2E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991
126	150700	27.2N	124.8E	LAND	FALM	EVE MNRV 2920	26.3N	125.8E	47999
*127	150710	27.9N	124.2E	LAND	PHUR	PSHL CNTM	26.4N	127.8E	47991
*128	150735	27.2N	125.0E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991
129	150900	27.1N	124.7E	LAND		47997 7290Y	24.4N	125.3E	47997
130	150900	27.2N	124.8E	LAND	FALM	EVE STNR	26.3N	125.8E	47999
131	150900	27.1N	124.8E	LAND		29073 50000	24.4N	125.3E	47997
132	150900	27.2N	124.9E	LAND	FALM	EVE STNR	26.3N	125.8E	47999
133	151000	27.1N	124.8E	LAND		57743 50000	24.4N	125.3E	47997
134	151100	27.3N	124.8E	LAND		57743 5360Y	24.4N	125.3E	47997
135	151100	27.2N	124.8E	LAND	FALM	EVE MNRV 3210	26.3N	125.8E	47999
136	151100	27.9N	124.8E	LAND	FALM	EVE MNRV 3210	26.2N	127.7E	47990
137	151200	27.5N	124.9E	LAND		47997 40211	24.4N	125.3E	47997
138	151200	27.5N	124.7E	LAND	FALM	EVE MNRV 3210	26.3N	125.8E	47999
139	151300	27.5N	124.9E	LAND		47997 50000	24.4N	125.3E	47997
140	151300	27.5N	124.8E	LAND	FALM	EVE MNRV 3610	26.3N	125.8E	47999
141	151400	27.5N	124.9E	LAND		47997 53606	24.4N	125.3E	47997
142	151400	27.3N	124.0E	LAND	GHUU	EVE MNRV 0215	26.3N	125.8E	47999
143	151500	27.3N	124.0E	LAND	GHUU	EVE MNRV 0120	26.3N	125.8E	47999
144	151700	24.3N	124.8E	LAND	GHUU	EVE MNRV 3620	26.3N	125.8E	47999
145	151900	24.5N	124.8E	LAND	PHUR	EVE MNRV 3620	26.3N	125.8E	47999
146	151930	24.3N	124.0E	ACFT		NAV ACCURACY 0NM			54824
147	152151	29.2N	124.8E	ACFT					54824
148	152335	25.6N	124.2E	LAND	PHUM	PSHL CNTM	26.4N	127.8E	47991

SUPER TYPHOON JUDY

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACFR.	JVTRAK CODE	SATELLITE	COMMENTS	SITE
1	151310	13.7N 150.1E	PCN 4		DMSP14		PGTW
2	152239	13.2N 140.4E	PCN 5	T0.0/0.0	DMSP14	INIT JDS	PGTW
3	151120	13.5N 145.4E	PCN 5		DMSP14		PGTW
4	152134	13.1N 144.1E	PCN 5		DMSP17	EDGE OF DATA	PGTW
5	170055	13.3N 143.2E	PCN 5	T3.0/3.0 /03.0/27HRS	DMSP14		PGTW
6	170132	13.3N 142.9E	PCN 4		DMSP14		PGTW
7	170133	14.1N 142.9E	PCN 5	T3.0/3.0	DMSP14	INIT JDS	RPWK
8	171015	13.3N 140.8E	PCN 5		DMSP17		PGTW
9	171155	14.4N 140.3E	PCN 5		DMSP14		PGTW
10	171414	14.8N 140.5E	PCN 5		DMSP14		PGTW
11	171414	14.9N 140.4E	PCN 6		DMSP14		RODN
12	172114	15.1N 139.7E	PCN 6		DMSP17		PGTW
13	172345	15.4N 139.6E	PCN 5	T4.0/4.0 /01.0/27HRS	DMSP14		PGTW
14	172345	15.4N 139.7E	PCN 3	T4.0/4.0	DMSP14	INIT JDS	RODN
15	180036	15.4N 139.5E	PCN 5		DMSP14		PGTW
16	180036	15.5N 139.5E	PCN 5	T4.0/4.0 /01.0/27HRS	DMSP14		RPWK
17	180114	15.4N 139.4E	PCN 5		DMSP14		PGTW
18	180954	14.6N 137.6E	PCN 6		DMSP17		PGTW
19	181226	14.7N 137.1E	PCN 5		DMSP14		PGTW
20	181355	17.1N 137.0E	PCN 5		DMSP14		PGTW
21	181355	14.5N 137.2E	PCN 5		DMSP14		RODN
22	181455	14.7N 137.0E	PCN 5		DMSP14		RPWK
23	182054	17.8N 134.1E	PCN 1		DMSP17		PGTW
24	182327	14.2N 135.8E	PCN 1	T6.0/6.0 /02.0/24HRS	DMSP14		PGTW
25	190159	14.5N 135.6E	PCN 1		DMSP14		PGTW
26	190237	14.4N 135.5E	PCN 1	T6.0/6.0 /01.5/24HRS	DMSP14		RPWK
27	190237	14.5N 135.5E	PCN 1		DMSP14		PGTW
28	190334	13.6N 134.9E	PCN 2		DMSP17		PGTW
29	191209	14.7N 134.0E	PCN 1		DMSP14		PGTW
30	191256	13.8N 134.7E	PCN 1		DMSP14		PGTW
31	191337	20.0N 114.8E	PCN 2		DMSP14		PGTW
32	191519	13.3N 134.7E	PCN 1		DMSP14		RPWK
33	191519	14.7N 134.6E	PCN 1		DMSP14		RODN
34	192034	20.5N 114.4E	PCN 5		DMSP17		PGTW
35	192309	21.3N 137.8E	PCN 1	T5.0/6.0 /41.0/24HRS	DMSP14		PGTW
36	200140	21.4N 137.8E	PCN 1	T7.0/7.0 /01.0/27HRS	DMSP14		RPWK
37	200140	21.5N 137.6E	PCN 1	T6.0/6.0	DMSP14	INIT JDS	RODN

38	200219	21.74	177.4E	PCN 1	040014	ROUN
39	200219	21.74	177.5E	PCN 1	040014	PGTW
40	200219	21.74	177.6E	PCN 2	040017	PGTW
41	201055	22.94	172.4E	PCN 4	040017	RPMK
42	201150	23.14	172.5E	PCN 5	040014	PGTW
43	201239	23.04	172.1E	PCN 5	040014	PGTW
44	201500	22.34	171.4E	PCN 2	040014	RPMK
45	201500	22.34	171.4E	PCN 1	040014	ROUN
46	201500	21.14	171.7E	PCN 1	040014	PGTW
47	202155	21.24	171.6E	PCN 3	13.0/6.0 /W2.0/20HRC	RPMK
48	202155	21.24	171.1E	PCN 3	040017	PGTW
49	210033	21.44	171.1E	PCN 3	13.0/5.0 /W1.0/20HRC	ROUN
50	210033	21.34	171.1E	PCN 3	13.0/5.0 /50.0/25HRC	PGTW
51	210121	21.44	170.4E	PCN 3	040014	ROUN
52	210121	21.44	170.4E	PCN 3	040014	RPMK
53	210121	21.34	170.4E	PCN 3	040014	PGTW
54	210200	21.54	170.4E	PCN 3	040014	PGTW
55	211036	24.34	170.4E	PCN 5	040017	ROUN
56	211036	24.34	170.7E	PCN 4	040017	PGTW
57	211220	24.64	170.6E	PCN 5	040014	PGTW
58	211316	24.54	170.3E	PCN 5	040014	PGTW
59	211441	24.34	170.2E	PCN 2	040014	RPMK
60	211442	24.34	170.2E	PCN 1	040014	ROUN
61	211442	24.74	170.0E	PCN 5	040014	PGTW
62	212135	24.54	170.2E	PCN 1	040017	ROUN
63	212135	24.44	170.1E	PCN 1	13.0/5.0 /50.0/24HRC	RPMK
64	212135	24.44	170.1E	PCN 2	040017	PGTW
65	220015	24.34	177.7E	PCN 3	14.5/5.0 /W0.5/24HRC	ROUN
66	220015	24.64	177.7E	PCN 3	14.5/4.5 /W0.5/24HRC	PGTW
67	220102	24.14	177.4E	PCN 3	040014	ROUN
68	220142	24.14	177.4E	PCN 3	040014	PGTW
69	220243	24.04	177.5E	PCN 3	040014	RPMS
70	220243	24.04	177.4E	PCN 3	040014	ROUN
71	221016	24.54	176.4E	PCN 6	040017	ROUN
72	221016	24.54	177.0E	PCN 6	040017	PGTW
73	221256	24.74	176.7E	PCN 3	040014	PGTW
74	221256	24.74	176.4E	PCN 3	040014	ROUN
75	221343	24.44	176.4E	PCN 4	040014	RPMS
76	221343	24.74	176.4E	PCN 5	040014	RPMS
77	221343	25.04	176.4E	PCN 5	040014	ROUN
78	221423	25.04	176.6E	PCN 5	040014	PGTW
79	222115	25.44	175.4E	PCN 3	040017	PGTW
80	222115	25.54	176.1E	PCN 3	040017	ROUN
81	222115	25.44	175.4E	PCN 2	040017	RPMS
82	222357	25.34	175.8E	PCN 5	13.0/5.0	RPMS
83	222357	24.44	175.5E	PCN 5	13.0/5.0 /W0.5/24HRC	PGTW
84	230224	24.54	175.2E	PCN 1	13.0/5.0 /50.0/24HRC	RPMS
85	230224	24.44	175.1E	PCN 1	13.0/5.0 /100.0/24HRC	ROUN
86	230224	24.44	175.3E	PCN 1	040014	RPMS
87	230305	24.54	175.1E	PCN 1	040014	RPMS
88	230955	27.24	171.4E	PCN 2	040017	ROUN
89	230955	27.54	171.4E	PCN 2	040017	PGTW
90	230955	27.34	171.0E	PCN 1	040017	RPMS
91	231136	27.34	171.7E	PCN 2	040017	PGTW
92	231238	27.64	171.7E	PCN 1	040014	ROUN
93	231238	27.24	171.7E	PCN 1	040014	RPMS
94	231324	27.44	171.6E	PCN 1	040014	RPMS
95	231324	27.44	171.7E	PCN 1	040014	RPMS
96	231547	27.44	171.3E	PCN 3	040014	ROUN
97	231547	27.54	171.3E	PCN 1	040017	RPMS
98	232236	24.44	171.2E	PCN 2	040017	ROUN
99	232236	24.74	171.0E	PCN 1	040017	PGTW
100	232338	24.54	172.7E	PCN 1	14.0/5.0 /W1.0/24HRC	RPMS
101	240120	24.04	172.1E	PCN 3	040014	RPMS
102	240205	24.04	172.7E	PCN 1	040014	PGTW
103	240205	24.04	172.5E	PCN 1	14.0/5.0 /W1.0/24HRC	RPMS
104	240205	24.04	172.6E	PCN 1	13.0/6.0 /W0.5/24HRC	RPMS
105	240246	24.14	172.6E	PCN 1	040014	RPMS
106	240247	24.14	172.7E	PCN 1	13.0/6.0 /W0.5/24HRC	ROUN
107	241117	24.94	172.6E	PCN 3	040017	RPMS
108	241117	24.74	172.4E	PCN 4	040017	PGTW
109	241305	30.14	172.6E	PCN 3	040014	RPMS
110	241401	30.34	172.4E	PCN 3	040014	RPMS
111	241525	30.24	172.5E	PCN 3	040014	RPMS
112	241528	30.14	172.5E	PCN 3	040014	ROUN
113	242216	30.54	172.9E	PCN 3	13.0/6.0 /W1.0/20HRC	RPMS
114	242216	30.54	172.4E	PCN 3	040017	ROUN
115	240102	30.24	171.0E	PCN 3	14.0/5.0 /W2.0/21HRC	RPMS
116	240146	31.04	171.2E	PCN 3	13.0/6.0 /W1.0/24HRC	PGTW
117	240228	31.04	171.3E	PCN 3	040014	RPMS
118	240228	31.04	171.4E	PCN 3	14.0/5.0 /W2.0/24HRC	ROUN
119	241056	31.44	174.3E	PCN 3	040017	RPMS
120	241056	31.34	174.0E	PCN 3	040017	ROUN
121	241246	32.04	174.4E	PCN 3	040014	RPMS
122	241246	31.74	174.4E	PCN 3	040014	PGTW
123	241344	31.64	174.4E	PCN 3	040014	RPMS
124	241310	31.34	174.4E	PCN 3	040014	PGTW
125	241310	31.44	174.5E	PCN 3	040014	ROUN
126	241310	31.14	174.7E	PCN 3	040014	RPMS
127	242155	32.14	174.4E	PCN 3	12.0/7.0 /W1.0/24HRC	RPMS
128	242156	32.54	174.1E	PCN 3	040017	ROUN
129	240045	32.44	171.5E	PCN 3	040014	RPMS
130	240127	31.64	174.2E	PCN 3	12.0/7.0 /W1.0/24HRC	PGTW
131	240210	32.04	174.4E	PCN 3	12.0/7.0 /W2.0/24HRC	ROUN
132	240210	31.74	174.5E	PCN 3	040014	PGTW
133	240210	32.34	172.7E	PCN 3	12.0/7.0 /W2.0/25HRC	RPMS
134	241036	34.64	170.4E	PCN 4	040017	ROUN
135	241036	31.34	170.1E	PCN 3	040017	RPMS

CI 0004

INIT JDS

136	241227	34.4N 124.5E	PCN J	DMC030	RKSO
137	241227	34.4N 124.7E	PCN J	DMC030	POTW
138	241325	34.3N 124.7E	PCN S	DMC034	QPMK
139	241451	34.3N 124.0E	PCN S	DMC034	RKSO
140	241451	34.2N 124.0E	PCN S	DMC034	RODM

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	THREAT	SBS MSPL	MAX-SFC-WVD VEL/ARG/RNG	MAX-FLT-LVL-RNG DTH/VEL/ARG/RNG	ACCPY NAV/MET	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) DUT/ IW DP/SET	WSN NO.
1	142341	11.4N 147.5E	700MM	100R	398	35 110 70	000 54 030 14 3 4				+14 +12 +12	2
2	170303	14.0N 147.7E	700MM	100R	395	35 360 15	000 46 350 90 3 10				+11 +11 +11	2
3	170505	14.2N 147.2E	700MM	1024	394	40 090 16	000 46 090 14 4 10				+10 +11 +10	2
4	172048	14.3N 130.5E	700MM	2992	387	70 090 15	170 61 090 10 4 2	CIRCULAR	10		+11 +12 +10	26 3
5	140554	14.3N 130.2E	700MM	2707	956	55 270 10	070 84 260 4 1 3	CIRCULAR	6		+15 +11 +11	4
6	140945	14.6N 137.4E	700MM	2717	956	65 320 5	340 90 330 4 2 2	CIRCULAR	5		+13 +18 +10	4
7	141932	17.7N 146.3E	700MM	2411	922		340 93 280 4 3 2				+18 +17 +17	5
8	142143	17.9N 136.2E	700MM	2336	314	55 260 12	320 90 260 7 1 1	CIRCULAR	5		+14 +23 +18	5
9	141036	19.5N 134.4E	700MM	2295	309		280 92 170 15 4 3	CIRCULAR	7		+14 +15 +15	6
10	141921	20.7N 134.3E	700MM	2121	RR9		270 108 180 4 4 2				+34 +18 +18	7
11	142145	21.0N 134.0E	700MM	2091	RR7	70 060 15	340 110 270 4 4 2	CIRCULAR	5		+14 +24 +15	7
12	200500	22.1N 133.1E	700MM	2291	90R	130 030 3	120 136 030 3 2 2				+18 +18 +18	8
13	240943	27.5N 133.0E	700MM	2380	919	50 280 40	340 110 270 10 2 2	CIRCULAR	7		+18 +19 +15	8
14	242259	27.3N 131.2E	700MM	2279	940	100 020 30	020 84 120 14 4 4	CIRCULAR	10		+19 +18 +12	9
15	210300	23.5N 130.6E	700MM	2611	945	30 010 10	070 98 010 30 4 10	CIRCULAR	25		+18 +19 +14	9
16	210503	24.2N 130.5E	700MM	2613	945	100 360 10	250 75 170 40 10 5				+20 +15 +15	10
17	210942	24.2N 130.2E	700MM	2614	944	100 360 10	340 76 270 30 4 2	CIRCULAR	30		+14 +18 +15	10
18	212206	24.2N 129.2E	700MM	2679	952	45 140 20	110 71 360 154 4 2				+16 +16 +16	11
19	250117	24.3N 127.4E	700MM	2679		45 150 15	140 81 260 30 4 2				+18 +16 +16	11
20	250247	24.3N 127.6E	700MM	2684	951	35 030 35	120 78 030 120 4 2				+18 +17 +17	11
21	250550	24.2N 127.3E	700MM	2679	953		120 78 020 143 4 3				+16 +15 +15	12
22	250959	24.1N 127.2E	700MM	2664	949	35 100 15	290 74 220 62 4 4	CIRCULAR	35		+14 +15 +15	12
23	251932	24.2N 126.2E	700MM	2634	948		110 91 050 90 2 8				+18 +18 +15	13
24	252200	24.5N 125.4E	700MM	2667	946	55 120 150	180 75 120 90 3 10	CIRCULAR	20		+19 +18 +15	13
25	210500	24.4N 124.3E	700MM	2669	952	55 080 130	120 65 080 14 4 2				+15 +15 +15	14
26	210918	27.1N 124.2E	700MM	2669	950	40 140 140	210 65 140 30 4 4	CIRCULAR	15		+16 +16 +15	14

RAJAW FIXES

FIX NO.	TIME (Z)	FIX POSITION	RAJAW	ACCPY	EYE SHAPE	EYE DIAM	RAJAW-CODE ASWAN TDOFF	COMMENTS	RAJAW POSITION	STP WND NO.
1	141535	17.1N 144.1E	LAND	FAIR				NFG WALL CLD	13.6N 144.9E	01218
2	141710	17.2N 144.9E	LAND	FAIR	ELLIPTICAL			AXIS 10/4	13.6N 144.9E	01218
3	141935	17.5N 144.5E	LAND						13.6N 144.9E	01218
4	142010	17.5N 144.2E	LAND	FAIR	CIRCULAR	35		CNTR OPEN SW-N	13.6N 144.9E	01218
5	142135	17.8N 147.4E	LAND	FAIR	CIRCULAR	30		NFG WALL CLD OPEN SW AND NE	13.6N 144.9E	01218
6	210500	27.6N 130.3E	LAND				30R/4 6777		26.1N 127.7E	47997
7	210700	24.0N 130.4E	LAND				30R/2 53022		26.1N 127.7E	47997
8	210900	24.0N 130.2E	LAND				3577 52709		26.1N 127.7E	47997
9	210900	24.2N 130.2E	LAND	GROD		40			26.1N 127.7E	47997
10	210900	24.1N 130.1E	LAND				3577 53010		26.1N 127.7E	47997
11	210900	24.1N 130.1E	LAND	GROD		40			26.1N 127.7E	47997
12	211000	24.1N 129.4E	LAND	GROD		36			26.1N 127.7E	47997
13	211100	24.0N 129.4E	LAND				3577 52412	EYE MOVN 2820	26.1N 127.7E	47997
14	211100	24.1N 129.7E	LAND	FAIR		40			26.1N 127.7E	47997
15	211200	24.0N 129.4E	LAND				5777 72611	EYE MOVN 2720	26.1N 127.7E	47997
16	211200	24.1N 129.5E	LAND	FAIR		40			26.1N 127.7E	47997
17	211300	24.0N 129.3E	LAND				5777 72710	EYE MOVN 2720	26.1N 127.7E	47997
18	211300	24.1N 129.4E	LAND						26.1N 127.7E	47997
19	211400	24.1N 129.2E	LAND				5777 72707	EYE MOVN 2720	26.1N 127.7E	47997
20	211400	24.1N 129.2E	LAND						26.1N 127.7E	47997
21	211500	24.1N 129.1E	LAND				5777 72806	EYE MOVN 2720	26.1N 127.7E	47997
22	211500	24.1N 129.1E	LAND	PJDR			5777 70408	EYE MOVN 2720	26.1N 127.7E	47997
23	211500	24.1N 129.2E	LAND						26.1N 127.7E	47997
24	211500	24.1N 129.4E	LAND	PJDR			5777 73107	EYE MOVN 2720	26.1N 127.7E	47997
25	211700	24.3N 129.4E	LAND						26.1N 127.7E	47997
26	211700	24.2N 129.7E	LAND	PJDR			3577 73301	EYE MOVN 2720	26.1N 127.7E	47997
27	211800	24.1N 129.4E	LAND						26.1N 127.7E	47997
28	211900	24.2N 129.5E	LAND	PJDR			2577 72909	EYE MOVN 2720	26.1N 127.7E	47997
29	211900	24.3N 129.7E	LAND						26.1N 127.7E	47997
30	211910	24.2N 129.5E	LAND	PJDR				EYE STND	26.1N 127.7E	47997
31	212000	24.3N 129.6E	LAND				6777 72706		26.1N 127.7E	47997
32	212000	24.4N 129.5E	LAND						26.1N 127.7E	47997
33	212100	24.1N 129.3E	LAND	GROD		40			26.1N 127.7E	47997
34	212100	24.4N 129.3E	LAND	PJDR			6777 72611		26.1N 127.7E	47997
35	212200	24.2N 129.2E	LAND				5777 72609	EYE MOVN 2715	26.1N 127.7E	47997
36	212200	24.3N 129.3E	LAND	PJDR					26.1N 127.7E	47997
37	212300	24.3N 129.0E	LAND	PJDR					26.1N 127.7E	47997
38	220000	24.1N 127.9E	LAND				5777 72808	EYE MOVN 2720	26.1N 127.7E	47997
39	220000	24.1N 127.9E	LAND	PJDR					26.1N 127.7E	47997
40	220100	24.1N 127.7E	LAND	PJDR					26.1N 127.7E	47997
41	220200	27.0N 127.5E	LAND				7777 72719		26.1N 127.7E	47997
42	220300	24.2N 127.5E	LAND				7777 72507		26.1N 127.7E	47997
43	220300	24.3N 127.2E	LAND	PJDR				EYE MOVN 2320	26.1N 127.7E	47997
44	220400	24.1N 127.2E	LAND				22704 5777		24.8N 123.3E	47997
45	220400	24.1N 127.4E	LAND				7777 72511		26.1N 127.7E	47997
46	220500	24.1N 127.1E	LAND				6777 50000		24.3N 124.2E	47918
47	220500	24.2N 127.2E	LAND				22R14 53306		24.4N 125.3E	47997
48	220500	24.1N 127.3E	LAND				5777 72405		26.1N 127.7E	47997

49	220500	24.34	127.3E	LAND	GRUU	70	6111 51204	EVE MNUA 0920	26.14	127.7E	67337
50	220600	24.04	127.1E	LAND		70	6111 72200	EVE STNR	24.34	124.2E	67318
51	220600	24.34	127.3E	LAND	GRUU		6111 71804		26.14	127.7E	67337
52	220600	24.24	127.2E	LAND					26.14	127.7E	67337
53	220700	24.34	127.1E	LAND					24.34	124.2E	67318
54	220700	24.14	127.0E	LAND	PRUH		6111 73404	EVE MNUA 2430	26.14	127.7E	67337
55	220800	24.34	127.2E	LAND			220803 6111		26.14	127.7E	67337
56	220800	24.14	127.2E	LAND			6111 71504		24.34	124.2E	67318
57	220800	24.04	127.1E	LAND					26.14	127.7E	67337
58	220800	24.14	127.0E	LAND	PRUH			EVE STNR	24.34	124.2E	67318
59	220835	24.34	127.2E	LAND	PRUH				26.14	127.7E	67337
60	220900	24.14	127.0E	LAND	PRUH			EVE STNR	26.44	127.8E	67337
61	220900	24.34	127.2E	LAND			21073 53001		26.14	127.7E	67337
62	220900	24.34	127.2E	LAND			21073 73005		24.34	124.2E	67318
63	220910	24.34	127.2E	LAND	PRUH		220903 53005		26.14	127.7E	67337
64	221000	24.44	127.2E	LAND					26.44	127.8E	67337
65	221035	24.34	127.0E	LAND	PRUH		21073 52711		26.14	127.7E	67337
66	221100	24.44	127.0E	LAND			7111 73204	EVE MNUA 2420	26.14	127.7E	67337
67	221100	24.44	127.0E	LAND	PRUH				26.44	127.8E	67337
68	221100	24.44	127.3E	LAND					26.14	127.7E	67337
69	221110	24.14	124.0E	LAND	PRUH				26.44	127.8E	67337
70	221135	24.44	127.0E	LAND	PRUH			EVE MNUA 3525	26.44	127.8E	67337
71	221200	24.44	124.0E	LAND	PRUH		2111 72900		26.14	127.7E	67337
72	221200	24.54	124.0E	LAND			21044 53414		26.14	127.7E	67337
73	221200	24.44	124.0E	LAND					24.34	124.2E	67318
74	221210	24.44	127.0E	LAND	PRUH				24.34	124.2E	67318
75	221235	24.54	124.0E	LAND	PRUH		2212 52814	EVE MNUA 3020	26.14	127.7E	67337
76	221300	24.74	124.7E	LAND			2112 73011		26.14	127.7E	67337
77	221300	24.74	124.7E	LAND	GRUU				26.44	127.8E	67337
78	221300	24.44	124.0E	LAND					26.14	127.7E	67337
79	221310	24.74	124.0E	LAND	PRUH				26.44	127.8E	67337
80	221335	24.44	124.0E	LAND	PRUH		6111 73111	EVE MNUA 3020	26.14	127.7E	67337
81	221400	24.64	124.0E	LAND			6111 73111		26.44	127.8E	67337
82	221400	24.74	124.0E	LAND			2111 72900		24.34	124.2E	67318
83	221400	24.74	124.0E	LAND	GRUU		6111 73111		24.34	124.2E	67318
84	221400	24.74	124.0E	LAND					26.14	127.7E	67337
85	221410	24.74	124.7E	LAND	PRUH				26.14	127.7E	67337
86	221435	24.44	124.0E	LAND	PRUH				26.44	127.8E	67337
87	221500	24.74	124.3E	LAND	GRUU		6111 73010	EVE MNUA 2710	26.14	127.7E	67337
88	221500	24.74	124.4E	LAND			2111 52911		26.14	127.7E	67337
89	221500	24.44	124.0E	LAND			6111 00000		24.34	124.2E	67318
90	221500	24.44	124.0E	LAND					26.14	127.7E	67337
91	221510	24.74	124.7E	LAND	PRUH				26.44	127.8E	67337
92	221535	24.74	124.7E	LAND	FAIR				26.14	127.7E	67337
93	221600	24.74	124.7E	LAND	GRUU		2111 53101	EVE MNUA 3220	26.14	127.7E	67337
94	221600	24.44	124.0E	LAND			6111 53310		24.34	124.2E	67318
95	221600	24.74	124.4E	LAND					26.44	127.8E	67337
96	221610	24.34	124.0E	LAND	FAIR				26.44	127.8E	67337
97	221635	25.04	124.0E	LAND	FAIR				26.14	127.7E	67337
98	221700	24.34	124.2E	LAND	GRUU			EVE MNUA 3520	26.14	127.7E	67337
99	221700	24.74	124.3E	LAND			6111 73004		24.34	124.2E	67318
100	221700	24.34	124.3E	LAND			6111 73004		26.14	127.7E	67337
101	221700	25.04	124.3E	LAND			21013 53400		26.14	127.7E	67337
102	221710	25.44	124.7E	LAND	PRUH				26.44	127.8E	67337
103	221735	25.34	124.7E	LAND	FAIR				26.44	127.8E	67337
104	221800	25.04	124.2E	LAND			21014 52904		24.34	124.2E	67318
105	221800	24.34	124.2E	LAND			6111 73203		26.14	127.7E	67337
106	221800	25.04	124.1E	LAND	GRUU			EVE MNUA 3510	26.14	127.7E	67337
107	221900	24.34	124.1E	LAND			6111 73201		24.34	124.2E	67318
108	221900	25.04	124.7E	LAND			6111 73405		24.34	124.2E	67318
109	221900	25.04	124.3E	LAND			6111 73504		26.14	127.7E	67337
110	221900	25.04	124.0E	LAND	GRUU			EVE MNUA 3510	26.14	127.7E	67337
111	221900	25.14	124.2E	LAND			21013 50108		26.14	127.7E	67337
112	221910	25.14	124.2E	LAND	PRUH				24.34	124.2E	67318
113	221935	25.34	124.2E	LAND	PRUH				26.44	127.8E	67337
114	222000	25.34	124.1E	LAND			7111 73410		26.14	127.7E	67337
115	222000	24.34	124.3E	LAND			6111 73512		24.34	124.2E	67318
116	222000	24.34	124.2E	LAND			22013 53512		24.34	124.2E	67318
117	222010	25.44	124.1E	LAND	PRUH				24.34	124.2E	67318
118	222100	24.54	124.0E	LAND			7111 73410		26.44	127.8E	67337
119	222100	24.54	124.2E	LAND			22113 53514		26.14	127.7E	67337
120	222100	25.34	124.2E	LAND			6111 73511		24.34	124.2E	67318
121	222110	25.44	124.1E	LAND	PRUH				26.44	127.8E	67337
122	222135	25.74	124.1E	LAND	PRUH				26.14	127.7E	67337
123	222200	25.74	124.0E	LAND			7111 73410		26.44	127.8E	67337
124	222200	25.54	124.0E	LAND			6111 73308		24.34	124.2E	67318
125	222200	25.74	124.0E	LAND			6111 53219		26.14	127.7E	67337
126	222235	24.04	124.1E	LAND	FAIR				24.34	124.2E	67318
127	222300	24.04	124.7E	LAND			7111 73315		26.44	127.8E	67337
128	222300	24.54	124.0E	LAND			6111 73104		26.14	127.7E	67337
129	222300	24.34	124.0E	LAND			6111 53412		24.34	124.2E	67318
130	222310	24.24	124.1E	LAND	FAIR				26.44	127.8E	67337
131	222335	24.14	124.1E	LAND	FAIR				26.14	127.7E	67337
132	220000	24.14	124.0E	LAND			6111 53030		26.44	127.8E	67337
133	220000	24.04	124.0E	LAND			6111 73325		24.34	124.2E	67318
134	220010	24.14	124.1E	LAND	FAIR				26.14	127.7E	67337
135	220035	24.24	124.1E	LAND	FAIR				26.44	127.8E	67337
136	220100	24.44	124.0E	LAND			10404 53012		24.34	124.2E	67318
137	220100	24.34	124.1E	LAND			6111 73116		26.14	127.7E	67337
138	220110	24.34	124.0E	LAND	PRUH				26.44	127.8E	67337
139	220135	24.44	124.0E	LAND	PRUH				26.14	127.7E	67337
140	220200	24.44	124.2E	LAND			20414 52816		24.34	124.2E	67318
141	220200	24.54	124.0E	LAND			6111 73312		26.14	127.7E	67337
142	220210	24.34	124.0E	LAND	PRUH				26.44	127.8E	67337
143	220235	24.44	124.0E	LAND	PRUH				26.14	127.7E	67337
144	220300	24.54	124.0E	LAND			20224 53113		24.34	124.2E	67318
145	220300	24.44	124.0E	LAND			6111 73115		26.14	127.7E	67337
146	220310	24.44	124.0E	LAND	PRUH				26.44	127.8E	67337
147	220335	24.74	124.2E	LAND	PRUH				26.14	127.7E	67337

NO.	TIME	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS	NO.	TIME	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
148	210400	24.7N 124.4E	LAND			26.1W	127.7E	47997			
149	210400	24.4N 124.4E	LAND			26.4W	125.3E	47997			
150	210400	24.4N 124.7E	LAND			26.4W	125.3E	47997			
151	210410	24.4N 124.7E	LAND			26.4W	127.8E	47997			
152	210430	24.4N 124.4E	LAND			26.4W	127.8E	47997			
153	210500	27.0N 124.4E	LAND			26.4W	127.8E	47997			
154	210500	27.1N 124.4E	LAND			26.1W	127.7E	47997			
155	210500	24.4N 124.4E	LAND			26.4W	125.3E	47997			
156	210510	24.4N 124.4E	LAND			26.4W	125.3E	47997			
157	210530	24.4N 124.4E	LAND			26.4W	127.8E	47997			
158	210500	24.4N 124.4E	LAND			26.4W	127.8E	47997			
159	210700	24.4N 124.4E	LAND			26.4W	125.3E	47997			
160	210700	24.4N 124.3E	LAND			26.4W	125.3E	47997			
161	210900	27.2N 124.2E	LAND			26.4W	125.3E	47997			
162	210900	24.4N 124.1E	LAND			26.4W	125.3E	47997			
163	210900	27.0N 124.0E	LAND			26.4W	125.3E	47997			
164	210900	27.0N 124.1E	LAND			26.4W	125.3E	47997			
165	211000	27.1N 124.0E	LAND			26.4W	125.3E	47997			
166	211100	27.2N 124.7E	LAND			26.4W	125.3E	47997			
167	211100	27.2N 124.7E	LAND			26.4W	125.3E	47997			
168	211200	27.2N 124.7E	LAND			26.4W	125.3E	47997			
169	211200	27.3N 124.7E	LAND			26.4W	125.3E	47997			
170	211300	27.4N 124.6E	LAND			26.4W	125.3E	47997			
171	211300	27.5N 124.6E	LAND			26.4W	125.3E	47997			
172	211400	27.6N 124.5E	LAND			26.4W	125.3E	47997			
173	211500	27.7N 124.5E	LAND			26.4W	125.3E	47997			
174	211500	27.7N 124.3E	LAND			26.4W	125.3E	47997			
175	211700	27.4N 124.3E	LAND			26.4W	125.3E	47997			
176	211900	24.4N 124.2E	LAND			26.4W	125.3E	47997			
177	211900	24.1N 124.0E	LAND			26.4W	125.3E	47997			

SYNOPTIC FIXES

FIX NO.	TIME	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	140000	9.0N 154.0E	015	250	
2	141200	11.5N 150.0E	020	250	

TROPICAL DEPRESSION 14

CATELITE FIXES

FIX NO.	TIME	FIX POSITION	ACCR	OVERLAP CODE	SATellite	COMMENTS	SITE
1	141435	12.7N 148.2E	PCN 6		DMSP	PSN BSU ON MK INL CONV ACTIVITY	KGWC
2	170552	14.7N 147.3E	PCN 6		DMSP		PHIK
3	170921	14.4N 147.3E	PCN 6		DMSP		PHIK
4	171233	14.4N 147.7E	PCN 6		DMSP		PGTW
5	172203	13.4N 146.5E	PCN 3	T1.0/1.0	DMSP	INIT OBS	KGWC
6	172333	13.4N 146.4E	PCN 4	T0.5/0.5 /50.0/24HRS	DMSP		KGWC
7	140813	14.3N 147.0E	PCN 6		DMSP		PGTW
8	141044	14.4N 145.4E	PCN 6		DMSP		PGTW
9	141214	14.2N 145.9E	PCN 6		DMSP		PGTW
10	141214	14.4N 145.4E	PCN 6		DMSP		KGWC
11	141912	14.4N 147.6E	PCN 6		DMSP		KGWC
12	141913	14.4N 145.2E	PCN 3	T1.0/1.0 /50.0/24HRS	DMSP		PGTW
13	142145	15.4N 144.8E	PCN 5		DMSP		PGTW
14	142236	15.4N 144.2E	PCN 6		DMSP		PHIK
15	142314	14.3N 144.2E	PCN 6	T1.0/1.0 /00.5/24HRS	DMSP		KGWC
16	140753	17.7N 147.7E	PCN 6		DMSP		PGTW
17	140753	19.1N 147.4E	PCN 6		DMSP		KGWC
18	141026	14.2N 147.0E	PCN 6		DMSP		PGTW
19	141117	14.4N 147.4E	PCN 6		DMSP		PGTW
20	141155	20.4N 147.4E	PCN 6		DMSP		KGWC
21	141127	22.0N 141.1E	PCN 5	T0.0/0.0 /41.0/24HRS	DMSP		PGTW
22	142358	22.1N 140.7E	PCN 5		DMSP		PGTW
23	240037	22.4N 140.8E	PCN 5		DMSP		PGTW

AIRCRAFT FIXES

FIX NO.	TIME	FIX POSITION	FLT LVL	70049 OBS MSLP	MAX-SPC-WND VEL/ARG/RWG	MAX-FLT-LVL-WND NTP/VEL/BNG/MNR	ACCR	EYE SHAPE	EYE ORIENTATION	REF TEMP (C)	WSN NO.
1	140026	13.4N 144.6E	1500FT	1007	25 130 50	140 25 060 120	4 10			25 24	1
2	140539	17.4N 143.9E	1500FT	1009	10 120 75	110 15 110 34	4 5			24 24	3
3	240100	14.7N 140.5E	7000B	1165		140 15 230 10	4 40				4

SYNOPTIC FIXES

FIX NO.	TIME	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	140000	12.0N 148.0E	15	300	
2	170000	13.0N 148.0E	15	300	

TROPICAL STORM KEN

CATELITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	UNSPAK CODE	SATellite	COMMENTS	SITE
1	012136	24.7N 133.0E	PCV 5		DMSP17	INIT JDS	PGTW
2	010115	24.4N 133.0E	PCV 5	11.0/1.0	DMSP14		PGTW
3	010200	24.2N 133.3E	PCV 5		DMSP14		PGTW
4	010200	24.2N 133.4E	PCV 4	11.3/1.0	DMSP14	INIT JDS	ROUN
5	011016	24.3N 133.0E	PCV 4		DMSP17		PGTW
6	011016	24.3N 133.2E	PCV 4		DMSP17		ROUN
7	011214	24.1N 133.5E	PCV 5		DMSP14		PGTW
8	011320	24.1N 133.7E	PCV 5		DMSP14		PGTW
9	011442	24.2N 133.1E	PCV 5		DMSP14		PGTW
10	012115	24.2N 133.2E	PCV 3	11.0/1.0 /50.0/20HRC	DMSP17		PGTW
11	020020	24.7N 133.7E	PCV 3		DMSP14		PGTW
12	020055	24.4N 133.4E	PCV 4		DMSP14		PGTW
13	020141	24.7N 133.1E	PCV 3		DMSP14		PGTW
14	020142	24.2N 133.2E	PCV 3	11.0/1.0 /50.0/20HRC	DMSP14		ROUN
15	020455	27.2N 131.3E	PCV 4		DMSP17		PGTW
16	021302	27.7N 131.1E	PCV 5		DMSP14		PGTW
17	021423	24.4N 131.2E	PCV 5		DMSP14		PGTW
18	022055	24.4N 131.0E	PCV 5	11.5/1.5	DMSP17	INIT JDS	RPMK
19	022055	24.5N 130.2E	PCV 5		DMSP17		PGTW
20	030002	24.1N 129.0E	PCV 5	12.5/2.5-111.5/2THRC	DMSP14		RPMK
21	030123	24.2N 129.5E	PCV 3		DMSP14		PGTW
22	030123	24.2N 129.0E	PCV 5		DMSP14		PGTW
23	030217	24.1N 129.0E	PCV 5	13.0/3.0-112.0/20HRC	DMSP14		ROD4
24	030217	24.2N 130.1E	PCV 5	13.0/3.0	DMSP14	INIT JDS	RKS1
25	030335	30.7N 130.1E	PCV 6		DMSP17		ROD4
26	030336	31.1N 130.1E	PCV 5		DMSP17		PC1W
27	031117	30.7N 130.0E	PCV 5		DMSP17		ROUN
28	031204	31.4N 131.0E	PCV 5		DMSP14		PGTW
29	031317	31.7N 131.0E	PCV 3		DMSP14		RPMK
30	031316	31.7N 131.0E	PCV 5		DMSP14		PGTW
31	031404	32.0N 131.0E	PCV 3		DMSP14		RKS0
32	031405	31.7N 131.2E	PCV 5		DMSP14		PGTW
33	031405	31.4N 131.3E	PCV 6		DMSP14		ROUN
34	031546	32.1N 131.3E	PCV 6		DMSP14		ROUN
35	031546	32.4N 131.7E	PCV 5		DMSP14		RKS0
36	032035	32.3N 132.0E	PCV 3		DMSP17		ROUN
37	032035	32.3N 132.2E	PCV 4		DMSP17		PGTW
38	032035	31.1N 132.1E	PCV 3		DMSP17		RKS0
39	032344	33.4N 133.0E	PCV 3	12.5/2.5-111.0/2THRC	DMSP14		RPMK
40	032344	33.4N 133.1E	PCV 3	11.0/2.0 /11.5/20HRC	DMSP14		PGTW
41	040125	34.3N 134.0E	PCV 6		DMSP10	FINALED 007	PGTW

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	FOUNT HGT	DOS MSLP	MAX-SFC-WND VFL/4RG/RNG	MAX-FLT-LVL-WND WAT/VFL/4RG/RNG	ACCRV NAV/MET	EYE SHAPE	EYE ORIENT- DIRM/TATION	EYE TEMP (C) DIR/ 1W DP/RET	WSN NO.
1	012105	24.4N 132.1E	1500F1		39H	60 030	40 170	33 080	44	2 4	+25 +25	1
2	020720	27.4N 131.0E	700MB	3084	377	50 200	40 220	55 200	60	4 20	+16 +18 +18	2
3	022132	24.3N 131.0E	700MB	3084	398	15 030	50 130	38 030	120	2 4	+11 +12 + 9	4
4	030725	30.3N 130.0E	700MB	3084	408	50 090	5 210	65 110	40	2 10	+14 +12 + 2	5
5	030713	30.7N 130.7E	700MB	3074	39H	50 180	10 210	65 130	40	2 14	+13 +12 + 2	5

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRV	EYE SHAPE	EYE DIRM	RADAR-CODE ARNAM TDDFF	COMMENTS	RADAR POSITION	QTY WMO NO.
1	012000	24.0N 130.0E	LAND				AS// 50113		28.4N 129.5E	47000
2	020700	24.7N 131.2E	LAND				AS// 50113		28.4N 129.5E	47000
3	020800	24.2N 131.2E	LAND				AS// 53512		28.4N 129.5E	47000
4	020900	27.1N 131.1E	LAND				AS// 53513		28.4N 129.5E	47000
5	021000	27.3N 130.0E	LAND				AS// 53113		28.4N 129.5E	47000
6	021100	27.3N 130.7E	LAND				AS// 52011		28.4N 129.5E	47000
7	021200	27.2N 130.0E	LAND				AS// 52300		28.4N 129.5E	47000
8	021300	24.4N 130.0E	LAND				AS// 51808		28.4N 129.5E	47000
9	021400	27.1N 130.0E	LAND				AS// 53512		28.4N 129.5E	47000
10	021500	27.2N 130.5E	LAND				AS// 53211		28.4N 129.5E	47000
11	021600	27.4N 130.4E	LAND				AS// 53511		28.4N 129.5E	47000
12	021700	27.4N 130.5E	LAND				AS// 50211		28.4N 129.5E	47000
13	021800	27.7N 130.0E	LAND				AS// 50106		28.4N 129.5E	47000
14	021900	27.4N 130.5E	LAND				AS// 53008		28.4N 129.5E	47000
15	022100	24.2N 130.0E	LAND				AS// 50211		28.4N 129.5E	47000
16	022200	24.4N 130.7E	LAND				AS// 50113		28.4N 129.5E	47000
17	022300	24.4N 130.0E	LAND				AS// 53308		28.4N 129.5E	47000
18	030000	24.4N 130.0E	LAND				AS// 53310		28.4N 129.5E	47000
19	030100	24.0N 130.2E	LAND				AS// 53212		28.4N 129.5E	47000
20	030200	24.2N 130.2E	LAND				AS// 53513		28.4N 129.5E	47000
21	030300	24.4N 130.3E	LAND				AS// 50210		28.4N 129.5E	47000
22	030400	24.4N 130.4E	LAND				AS// 51122		28.4N 129.5E	47000
23	030500	24.4N 130.4E	LAND				AS// 50122		30.4N 131.0E	47000
24	030600	24.4N 130.5E	LAND				AS// 50216		28.4N 129.5E	47000
25	031300	31.4N 131.1E	LAND				AS// 50208		33.4N 130.3E	47000

37	051208	26.1N	166.5E	PCN 1		DN4074		PSTW
38	051240	26.1N	166.6E	PCN 1		DN4070		PSTW
39	051320	26.5N	166.4E	PCN 1		DN4075		PSTW
40	051320	26.2N	166.3E	PCN 2		DN4075		RODN
41	051355	27.0N	166.3E	PCN 2		DN4077		PSTW
42	052309	27.3N	166.6E	PCN 1	T5.0/5.0-50.0/21HRC	DN4076		PSTW
43	060020	27.5N	166.6E	PCN 1		DN4076		PSTW
44	060121	27.5N	166.6E	PCN 1		DN4070		PSTW
45	060121	27.5N	166.5E	PCN 1	T6.5/4.5	DN4070	INIT DGS	RPHK
46	060835	27.7N	166.2E	PCN 4		DN4077		PSTW
47	061150	28.1N	166.0E	PCN 1		DN4076		PSTW
48	061221	28.4N	166.2E	PCN 1		DN4070		RODN
49	061221	28.7N	166.2E	PCN 1		DN4070		PSTW
50	061309	28.9N	166.0E	PCN 1		DN4074		PSTW
51	061335	29.5N	166.0E	PCN 2		DN4077		PSTW
52	070009	29.7N	166.2E	PCN 2		DN4074		PSTW
53	070101	30.1N	166.4E	PCN 1	T6.5/4.5-	DN4070		RODN
54	070102	30.0N	166.4E	PCN 3	T3.5/4.5 /W1.5/24HRC	DN4070		PSTW
55	070357	30.7N	166.5E	PCN 1		DN4077		PSTW
56	071137	30.4N	166.4E	PCN 1		DN4076		PSTW
57	071202	31.7N	166.2E	PCN 5		DN4070		RODN
58	071202	31.7N	167.0E	PCN 5		DN4070		PSTW
59	071432	32.0N	167.1E	PCN 3		DN4074		PSTW
60	072056	33.7N	166.2E	PCN 3	T2.0/3.0 /W1.5/20HRC	DN4077		PSTW
61	072233	34.0N	166.0E	PCN 3		DN4076		PSTW
62	080043	34.2N	166.9E	PCN 3	T2.5/3.5 /W2.0/24HRC	DN4070		RODN
63	080043	34.3N	166.9E			DN4074		PSTW

ATCRAFT FIXES

FLX NO.	TIME (Z)	FIX POSITION	FLT LVL	Y0043 HGT	D85 MSLE	MAX-SFC-WND VEL/3RG/4RG	MAX-FLT-LVL-WND 014/VEL/DRU/4NG	ACCRV NAV/HFT	EYE SHAPE	EYE ORIEN- DIRM/TATION	EYE TEMP (C) OUT/ IN/ DP/5GT	WSN NO.
1	071932	23.4N	169.7E	700NM	3044		040	45 270 15	4		+14 +13	4
2	072046	23.5N	169.4E	700NM	3001	900	45 090 20	120 49 080 40	4	2	+11 +15 +13	4
3	040809	24.4N	169.1E	700NM	2917	978	65 120 15	340 71 320 30	2	4	+04 +16 +12	5
4	041913	24.4N	167.0E	700NM	2911		35 270 30	240 50 240 5	4		+17 + 6	6
5	042118	25.1N	166.9E	700NM	2751	965	75 350 15	020 68 330 4	10		+11 +15 + 8	6
6	050506	25.7N	166.6E	700NM	2743		40 300 10	110 87 230 10	3	5	+19 +10	7
7	050848	25.2N	166.5E	700NM	2757	959	60 210 50	250 86 180 10	2	3	+12 +19 +12	7
8	051943	27.0N	166.4E	700NM	2665		45 250 40	340 82 300 20	4	3	+23	8
9	052120	27.1N	166.5E	700NM	2656		45 070 40	070 45 360 30	4	3	+14 +17	8
10	060610	27.3N	166.5E	700NM	2683	953	70 280 20	040 71 290 50	2	4	+19 +13	9
11	060850	28.1N	166.4E	700NM	2744	960	50 080 40	140 72 090 94	2	5	+17 +17 +15	9
12	061943	28.7N	166.3E	700NM	2864		75 080 5	040 60 330 30	4	0	+14 +12	10
13	062137	29.7N	166.2E	700NM	2890	984	75 080 5	210 60 170 30	4	10	+11 +15 +14	10
14	070539	30.7N	166.4E	700NM	2907		50 260 40	020 57 310 30	3	0	+15 +12	11
15	070829	31.2N	166.4E	700NM	2924	974	70 040 10	200 77 170 64	2	3	+ 4 +15 +12	11
16	071846	31.2N	167.4E	700NM	2942		65 120 40	240 47 120 30	4	2	+19 +12	12
17	072102	33.4N	169.1E	700NM	3004		40 060 160	170 49 060 125	4	5	+14 +17 +12	12

TYPHOON MAC

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCY	UV32AK CODE	SATELLITE	COMMENTS	SITE
1	140008	11.9N 134.5E	PCN 5	T0.0/0.0	DMS13A	INIT J45	PGTW
2	140030	11.9N 134.5E	PCN 5		DMS13A		PGTW
3	140217	11.5N 134.9E	PCN 5		DMS13A		PGTW
4	141250	11.9N 134.7E	PCN 5		DMS13A		PGTW
5	141404	12.0N 134.2E	PCN 5		DMS13A		PGTW
6	142157	12.2N 133.6E	PCN 5	T0.0/0.0	DMS13A	INIT J45	RPNK
7	142350	12.2N 133.0E	PCN 5	T1.0/1.0 /01.0/24HRC	DMS13A		PGTW
8	141037	12.4N 131.6E	PCN 6		DMS13A		RPNK
9	141232	12.9N 130.8E	PCN 5		DMS13A		PGTW
10	141252	12.5N 130.0E	PCN 5		DMS13A		PGTW
11	141346	12.2N 131.9E	PCN 6		DMS13A		RPNK
12	141327	12.2N 131.0E	PCN 5		DMS13A		RPNK
13	142136	12.9N 129.1E	PCN 5	T0.5/0.5 /00.5/24HRC	DMS13A		PGTW
14	142137	13.0N 129.6E	PCN 5		DMS13A		PGTW
15	142332	13.3N 129.0E	PCN 5	T1.0/1.0 /00.0/24HRC	DMS13A		PGTW
16	140133	13.5N 128.8E	PCN 5		DMS13A		PGTW
17	140227	13.4N 128.7E	PCN 5		DMS13A		PGTW
18	141017	13.4N 127.3E	PCN 5		DMS13A		PGTW
19	141017	13.3N 127.0E	PCN 6		DMS13A		RPNK
20	141214	13.2N 126.3E	PCN 5		DMS13A		PGTW
21	142117	13.1N 125.2E	PCN 6		DMS13A		PGTW
22	170114	13.6N 125.4E	PCN 5	T2.5/2.5 /01.5/24HRC	DMS13A		PGTW
23	170114	13.6N 125.4E	PCN 5	T2.0/2.0 /01.5/24HRC	DMS13A		RPNK
24	170357	13.9N 125.3E	PCN 5		DMS13A		PGTW
25	171355	13.9N 125.0E	PCN 5		DMS13A		RPNK
26	171356	13.4N 125.2E	PCN 5		DMS13A		RPNK
27	172238	13.4N 124.4E	PCN 6		DMS13A		RPNK
28	180038	13.4N 123.8E	PCN 5	T3.5/3.5 /01.0/24HRC	DMS13A		PGTW
29	180237	13.7N 123.4E	PCN 3	T3.5/3.5 /01.5/24HRC	DMS13A		RPNK
30	180237	13.4N 123.4E	PCN 3	T3.5/3.5	DMS13A	INIT J45	RPNK
31	181118	13.3N 122.3E	PCN 4		DMS13A		RPNK
32	181118	13.3N 122.7E	PCN 6		DMS13A		RPNK
33	181320	13.2N 122.2E	PCN 5		DMS13A		PGTW
34	181336	13.2N 122.3E	PCN 5		DMS13A		RPNK
35	181327	13.3N 122.2E	PCN 5		DMS13A		PGTW
36	182218	13.7N 121.5E	PCN 6		DMS13A		RPNK
37	182218	13.5N 121.4E	PCN 6		DMS13A		PGTW
38	180020	13.4N 121.1E	PCN 5	T2.5/3.5 /01.0/24HRC	DMS13A		PGTW
39	180218	13.4N 120.7E	PCN 5	T2.5/3.0 /01.0/24HRC	DMS13A		RPNK
40	180218	13.2N 120.8E	PCN 5	T2.5/3.5 /01.0/24HRC	DMS13A		RPNK
41	181058	13.7N 119.7E	PCN 6		DMS13A	PSBL 2ND CNTN AT 153N 120E	RPNK
42	181058	13.7N 119.7E	PCN 5		DMS13A		RPNK
43	181302	13.5N 118.8E	PCN 5		DMS13A		PGTW
44	181313	13.2N 118.6E	PCN 5		DMS13A		RPNK
45	181317	13.7N 119.3E	PCN 5		DMS13A		RPNK
46	181318	13.5N 118.8E	PCN 5		DMS13A		PGTW
47	182157	14.5N 118.4E	PCN 5		DMS13A		PGTW
48	182157	14.7N 117.8E	PCN 5		DMS13A		RPNK
49	182157	13.9N 118.2E	PCN 6		DMS13A		RPNK
50	200144	14.5N 118.8E	PCN 5	T1.0/2.0 /01.5/24HRC	DMS13A		RPNK
51	200159	14.8N 118.9E	PCN 3	T2.0/2.0 /00.5/24HRC	DMS13A		RPNK
52	200159	14.8N 118.8E	PCN 3	T1.5/2.5 /01.0/24HRC	DMS13A		PGTW
53	201038	17.5N 118.5E	PCN 5		DMS13A		PGTW
54	201244	17.5N 117.7E	PCN 5		DMS13A		PGTW
55	201439	17.7N 117.5E	PCN 6		DMS13A		RPNK
56	201440	17.8N 118.3E	PCN 5		DMS13A		RPNK
57	202137	18.4N 117.3E	PCN 5		DMS13A		PGTW
58	202319	18.4N 117.7E	PCN 5		DMS13A		RPNK
59	210114	18.9N 117.3E	PCN 5	T1.0/1.0 /50.0/24HRC	DMS13A		RPNK
60	210126	18.7N 117.7E	PCN 5	T1.0/2.0 /01.0/24HRC	DMS13A		RPNK
61	210140	18.9N 117.2E	PCN 5	T1.0/1.5 /50.0/24HRC	DMS13A		PGTW
62	210321	19.0N 116.8E	PCN 5		DMS13A		RPNK
63	211018	19.4N 117.4E	PCN 5		DMS13A		PGTW
64	211421	19.4N 117.1E	PCN 5		DMS13A		RPNK
65	211421	19.4N 116.9E	PCN 5		DMS13A		RPNK
66	212258	19.4N 116.6E	PCN 5	T2.0/2.0 /01.0/24HRC	DMS13A		RPNK
67	212258	20.4N 116.4E	PCN 5		DMS13A		RPNK
68	220108	20.4N 116.6E	PCN 5		DMS13A		RPNK
69	220302	20.4N 116.4E	PCN 5	T3.0/3.0 /02.0/24HRC	DMS13A		RPNK
70	220302	20.4N 116.1E	PCN 5		DMS13A		RPNK
71	221139	20.3N 116.8E	PCN 5		DMS13A	PSN BSU ON EXTRAP OF CLD LINE	RPNK
72	221402	20.4N 116.9E	PCN 5		DMS13A		RPNK
73	221402	21.3N 116.2E	PCN 5		DMS13A		RPNK
74	222238	21.4N 116.7E	PCN 5	T2.0/2.0 /50.0/24HRC	DMS13A		RPNK
75	230050	21.4N 116.5E	PCN 5	T2.5/3.0 /00.5/24HRC	DMS13A		RPNK
76	230050	21.5N 116.5E	PCN 5	T2.5/2.5	DMS13A	INIT J45	PGTW
77	230243	21.5N 116.1E	PCN 3		DMS13A		RPNK
78	230243	21.0N 117.9E	PCN 5		DMS13A		RPNK
79	231118	22.2N 117.4E	PCN 6		DMS13A		RPNK
80	231119	22.1N 117.9E	PCN 6		DMS13A		RPNK
81	231342	22.1N 117.6E	PCN 5		DMS13A		RPNK
82	231343	22.4N 117.3E	PCN 6		DMS13A		RPNK
83	231343	22.1N 117.8E	PCN 5		DMS13A		RPNK
84	232218	22.5N 117.8E	PCN 5		DMS13A		RPNK
85	240031	22.4N 117.9E	PCN 5		DMS13A		RPNK
86	240224	22.4N 117.8E	PCN 3	T1.5/2.5 /01.0/24HRC	DMS13A		RPNK

ATSCRAFT FIXES

FIA NO.	TIME (Z)	FIX POSITION	FLY LVL	Y0044 HGT	DOS MSLE	MAX-SFC-WVD VEL/ARG/WVG	MAX-FLT-LVL-4ND ITH/VEL/GND/4ND	ACFTY NAV/MFT	EYE SHAPE	EYE ORIEN- 3144/TATION	BYE TEMP (C) DUT/ 1W DP/ACT	ASN NO.
1	170503	13.74 124.0E	700MM	7054	995	40 050 10	170 68 050 10	3 4			+10 +15 +11	2
2	170507	13.74 124.0E	700MM	7043	994	30 110 30	160 58 050 40	4 4			+13 +11	4
3	170518	13.74 124.0E	700MM	7056	994	50 160 30	160 52 300 30	4 20			+10 +10 + 8	4
4	170511	13.74 124.0E	700MM	7061		40 160 75	160 65 300 50	2 4			+11 +15 + 9	6
5	171436	13.74 121.0E	700MM	7032			700 27 250 50	1 5			+11 +11	7
6	172042	13.74 121.0E	700MM	7046		20 310 30	160 28 050 24	1 2			+10 +11 +11	9
7	170929	13.74 120.3E	700MM	7101		40 150 25		4 2			+11 + 4	10
8	200909	17.64 119.1E	700MM	7104	1005	40 070 15	130 31 050 15	2 4			+11 +13 + 8	12
9	201933	17.64 119.1E	700MM	7061	1000		110 60 300 120	6 5			+12 +10	14
10	202151	14.14 114.1E	700MM	7067	997	20 090 30	150 24 040 60	4 4			+10 +15 + 9	14
11	210619	14.14 114.0E	700MM	7093	998	40 350 10	050 20 300 45	10 10				15
12	210906	14.24 117.5E	1500FT		999	40 070 60	110 37 070 40	20 1			+25 +26 28	15
13	212100	21.04 114.1E	1500FT									16

BAJAH FIXES

FIA NO.	TIME (Z)	FIX POSITION	MAJAH ACFTY	EYE SHAPE	EYE DIAM	BAJAH-CODE 45444 TDDFF	COMMENTS	MAJAH POSITION	CTF 440 NO.
1	171859	13.74 124.3E	ACFT					14.14 123.0E	44004
2	172300	13.74 123.9E	LAND			10710 ////		16.34 120.6E	00371
3	172300	13.74 123.9E	LAND			6777 ////		14.14 123.0E	00440
4	180900	13.74 122.0E	LAND			20777 52116		22.34 114.2E	45005
5	181030	13.74 122.0E	LAND			25777 ////		16.34 120.6E	00371
6	181100	13.74 122.0E	LAND			10447 ////		16.34 120.6E	00371
7	181100	13.74 122.0E	LAND			25777 ////		16.34 120.6E	00371
8	181200	13.74 122.0E	LAND			10447 ////		16.34 120.6E	00371
9	181300	13.74 122.0E	LAND			10447 ////		16.34 120.6E	00371
10	181500	13.74 122.0E	LAND			10447 ////		16.34 120.6E	00371
11	181530	13.74 122.0E	LAND			70777 72777		14.14 123.0E	00440
12	181600	13.74 122.0E	LAND			11777 52705		16.34 120.6E	00371
13	182145	13.74 121.0E	LAND	FAIR	CIRCULAR	15		15.24 120.6E	00377
14	182230	13.74 121.0E	LAND	FAIR	CIRCULAR	15		15.24 120.6E	00377
15	182255	13.74 121.0E	LAND	FAIR	CIRCULAR	15		15.24 120.6E	00377
16	181205	13.74 120.5E	LAND	FAIR	CIRCULAR	4		15.24 120.6E	00377
17	181300	13.74 120.5E	LAND	FAIR	CIRCULAR	5		15.24 120.6E	00377
18	181300	13.74 120.5E	LAND	FAIR	CIRCULAR	5		16.34 120.6E	00371
19	181335	13.74 120.5E	LAND	FAIR	CIRCULAR	5		15.24 120.6E	00377
20	181400	13.74 120.5E	LAND	FAIR	CIRCULAR	5		16.34 120.6E	00371
21	182200	13.74 120.5E	LAND			10447 10447		16.34 120.6E	00371
22	200000	16.74 119.0E	LAND			10447 10447		16.34 120.6E	00371
23	200040	16.74 119.0E	LAND			12667 52912		16.34 120.6E	00371
24	200100	16.74 119.0E	LAND			10517 53218		16.34 120.6E	00371
25	200100	16.74 119.0E	LAND			10447 57777		16.34 120.6E	00371
26	200130	16.74 119.0E	LAND			10447 42916		16.34 120.6E	00371
27	200300	16.74 119.0E	LAND			10447 63077		16.34 120.6E	00371
28	200500	16.74 119.0E	LAND			10447 67777		16.34 120.6E	00371
29	200700	16.74 119.0E	LAND			10447 57777		16.34 120.6E	00371
30	200900	16.74 119.0E	LAND			10447 57777		16.34 120.6E	00371
31	200900	16.74 119.0E	LAND			10447 57777		16.34 120.6E	00371
32	201200	16.74 119.0E	LAND			45417 67777		16.34 120.6E	00371
33	202000	20.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
34	202200	20.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
35	202500	20.74 114.0E	LAND			45777 11777		22.34 114.2E	45004
36	203000	20.74 114.0E	LAND			45777 11777		22.34 114.2E	45004
37	201200	20.74 114.0E	LAND			45777 11777		22.34 114.2E	45004
38	201300	20.74 114.0E	LAND			45013 57777		22.34 114.2E	45004
39	201400	20.74 114.0E	LAND			45013 54400		22.34 114.2E	45004
40	201500	21.74 114.0E	LAND			45023 53100		22.34 114.2E	45004
41	201600	21.74 114.0E	LAND			45023 53087		22.34 114.2E	45004
42	200800	21.74 114.0E	LAND			45023 53081		22.34 114.2E	45004
43	201200	21.74 114.0E	LAND			45042 52900		22.34 114.2E	45004
44	201300	21.74 114.0E	LAND			47777 52900		22.34 114.2E	45004
45	201500	21.74 114.0E	LAND			47777 52900		22.34 114.2E	45004
46	201900	21.74 114.0E	LAND			47777 52903		22.34 114.2E	45004
47	201200	21.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
48	201500	22.74 114.0E	LAND			11777 11777		22.34 114.2E	45004
49	201900	22.74 114.0E	LAND			45012 11777		22.34 114.2E	45004
50	202000	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
51	202100	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
52	202200	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
53	202300	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
54	202400	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004
55	202500	22.74 114.0E	LAND			47777 11777		22.34 114.2E	45004

TROPICAL STORM NANCY

RADIANT FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACRY	UVIRAK CODE	SATellite	COMMENTS	SITE
1	142218	14.34 111.9E	PCN 6		DMS037		PBTW
2	142218	14.14 111.5E	PCN 6		DMS037		RPNK
3	140218	14.44 111.2E	PCN 5	T1.0/1.0	DMS034	INIT JDS	RPNK
4	140218	14.04 112.0E	PCN 5	T3.0/3.0	DMS039	INIT JDS	ROON
5	141058	14.44 110.8E	PCN 4		DMS037		RPNK
6	141058	14.24 110.7E	PCN 3		DMS037		ROON
7	141459	14.14 110.4E	PCN 3		DMS039	EYE HANDING POSSIBLE	RPNK
8	141459	14.54 110.5E	PCN 4		DMS039		KGWC
9	142338	14.64 109.5E	PCN 4		DMS037		KGWC
10	142339	14.04 110.0E	PCN 4	T3.0/3.0 /02.0/21HRS	DMS039		RPNK
11	240144	14.04 109.4E		T3.0/3.0 /50.0/24HRS	DMS034		ROON
12	240340	14.64 109.8E	PCN 3		DMS034		RPNK
13	241219	14.74 109.2E	PCN 4		DMS037		RPNK
14	241219	14.34 108.6E	PCN 4		DMS037		KGWC
15	241439	14.64 108.7E	PCN 4		DMS039		RPNK
16	241440	14.64 108.4E	PCN 3		DMS039		ROON
17	242319	17.54 108.3E	PCN 5		DMS037		ROON
18	242319	14.24 108.6E	PCN 5	T2.5/3.0 /40.5/24HRS	DMS037		RPNK
19	210108	17.64 107.9E	PCN 5		DMS034		RPNK
20	210126	14.24 108.2E	PCN 5		DMS034		RPNK
21	210321	17.74 107.9E	PCN 3	T4.0/4.0-01.0/24HRS	DMS034		ROON
22	210321	14.14 108.1E	PCN 5		DMS039		RPNK
23	211159	14.14 108.1E	PCN 4		DMS037		RPNK
24	211421	17.34 107.4E	PCN 3		DMS034		ROON
25	211421	17.34 107.9E	PCN 3		DMS039		RPNK
26	212258	17.34 107.3E	PCN 5		DMS037		ROON
27	212258	17.64 107.4E	PCN 5	T1.5/2.5 /41.0/24HRS	DMS037		RPNK
28	220302	17.34 107.2E	PCN 3	T4.0/4.0-50.0/24HRS	DMS034		ROON
29	220302	17.54 106.4E	PCN 3		DMS034		RPNK
30	221139	14.44 106.6E	PCN 3		DMS037		ROON
31	221139	14.44 106.6E	PCN 6		DMS037		RPNK
32	221402	14.44 106.5E	PCN 5		DMS034		ROON
33	221402	14.44 106.1E	PCN 5		DMS034		RPNK

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	171200	14.04 112.0E	15	120	
2	140000	17.54 111.5E	15	90	
3	141200	14.04 111.5E	15	60	
4	140000	14.04 111.2E	20	120	
5	141200	14.34 110.7E	25	120	
6	200000	14.54 109.5E	25	50	
7	241200	14.14 108.4E	10	20	
8	210000	17.24 108.4E	20	70	
9	211200	17.04 108.0E	5	20	
10	220000	17.04 107.0E	5	70	
11	220500	14.54 106.0E	25	120	
12	221200	17.04 107.0E	5	120	
13	240000	14.34 106.0E	16	120	
14	240000	14.34 106.0E	17	120	
15	240000	15.74 102.5E	10	80	

TYPHOON OWEN

SATELLITE FIXES

FLA NO.	TIME (Z)	FIX POSITION	ACQRY	DVTRAK CODE	SATELLITE	COMMENTS	SITE
1	210140	12.7N 130.4E	PCN 5	T1.0/1.0	DMSP34	INIT JDS	PGTW
2	211225	11.4N 130.4E	PCN 5		DMSP34		PGTW
3	212117	10.4N 130.4E	PCN 5		DMSP37		PGTW
4	212326	11.3N 130.6E	PCN 5	T2.0/2.0 /01.0/23HRS	DMSP34		PGTW
5	220120	11.0N 130.7E	PCN 5		DMSP34		PGTW
6	220357	11.5N 131.2E	PCN 5		DMSP37		PGTW
7	221209	11.4N 130.4E	PCN 5		DMSP34		PGTW
8	221220	11.4N 130.5E	PCN 5		DMSP34		PGTW
9	221220	11.5N 130.7E	PCN 5		DMSP34		RODN
10	222057	12.0N 130.9E	PCN 5		DMSP37		PGTW
11	222308	12.0N 130.7E	PCN 5		DMSP34		PGTW
12	230102	11.8N 130.4E	PCN 5	T0.0/0.0	DMSP34	INIT JDS	RPMK
13	230102	12.4N 130.5E	PCN 5	T2.0/2.0 /50.0/24HRS	DMSP34		PGTW
14	230437	12.4N 130.6E	PCN 5		DMSP37		PGTW
15	231201	13.7N 130.2E	PCN 5		DMSP34		PGTW
16	232036	14.4N 130.5E	PCN 5		DMSP37		PGTW
17	240031	14.4N 130.7E	PCN 5	T2.0/2.0 /02.0/23HRS	DMSP34		RPMK
18	240032	14.7N 130.4E	PCN 5		DMSP34		PGTW
19	240042	14.3N 130.0E	PCN 3	T3.0/3.0 /01.0/24HRS	DMSP34		PGTW
20	240043	14.4N 130.7E	PCN 3	T3.0/3.0	DMSP34	INIT JDS	RODN
21	240417	14.2N 131.7E	PCN 5		DMSP37		PGTW
22	240917	14.7N 131.3E	PCN 5		DMSP37		RODN
23	241311	14.4N 131.2E	PCN 3		DMSP34		RPMK
24	241314	14.3N 130.7E	PCN 5		DMSP34		PGTW
25	241324	13.2N 132.7E	PCN 5		DMSP34		RODN
26	241324	13.1N 133.1E	PCN 5		DMSP34		RPMK
27	242127	20.3N 131.2E	PCN 3	T4.0/4.0 /02.0/22HRS	DMSP37		PGTW
28	242128	20.7N 130.4E	PCN 3		DMSP37		RODN
29	242156	20.4N 130.4E	PCN 3		DMSP37		PGTW
30	240014	21.0N 130.8E	PCN 3	T4.5/4.5 /01.5/24HRS	DMSP34		RODN
31	240205	21.3N 130.6E	PCN 3		DMSP34		PGTW
32	240205	21.2N 130.5E	PCN 1	T4.5/4.5 /01.5/25HRS	DMSP34		RODN
33	241038	21.2N 129.7E	PCN 1		DMSP37		PGTW
34	241039	21.2N 129.7E	PCN 1		DMSP37		RODN
35	241256	22.0N 129.8E	PCN 1		DMSP34		RPMK
36	241304	24.4N 129.4E	PCN 2		DMSP34		RODN
37	241305	22.0N 129.7E	PCN 1		DMSP37		PGTW
38	242137	23.1N 129.2E	PCN 1		DMSP37		RPMK
39	242147	22.3N 129.2E	PCN 1	T5.5/5.5 /01.5/24HRS	DMSP37		RPMK
40	240146	23.3N 129.4E	PCN 1		DMSP34		RODN
41	240146	23.3N 129.1E	PCN 1	T6.0/6.0 /01.5/24HRS	DMSP34		PGTW
42	240146	23.3N 129.0E	PCN 1	T6.0/6.0 /01.5/25HRS	DMSP34		PGTW
43	241318	23.3N 129.2E	PCN 1		DMSP37		RODN
44	241318	23.4N 129.2E	PCN 1		DMSP37		PGTW
45	241328	24.0N 129.3E	PCN 1		DMSP34		RODN
46	241334	23.7N 129.3E	PCN 1		DMSP37		RPMK
47	241246	23.8N 129.1E	PCN 1		DMSP34		PGTW
48	241246	23.4N 129.3E	PCN 3		DMSP34	EYE NOT VSHL	RKSO
49	241246	24.0N 129.2E	PCN 3		DMSP34		PGTW
50	242117	24.5N 129.5E	PCN 1		DMSP37		RKSO
51	242117	24.3N 129.5E	PCN 1		DMSP37		PGTW
52	242339	24.7N 129.5E	PCN 1	T5.0/5.0 /01.0/22HRS	DMSP34		RODN
53	242338	24.4N 129.4E	PCN 1	T5.0/5.0 /01.0/22HRS	DMSP34		PGTW
54	270127	24.8N 129.5E	PCN 1	T6.0/6.0 /00.5/24HRS	DMSP34		RPMK
55	270127	24.0N 129.5E	PCN 1		DMSP34		PGTW
56	270127	24.2N 129.3E	PCN 1		DMSP34		RODN
57	270358	24.7N 129.6E	PCN 1		DMSP37		PGTW
58	270358	24.3N 129.8E	PCN 1		DMSP37		PGTW
59	271220	24.1N 129.8E	PCN 1		DMSP34		RPMK
60	271226	24.0N 129.4E	PCN 1		DMSP34		PGTW
61	271227	24.1N 129.6E	PCN 1		DMSP34		RODN
62	271227	24.4N 129.5E	PCN 1		DMSP37		PGTW
63	272057	24.7N 129.4E	PCN 1		DMSP37		RODN
64	272057	24.5N 130.0E	PCN 1		DMSP37		PGTW
65	272320	27.0N 129.8E	PCN 1	T4.0/5.0 /01.0/24HRS	DMSP34		PGTW
66	240108	27.2N 129.8E	PCN 1		DMSP34		RODN
67	240108	27.1N 129.5E	PCN 1	T4.5/5.0 /00.5/24HRS	DMSP34		PGTW
68	240437	27.7N 129.7E	PCN 1		DMSP37		RODN
69	241114	27.3N 129.8E	PCN 1		DMSP37		PGTW
70	241202	27.5N 129.8E	PCN 1		DMSP34		RODN
71	241207	27.5N 129.6E	PCN 1		DMSP34		PGTW
72	241207	27.5N 129.4E	PCN 1		DMSP37		RKSO
73	242037	27.4N 129.6E	PCN 2		DMSP37		PGTW
74	240025	30.7N 131.8E	PCN 3	T4.0/4.5 /00.5/22HRS	DMSP34		RKSO
75	240043	31.0N 129.4E	PCN 1	T4.5/4.5 /00.0/24HRS	DMSP34		RODN
76	241230	24.2N 129.7E	PCN 1	T4.5/4.5	DMSP34	INIT JDS	RKSO
77	241054	24.4N 130.2E	PCN 1		DMSP37		RPMK
78	241157	24.2N 130.4E	PCN 1		DMSP34		PGTW
79	241325	24.3N 130.0E	PCN 1		DMSP34		RODN
80	241330	24.2N 130.4E	PCN 1		DMSP34		RKSO
81	242155	30.6N 131.3E	PCN 3	T4.0/4.0	DMSP37	INIT JDS	PGTW
82	242154	30.3N 131.3E	PCN 3		DMSP34		RODN
83	300211	31.5N 131.0E	PCN 3	T4.5/4.5	DMSP34	INIT JDS	RPMK
84	300211	31.6N 130.7E	PCN 3		DMSP34		PGTW
85	301124	30.0N 130.5E	PCN 3		DMSP34		PGTW
86	301311	30.2N 130.2E	PCN 3		DMSP34		RPMK
87	301311	30.5N 130.8E	PCN 3		DMSP34		RODN

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION (LAT/LONG)	FLY VFL	700-4 ALT	705 MSLP	MAX-SFC-WVD VEL/IRG/44G	MAX-FLT-LVL-4NN ITH/VEL/SHG/44G	ACFTRY NAV/MPT	EYE SHAPE	EYE ORIENT- JAW/TATION	EYE TEMP (C) W/ DP/44T	WNO
1	220115	12.4N 134.4E	1500F1		999	15 250 65	140 16 100 65	5 10			+20 +25 +22 29	1
2	220133	12.4N 134.4E	1500F1		1002	15 290 30	040 20 310 30	5 10			+20 +26 +25 27	2
3	220150	11.2N 134.2E	700-4M	1077			040 28 310 25	5 5				3
4	220213	12.2N 134.0E	1500F1		1002	15 080 30	170 18 080 25	5 10			+20 +26 +23 29	4
5	220230	11.3N 134.7E	1500F1		999	70 150 25	140 60 180 15	5 15			+25 +23 29	5
6	220240	11.4N 134.4E	700-4M	1091	1002	15 0	240 33 210 75	5 35			+9 +8 29	6
7	220253	14.4N 134.4E	700-4M	1015			140 45 120 150	5 10			+11 +10 29	7
8	220218	12.2N 134.4E	700-4M	2997	990	40 090 8	170 46 110 90	5 2	CIRCULAR	20	+14 +13 +10 29	8
9	220258	17.4N 134.2E	700-4M	1022		55 180 45	140 50 080 100	1 3			+11 +10 29	9
10	220358	14.4N 134.4E	700-4M	1001		65 090 30	140 65 050 50	3 2	CIRCULAR	4	+11 +10 29	10
11	220410	20.5N 131.4E	700-4M	2027			140 70 100 30	5 1			+19 +4 29	11
12	220455	20.4N 131.2E	700-4M	2033	967	40 040 5	110 63 040 90	5 5			+14 +19 +6 29	12
13	220733	21.5N 120.4E	700-4M	2701		40 360 8	120 75 080 12	5 5				13
14	220904	21.4N 120.4E	700-4M	2055	949	40 110 8	020 79 340 5	5 5	CIRCULAR	15	+19 +15 +14 29	14
15	220931	22.4N 120.4E	700-4M	2375	914	20 050 3	110 12 5	2 1	CIRCULAR	10	+13 +20 +13 29	15
16	220933	21.2N 120.0E	700-4M	2403		100 250 3	310 95 250 8	2 1				16
17	220222	21.2N 120.0E	700-4M	2416	922	20 330 3	020 90 330 10	2 1	CIRCULAR	8	+16 +18 +15 29	17
18	220930	21.4N 120.2E	700-4M	2382	919	40 250 15	300 95 250 5	5 2	CIRCULAR	12	+16 +17 +7 29	18
19	220940	21.5N 120.4E	700-4M	2094	942	40 170 18	300 84 230 15	5 10	CUNCENTRIC	25	+16 +16 +16 29	19
20	220940	21.5N 120.4E	700-4M	2032		40 270 72	440 60 270 30	5 10	CIRCULAR	12	+14 +17 29	20
21	220948	21.4N 120.1E	700-4M	2092		70 180 35	240 70 190 35	2 1	CIRCULAR	20	+14 +17 29	21
22	220912	27.2N 120.4E	700-4M	2094	953	50 230 30	310 61 230 40	5 5	ELLIPTICAL	20 10 030	+14 +15 +15 29	22
23	220915	27.2N 120.7E	700-4M	2097		50 090 120	340 65 270 30	5 5	ELLIPTICAL	35 15 220	+14 +16 +16 29	23
24	220914	24.4N 120.4E	700-4M	2094		50 040 50	170 78 040 50	5 5			+16 +16 29	24
25	220935	27.4N 120.4E	700-4M	2701	954	70 090 30	140 81 040 60	5 3	ELLIPTICAL	25 15 120	+14 +17 +13 29	25
26	220947	27.4N 120.4E	700-4M	2082	952	65 040 30	120 75 020 60	2 1	CIRCULAR	2	+14 +17 29	26
27	220948	24.4N 120.7E	700-4M	2083		70 250 30	340 70 250 60	2 1				27
28	220928	24.4N 120.7E	700-4M	2085		65 050 120	140 75 050 15	2 1	CIRCULAR	12	+14 +16 29	28
29	220942	24.4N 120.4E	700-4M	2088		40 090 120	140 64 110 70	10 5	CIRCULAR		+17 +15 29	29
30	220948	24.4N 130.1E	700-4M	2084	952	65 270 60	340 64 270 20	5 5	ELLIPTICAL	15 10 310	+14 +18 +15 29	30
31	220942	30.4N 131.1E	700-4M	2702	956	50 040 30	140 74 040 60	5 5	CIRCULAR	9	+15 +12 29	31
32	220905	30.4N 131.4E	700-4M	2707		90 160 15	270 100 160 15	5 5	CIRCULAR		+15 +12 29	32
33	220900	31.2N 131.4E	700-4M	2702	954	100 250 20	140 78 070 40	5 5	CIRCULAR	10	+17 +19 +10 29	33
34	220921	32.2N 131.4E	700-4M	2094	957	40 310 5	270 60 360 12	5 5			+16 +17 +6 29	34

RAJAN FIXES

FIX NO.	TIME (Z)	FIX POSITION (LAT/LONG)	RAJAN	ACFTRY	EYE SHAPE	EYE DIA	RAJAN-CODE ASMAN TDDFF	COMMENTS	NADAR POSITION	WNO
1	220100	22.4N 120.3E	LAND				75/76 43316		26.2N 127.0E	47997
2	220200	23.1N 120.3E	LAND				76/72 53411		26.2N 127.0E	47997
3	220300	23.2N 120.2E	LAND				76/72 53411		26.2N 127.0E	47997
4	220300	21.3N 120.2E	LAND	PRDH					26.3N 126.0E	47999
5	220300	21.2N 120.2E	LAND				55/73 53308		26.2N 127.0E	47997
6	220100	21.1N 120.1E	LAND				65/73 52005		26.2N 127.0E	47997
7	220100	21.2N 120.0E	LAND	GRUD					26.3N 126.0E	47999
8	220200	23.1N 120.0E	LAND				65/73 53416		26.2N 127.0E	47997
9	220200	23.3N 120.0E	LAND	PRDH				EYE MOVN 3225	26.1N 127.7E	47997
10	220300	21.4N 120.0E	LAND				65/72 50177		26.2N 127.0E	47997
11	220300	21.1N 120.0E	LAND	GRUD					26.3N 126.0E	47999
12	220300	21.4N 120.0E	LAND	PRDH					26.1N 127.7E	47997
13	220300	21.4N 120.0E	LAND						26.2N 127.0E	47997
14	220300	21.4N 120.1E	LAND	GRUD			75/71 70204		26.1N 127.7E	47997
15	220300	21.4N 120.1E	LAND	GRUD				EYE MOVN 3210	26.1N 127.7E	47997
16	220300	21.4N 120.0E	LAND				55/71 70202		26.2N 127.0E	47997
17	220700	21.7N 120.2E	LAND				75/41 70204		26.2N 127.0E	47997
18	220700	21.7N 120.1E	LAND	GRUD					26.1N 127.7E	47997
19	220900	21.4N 120.1E	LAND	GRUD					26.1N 127.7E	47997
20	220900	21.4N 120.2E	LAND				20411 70603		26.2N 127.0E	47997
21	220900	21.7N 120.2E	LAND	GRUD				EYE MOVN 0205	26.1N 127.7E	47997
22	221000	21.4N 120.2E	LAND	PRDH				EYE MOVN 0205	26.1N 127.7E	47997
23	221000	21.7N 120.1E	LAND				20411 53308		26.2N 127.0E	47997
24	221100	21.4N 120.3E	LAND				55/41 70504		26.2N 127.0E	47997
25	221100	21.7N 120.2E	LAND	PRDH				EYE STND	26.1N 127.7E	47997
26	221200	21.2N 120.2E	LAND	PRDH				EYE STND	26.1N 127.7E	47997
27	221200	21.4N 120.2E	LAND				25/11 73605		26.2N 127.0E	47997
28	221300	24.0N 120.2E	LAND	GRUD				EYE MOVN 0205	26.1N 127.7E	47997
29	221300	24.0N 120.2E	LAND				55/11 70105		26.2N 127.0E	47997
30	221400	24.1N 120.3E	LAND				55/11 73605		26.2N 127.0E	47997
31	221400	24.0N 120.3E	LAND	GRUD				EYE MOVN 0205	26.1N 127.7E	47997
32	221500	24.2N 120.3E	LAND	GRUD				EYE MOVN 3610	26.1N 127.7E	47997
33	221500	24.2N 120.2E	LAND				55/11 70105		26.2N 127.0E	47997
34	221500	24.1N 120.2E	LAND				55/11 70105		26.2N 127.0E	47997
35	221700	24.1N 120.3E	LAND				31/11 73603		26.2N 127.0E	47997
36	221700	24.1N 120.1E	LAND	GRUD				EYE MOVN 3610	26.1N 127.7E	47997
37	221900	24.1N 120.1E	LAND	GRUD				EYE MOVN 3610	26.1N 127.7E	47997
38	221900	24.4N 120.3E	LAND				71/11 70204		26.2N 127.0E	47997
39	221900	24.4N 120.4E	LAND				71/11 70308		26.2N 127.0E	47997

40	241300	24.4N 129.3E	LAND	GROU	20		EVE MNUA 0510	26.1N 127.7E	47337
41	242000	24.4N 129.4E	LAND	GROU	20		EVE MNUA 0510	26.1N 127.7E	47337
42	242100	24.4N 129.4E	LAND			11/11 70200		26.1N 127.7E	47337
43	242100	24.4N 129.5E	LAND			11/11 70400		26.1N 127.7E	47337
44	242100	24.4N 129.5E	LAND	FAIR	45		EVE MNUA 0515	26.1N 127.7E	47337
45	242200	24.4N 129.5E	LAND	FAIR	45		EVE MNUA 0515	26.1N 127.7E	47337
46	242200	24.4N 129.5E	LAND			11/11 70200		26.1N 127.7E	47337
47	242300	24.4N 129.5E	LAND	FAIR	45		EVE MNUA 0515	26.1N 127.7E	47337
48	270000	24.4N 129.6E	LAND	GROU	45		EVE MNUA 0515	26.1N 127.7E	47337
49	270000	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
50	270000	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
51	270100	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
52	270100	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
53	270100	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3620	26.1N 127.7E	47337
54	270200	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
55	270200	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
56	270200	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
57	270300	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
58	270300	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
59	270300	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
60	270400	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
61	270400	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
62	270400	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
63	270500	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
64	270500	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
65	270510	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
66	270535	24.4N 129.6E	LAND	GROU				26.1N 127.7E	47337
67	270600	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
68	270600	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
69	270610	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
70	270630	24.4N 129.6E	LAND	GROU				26.1N 127.7E	47337
71	270700	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
72	270700	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
73	270700	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
74	270710	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
75	270700	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
76	270800	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
77	270800	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
78	270810	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
79	270840	24.4N 129.6E	LAND	GROU				26.1N 127.7E	47337
80	270900	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
81	270900	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
82	270900	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3615	26.1N 127.7E	47337
83	270910	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3615	26.1N 127.7E	47337
84	270940	24.4N 129.6E	LAND	GROU				26.1N 127.7E	47337
85	271000	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
86	271000	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
87	271000	24.4N 129.6E	LAND			11/11 73000		26.1N 127.7E	47337
88	271035	24.4N 129.6E	LAND	PGR	45		EVE MNUA 3610	26.1N 127.7E	47337
89	271100	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
90	271100	24.4N 129.6E	LAND			11/11 70500		26.1N 127.7E	47337
91	271100	24.4N 129.6E	LAND			11/11 70500		26.1N 127.7E	47337
92	271200	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3620	26.1N 127.7E	47337
93	271200	24.4N 129.6E	LAND			11/11 70100		26.1N 127.7E	47337
94	271300	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
95	271300	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3615	26.1N 127.7E	47337
96	271400	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3615	26.1N 127.7E	47337
97	271400	24.4N 129.6E	LAND			11/11 73300		26.1N 127.7E	47337
98	271400	24.4N 129.6E	LAND			11/11 73300		26.1N 127.7E	47337
99	271500	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
100	271500	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
101	271600	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
102	271600	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
103	271600	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
104	271700	24.4N 129.6E	LAND	PGR	45		EVE MNUA 3615	26.1N 127.7E	47337
105	271700	24.4N 129.6E	LAND	PGR	45		EVE MNUA 0410	26.1N 127.7E	47337
106	271700	24.4N 129.6E	LAND			11/11 70200		26.1N 127.7E	47337
107	271800	24.4N 129.6E	LAND	PGR	45		EVE MNUA 0510	26.1N 127.7E	47337
108	271900	24.4N 129.6E	LAND			11/11 70100		26.1N 127.7E	47337
109	271900	24.4N 129.6E	LAND			11/11 73600		26.1N 127.7E	47337
110	271900	24.4N 129.6E	LAND			11/11 73600		26.1N 127.7E	47337
111	271900	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
112	271900	24.4N 129.6E	LAND	PGR	45		EVE STMP	26.1N 127.7E	47337
113	272000	24.4N 129.6E	LAND			11/11 73500		26.1N 127.7E	47337
114	272000	24.4N 129.6E	LAND	PGR	45		EVE MNUA 0305	26.1N 127.7E	47337
115	272100	24.4N 129.6E	LAND	PGR	45		EVE MNUA 0310	26.1N 127.7E	47337
116	272100	24.4N 129.6E	LAND			11/11 73800		26.1N 127.7E	47337
117	272200	24.4N 129.6E	LAND			11/11 50200		26.1N 127.7E	47337
118	272200	24.4N 129.6E	LAND	FAIR	45		EVE MNUA 3610	26.1N 127.7E	47337
119	272300	24.4N 129.6E	LAND	GROU	45		EVE MNUA 3615	26.1N 127.7E	47337
120	272300	24.4N 129.6E	LAND			11/11 53611		26.1N 127.7E	47337
121	280000	27.1N 129.6E	LAND			11/11 50000		26.1N 127.7E	47337
122	280000	27.1N 129.6E	LAND	GROU	45		EVE MNUA 3610	26.1N 127.7E	47337
123	280035	27.1N 129.6E	LAND	GROU				26.1N 127.7E	47337
124	280110	27.1N 129.6E	LAND	FAIR				26.1N 127.7E	47337
125	280135	27.1N 129.6E	LAND	FAIR				26.1N 127.7E	47337
126	280200	27.1N 129.6E	LAND			11/11 53100		26.1N 127.7E	47337

127	200210	27.44	120.8E	LAND	FAIR							26.4N	127.8E	4793
128	200210	27.44	120.7E	LAND	GOOD							26.1N	127.7E	4793
129	200300	27.14	120.8E	LAND	GOOD	45		AN///	53503	EVE	MNVR	3510		4793
130	200300	27.24	120.8E	LAND	GOOD							28.4N	129.5E	4790
131	200310	27.54	120.4E	LAND	POOR	40				EVE	MNVR	3610		4794
132	200400	27.24	120.7E	LAND	GOOD							27.4N	128.7E	4794
133	200400	27.24	120.7E	LAND	GOOD	40		21811	70601	EVE	MNVR	3205		4794
134	200400	27.14	120.6E	LAND	GOOD			AN///	50203			26.4N	129.5E	4790
135	200500	27.34	120.8E	LAND	GOOD			20711	70502			26.2N	127.8E	4794
136	200500	27.34	120.8E	LAND	GOOD			AN///	50308			28.4N	129.5E	4790
137	200500	27.34	120.8E	LAND	GOOD	40				EVE	MNVR	3605		4794
138	200600	27.44	120.8E	LAND	GOOD	50				EVE	MNVR	3605		4794
139	200600	27.44	120.8E	LAND	GOOD			5111	70204			26.2N	127.8E	4794
140	200700	27.44	120.9E	LAND	GOOD			AN///	50803			28.4N	129.5E	4790
141	200700	27.44	120.8E	LAND	GOOD	40				EVE	MNVR	3605		4794
142	200800	27.44	120.9E	LAND	GOOD	40				EVE	MNVR	0305		4794
143	200900	27.44	120.9E	LAND	GOOD			AN///	53304			27.4N	128.7E	4794
144	200935	27.44	120.7E	LAND	GOOD							28.4N	129.5E	4790
145	200930	27.54	120.4E	LAND	GOOD			55///	50103			28.4N	129.5E	4790
146	200930	27.54	120.4E	LAND	GOOD	20				EVE	STNR			4794
147	200910	27.54	120.8E	LAND	FAIR							26.4N	127.8E	4794
148	200935	27.54	120.8E	LAND	FAIR							26.4N	127.8E	4794
149	201000	27.54	120.4E	LAND	GOOD	25				EVE	MNVR	0505		4794
150	201000	27.54	120.4E	LAND	GOOD			55///	53604			28.4N	129.5E	4790
151	201010	27.54	120.5E	LAND	POOR							26.4N	127.8E	4794
152	201035	27.54	120.7E	LAND	GOOD							26.4N	127.8E	4794
153	201100	27.44	120.9E	LAND	GOOD	25				EVE	MNVR	3610		4794
154	201110	27.54	120.7E	LAND	FAIR							26.4N	127.8E	4794
155	201200	27.54	120.8E	LAND	GOOD			55///	52004			28.4N	129.5E	4790
156	201210	27.44	120.9E	LAND	GOOD	25				EVE	STNR			4794
157	201300	27.54	120.8E	LAND	GOOD			55///	52003			28.4N	129.5E	4790
158	201330	27.54	120.9E	LAND	GOOD	25				EVE	MNVR	3205		4794
159	201400	27.54	120.4E	LAND	GOOD	20				EVE	MNVR	3605		4794
160	201400	27.44	120.8E	LAND	GOOD			55///	51203			28.4N	129.5E	4790
161	201435	27.44	120.4E	LAND	GOOD	20				EVE	MNVR	3605		4794
162	201600	27.54	120.4E	LAND	GOOD			55///	53404					

229	201900	20.40	130.5E	LAND		21771	50100				30.6N	131.0E	47949
230	201900	20.30	130.7E	LAND		21771	50111				30.6N	131.0E	47949
231	201900	20.30	130.7E	LAND		21661	50300				28.4N	129.5E	47909
232	201900	20.40	130.7E	LAND	GUDU				EVE	MOV 0320	TAKAHATA		
233	202000	20.10	130.6E	LAND	GUDU				EVE	MOV 0420	TAKAHATA		
234	202000	20.10	130.6E	LAND		45771	50210				28.4N	129.5E	47909
235	202000	20.20	130.9E	LAND		21571	50310				30.6N	131.0E	47949
236	202100	20.30	130.9E	LAND		21571	50100				30.6N	131.0E	47949
237	202100	20.30	131.0E	LAND		45771	50211				28.4N	129.5E	47909
238	202100	20.30	130.9E	LAND	GUDU				EVE	MOV 0420	TAKAHATA		
239	202200	20.30	131.1E	LAND		45771	50200				28.4N	129.5E	47909
240	202200	20.40	131.1E	LAND		21571	50010				30.6N	131.0E	47949
241	202300	20.50	131.2E	LAND		45771	50310				28.4N	129.5E	47909
242	202300	20.40	131.4E	LAND		10001	50410				30.6N	131.0E	47949
243	202300	20.40	131.4E	LAND	GUDU				EVE	MOV 0520	STOKOSIKI		
244	202300	20.40	131.5E	LAND	GUDU				EVE	MOV 0530	STOKOSIKI		
245	202300	20.40	131.6E	LAND		45771	50410				30.6N	131.0E	47949
246	202300	21.00	131.7E	LAND	GUDU				EVE	MOV 0524	STOKOSIKI		
247	202300	21.30	131.9E	LAND		20771	50310				30.6N	131.0E	47949
248	202300	21.40	131.9E	LAND		45712	57777				33.4N	130.3E	47906
249	202300	21.30	131.9E	LAND	GUDU				EVE	MOV 0530	STOKOSIKI		
250	202300	21.40	132.0E	LAND		45771	57777				33.3N	130.2E	47909
251	202300	21.50	131.9E	LAND		45712	50411				33.4N	130.3E	47906
252	202300	21.50	132.2E	LAND					EVE	MOV 0530	STOKOSIKI		
253	202300	21.50	132.2E	LAND	GUDU				EVE	MOV 0530	STOKOSIKI		
254	202300	21.50	132.2E	LAND		45771	50410				30.6N	131.0E	47949
255	202300	21.70	132.3E	LAND					EVE	MOV 0645	KJS+TMOTO		
256	202300	21.90	132.4E	LAND		45771	50410				30.6N	131.0E	47949
257	202300	21.90	132.5E	LAND	GUDU				EVE	MOV 0550	SEBURI		
258	202300	21.90	132.2E	LAND		45772	50010				33.4N	130.3E	47906
259	202300	21.70	132.3E	LAND		45771	50420				33.3N	130.2E	47909
260	202300	22.00	132.7E	LAND		45771	50520				30.6N	131.0E	47949
261	202300	22.10	132.7E	LAND	GUDU				EVE	MOV 0540	SEBURI		
262	202300	22.00	132.7E	LAND		10501	50520				33.3N	130.2E	47909
263	202300	22.30	132.7E	LAND		45772	50430				33.4N	130.3E	47906
264	202300	22.20	132.8E	LAND		10011	50520				32.1N	131.5E	47854
265	202300	22.20	132.8E	LAND	GUDU				EVE	MOV 0540	SEBURI		
266	202300	22.30	132.9E	LAND		45771	50510				33.3N	130.2E	47909
267	202300	22.20	132.1E	LAND					EVE	MOV 0540	SEBURI		
268	202300	22.20	132.9E	LAND	GUDU				EVE	MOV 0540	SEBURI		
269	202300	22.20	133.0E	LAND		20010	50320				34.3N	132.6E	47792
270	202300	22.30	133.0E	LAND	GUDU				EVE	MOV 0540	SEBURI		
271	202300	22.20	132.7E	LAND					EVE	MOV 0550	KJS+TMOTO		
272	202300	22.40	132.7E	LAND	GUDU				EVE	MOV 0540	SEBURI		
273	202300	22.40	132.2E	LAND		10501	50520				33.3N	130.2E	47909
274	202300	22.40	132.6E	LAND					EVE	MOV 0150	KJS+TMOTO		
275	202300	22.50	132.2E	LAND		20010	50410				34.3N	132.6E	47792
276	202300	22.90	132.7E	LAND		20010	50520				34.3N	132.6E	47792
277	202300	22.90	132.6E	LAND		20701	50520				33.4N	130.2E	47909
278	202300	23.00	132.7E	LAND	GUDU				EVE	MOV 0540	SEBURI		
279	202300	23.10	132.0E	LAND					EVE	MOV 0345	KJS+TMOTO		
280	202300	23.10	132.9E	LAND		20010	50520				33.3N	130.2E	47909
281	202300	23.10	132.9E	LAND	GUDU				EVE	MOV 0540	SEBURI		
282	202300	23.10	132.0E	LAND		45772	50520				34.3N	132.6E	47792
283	202300	23.40	132.3E	LAND		20010	50520				33.3N	130.2E	47909
284	202300	23.30	132.2E	LAND		45772	50520				34.3N	132.6E	47792
285	202300	23.40	132.4E	LAND		45771	50710				35.3N	130.7E	47699
286	202300	23.20	132.9E	LAND					EVE	MOV 0540	KJS+TMOTO		
287	202300	23.50	132.5E	LAND		45772	50420				34.3N	132.6E	47792
288	202300	23.90	132.8E	LAND		20010	50520				33.3N	130.2E	47909
289	202300	23.40	132.6E	LAND		45771	50530				35.3N	130.7E	47699
290	202300	23.40	132.5E	LAND		10501	57777				34.6N	133.7E	47773
291	202300	23.40	132.7E	LAND					EVE	MOV 0435	KASATORI		
292	202300	23.70	132.7E	LAND		45771	70220				35.3N	130.7E	47699
293	202300	23.40	132.1E	LAND		20010	50420				33.4N	130.2E	47909
294	202300	24.00	132.8E	LAND		20010	57777				34.6N	133.7E	47773
295	202300	24.10	132.0E	LAND		45771	70520				35.3N	130.7E	47699
296	202300	24.40	132.0E	LAND		10001					26.2N	127.0E	47997
297	202300	24.20	132.2E	LAND					EVE	MOV 0345	KASATORI		
298	202300	24.10	132.0E	LAND		22771	77777				34.6N	133.7E	47773
299	202300	24.20	132.0E	LAND		31001	77777				34.6N	133.7E	47773
300	202300	24.30	132.7E	LAND		35771	70420				35.3N	130.7E	47699
301	202300	24.40	132.6E	LAND					EVE	MOV 0445	KASATORI		
302	202300	24.50	132.5E	LAND		20010	77777				34.6N	133.7E	47773
303	202300	25.00	132.2E	LAND					EVE	MOV 0445	KASATORI		
304	202300	25.00	132.1E	LAND		45771	70330				35.3N	130.7E	47699
305	202300	24.20	132.0E	LAND		35771	70330				37.4N	135.9E	47600
306	202300	25.00	132.6E	LAND		20010	50530				34.6N	133.7E	47773
307	202300	25.40	132.7E	LAND		20010	50530				34.6N	133.7E	47773
308	202300	25.90	132.2E	LAND					EVE	MOV 0455			
309	202300	25.50	132.3E	LAND		35771	70430				37.4N	135.9E	47600
310	202300	25.40	132.2E	LAND					EVE	MOV 0595	YAMADA		
311	202300	25.10	131.3E	LAND	GUDU				EVE	MOV 3110	YAMADA		
312	010020	40.50	131.0E	LAND	GUDU								

SYNOPTIC STAGES

FILE NO.	TIME (Z)	POS. (LAT/LON)	INTENSITY ESTIMATE	W. AREST DATA (MM)	COMMENTS
1	190000	15.00 142.0E	10	200	
2	191200	15.50 142.5E	10	200	
3	200000	15.00 144.0E	10	150	
4	201200	15.00 142.0E	10	200	
5	210000	15.50 140.5E	15	200	
6	211200	15.00 134.0E	15	150	
7	211500	15.30 132.0E	15	150	
8	220000	15.00 138.0E	20	150	

TROPICAL STORM PAMELA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACRY	UVJAK CODE	SATELLITE	COMMENTS	SITE
1	232250	14.50 144.3E	PCN 5	T0.0/0.0	DMSD1A	INIT JDS	PGTW
2	242232	14.40 143.9E	PCN 5	T2.0/2.0 /02.0/24HRS	DMSD1A	EXPUSED ILCC	PGTW
3	240957	13.00 141.4E	PCN 5		DMSD17		PGTW
4	241114	13.00 143.3E	PCN 5		DMSD1A		PGTW
5	242137	20.40 130.2E	PCN 5		DMSD17		PGTW
6	240146	21.20 130.4E	PCN 3	T1.5/2.0 /00.5/27HRS	DMSD1A	EXPUSED ILCC	PGTW
7	240146	21.20 130.4E	PCN 5	T1.0/1.0	DMSD1A	INIT JDS	RPMK
8	241015	23.20 137.9E	PCN 3		DMSD17		PGTW
9	241246	24.30 137.6E	PCN 3		DMSD1A		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70042 DRS	70042 DBT	70042 MSLP	MAX-SFC-WIND VEL/HRG/MNS	MAX-FLT-LVL-WIND VEL/VEL/HRG/MNS	ACRY	EYE SHAPE	EYE ORIENTATION	EYE TEMP (C)	WIND DIR/DP/SEC
1	250927	13.40 142.1E	700MM	3151	1004	50 100	35 140	50 100 35 3 3				+10 + 7	
2	252222	20.50 140.1E	1500FT	1004	25 050	30 110	16 050 30 5 5				+20 +22 +21		
3	262258	20.50 140.1E	700MM	3129		20 160	50 120	20 360 60				+11 + 7	
4	260307	21.20 134.5E	1500FT		1003	25 060	50 140	17 100 60 5 10				+20 +25 + 8 10	
5	260504	21.40 137.4E	1500FT		1003	15 150	20 220	21 110 40 10 5					

TROPICAL STORM ROGER

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACRY	UVJAK CODE	SATELLITE	COMMENTS	SITE
1	021233	13.50 135.7E	PCN 5		DMSD10		PGTW
2	031213	14.10 134.6E	PCN 5		DMSD1A		PGTW
3	032036	20.40 134.9E	PCN 5		DMSD17		PGTW
4	032313	20.50 134.4E	PCN 5	T1.0/1.0 /50.0/24HRS	DMSD1A		PGTW
5	040055	21.40 135.7E	PCN 5		DMSD10		PGTW
6	040055	20.30 135.6E	PCN 5	T1.5/1.5	DMSD1A	INIT JDS	RPMK
7	040917	21.40 135.2E	PCN 5		DMSD17		PGTW
8	041154	21.70 133.4E	PCN 5		DMSD1A		RODN
9	041155	21.40 133.5E	PCN 5		DMSD1A		PGTW
10	042157	20.40 133.1E	PCN 6	T2.0/2.0 /01.0/27HRS	DMSD17		PGTW
11	042158	20.30 133.6E	PCN 5	T1.5/1.5	DMSD17	INIT JDS	RODN
12	050036	20.40 133.8E	PCN 6		DMSD1A		PGTW
13	050217	20.20 133.3E	PCN 6		DMSD10	EDGE OF DATA	PGTW
14	050217	20.00 133.5E	PCN 5		DMSD1A		RPMK
15	050317	20.30 133.3E	PCN 5		DMSD1A		RODN
16	051317	21.70 134.6E	PCN 3		DMSD10	EXPUSED ILCC	PGTW
17	051317	21.70 135.6E	PCN 3		DMSD1A		RODN
18	051317	21.40 135.7E	PCN 5		DMSD10		RKSD
19	051319	21.30 135.4E	PCN 5		DMSD1A		RPMK
20	051319	21.40 135.7E	PCN 3		DMSD1A		PGTW
21	052137	23.40 134.9E	PCN 5	T1.0/2.0 /01.0/24HRS	DMSD17		PGTW
22	060018	23.30 135.0E	PCN 5		DMSD1A		PGTW
23	060158	24.40 135.0E	PCN 5	T3.0/3.0	DMSD10	INIT JDS	RPMK
24	060158	24.10 135.1E	PCN 5		DMSD10		PGTW
25	060158	24.20 135.0E	PCN 5	T3.0/3.0	DMSD10	INIT JDS	RKSD
26	061017	24.50 134.6E	PCN 5		DMSD17		RKSD
27	061018	24.40 134.2E	PCN 5		DMSD17		RPMK
28	061915	24.00 134.6E	PCN 5		DMSD17		PGTW
29	061257	27.30 134.4E	PCN 5		DMSD10		RKSD
30	061301	27.10 135.1E	PCN 5		DMSD1A		PGTW
31	061301	26.30 135.4E	PCN 5		DMSD1A		RPMK
32	062117	29.00 136.3E	PCN 6		DMSD17		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	TUOM3 HGT	OBS MSLP	MAX-SFC-WND VEL/ANG/ANG	MAX-FLT-LVL-WND VEL/ANG/ANG	ACCRV NAV/WFT	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) DIR/ IN/ DP/SLT	WSN NO.
1	010220	14.1N 144.2E	1500F1		998	40 180 40	240 30 160 60	5 5			+24 +24 +24 28	2
2	040308	21.1N 134.7E	1500F1		982	35 080 10	140 35 080 10	3 3			+24 +24 +24 28	3
3	040305	21.2N 134.1E	1500F1		987	40 030 25	100 40 030 25	2 5			+24 +24 +24 28	4
4	041320	20.4N 134.5E	700MM	3003			130 32 210 60	4 5			+15 +11	5
5	042125	20.4N 134.7E	700MM	3015	992	35 180 10	040 36 320 45	5 3			+11 +11 + 5	5
6	040124	24.1N 134.5E	700MM	3001		40 220 30	140 48 120 85	5 5			+14 +12 +10	6

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (MM)	COMMENTS
1	010000	13.0N 141.1E	20	120	
2	011500	13.1N 134.0E	20	240	
3	020000	12.7N 142.0E	20	210	
4	040000	24.0N 134.5E	40	10	
5	041200	27.0N 134.5E	45	70	
6	070000	17.5N 137.0E	35	190	

TYPHOON SARAH

SATELLITE FIXES

FLA NO.	TIME (Z)	FIX POSITION	ACQRY	UNUSAK CODE	SATELLITE	COMMENTS	SITE
1	012259	16.20 121.0E	PCN 5	T1.0/1.0	DWSP47	INIT JMS	RODN
2	020131	16.20 122.0E	PCN 5	T0.0/0.0	DWSP46	INIT JMS	RPNK
3	021134	16.20 120.0E	PCN 5		DWSP40		RPNK
4	021412	16.20 120.0E	PCN 5		DWSP40		RPNK
5	021416	16.20 120.1E	PCN 5		DWSP40		RODN
6	022236	16.20 121.7E	PCN 5	T0.0/0.0 /50.0/21HRS	DWSP47		RPNK
7	030113	16.20 110.0E	PCN 5	T1.0/1.0 /50.0/24HRS	DWSP46		RODN
8	030255	16.20 110.0E	PCN 5		DWSP40		RPNK
9	031355	16.20 120.0E	PCN 5		DWSP40		RODN
10	031355	16.20 110.2E	PCN 5		DWSP46		RPNK
11	042218	16.20 110.0E	PCN 5	T0.0/0.0 /50.0/24HRS	DWSP47		RPNK
12	040055	16.20 110.1E	PCN 5	T2.0/2.0 /01.0/24HRS	DWSP46		RODN
13	040235	16.20 110.0E	PCN 5		DWSP40		RPNK
14	041058	16.20 110.0E	PCN 5		DWSP47		RODN
15	041336	16.20 111.0E	PCN 5		DWSP40		RPNK
16	041337	16.20 110.0E	PCN 5		DWSP46		PGTW
17	042157	16.20 110.3E	PCN 5		DWSP40		PGTW
18	050036	16.20 110.1E	PCN 5		DWSP46		PGTW
19	050036	16.20 110.1E	PCN 5		DWSP47		PGTW
20	050217	16.20 110.0E	PCN 5	T2.0/2.0	DWSP40	INIT JMS	PGTW
21	050217	16.20 110.2E	PCN 5	T1.5/1.5 /01.5/24HRS	DWSP40		RPNK
22	050217	16.20 110.1E	PCN 5	T2.5/2.5 /00.5/25HRS	DWSP40		RODN
23	051036	16.20 110.2E	PCN 6		DWSP47		PGTW
24	051317	16.20 110.0E	PCN 6		DWSP40		PGTW
25	051317	16.20 110.7E	PCN 5		DWSP40		RODN
26	051319	16.20 110.2E	PCN 5		DWSP46		PGTW
27	051319	16.20 110.2E	PCN 5		DWSP46		RPNK
28	052319	16.20 110.0E	PCN 5		DWSP47		RODN
29	052319	16.20 110.7E	PCN 5		DWSP47		RPNK
30	060016	16.20 110.9E	PCN 5		DWSP46		PGTW
31	060158	16.20 110.7E	PCN 5	T2.0/2.0 /50.0/24HRS	DWSP40		PGTW
32	060158	16.20 110.5E	PCN 5	T1.0/1.5 /00.5/24HRS	DWSP40		RPNK
33	061018	16.20 110.3E	PCN 5		DWSP47		RPNK
34	061018	16.20 110.9E	PCN 5		DWSP47		PGTW
35	061301	16.20 110.1E	PCN 5		DWSP46		RPNK
36	061301	16.20 110.0E	PCN 5		DWSP46		PGTW
37	061639	16.20 110.0E	PCN 5		DWSP40		RODN
38	061639	16.20 110.2E	PCN 5		DWSP40		RPNK
39	062259	16.20 110.2E	PCN 3	T2.0/2.0 /01.0/21HRS	DWSP46		RPNK
40	062259	16.20 120.0E	PCN 5	T2.5/2.5	DWSP47	INIT JMS	RODN
41	070138	16.20 110.3E	PCN 3	T2.5/2.5 /00.5/24HRS	DWSP40		PGTW
42	070139	16.20 110.3E	PCN 3		DWSP40		RODN
43	070143	16.20 110.3E	PCN 5		DWSP46		RPNK
44	070240	16.20 110.1E	PCN 5		DWSP40		RPNK
45	071139	16.20 110.3E	PCN 5		DWSP47		RPNK
46	071139	16.20 110.2E	PCN 5		DWSP47		RODN
47	071202	16.20 110.4E	PCN 5		DWSP46		RPNK
48	071203	16.20 110.3E	PCN 5		DWSP46		PGTW
49	071420	16.20 110.3E	PCN 5		DWSP40		RODN
50	072238	16.20 110.3E	PCN 5	T3.0/3.5 /00.5/24HRS	DWSP47		RPNK
51	072238	16.20 110.2E	PCN 5		DWSP47		RODN
52	080126	16.20 110.3E	PCN 5		DWSP46		RPNK
53	080301	16.20 110.5E	PCN 3	T3.0/3.0 /00.5/24HRS	DWSP40		RODN
54	081118	16.20 110.0E	PCN 5		DWSP47	PSN CYR OF CON	RPNK
55	081118	16.20 110.3E	PCN 5		DWSP47	NU LYE/PSN BASED ON 2 CR BANDS	RODN
56	081406	16.20 110.2E	PCN 5		DWSP46	CI UP/JUTFLOW INCREASED	RPNK
57	081406	16.20 110.3E	PCN 5		DWSP46		RODN
58	082218	16.20 110.2E	PCN 5	T4.0/4.0 /01.5/21HRS	DWSP47		PGTW
59	082218	16.20 110.1E	PCN 5	T4.0/4.0 /01.0/24HRS	DWSP47		RPNK
60	090107	16.20 110.0E	PCN 1	T4.5/4.5 /01.5/24HRS	DWSP46		RODN
61	090242	16.20 110.0E	PCN 3		DWSP40		RPNK
62	091058	16.20 117.5E	PCN 1		DWSP47		RPNK
63	091059	16.20 117.4E	PCN 1		DWSP47		RODN
64	091342	16.20 117.1E	PCN 1		DWSP40		PGTW
65	091342	16.20 117.4E	PCN 1		DWSP40		RODN
66	091348	16.20 117.3E	PCN 1		DWSP46		RPNK
67	092158	16.20 116.5E	PCN 1		DWSP47		RPNK
68	100049	16.20 116.2E	PCN 1	T5.0/5.0 /01.0/24HRS	DWSP46		RPNK
69	100049	16.20 116.4E	PCN 1	T5.0/5.0 /01.0/24HRS	DWSP46		PGTW
70	100223	16.20 116.4E	PCN 1	T5.5/5.5 /01.0/25HRS	DWSP40		RODN
71	101038	16.20 116.1E	PCN 1		DWSP47		RPNK
72	101038	16.20 116.0E	PCN 1		DWSP40		RODN
73	101038	16.20 116.1E	PCN 1		DWSP47		PGTW
74	101331	16.20 116.0E	PCN 1		DWSP46		RPNK
75	101331	16.20 116.0E	PCN 2		DWSP46		RODN
76	101504	16.20 116.0E	PCN 6		DWSP40	ESTIMATE CNTR OFF EDGE OF DATA	RPNK
77	102319	16.20 116.7E	PCN 3	T5.0/5.0 /50.0/24HRS	DWSP47		RPNK
78	102319	16.20 116.0E	PCN 3	T4.5/5.5 /01.0/21HRS	DWSP47		RODN
79	110031	16.20 116.5E	PCN 3		DWSP46		RPNK
80	110204	16.20 116.2E	PCN 3	T4.5/5.0 /00.5/24HRS	DWSP40		PGTW
81	111018	16.20 116.0E	PCN 5		DWSP47		RPNK
82	111159	16.20 116.2E	PCN 6		DWSP47		PGTW
83	111312	16.20 116.7E	PCN 3		DWSP46		RPNK
84	111445	16.20 116.3E	PCN 3		DWSP40		PGTW
85	111445	16.20 116.3E	PCN 5		DWSP40		RODN
86	112258	16.20 116.4E	PCN 3		DWSP47		RODN
87	120150	16.20 116.0E	PCN 5	T4.5/5.0 /00.5/24HRS	DWSP46		RPNK
88	120154	16.20 116.3E	PCN 5	T3.5/4.5 /01.0/24HRS	DWSP46		RODN
89	120326	16.20 116.0E	PCN 5		DWSP40		RPNK

90	121139	13.30	117.0E	PCN 3		DM5037	RPMK
91	121426	13.40	117.4E	PCN 3		DM5030	RPMK
92	121426	13.40	117.4E	PCN 5		DM5030	ROUN
93	122238	13.00	117.3E	PCN 5		DM5037	RPMK
94	122238	13.20	117.5E	PCN 3		DM5037	ROUN
95	120136	13.10	117.4E	PCN 5	T3.5/4.5 /W1.0/24HRC	DM5030	RPMK
96	120307	13.20	117.3E	PCN 1		DM5030	RPMK
97	120307	13.30	117.4E	PCN 1	T5.0/5.0 /D1.5/24HRC	DM5030	ROUN
98	121119	13.40	111.7E	PCN 3		DM5037	RPMK
99	121119	13.40	111.7E	PCN 3		DM5037	ROUN
100	121401	13.40	111.6E	PCN 3		DM 037	ROUN
101	121407	13.70	111.1E	PCN 3		DM5030	RPMK
102	140118	13.50	110.7E	PCN 5	T2.5/3.5 /W1.0/24HRC	DM5030	RPMK
103	140248	13.40	110.7E	PCN 3		DM5030	RPMK
104	140248	13.30	110.7E	PCN 3	T4.0/5.0-/W1.0/24HRC	DM5030	ROUN
105	141058	12.30	100.0E	PCN 5		DM5037	ROUN
106	141058	13.30	100.5E	PCN 3		DM5037	RPMK
107	141348	13.20	100.2E	PCN 5		DM5030	PGTW
108	141348	13.00	100.6E	PCN 5		DM5030	ROUN
109	141359	13.10	100.2E	PCN 3		DM5030	RPMK
110	142339	13.20	100.7E	PCN 5	T1.5/2.5 /W1.0/24HRC	DM5037	RPMK
111	140229	13.30	107.9E	PCN 5		DM5030	RPMK
112	140229	12.30	107.5E	PCN 5	T2.0/3.0-/W2.0/24HRC	DM5030	ROUN

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70043 HGT	OBS MSLP	MAX-SFC-WND VEL/RRG/RNG	MAX-FLT-LVL-WND DTN/VEL/SHU/MNG	ACFTY NAV/MET	EYE SHAPE	EYE ORIENT- DIAM/TATION	EYE TEMP (C) DUTY /W/ DP/ST	WSN NO.
1	041001	12.60	110.3E	700MB	7017	991	65 360 50 340 35 270 30	3 4			+10 +17 + 7	1
2	040342	12.60	110.7E	700MB	7054	996	40 010 50 130 32 010 30	3 4	CIRCULAR	20	+13 +13 + 5	3
3	070203	12.20	110.4E	700MB	2994		50 030 11 040 50 360 15	3 5	CIRCULAR	20	+13 + 3	4
4	070431	12.20	110.3E	700MB	2970	985	75 330 10 340 73 270 10	3 4	CIRCULAR	20	+11 +15 + 5	4
5	080210	11.30	110.2E	700MB	2920	982	75 300 20 120 78 300 20	4 4	CIRCULAR	10	+11 +12 + 8	5
6	080312	11.10	110.2E	700MB	2927	980	45 080 5 320 40 220 30	3 4	CIRCULAR	20	+11 +15 + 9	5
7	090405	11.30	117.9E	700MB	2761	960	40 140 10 100 101 040 20	4 4	CIRCULAR	20	+11 +13 + 8	6
8	100142	11.50	116.5E	700MB	2696		100 060 5 150 93 060 10	4 2	CIRCULAR		+25 +10	7
9	100422	11.70	116.4E	700MB	2489	929	100 180 7 070 115 020 5	4 1	CIRCULAR	15	+11 +25 + 4	7
10	110131	12.00	115.4E	700MB	2737		50 070 50 120 73 060 12	4 2				8
11	110343	12.00	115.2E	700MB	2733	959	65 130 25 040 74 320 14	4 2	CIRCULAR	12	+10 +13 +11	8
12	120700	12.00	117.6E	700MB	2785		65 080 20 240 70 160 50	4 4	CIRCULAR			9
13	120923	13.10	117.4E	700MB	2784	962	45 180 30 110 63 040 20	4 4			+14 +15 + 6	9

RAJAM FIXES

FIX NO.	TIME (Z)	FIX POSITION	RAJAM ACFTY	EYE SHAPE	EYE DIAM	RAJAM-CODE ASWAN TODFF	COMMENTS	RAJAM POSITION	SITE WND NO.	
1	041208	14.10	119.7E	LAND				16.30	120.6E	08321
2	041300	13.40	110.8E	LAND	CIRCULAR			16.30	120.6E	08321
3	041308	14.00	110.5E	LAND				16.30	120.6E	08321
4	041800	13.40	110.2E	LAND				16.30	120.6E	08321
5	040000	13.50	110.0E	LAND				13.70	100.6E	08455

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	011200	14.50	120.5E	10	60
2	020000	15.00	121.0E	10	90
3	030000	15.00	121.0E	10	60
4	041200	14.00	119.8E	15	90

SUPER TYPHOON TIP

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACQRY	UVIRAK CODE	SATELLITE	COMMENTS	SITE
1	041154	14.2N 152.4E	PCN 5		DMSP14		PGTW
2	042016	14.5N 152.7E	PCN 6	T1.0/1.0	DMSP17	INIT JDS	PGTW
3	042255	14.7N 152.7E	PCN 6		DMSP1A		PGTW
4	043557	14.7N 152.4E	PCN 6		DMSP17		PGTW
5	044137	14.7N 152.4E	PCN 5		DMSP17		PGTW
6	044955	14.7N 152.4E	PCN 6		DMSP17		PGTW
7	045237	14.7N 152.4E	PCN 5	T2.0/2.0 /01.0/24HRC	DMSP1A		PGTW
8	045018	14.7N 152.4E	PCN 4		DMSP14		PGTW
9	044936	14.7N 152.4E	PCN 6		DMSP17		PGTW
10	044116	14.7N 152.4E	PCN 6		DMSP14		PGTW
11	044112	14.7N 152.4E	PCN 6	T2.5/2.5 /00.5/25HRC	DMSP14	LOW CONFIDENCE	PGTW
12	042212	14.6N 152.7E	PCN 6		DMSP1A		PGTW
13	070416	14.7N 152.1E	PCN 6		DMSP17		PGTW
14	071101	14.7N 152.4E	PCN 5		DMSP1A		PGTW
15	072338	14.7N 152.4E	PCN 5	T3.0/3.0 /01.0/24HRC	DMSP14		PGTW
16	072343	14.7N 152.1E	PCN 5		DMSP1A		PGTW
17	040755	14.7N 152.2E	PCN 6		DMSP17		PGTW
18	040843	14.7N 152.0E	PCN 4		DMSP1A		PGTW
19	042037	14.7N 152.4E	PCN 5		DMSP17		PGTW
20	042325	14.7N 152.7E	PCN 5	T3.5/3.5 /00.5/24HRC	DMSP1A		PGTW
21	040101	14.7N 152.1E	PCN 5		DMSP14		PGTW
22	042016	14.7N 152.7E	PCN 4		DMSP17		PGTW
23	100042	14.7N 152.7E	PCN 5	T5.0/5.0	DMSP14	INIT JDS	RODN
24	100042	14.7N 152.4E	PCN 5	T4.5/4.5	DMSP14	INIT JDS	RPWK
25	100042	14.7N 152.4E	PCN 5	T4.5/4.5 /01.0/25HRC	DMSP14		PGTW
26	100957	14.7N 152.4E	PCN 6		DMSP17		PGTW
27	100957	14.7N 152.0E	PCN 6		DMSP17		RODN
28	101149	14.7N 152.1E	PCN 2		DMSP1A		PGTW
29	101149	14.7N 152.1E	PCN 2		DMSP1A		RPWK
30	101149	14.7N 152.0E	PCN 2		DMSP1A		RODN
31	110031	14.7N 152.7E	PCN 1	T6.0/6.0 /01.5/24HRC	DMSP1A		RPWK
32	111014	14.7N 152.4E	PCN 1		DMSP1A		PGTW
33	111014	14.7N 152.3E	PCN 1		DMSP17		RODN
34	111131	14.7N 152.1E	PCN 4		DMSP1A		PGTW
35	111304	14.7N 152.2E	PCN 1		DMSP14		RPWK
36	112117	14.7N 152.0E	PCN 1	T7.5/7.5	DMSP17	INIT JDS	RODN
37	112117	14.7N 152.4E	PCN 1	T7.0/7.0	DMSP17	INIT JDS	PGTW
38	120012	14.7N 152.2E	PCN 1		DMSP1A		PGTW
39	120144	14.7N 152.3E	PCN 1	T7.0/7.0 /01.0/25HRC	DMSP14		RPWK
40	120145	14.7N 152.0E	PCN 1		DMSP14		PGTW
41	120957	14.7N 152.3E	PCN 1		DMSP17		PGTW
42	121254	14.7N 152.7E	PCN 1		DMSP1A		PGTW
43	121254	14.7N 152.2E	PCN 1		DMSP1A		RODN
44	122057	14.7N 152.3E	PCN 1		DMSP17		PGTW
45	122354	14.7N 152.1E	PCN 1	T8.5/7.0 /00.5/27HRC	DMSP1A		PGTW
46	130126	14.7N 152.0E	PCN 1		DMSP14		PGTW
47	130126	14.7N 152.1E	PCN 1	T7.0/7.5 /00.5/24HRC	DMSP14		RODN
48	130937	14.7N 152.4E	PCN 1		DMSP17		PGTW
49	131220	14.7N 152.4E	PCN 1		DMSP14		RODN
50	131236	14.7N 152.4E	PCN 3		DMSP1A		PGTW
51	132036	14.7N 152.0E	PCN 5		DMSP17		PGTW
52	132336	14.7N 152.4E	PCN 1	T3.0/3.0 /01.5/24HRC	DMSP1A		PGTW
53	140106	14.7N 152.7E	PCN 1		DMSP14		PGTW
54	140107	14.7N 152.4E	PCN 1	T6.0/7.0 /01.0/24HRC	DMSP14		RODN
55	140917	14.7N 152.5E	PCN 1		DMSP17		PGTW
56	141206	14.7N 152.2E	PCN 1		DMSP14		PGTW
57	141206	14.7N 152.2E	PCN 1		DMSP14		RODN
58	141348	14.7N 152.1E	PCN 1		DMSP14		PGTW
59	142157	14.7N 152.2E	PCN 1	T3.0/5.0 /50.0/27HRC	DMSP17		PGTW
60	140047	14.7N 152.0E	PCN 1		DMSP14		PGTW
61	140048	14.7N 152.7E	PCN 1	T5.5/6.0 /00.5/24HRC	DMSP14		RODN
62	140059	14.7N 152.7E	PCN 2		DMSP1A		PGTW
63	140229	14.7N 152.0E	PCN 1		DMSP14		RODN
64	141038	14.7N 152.5E	PCN 5		DMSP17		PGTW
65	141200	14.7N 152.3E	PCN 5		DMSP1A		PGTW
66	141329	14.7N 152.2E	PCN 5		DMSP14		PGTW
67	141329	14.7N 152.2E	PCN 5		DMSP14		RODN
68	142137	14.7N 152.2E	PCN 1	T5.0/5.0 /50.0/24HRC	DMSP17		PGTW
69	140041	14.7N 152.1E	PCN 3		DMSP1A		PGTW
70	140204	14.7N 152.2E	PCN 3		DMSP14		PGTW
71	140210	14.7N 152.1E	PCN 3	T3.0/5.5 /00.5/25HRC	DMSP14		RODN
72	141018	14.7N 152.7E	PCN 3		DMSP17		PGTW
73	141324	14.7N 152.4E	PCN 3		DMSP1A		PGTW
74	142117	14.7N 152.2E	PCN 3		DMSP17		PGTW
75	170024	21.2N 128.1E	PCN 3	T5.0/5.0-50.0/27HRC	DMSP1A		PGTW
76	170151	21.4N 128.0E	PCN 3		DMSP14		PGTW
77	170151	21.4N 128.0E	PCN 3	T5.0/5.0	DMSP14	INIT JDS	RPWK
78	170151	21.4N 127.4E	PCN 1	T5.0/5.0 /50.0/24HRC	DMSP14		RODN
79	170957	22.7N 127.4E	PCN 3		DMSP17		PGTW
80	171251	22.0N 127.4E	PCN 3		DMSP14		RODN
81	171306	22.3N 127.4E	PCN 3		DMSP1A		PGTW
82	172056	24.1N 128.0E	PCN 3		DMSP17		PGTW
83	172057	24.4N 127.7E	PCN 6		DMSP17		RODN
84	180006	25.7N 128.3E	PCN 3	T4.5/5.0 /00.5/24HRC	DMSP1A		PGTW
85	180131	25.2N 128.2E	PCN 3	T4.5/5.0 /00.5/24HRC	DMSP14		RPWK
86	180132	25.2N 128.0E	PCN 3		DMSP14		PGTW
87	180132	24.4N 128.0E	PCN 3	T3.5/4.5 /01.5/24HRC	DMSP14		RODN
88	180937	27.2N 129.4E	PCN 3		DMSP17		PGTW
89	180937	27.5N 129.4E	PCN 4		DMSP17		RODN
90	181118	28.2N 129.6E	PCN 3		DMSP17		RODN

91	121231	24.6N	130.5E	PCN 5	DMSD39		RPMK
92	121248	24.7N	130.5E	PCN 3	DMSD34		PGTW
93	122036	30.6N	131.0E	PCN 3	DMSD17		PGTW
94	122348	32.7N	134.0E	PCN 3	DMSD14		PGTW
95	120112	33.6N	134.6E	PCN 5	DMSD30	INIT JDS	RKSO
96	120112	33.7N	135.2E	PCN 3	DMSD39		PGTW
97	121212	41.1N	145.0E	PCN 5	DMSD39	PSBL LLCP	RODN
98	121212	41.1N	144.5E	PCN 5	DMSD39		RKSO
99	122016	43.7N	144.4E	PCN 5	DMSD17	EXPSU GLFC	RKSO

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70043 HGT	OBS MSLP	MAX-SFC-WND VEL/ARG/RNG	MAX-FLT-LVL-WND VEL/ARG/RNG	ACFT NAV/MT	EYE SHAPE	EYE ORIENT- DIAM/TATION	HYF TEMP (C) OUT/ IN/ CP/SET	ASN NO.
1	040514	4.2N 153.0E	1500FT		1004	25 276 10	270 29 180 30	4 5				1
2	050030	5.4N 154.4E	700MM	1095	1004	25 270 18	140 33 360 120	5 10				2
3	050510	5.9N 155.3E	1500FT		1003	25 050 30	170 27 360 15	2 5				3
4	050800	5.7N 155.1E	700MM	1113	1003	35 230 40	270 37 210 60	2 4				4
5	061943	7.1N 153.4E	700MM	1112		40 110 12	060 34 300 20	4 4				5
6	062222	7.2N 153.4E	700MM	1124		35 010 30	100 26 010 60	4 2				6
7	060713	7.4N 153.0E	700MM	1110	1000	10 040 20	040 31 270 60	4 5				7
8	062111	7.3N 152.5E	700MM	1100	998	40 360 15	080 30 290 90	2 2				8
9	070305	7.4N 152.3E	700MM	1101		35 320 30	100 33 320 30	4 4				9
10	070617	6.9N 152.4E	700MM	1095		30 110 50	100 32 310 60	4 10				10
11	070801	6.4N 152.0E	700MM	1106		30 100 55	070 56 010 15	4 4				11
12	071428	6.3N 151.7E	700MM	1091	1005		070 51 310 65	5 5				12
13	071956	6.6N 152.2E	700MM	1072			140 45 060 30	10 5				13
14	072030	6.9N 152.2E	700MM	1054	997	40 180 35	270 40 180 30	5 5				14
15	080248	6.2N 151.5E	700MM	1047	995	35 230 105	220 44 130 120	5 5				15
16	080550	9.0N 151.3E	700MM	1034		35 050 30	140 35 050 30	4 4				16
17	080825	9.3N 150.9E	700MM	1043	995		090 38 350 30	8 10				17
18	121557	10.3N 150.1E	700MM	1027	991		110 50 360 100	5 10				18
19	081900	10.4N 148.0E	700MM				070 37 340 75	5 10				19
20	082140	11.3N 148.5E	700MM	9994	989	50 320 20	140 50 120 60	5 10	CIRCULAR	25		20
21	090005	12.1N 147.7E	700MM	9996		50 150 10	070 48 310 80	3 2				21
22	090241	12.6N 146.8E	700MM	9960	985	50 130 10	100 43 130 115	2 3	CIRCULAR	25		22
23	090521	12.7N 145.6E	700MM	9936		60 160 45	080 69 360 50	5 2				23
24	090735	12.7N 145.2E	700MM	9931	981	55 080 68	100 57 020 72	2 2				24
25	091201	12.9N 144.3E	700MM	9889	974		290 43 210 18	2 2				25
26	092006	12.9N 143.2E	700MM	2773		70 070 10	140 57 070 15	1 5	CIRCULAR	8		26
27	092110	12.9N 142.9E	700MM	2712	959	90 360 10	130 78 360 15	1 10	CIRCULAR	20		27
28	100951	13.7N 141.3E	700MM	2654	949		106 110 10	3 3	CIRCULAR	15		28
29	102340	14.2N 130.5E	700MM	2237	900	130 050 10	140 125 050 10	2 2	CIRCULAR	15		29
30	111308	15.3N 130.4E	700MM	2271			240 120 160 14	4 5	CUNCENTRIC			30
31	111529	15.6N 130.1E	700MM	2201	900		180 125 130 70	4 5	CUNCENTRIC	20	130	31
32	120353	16.7N 137.0E	700MM	1944	870	130 090 50	200 110 090 15	4 4	CIRCULAR	12		32
33	120655	16.3N 137.5E	700MM	1995		130 310 07	010 110 310 10	4 4	CIRCULAR			33
34	120837	16.9N 137.3E	700MM	2058	884	130 130 6	210 110 130 15	4 4	CIRCULAR	12		34
35	121901	16.9N 136.8E	700MM	2201			340 125 270 35	4 2	CIRCULAR	10		35
36	122122	16.7N 136.5E	700MM	2224	903	130 360 25	040 114 360 18	4 2	CIRCULAR	12		36
37	130503	16.7N 135.4E	700MM	2244		30 140 55	210 105 130 30	5 2	CIRCULAR			37
38	130810	16.7N 135.6E	700MM	2267	905		070 100 310 30	2 2	ELLIPTICAL	40 25 100		38
39	140809	17.0N 134.0E	700MM	2417	922	50 230 135	080 86 360 90	2 5	ELLIPTICAL	10 7 150		39
40	140510	17.2N 133.4E	700MM	2391		130 100 7	190 110 100 10	4 2				40
41	140900	17.2N 132.8E	700MM	2389	919		090 95 040 50	5 2	CIRCULAR	14		41
42	140600	18.4N 130.4E	700MM	2383		50 240 130	230 82 140 90	2 3	CIRCULAR			42
43	140824	18.5N 130.1E	700MM	2387	919	95 030 15	140 98 050 60	2 5	CIRCULAR	13		43
44	141900	19.0N 129.4E	700MM	2433			220 101 140 95	4 3				44
45	142135	19.3N 129.4E	700MM	2435	924		110 87 360 20	5 4				45
46	140808	20.2N 128.9E	700MM	2490	931	80 240 14	320 74 240 50	5 5	CIRCULAR	25		46
47	141203	20.6N 128.6E	700MM	2520			67 18 90	5 5				47
48	141407	20.7N 128.6E	700MM	2513	931		220 76 150 50	5 5	CIRCULAR	25		48
49	141904	21.0N 128.3E	700MM	2521			230 85 130 50	5 4				49
50	142150	21.2N 128.3E	700MM	2356	935		140 80 040 150	5 5				50
51	170735	22.5N 128.0E	700MM	2567			100 87 120 12	4 3				51
52	170908	22.7N 127.8E	700MM	2562	939	70 160 30	170 77 020 60	4 3				52
53	170908	22.7N 127.8E	700MM	2562			170 80 360 90	4 3				53
54	151407	23.6N 127.3E	700MM	2582			100 99 200 30	4 3	CIRCULAR	35		54
55	171901	24.2N 127.7E	700MM	2579			290 72 210 12	5 3				55
56	172114	24.6N 127.7E	700MM	2590			210 95 140 100	4 4				56
57	181132	24.3N 130.0E	700MM	2694			190 89 090 120	4 3				57
58	181401	24.0N 130.7E	700MM	2719			140 60 010 120	4 4				58
59	182221	27.2N 133.4E	700MM	2831	971	90 120 10	230 85 110 110	2 2				59

RAJAP FIXES

FIX NO.	TIME (Z)	FIX POSITION	HADAR	ACFT	EYE SHAPE	EYE DIAM	RADAR-CODE ASMAN DUFT	COMMENTS.	HADAR POSITION	STF WND NO.
1	090335	12.4N 144.5E	LAND	FAIR					13.0N 144.9E	01218
2	090410	12.4N 144.3E	LAND	FAIR					13.0N 144.9E	01218
3	090435	12.4N 144.1E	LAND	FAIR					13.0N 144.9E	01218
4	090500	12.4N 144.0E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
5	090510	12.4N 144.0E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
6	090510	12.4N 144.0E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
7	090535	12.4N 144.0E	LAND	FAIR	CIRCULAR	15			13.0N 144.9E	01218
8	090710	12.4N 144.5E	LAND	FAIR	CIRCULAR	15			13.0N 144.9E	01218
9	090735	12.4N 144.0E	LAND	FAIR	CIRCULAR	15			13.0N 144.9E	01218
10	090810	12.7N 145.2E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
11	090935	12.4N 145.1E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
12	090910	12.4N 145.0E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
13	090935	12.4N 144.8E	LAND	FAIR	CIRCULAR	20			13.0N 144.9E	01218
14	091010	12.7N 144.8E	LAND	FAIR	CIRCULAR	15			13.0N 144.9E	01218
15	091035	12.7N 144.7E	LAND	FAIR	CIRCULAR	15			13.0N 144.9E	01218

16	001110	12.70	144.7E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
17	001130	12.80	144.5E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
18	001210	12.80	144.5E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
19	001230	12.80	144.4E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
20	001310	12.80	144.3E	LAND	FAIR	CIRCHLAR	15			13.0N	144.9E	01218
21	001330	12.80	144.2E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
22	001410	12.80	144.1E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
23	001430	12.80	144.1E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
24	001510	12.80	144.1E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
25	001530	12.70	144.1E	LAND	GNDU	CIRCHLAR	15			13.0N	144.9E	01218
26	001600	12.70	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
27	001630	12.60	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
28	001710	12.70	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
29	001730	12.80	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
30	001810	12.80	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
31	001830	12.80	144.1E	LAND	GNDU	CIRCHLAR	7			13.0N	144.9E	01218
32	001910	12.80	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
33	001930	12.80	144.1E	LAND	GNDU	CIRCHLAR	10			13.0N	144.9E	01218
34	002010	12.80	144.1E	LAND	FAIR	CIRCHLAR	10			13.0N	144.9E	01218
35	171230	23.20	127.7E	LAND	GNDU		45			24.0N	125.3E	07997
36	171400	23.30	127.7E	LAND	GNDU		45			24.0N	125.3E	07997
37	171500	23.50	127.7E	LAND	GNDU		45			24.0N	125.3E	07997
38	171600	23.70	127.6E	LAND	GNDU		45			24.0N	125.3E	07997
39	171700	23.30	127.6E	LAND	GNDU		45			24.0N	125.3E	07997
40	171708	24.00	127.5E	LAND				3773 5310		26.2N	127.0E	07937
41	171900	24.00	127.5E	LAND	PHOR					24.0N	125.3E	07997
42	171900	24.10	127.5E	LAND	PHOR					26.3N	126.0E	07999
43	171900	24.30	127.5E	LAND				6772 70311		26.2N	127.0E	07937
44	172000	24.20	127.6E	LAND	PHOR					26.3N	126.0E	07999
45	172000	24.40	127.7E	LAND				6773 70211		26.2N	127.0E	07937
46	172035	24.80	127.5E	LAND	FAIR					26.4N	127.0E	07931
47	172100	24.30	127.5E	LAND	PHOR					26.3N	126.0E	07999
48	172100	24.40	127.7E	LAND				6773 70110		26.2N	127.0E	07937
49	172200	24.50	127.4E	LAND	GNDU					26.3N	126.0E	07999
50	172200	24.70	127.6E	LAND				6773 73608		26.2N	127.0E	07937
51	172235	25.00	127.5E	LAND	PHOR					26.4N	127.0E	07931
52	172300	24.30	127.4E	LAND				6771 70209		26.2N	127.0E	07937
53	172310	24.80	127.7E	LAND	PHOR					26.4N	127.0E	07931
54	172320	24.80	127.7E	LAND	PHOR					24.0N	125.3E	07997
55	172335	24.90	127.8E	LAND	PHOR					26.4N	127.0E	07931
56	180000	25.00	129.0E	LAND	GNDU		40			26.3N	126.0E	07999
57	180000	25.10	127.4E	LAND				3774 70111		26.2N	127.0E	07937
58	180010	25.10	127.8E	LAND	PHOR					26.4N	127.0E	07931
59	180035	25.20	127.8E	LAND	PHOR					26.4N	127.0E	07931
60	180100	25.30	129.0E	LAND				3772 70308		26.2N	127.0E	07937
61	180120	25.20	129.1E	LAND	GNDU		40			26.3N	126.0E	07999
62	180135	25.50	127.9E	LAND	PHOR					26.4N	127.0E	07931
63	180200	24.50	129.0E	LAND				3772 70111		26.2N	127.0E	07937
64	180210	25.50	129.1E	LAND	GNDU		45			26.3N	126.0E	07999
65	180210	25.80	129.0E	LAND	PHOR					26.4N	127.0E	07931
66	180235	25.70	129.1E	LAND	PHOR					26.4N	127.0E	07931
67	180300	25.70	129.5E	LAND				3772 70514		26.2N	127.0E	07937
68	180300	25.70	129.3E	LAND	GNDU		45			26.3N	126.0E	07999
69	180310	25.90	127.3E	LAND	PHOR					26.4N	127.0E	07931
70	180335	26.10	129.5E	LAND	PHOR					26.4N	127.0E	07931
71	180400	26.10	129.8E	LAND				6772 70218		26.2N	127.0E	07937
72	180400	26.00	129.1E	LAND				6771 5777		26.2N	127.0E	07937
73	180400	26.00	129.4E	LAND	GNDU		45			26.4N	127.0E	07931
74	180410	26.20	129.4E	LAND	PHOR					26.3N	126.0E	07999
75	180435	26.40	129.7E	LAND	PHOR					26.4N	127.0E	07931
76	180445	26.40	129.4E	LAND	GNDU					26.4N	127.0E	07931
77	180445	26.40	129.4E	LAND	GNDU					26.2N	127.0E	07937
78	180500	26.40	129.4E	LAND				6771 50327		26.2N	127.0E	07937
79	180500	26.50	129.5E	LAND				6774 70222		26.2N	127.0E	07937
80	180500	26.30	129.5E	LAND	GNDU		40			26.3N	126.0E	07999
81	180510	26.70	129.6E	LAND	PHOR					26.4N	127.0E	07931
82	180535	26.80	129.7E	LAND	PHOR					26.4N	127.0E	07931
83	180545	26.60	129.6E	LAND	PHOR					26.2N	127.0E	07937
84	180545	26.50	129.6E	LAND	PHOR					26.2N	127.0E	07937
85	180600	26.60	129.7E	LAND	FAIR		45			26.3N	126.0E	07999
86	180600	26.60	129.7E	LAND				6774 70219		26.2N	127.0E	07937
87	180600	26.40	129.5E	LAND				6771 50509		26.4N	129.5E	07999
88	180610	26.30	129.7E	LAND	PHOR					26.4N	127.0E	07931
89	180700	27.00	129.0E	LAND				6772 70320		26.2N	127.0E	07937
90	180700	26.90	129.7E	LAND	PHOR					26.3N	126.0E	07999
91	180700	26.80	129.9E	LAND				6771 50430		26.4N	129.5E	07999
92	180800	27.10	129.9E	LAND	PHOR					26.3N	126.0E	07999
93	180900	27.10	129.2E	LAND				6773 70618		26.2N	127.0E	07937
94	180900	27.20	129.0E	LAND				6771 50327		26.4N	129.5E	07999
95	180900	27.50	129.3E	LAND	PHOR					27.4N	129.5E	07999
96	180900	27.20	129.5E	LAND				7773 70516		26.2N	127.0E	07937
97	180900	27.50	129.3E	LAND				6771 50519		26.4N	129.5E	07999
98	181000	27.70	129.5E	LAND				6771 50316		26.4N	129.5E	07999
99	181000	27.70	129.4E	LAND	PHOR					27.4N	129.5E	07999
100	181100	27.90	129.8E	LAND	PHOR					27.4N	129.5E	07999
101	181100	28.00	129.7E	LAND				6771 50324		26.4N	129.5E	07999
102	181200	28.30	129.8E	LAND				6771 50316		26.4N	129.5E	07999
103	181300	28.50	130.0E	LAND				6771 50423		26.4N	129.5E	07999
104	181400	28.80	130.4E	LAND				6771 50527		26.4N	129.5E	07999
105	181500	29.20	130.8E	LAND				6772 5777		30.6N	131.0E	07849
106	181500	29.10	130.9E	LAND				6771 50629		28.4N	129.5E	07999
107	181600	29.40	131.3E	LAND				6771 50627		30.6N	131.0E	07849
108	181700	29.60	131.6E	LAND				6771 50522		30.6N	131.0E	07849
109	182330	30.20	134.2E	LAND	PHOR							

HUY ATTENUATION

KUSHIMOTO

SUPER TYPHOON VERA

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACRY	UVCRAK CODE	SATELLITE	COMMENTS	SITE
1	312316	6.2N 149.0E	PCN 5	T1.0/1.0	DWSP3A	INIT JDS	PGTW
2	010026	6.2N 149.9E	PCN 5		DWSP3A		PGTW
3	010814	6.2N 149.3E	PCN 5		DWSP3A	CI UP	PGTW
4	011126	6.3N 147.0E	PCN 5		DWSP3A		PGTW
5	011158	6.3N 147.2E	PCN 5		DWSP3A		PGTW
6	012055	6.9N 146.7E	PCN 5		DWSP3A		PGTW
7	012250	6.9N 146.0E	PCN 5	T2.0/2.0 /D1.0/24HRS	DWSP3A		PGTW
8	020007	6.6N 145.7E	PCN 5		DWSP3A		PGTW
9	020335	7.2N 143.9E	PCN 5		DWSP3A		PGTW
10	021140	7.2N 143.6E	PCN 5		DWSP3A		PGTW
11	021248	7.1N 143.4E	PCN 5		DWSP3A		PGTW
12	021248	6.9N 143.2E	PCN 5		DWSP3A		PGTW
13	022034	7.5N 141.5E	PCN 5		DWSP3A		PGTW
14	030021	8.3N 141.0E	PCN 5	T3.5/3.5	DWSP3A	INIT JDS	PGTW
15	030021	7.9N 141.1E	PCN 5	T3.0/3.0 /D1.0/24HRS	DWSP3A		PGTW
16	030129	8.2N 140.7E	PCN 5		DWSP3A		PGTW
17	030314	9.0N 137.8E	PCN 6		DWSP3A		PGTW
18	031228	9.2N 137.1E	PCN 6		DWSP3A		PGTW
19	031229	9.4N 137.2E	PCN 5		DWSP3A		PGTW
20	031302	9.2N 136.9E	PCN 6		DWSP3A		PGTW
21	032155	10.5N 137.8E	PCN 1	T5.0/5.0+/D2.0/24HRS	DWSP3A		PGTW
22	040003	10.5N 137.0E	PCN 1		DWSP3A		PGTW
23	040110	10.5N 137.7E	PCN 1		DWSP3A		PGTW
24	040110	10.5N 137.6E	PCN 1	T5.0/5.0	DWSP3A	INIT JDS	PGTW
25	041035	11.4N 129.7E	PCN 2		DWSP3A		PGTW
26	041244	11.9N 129.0E	PCN 1		DWSP3A		PGTW
27	041245	11.7N 128.8E	PCN 2		DWSP3A		PGTW
28	041351	11.4N 128.7E	PCN 2		DWSP3A		PGTW
29	042135	12.4N 126.6E	PCN 1	T5.5/6.5 /D0.5/24HRS	DWSP3A		PGTW
30	042135	12.5N 126.5E	PCN 1		DWSP3A		PGTW
31	050126	12.9N 126.9E	PCN 1	T6.0/6.0+/D1.0/24HRS	DWSP3A		PGTW
32	050232	13.1N 126.9E	PCN 1	T6.5/6.5	DWSP3A	INIT JDS	PGTW
33	050232	13.1N 126.8E	PCN 1		DWSP3A		PGTW
34	051015	14.1N 124.4E	PCN 2		DWSP3A		PGTW
35	05 226	14.4N 123.9E	PCN 1		DWSP3A		PGTW
36	051332	14.4N 123.6E	PCN 1		DWSP3A		PGTW
37	051332	14.5N 123.7E	PCN 1		DWSP3A		PGTW
38	051608	14.4N 124.1E	PCN 1		DWSP3A		PGTW
39	052256	14.4N 122.9E	PCN 3	T4.5/5.5 /W1.0/24HRS	DWSP3A		PGTW
40	060108	15.4N 123.1E	PCN 3	T5.5/6.5-/W1.0/24HRS	DWSP3A		PGTW
41	060109	15.4N 122.9E	PCN 3		DWSP3A		PGTW
42	060213	15.7N 122.3E	PCN 1		DWSP3A		PGTW
43	060213	15.9N 122.5E	PCN 1	T6.0/6.0+/S0.0/24HRS	DWSP3A		PGTW
44	060954	16.7N 122.2E	PCN 3		DWSP3A		PGTW
45	061312	17.1N 122.2E	PCN 5		DWSP3A		PGTW
46	061350	17.2N 122.3E	PCN 5		DWSP3A		PGTW
47	061351	17.2N 122.3E	PCN 3		DWSP3A		PGTW
48	062236	18.3N 121.5E	PCN 3		DWSP3A		PGTW
49	070050	18.5N 121.7E	PCN 5		DWSP3A		PGTW
50	070153	17.9N 121.7E	PCN 5	T4.0/5.0 /W2.0/24HRS	DWSP3A		PGTW
51	070154	18.6N 121.7E	PCN 5	T3.0/4.0 /W1.5/24HRS	DWSP3A		PGTW
52	071116	18.7N 122.1E	PCN 1		DWSP3A		PGTW
53	071332	16.4N 117.9E	PCN 5		DWSP3A		PGTW
54	080032	16.1N 114.5E	PCN 5		DWSP3A	APRINT 6LCC	PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	70043 HGT	OBS MSLP	MAX-CFC-WND VEL/ARQ/RNG	MAX-FLT-LVL-WND HGT/VEL/BKG/HNR	ACRY NAV/MET	EYE SHAPE	EYE ORIEN- DIRECTION	WIND TEMP (C) DIR/ 1M/ 3P/5KT	WIND NO.	
1	020625	7.4N 144.5E	1500FT		994	50 130	7 140 65 060 20	5 2			+21 +24 +22	2	
2	030500	8.4N 139.3E	700MM	2471		70 090	5 150 46 240 30	5 2			+14 +10	4	
3	030753	8.9N 134.4E	700MM	2946	982		150 73 020	8 5 2	CIRCULAR	17	+11 +15 + 8	4	
4	031833	10.1N 134.7E	700MM	2720			120 120 080	17 5 5	CIRCULAR	20	+14 +11	5	
5	032049	10.2N 134.3E	700MM	2643	945	130 270	3 120 125 270	10 5 1	CIRCULAR	8	+10 +13 + 8	5	
6	040507	11.0N 131.5E	700MM	2390		130 110	5 140 170 110	5 6 1	CIRCULAR	8	+12 +23 +13	6	
7	041900	12.2N 127.4E	700MM	2349	915		120 100 060	10 4 2	CIRCULAR		+19 +14	7	
8	042125	12.5N 126.5E	700MM	2372	919	120 330	3 240 111 180	14 4 2	CUNCENTRIC	25	+14 +15 +14	7	
9	050418	13.2N 124.1E	700MM	2413		130 050	7 120 116 050	12 8 5			+15 +12	8	
10	050702	13.6N 124.8E	700MM	2410		130 140	4 140 100 270	10 4 2	CIRCULAR	7	+10 +15 +15	9	
11	052017	14.1N 123.3E	700MM	2357			100 103 110	30 4 2	CIRCULAR	10	+15 +15	9	
12	052232	14.1N 122.7E	700MM	2587									
13	060520	16.9N 122.3E	700MM	2647	941	65 060	40 140 85 070	25 5 1	CIRCULAR	30	+15 +15 +15	9	
14	062001	17.4N 121.0E	700MM			100 050	35 120 52 020	60 5	CIRCULAR		+15 + 4	10	

RAJAM FIXES

FIX NO.	TIME (Z)	FIX POSITION	HADAR	ACONY	EYE SHAPE	EYE DIAM	MAIN- COUE ACYON	COMMENTS	HADAR POSITION	CTF NO.
1	040716	11.24 124.7E	ACFT							
2	040800	11.24 124.6E	LAND				20411 1111		10.3M 124.0E	08446
3	040805	11.24 124.5E	LAND				11245 3011		14.1M 123.0E	08440
4	040800	11.24 124.3E	LAND				10111 53408		14.1M 123.0E	08440
5	040800	11.24 124.0E	LAND				20401 1111		14.0M 124.3E	08447
6	040800	11.24 123.7E	LAND				10443 53515		14.1M 123.0E	08440
7	040830	11.24 124.7E	LAND				20411 53028		14.0M 124.3E	08447
8	040700	11.24 124.5E	LAND				20411 53313		14.0M 124.3E	08447
9	040700	11.24 124.1E	LAND				20411 53309		14.0M 124.3E	08447
10	040800	11.24 124.4E	LAND				20411 53325		14.0M 124.3E	08447
11	040800	11.24 124.6E	LAND				20411 53125		14.0M 124.3E	08447
12	040800	11.24 124.4E	LAND				20411 52921		14.0M 124.3E	08447
13	040800	11.24 124.6E	LAND				20411 52921		14.0M 124.3E	08447
14	040800	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
15	041000	11.24 124.5E	LAND				20411 53314		14.0M 124.3E	08447
16	041100	11.24 124.5E	LAND				20411 53314		14.0M 124.3E	08447
17	041300	11.24 124.0E	LAND				20411 53314		14.0M 124.3E	08447
18	041400	11.24 124.5E	LAND				20411 53314		14.0M 124.3E	08447
19	041500	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
20	041600	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
21	041800	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
22	041900	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
23	041945	11.24 124.5E	LAND				20411 53314		14.0M 124.3E	08447
24	042005	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
25	042035	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
26	042110	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
27	042135	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
28	042215	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
29	042235	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
30	042300	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
31	042300	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
32	042300	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
33	040000	11.24 124.0E	LAND				20411 53314		14.0M 124.3E	08447
34	040100	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
35	040100	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
36	040200	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
37	040200	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
38	040300	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
39	040300	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
40	040400	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
41	040400	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
42	040430	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
43	040500	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
44	040500	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
45	040500	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
46	040700	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
47	040930	11.24 124.3E	LAND				20411 53314		14.0M 124.3E	08447
48	041200	11.24 124.1E	LAND				20411 53314		14.0M 124.3E	08447
49	041500	11.24 124.1E	LAND				20411 53314		14.0M 124.3E	08447
50	041500	11.24 124.1E	LAND				20411 53314		14.0M 124.3E	08447
51	041900	11.24 124.4E	LAND				20411 53314		14.0M 124.3E	08447
52	041900	11.24 124.4E	LAND				20411 53314		14.0M 124.3E	08447
53	070100	11.24 124.1E	LAND				20411 53314		14.0M 124.3E	08447
54	070200	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
55	070300	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
56	070300	11.24 124.6E	LAND				20411 53314		14.0M 124.3E	08447
57	070500	11.24 124.4E	LAND				20411 53314		14.0M 124.3E	08447
58	070500	11.24 124.4E	LAND				20411 53314		14.0M 124.3E	08447
59	070700	11.24 124.7E	LAND				20411 53314		14.0M 124.3E	08447
60	070900	11.24 119.4E	LAND				20411 53314		14.0M 124.3E	08447

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	240000	14.0N 150.5E	05	60	
2	241200	14.0N 150.5E	05	120	
3	300000	14.0N 150.0E	10	225	
4	301200	14.0N 150.0E	05	320	
5	310000	14.0N 151.0E	10	90	
6	311200	14.0N 149.0E	15	75	
7	071200	15.0N 117.5E	20	30	
8	080000	15.0N 117.5E	20	90	
9	081200	15.0N 117.0E	15	120	

TROPICAL STORM WAYNE
SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACQRY	ORIGIN CODE	SATellite	COMMENTS	SITE
1	070012	17.7N 140.7E	PCN 5	TU.0/0.0	DMSP02V	INIT JDS/PNO CNTR AT 113N 1470E	PGTW
2	070935	17.7N 137.5E	PCN 6		DMSP02V	PSN 050 ON W FLOW	PGTW
3	071254	14.5N 130.4E	PCN 5		DMSP02V	PSN 050 ON W FLOW	PGTW
4	072034	14.7N 135.4E	PCN 6		DMSP02V	PSN 050 ON W FLOW	PGTW
5	080032	15.6N 135.6E	PCN 5	T1.5/1.5 /01.5/24HRS	DMSP02V		PGTW
6	080914	14.2N 137.5E	PCN 5		DMSP02V		PGTW
7	080914	14.2N 137.5E	PCN 5		DMSP02V		RODN
8	081234	14.4N 131.4E	PCN 5		DMSP02V		PGTW
9	081234	14.4N 131.4E	PCN 5		DMSP02V		RODN
10	081314	14.4N 131.7E	PCN 5		DMSP02V		PGTW
11	082155	14.0N 130.1E	PCN 5		DMSP02V	ULC 103N 1294E	PGTW
12	080014	14.0N 120.7E	PCN 3	T2.5/2.5 /01.0/24HRS	DMSP02V		PGTW
13	080115	15.7N 120.4E	PCN 3		DMSP02V		PGTW
14	080115	15.7N 120.7E	PCN 5	T2.0/2.0	DMSP02V	INIT JDS	RPMK
15	081035	14.0N 120.7E	PCN 5		DMSP02V		PGTW
16	081256	14.4N 120.4E	PCN 5		DMSP02V		PGTW
17	081255	14.2N 120.9E	PCN 5		DMSP02V		RPMK
18	081350	14.4N 120.3E	PCN 6		DMSP02V		RPMK
19	082134	17.0N 120.2E	PCN 6	T2.0/2.5 /00.5/21HRS	DMSP02V		PGTW
20	082355	17.7N 120.3E	PCN 5		DMSP02V		PGTW
21	100056	17.4N 120.7E	PCN 5		DMSP02V	EDGE OF DATA	RODN
22	100056	17.5N 120.3E	PCN 5		DMSP02V		PGTW
23	101015	14.7N 120.3E	PCN 5		DMSP02V		PGTW
24	101238	14.4N 127.5E	PCN 5		DMSP02V		PGTW
* 25	101337	17.5N 127.6E	PCN 5		DMSP02V		PGTW
* 26	101337	17.5N 127.6E	PCN 5		DMSP02V		PGTW
27	102113	14.4N 120.6E	PCN 4		DMSP02V	EARLY GLOC	PGTW
28	102337	14.4N 120.5E	PCN 3		DMSP02V		PGTW
29	110219	14.7N 120.4E	PCN 3	T1.0/1.0	DMSP02V	INIT JDS	PGTW
30	110218	14.4N 120.4E	PCN 3	T1.0/1.5 /01.0/27HRS	DMSP02V		PGTW
31	110954	14.4N 120.2E	PCN 5		DMSP02V		PGTW
32	111219	14.4N 120.2E	PCN 2		DMSP02V		PGTW
33	111318	14.7N 120.1E	PCN 3		DMSP02V		PGTW
34	111318	14.3N 120.5E	PCN 3		DMSP02V		RKSO
35	121234	14.4N 127.2E	PCN 3	T1.0/1.0 /50.0/20HRS	DMSP02V		RODN
36	120100	14.3N 127.2E	PCN 3		DMSP02V		PGTW
37	120214	17.1N 125.2E	PCN 3		DMSP02V		PGTW
38	120043	14.9N 126.6E	PCN 3	T3.0/3.0	DMSP02V	INIT JDS	RPMK
39	120043	17.0N 126.6E	PCN 3		DMSP02V		PGTW
40	120140	14.3N 126.5E	PCN 3		DMSP02V		RPMK
41	120140	14.4N 126.4E	PCN 3	T1.0/1.0	DMSP02V	INIT JDS	PGTW
42	120515	14.3N 127.0E	PCN 4		DMSP02V		PGTW
43	121324	15.4N 122.4E	PCN 5		DMSP02V		PGTW
44	121325	15.4N 122.3E	PCN 3		DMSP02V		RODN

ATCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLY	70043	OBS	MAX-SFC-WND	MAX-FLY-LVL-WND	APPROX	EYE	EYE ORIENT-	WIND TEMP (C)	WIND
			1VL	70T	MSLP	VEL/HRG/HRG	DIR/VEL/HRG/HRG	NAV/MET	SHAPE	DIRECTION	DIR/VELOCITY	WIND
1	082027	15.4N 130.1E	70044	7047			110 32 080 14 10 3				+13 +12	5
2	082153	15.4N 130.1E	70044	7046	993	40 130 15 100	37 300 14 4 3				+14 +11	5
3	080928	15.4N 130.4E	70044	7024	990	45 270 10 100	51 070 12 4 4				+14 +11	6
4	081947	17.3N 120.2E	70044	7004			170 35 090 30 4 4				+14 +11	7
5	082140	17.6N 120.2E	70044	7010		50 060 20 100	38 060 30 4 4				+14 +11	7
6	102306	14.3N 120.4E	70044	7035			210 27 230 14 4 2				+13 +10	4
7	102213	14.5N 120.4E	70044	7071		35 140 75 230	30 140 90 4 4				+14 +8	4
8	110540	14.4N 120.4E	70044	7005		35 210 30 000	30 320 90 4 10				+15 +11	10
9	110425	14.4N 120.5E	70044	7079	995	20 180 30 150	17 010 30 4 4				+14 +10	10
10	120515	14.3N 127.0E	150047	1003		40 220 30 000	48 010 180 4 4				+24 +24	11
11	120558	14.2N 126.5E	70044	7124	1001							

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (MM)	COMMENTS
1	070000	0.2N 141.5E	17	190	

TROPICAL DEPRESSION 26

SATELLITE FIXES

FIA NO.	TIME (Z)	FIX POSITION	ACCRV	UNPACK CODE	SATELLITE	COMMENTS	SITE
1	202255	11.24 154.4E	PCN 3		DMSPD1A	LL EXP	PGTW
2	301137	14.14 154.5E	PCN 5		DMSPD1A	ULCC	PGTW
3	302238	14.74 152.5E	PCN 3	72.0/2.0	DMSPD1A	INIT OBS	PGTW
4	010056	14.74 152.0E	PCN 3		DMSPD1A		PGTW
5	010907	20.34 152.2E	PCN 6		DMSPD1A		PGTW
6	011119	20.34 151.1E	PCN 6		DMSPD1A		PGTW
7	011156	20.34 151.0E	PCN 5		DMSPD1A		PGTW
8	012048	22.64 150.6E	PCN 5		DMSPD1A		PGTW
9	012219	22.64 151.0E	PCN 5	71.0/2.0-71.0/2.0HRS	DMSPD1A		PGTW
10	012219	21.24 140.0E	PCN 5		DMSPD1A	RELOCATED	PGTW
11	020037	24.34 149.7E	PCN 3		DMSPD1A	LLCC	PGTW

AIRCRAFT FIXES

FIA NO.	TIME (Z)	FIX POSITION	FLT IVL	70043 OBS MUT	70043 OBS MSLP	MAX-SFC-WIND VEL/4RG/RWG	MAX-FLI-LVL-4NN IIR/VEL/8HG/4NG	ACCRV NAV/MET	EYE SHAPE	EYE ORIEN-DIAG/TATION	EYE TEMP (F) DUT/ 14/ 3P/4ST	WSN NO.
1	011913	21.04 149.0E	700MM	3091			270 27 200 40	4 4			+15	3
2	012144	21.04 149.0E	700MM	3102	1001	40 090	5 244 35 200 20	4 4			+11 +14 + 6	3

SYNOPTIC FIXES

FIA NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (MM)	COMMENTS
1	021200	24.24 152.1E	15	120	

TYPHOON ABBY

SATELLITE FIXES

FLA NO.	TIME (Z)	STX POSITION	ACFRY	SVTAK CODE	SATELLITE	COMMENTS	SITE
1	012238	4,200 180.0E	PCV 5	T1-5/1.5	DMS03A	INIT JDS	PGTW
2	010507	4,200 180.2E	PCV 5		DMS03A		PGTW
3	011114	4,200 180.4E	PCV 5		DMS03A		PGTW
4	011155	4,200 180.2E	PCV 5		DMS03A		PGTW
5	012214	4,200 180.2E	PCV 5	T3-0/3.0 /11.5/24HRS	DMS03A		PGTW
6	020740	4,200 180.2E	PCV 5		DMS03A		PGTW
7	021101	4,200 180.4E	PCV 5		DMS03A		PGTW
8	021135	4,200 180.2E	PCV 5		DMS03A		PGTW
9	022201	4,200 180.0E	PCV 5		DMS03A		PGTW
10	030015	4,200 180.2E	PCV 5	T3-5/3.5 /10.5/24HRS	DMS03A		PGTW
11	031042	4,200 180.2E	PCV 5		DMS03A		PGTW
12	031117	4,200 180.4E	PCV 5		DMS03A		PGTW
13	031514	4,200 180.4E	PCV 5		TIW05N		KGWC
14	032326	4,200 180.4E	PCV 3		DMS03A		PGTW
15	032358	4,200 180.2E	PCV 3	T4-0/4.0 /10.5/24HRS	DMS03A		PGTW
16	041024	4,200 180.1E	PCV 5		DMS03A		PGTW
17	041058	4,200 180.0E	PCV 5		DMS03A		PGTW
18	042305	4,200 180.2E	PCV 5		DMS03A		PGTW
19	042434	4,200 180.4E	PCV 5	T4-0/4.0 /50.0/24HRS	DMS03A		PGTW
20	041147	4,200 180.2E	PCV 5		DMS03A		PGTW
21	041200	4,200 180.2E	PCV 5		DMS03A		PGTW
22	041734	4,200 180.2E	PCV 5		TIW05N	APRNT LFC INDICATED 10 N	PGTW
23	042248	4,200 180.1E	PCV 5		DMS03A		KGWC
24	042314	4,200 180.2E	PCV 5	T4-0/4.0 /50.0/24HRS	DMS03A	2ND CIRC AT 084N 1504E	PGTW
25	041124	4,200 180.4E	PCV 5		DMS03A		PGTW
26	041201	4,200 180.2E	PCV 5		DMS03A	UL CNTR AT 105N 1679E	PGTW
27	041724	4,200 180.0E	PCV 5		TIW05N		KGWC
28	070511	10,200 180.7E	PCV 5	T3-5/4.0 /10.5/24HRS	DMS03A		PGTW
29	071042	10,200 180.6E	PCV 5		DMS03A		PGTW
30	071111	10,200 180.3E	PCV 5		DMS03A		PGTW
31	071141	10,200 180.2E	PCV 5		DMS03A		PGTW
32	072352	11,200 180.5E	PCV 5	T2-5/3.5 /11.0/24HRS	DMS03A		PGTW
33	040022	11,200 180.7E	PCV 5	T2-5/2.5	DMS03A	INIT JDS	RODN
34	040022	11,200 180.3E	PCV 5		DMS03A		PGTW
35	041234	12,200 180.1E	PCV 5		DMS03A		PGTW
36	041303	12,200 180.6E	PCV 5		DMS03A	UPN LVL	RODN
37	041303	12,200 180.1E	PCV 5		DMS03A		PGTW
38	042334	11,200 180.4E	PCV 5	T3-0/3.0 /10.5/24HRS	DMS03A		PGTW
39	050144	11,200 180.0E	PCV 5		DMS03A		PGTW
40	051215	10,200 180.4E	PCV 5		DMS03A		PGTW
41	051244	10,200 180.4E	PCV 5		DMS03A		RODN
42	051244	10,200 180.2E	PCV 5		DMS03A		PGTW
43	051437	11,200 180.2E	PCV 5		TIW05N		KGWC
44	100059	11,200 180.5E	PCV 5		DMS03A		PGTW
45	100125	11,200 180.4E	PCV 5	T4-0/4.0 /11.0/24HRS	DMS03A		PGTW
46	101157	12,200 180.6E	PCV 5		DMS03A		PGTW
47	101157	12,200 180.5E	PCV 5		DMS03A		RODN
48	101224	12,200 180.3E	PCV 5		DMS03A		PGTW
49	111426	13,200 180.3E	PCV 5		TIW05N		KGWC
50	110034	13,200 180.6E	PCV 5		DMS03A		PGTW
51	110105	13,200 180.4E	PCV 5	T4-5/4.5	DMS03A	INIT JDS	RODN
52	110105	13,200 180.4E	PCV 3	T3-0/5.0 /11.0/24HRS	DMS03A		PGTW
53	111320	14,200 180.4E	PCV 1		DMS03A		PGTW
54	111345	14,200 180.4E	PCV 1		DMS03A		PGTW
55	111345	14,200 180.3E	PCV 1	T3-0/5.0	DMS03A	INIT JDS	RODN
56	120021	14,200 180.7E	PCV 1		DMS03A		PGTW
57	120046	14,200 180.6E	PCV 1	T3-0/5.0 /50.0/24HRS	DMS03A		PGTW
58	120046	14,200 180.4E	PCV 1	T3-0/5.0 /10.5/24HRS	DMS03A		RODN
59	120227	14,200 180.4E	PCV 1		DMS03A		RODN
60	120700	14,200 180.2E	PCV 1		TIW05N		KGWC
61	121302	14,200 180.4E	PCV 1		DMS03A		PGTW
62	121327	14,200 180.1E	PCV 1		DMS03A		RODN
63	121327	14,200 180.4E	PCV 1		DMS03A		PGTW
64	130003	14,200 180.7E	PCV 1	T4-5/4.0 /10.5/24HRS	DMS03A		PGTW
65	130205	21,200 180.3E	PCV 1		DMS03A		PGTW
66	130205	21,200 180.2E	PCV 1	T4-0/5.0 /11.0/24HRS	DMS03A		RODN
67	131244	21,200 180.5E	PCV 5		DMS03A		PGTW
68	131305	21,200 180.5E	PCV 5		DMS03A		PGTW
69	131305	21,200 180.2E	PCV 5		DMS03A		RODN
70	131753	21,200 180.4E	PCV 5		TIW05N		KGWC
71	132345	22,200 180.5E	PCV 1	T4-0/4.0 /50.0/24HRS	DMS03A		RODN
72	132345	22,200 180.1E	PCV 5		DMS03A		PGTW
73	140007	22,200 180.5E	PCV 5	T4-0/4.0 /10.5/24HRS	DMS03A		PGTW

ATCRAFT FIXES

FLA NO.	TIME (Z)	STX POSITION	FLT LVL	70044 HGT	JDS MSLP	MAX-SFC-WND VFL/ARG/ANG	MAX-FLT-LVL-WND DTH/VFL/ARG/ANG	ACFRY NAV/MFT	EYE SHAPE	EYE ORIEN- JIRAMTATION	EYE TEMP (F) DIR/ 1N/ DP/ECT	WSN NO.
1	012215	4,200 180.4E	700MM		996	45 050 15	040 36 020 50	1 4			+20 +25 +23	1
2	020210	4,200 180.1E	700MM	1074		40 050 25	040 39 360 12	2 5			+4 +11	2
3	030920	4,200 180.2E	700MM	1064	998		110 34 360 24	1 5			+4 +10 +9	3
4	031302	4,200 180.0E	700MM	1049	995		140 38 110 20	2 2			+10 +14	4
5	032130	4,200 180.2E	700MM	1050	992	55 030 15	140 40 070 60	4 5			+4 +14 +10	5
6	040104	4,200 180.2E	700MM	1050	994	50 010 25	040 41 340 00	4 5			+11 +14 +10	6
7	040718	4,200 180.4E	700MM	1013	987	40 140 10	040 50 270 54	4 5			+4 +14 +10	7
8	050154	4,200 180.4E	700MM		986	40 270 10	040 53 350 20	2 4			+14 +18 +10	8
9	050340	4,200 180.4E	700MM	1101			140 53 350 00	1 4			+14 +13 +12	9
10	061500	4,200 180.0E	700MM	1083			50 050 15	4 4			+14 +13 +9	10
11	061421	4,200 180.4E	700MM	1070	1001		50 350 60	7 4			+14 +12 +12	11
12	062150	4,200 180.4E	700MM	1134	1000	50 090 10	070 45 310 50	2 4			+10 +14 +6	12

13	040051	4.40	141.4E	700MM	1135	35	170	35	040	41	300	90	2	3			
14	040215	4.40	141.7E	700MM	1127	1002	40	220	30	120	41	300	90	4	4		
15	040335	4.40	140.9E	700MM	1094	1000	40	290	30	040	47	240	150	10	4		
16	041205	4.30	140.7E	700MM	1040					130	10	240	30				
17	041402	4.60	140.4E	700MM	1090	1002				260	28	160	135	4	20		
18	042030	4.60	140.1E	700MM	1000		25	150	25	090	51	350	120	4	5		
19	042127	10.00	140.0E	700MM		995	50	050	25	140	52	050	22	4	20		
20	071503	10.20	140.7E	700MM	1050	996				230	30	150	20	4	5		
21	071907	10.30	140.0E	700MM	1053					140	33	090	90	4	5		
22	072128	11.10	140.0E	700MM	1062	996	35	020	40	140	43	040	80	4	5		
23	080553	12.20	140.6E	700MM	1084		30	020	30	110	34	020	35	4	5		
24	080558	11.00	140.4E	700MM	1092					180	27	100	110	10	5		
25	081938	11.30	130.7E	700MM	1045					150	23	070	4	15	10		
26	082126	11.50	130.4E	700MM	1084		25	230	15	140	22	070	60	10	5		
27	090617	11.20	137.0E	700MM	1064		35	100	30	100	39	300	40	4	5		
28	090812	10.50	136.3E	700MM	2942	988	40	360	5	110	74	360	10	4	5		
29	091934	10.30	134.4E	700MM	2925					040	61	330	30	4	5		
30	092207	11.10	134.2E	700MM	2935		60	190	25	140	55	090	30	4	5		
31	102247	11.50	130.9E	700MM	2747	964	40	120	35	170	78	120	35	4	5		
32	110554	14.30	130.2E	700MM	2792		75	300	10	110	85	230	60	4	5		
33	110927	14.40	130.1E	700MM	2774	963	75	030	13	240	76	140	74	4	5		
34	112149	14.30	130.3E	700MM	2682	954	100	110	30	200	105	130	30	4	5		
35	122105	14.40	130.0E	700MM	2681					120	84	270	14	4	5		
36	122214	14.50	130.0E	700MM	2663	951	30	110	30	220	106	120	30	4	5		
37	120906	20.70	130.0E	700MM	2762	962	110	180	20	260	118	170	25	4	7		
38	131938	22.10	141.4E	700MM	2934					180	75	080	30	4	5		
39	142220	22.20	142.0E	700MM	1002		40	150	50	230	45	080	30	4	10		
40	140737	22.70	140.5E	1500FT	1001		40	270	15	240	39	070	45	4	2		

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	200000	7.00 140.0E	15	100	
2	300000	7.00 140.5E	15	120	
3	141200	21.00 140.0E	20	200	

TROPICAL STORM BEN

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCR	ORIGIN CODE	SATELLITE	COMMENTS	SITE
1	201134	11.7N 122.0E	PCN 5		DMS030		PGTW
2	201217	11.7N 120.9E	PCN 5		DMS030		PGTW
3	210059	11.5N 127.0E	PCN 3	T2.0/2.0	DMS030	INIT JDS	PGTW
4	210114	11.5N 126.9E	PCN 3		DMS030		PGTW
5	210114	11.5N 126.7E	PCN 5	T2.0/2.0	DMS030	INIT JDS	RPMK
6	211340	11.7N 121.8E	PCN 5		DMS030		RODN
7	211355	11.5N 121.8E	PCN 5		DMS030		PGTW
8	211355	11.5N 121.7E	PCN 5		DMS030		RPMK
9	211356	11.5N 121.4E	PCN 5		DMS030		RODN
10	220041	12.4N 121.4E	PCN 5	T3.5/3.5 / 01.5/24HRS	DMS030		PGTW
11	220236	12.1N 121.0E	PCN 5	T3.5/3.5	DMS030	INIT JDS	RODN
12	220237	12.5N 120.9E	PCN 5	T3.0/3.0 / 01.0/24HRS	DMS030		RPMK
13	220652	13.5N 119.4E	PCN 5		TH030		KGWC
14	221322	13.9N 119.1E	PCN 5		DMS030		PGTW
15	221336	13.9N 119.2E	PCN 5		DMS030		PGTW
16	230023	14.3N 119.3E	PCN 5	T2.5/3.5 / 01.0/24HRS	DMS030		PGTW
17	230204	15.7N 119.6E	PCN 5		DMS030		RODN
18	230217	16.3N 119.7E	PCN 5		DMS030		PGTW
19	230217	15.5N 119.3E	PCN 5	T2.5/3.0 / 00.5/24HRS	DMS030		RPMK
20	230640	14.0N 121.3E	PCN 5		TH030		KGWC
21	231304	20.0N 121.9E	PCN 5		DMS030		PGTW
22	231317	20.0N 124.1E	PCN 5		DMS030		PGTW

AIRCRAFT FIXES

FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	T0043	DRS	MAX-SFC-WND	MAX-FLT-LVL-WND	ACCR	EYE SHAPE	EYE ORIENTATION	WV TEMP (C)	WIND NO.
1	210620	11.5N 125.4E	700MH	3047	392	50 030	20 100	46 330	60	4 5	+11 +11	1
2	212225	12.5N 122.3E	700MH			50 350	10 210	38 120	60	3 4		2
3	220913	13.4N 119.4E	700MH	3013	906	70 320	10 120	72 000	15	1 3	+13 + 8	4
4	222239	15.5N 119.4E	700MH	3052	995	70 020	12 170	56 090	15	2 2	+14 + 9	6

RAJAH FIXES

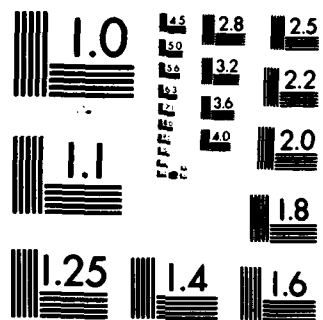
FIX NO.	TIME (Z)	FIX POSITION	RAJAH	ACCR	EYE SHAPE	EYE DIAM	RAJAH-CODE	COMMENTS	RAJAH POSITION	CITF WIND NO.
1	210710	12.0N 125.2E	LAND				10017 / 11111		10.3N 124.0E	08446
2	210940	12.9N 124.2E	LAND				10010 5/111		10.3N 124.0E	08446
3	211100	12.0N 124.2E	LAND				12013 52714		10.3N 124.0E	08446
4	211200	11.9N 121.4E	LAND				10130 52618		10.3N 124.0E	08446
5	211300	11.9N 121.4E	LAND				25240 52620		10.3N 124.0E	08446
6	220700	13.5N 119.4E	LAND	FAIR	CIRCULAR	20			15.2N 123.6E	08327
7	221900	15.2N 119.4E	LAND		CIRCULAR				15.2N 120.6E	08327

NAVAL OCEANOGRAPHY COMMAND CENTER/JOINT TYPHOON WARNI--ETC F/6 4/2
ANNUAL TYPHOON REPORT 1979.(U)
1979 J W DIERCKS, J K LAVIN, J H BELL

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

2. NORTH INDIAN OCEAN CYCLONE FIX DATA

TC 17-79

KATELITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	AC/RV	DVORAK CODE	SATFILLITE	COMMENTS	SITE
1	062354	4.4N 80.7E	PCN 6	T1.0/1.0	DWSP17	CNTH BASED ON IPR LVL OUTFLOW	KRMC
2	061240	7.7N 87.0E	PCN 6	T1.0/1.0	DWSP17	POSIT BASED ON IPR LVL ANTICYCLONE	KRMC
3	061705	9.4N 88.5E	PCN 6	T1.0/1.0	DWSP17	INIT 305	KRMC
4	070121	7.4N 84.4E	PCN 6	T1.0/1.0	DWSP17		KRMC
5	070509	4.0N 87.0E	PCN 6	T2.5/2.5 /D1.5/20HR	DWSP17		KRMC
6	071220	4.0N 84.0E	PCN 6		DWSP17	EDGE OF DATA POSIT BASED CURV	KRMC
7	071647	7.0N 84.7E	PCN 6		DWSP17		KRMC
8	080100	5.0N 86.1E	PCN 4	T3.0/3.0 /D0.5/10HR	DWSP17	APPROX LOW LVL CIRC	KRMC
9	080520	5.7N 86.3E	PCN 1	T0.0/4.0 /D1.5/24HR	DWSP17		KRMC
10	081341	4.1N 86.4E	PCN 1		DWSP17	STORM ON EAST EDGE OF PICTURE	KRMC
11	081910	7.2N 84.7E	PCN 2		DWSP17		KRMC
12	080800	7.2N 86.3E	PCN 2		DWSP17	EYE COVERED BY THIN CI CANOPY	KRMC
13	080800	7.0N 87.5E			TIMON	EYE UNSTABLE	FJDB
14	081321	4.7N 84.0E	PCN 4	T3.5/4.0 /D0.5/24HR	DWSP17	CTR BASED ON CH BANDS	KRMC
15	081751	10.7N 84.5E	PCN 1		DWSP17	EYE BASED	KRMC
16	100021	10.7N 84.0E	PCN 1		DWSP17		KRMC
17	100651	11.0N 84.5E	PCN 1	T5.0/5.0 /D1.0/24HR	DWSP17	EYE EMBEDDED	KRMC
18	101302	12.1N 84.0E	PCN 2		DWSP17	GOOD EYE GOOD CI OUTFLOW	KRMC
19	101736	15.0N 84.0E	PCN 1		DWSP17	EYE WELL DEFINED	KRMC
20	102115	15.0N 87.2E			TIMON	EYE WELL DEFINED EST. DTS	FJDB
21	102124	9.4N 84.3E			TIMON	EYE NOT USBL	FJDB
22	110001	12.0N 87.5E	PCN 2	T5.0/5.0 /D1.5/24HR	DWSP17	EYE ON EDGE OF DATA	KRMC
23	110142	12.7N 87.3E	PCN 2		DWSP17	EYE WELL DEFINED	KRMC
24	110615	15.0N 87.7E	PCN 2	T6.0/6.0 /D1.0/24HR	DWSP17	EYE WELL DEFINED AND EMBEDDED	KRMC
25	111001	14.3N 88.5E			TIMON	EYE WELL DEFINED	FJDB
26	111241	14.1N 87.0E	PCN 2	T6.0/6.0 /D1.0/24HR	DWSP17	EYE NOT USBL RHE TO CI CANOPY	KRMC
27	111715	17.0N 81.2E	PCN 1		DWSP17	W EDGE OF DATA CI CAP OVER EYE	KRMC
28	120122	14.3N 81.0E	PCN 4		DWSP17	COO HOME OVA	KRMC
29	120556	14.7N 80.0E	PCN 4		DWSP17	EYE NOT USBL GOOD CI OUTFLOW	KRMC
30	121135	15.0N 78.0E			TIMON	EYE DEFINABLE FST. DTS	FJDB
31	121602	16.7N 79.1E	PCN 4		DWSP17	EYE NOT USBL	KRMC
32	120102	16.0N 78.0E	PCN 6		DWSP17	UPR LVL ANTICYCLONE	KRMC
33	120530	16.0N 77.0E	PCN 6	T3.0/4.0 /D2.0/24HR	DWSP17		KRMC

TC 18-79

KATELITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	AC/RV	DVORAK CODE	SATFILLITE	COMMENTS	SITE
1	170645	14.0N 69.2E	PCN 6	T1.0/1.0	DWSP17	INIT OBS/ANTICYCLONE ALOP	KRMC
2	171349	10.7N 71.1E	PCN 6		DWSP17		KRMC
3	171927	17.0N 66.0E	PCN 6		DWSP17		KRMC
4	180230	14.7N 64.0E	PCN 6		DWSP17	UPR LVL ANTICYCLONE CI OUTFLOW	KRMC
5	180627	17.7N 64.2E	PCN 4	T2.0/2.0 /D1.0/24HR	DWSP17		KRMC
6	181100	18.1N 68.0E	PCN 6		TIMON		KRMC
7	181311	18.2N 67.0E	PCN 6		DWSP17		KRMC
8	181909	18.0N 67.6E	PCN 6		DWSP17	POSIT BASED ON EXTRAP	KRMC
9	180800	18.0N 66.0E			TIMON		KRMC
10	180210	18.0N 66.7E	PCN 6		DWSP17		KRMC
11	180600	18.7N 66.1E	PCN 5	T2.5/2.5 /D0.5/24HR	DWSP17		KRMC
12	180750	18.3N 66.3E	PCN 5		DWSP17	ON EDGE OF DATA	KRMC
13	181139	14.7N 57.0E			TIMON		KRMC
14	181650	10.0N 50.5E	PCN 5	T2.5/2.5 /D0.5/24HR	DWSP17	BASED ON EXPANDED LLC	KRMC
15	181950	10.1N 50.7E	PCN 6		DWSP17	POSIT BASED ON EXTRAP	KRMC
16	182300	10.0N 50.0E			TIMON		KRMC
17	200150	10.1N 57.0E	PCN 6	T2.0/2.5 /D0.5/24HR	DWSP17		KRMC
18	200731	10.3N 54.0E	PCN 5		DWSP17		KRMC
19	201630	21.0N 56.0E	PCN 6		DWSP17	POSIT BASED ON EXTRAP	KRMC
20	210619	10.0N 57.1E	PCN 5	T1.0/2.0 /D1.0/27HR	DWSP17		KRMC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	171200	17.0N 67.0E	30	40	
2	171800	18.0N 66.5E	30	20	
3	180800	18.0N 66.0E	45	60	
4	181200	18.0N 66.0E	35	80	
5	211500	21.0N 56.5E	15	200	

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SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVDRK CODE	SATFLITE	COMMENTS	SITE
1	211200	9.5N 84.0E			TIROK4		KNSS
2	211340	11.5N 84.4E	PCN 6		DWSP17	INIT JGS	KOMC
3	211602	12.0N 84.2E	PCN 6		DWSP10	INIT JGS	KOMC
4	220039	14.6N 87.2E	PCN 6	T1.5/1.5	DWSP17		KOMC
5	220100	13.5N 87.1E			TIROK4		KNSS
6	220443	14.3N 86.0E	PCN 6		DWSP10		KOMC
7	221320	15.0N 89.0E	PCN 6	T1.5/1.5	DWSP17	INIT JGS	KOMC
8	221543	15.7N 89.4E	PCN 6		DWSP10	INIT JGS	KOMC
9	220413	16.0N 81.2E	PCN 6	T1.5/1.5	DWSP1A	INIT JGS/PSN BASED ON COMV	KOMC
10	220424	16.0N 81.3E	PCN 6	T1.5/1.5 /00.5/24HR	DWSP10	PSN BASED ON CENTER OF COMV	KOMC

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	

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SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRV	DVDRK CODE	SATFLITE	COMMENTS	SITE
1	180559	12.6N 71.0E	PCN 5	T1.0/1.0	DWSP10	INIT JGS/CENTER BASED ON LLCC	KOMC
2	181441	12.6N 70.1E	PCN 6		DWSP17		KOMC
3	180140	14.6N 70.4E	PCN 5	T2.0/2.0 /01.0/24HR	DWSP17		KOMC
4	180443	14.1N 71.3E	PCN 5		DWSP1A		KOMC
5	180541	14.1N 71.9E	PCN 5		DWSP10		KOMC
6	181421	14.0N 69.0E	PCN 6		DWSP17		KOMC
7	181640	13.5N 68.7E	PCN 6		DWSP10		KOMC
8	200120	14.4N 70.3E	PCN 6	T0.5/1.5 /01.5/24HR	DWSP17	PSN BSU ON CNTR OF COMV/NO LIC	KOMC
9	200512	15.6N 70.4E	PCN 6		DWSP10		KOMC
10	201015	15.0N 69.0E			TIROK4		KNSS
11	201400	15.9N 69.0E	PCN 6		DWSP17		KOMC
12	201606	16.7N 69.4E	PCN 6		DWSP1A	PSN BSU ON APPROX LLCC	KOMC
13	210059	16.7N 69.0E	PCN 6		DWSP17	PSN BSU ON APPROX LLCC	KOMC
14	210321	16.0N 69.5E	PCN 4		DWSP10		KOMC
15	211100	18.0N 68.0E	PCN 4		TIROK4		KNSS
16	211340	17.9N 69.4E	PCN 6	T1.0/1.0 /00.5/24HR	DWSP17		KOMC
17	211447	16.6N 87.0E			TIROK4		PJBJ
18	220039	18.5N 64.2E	PCN 3	T3.0/3.0 /02.0/24HR	DWSP17		KOMC
19	220100	17.7N 64.4E			TIROK4		KNSS
20	220221	18.4N 64.2E	PCN 3		DWSP17		KOMC
21	220625	18.8N 64.7E	PCN 3		DWSP10		KOMC
22	221130	19.0N 64.2E			TIROK4		KNSS
23	221501	19.4N 64.3E	PCN 6		DWSP17	UPR LVL OUTFLW GOOD	KOMC
24	221712	20.7N 67.3E	PCN 6		DWSP1A		KOMC
25	221724	19.5N 67.5E	PCN 6	T3.0/3.0 /02.0/24HR	DWSP10	PSN BASED ON CENTER OF COMV	KOMC
26	220200	19.7N 67.4E	PCN 4	T2.0/3.0 /01.0/24HR	DWSP17		KOMC
27	220413	19.6N 67.3E	PCN 3		DWSP1A		KOMC
28	220606	19.7N 67.2E	PCN 3		DWSP10	PSN BASED ON EXPOSED LLC	KOMC
29	221100	19.1N 61.0E	PCN 6	T2.0/3.0 /01.0/24HR	TIROK4		KNSS
30	221441	20.0N 61.0E	PCN 6		DWSP17		KOMC
31	221705	20.3N 60.0E	PCN 6		DWSP10	POSIT GSN ON FIXTRAP	KOMC
32	240140	20.4N 60.1E	PCN 3	T1.0/2.0 /01.0/24HR	DWSP17		KOMC
33	240354	20.3N 60.0E	PCN 3		DWSP1A		KOMC
34	240547	19.4N 59.4E	PCN 3		DWSP10	GOOD LL FLD TIME/NO CDO	KOMC
35	241421	19.4N 58.0E	PCN 6		DWSP17	PSN-DS BASED ON LL CU LINE	KOMC
36	241646	19.4N 58.1E	PCN 6		DWSP10	COMV VAL/POSIT NSD ON LLC	KOMC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
1	241000	20.4N 57.0E	10	200	

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SATELLITE PAGES

FIA NO.	TIME (Z)	FIX POSITION	ACQRY	DUPLICATE CODE	SATellite	COMMENTS	SITE
1	201626	10.24 09.5E	PCN 0	70.5/0.5	DWSP04	INIT J05	KOMC
2	202350	10.24 01.5E	PCN 0	71.5/1.5	DWSP07		KOMC
3	200164	10.24 00.0E	PCN 0		TIM004	INIT J05	FJBJ
4	200333	11.24 00.7E	PCN 0		DWSP04		KOMC
5	200440	11.24 00.3E	PCN 0		DWSP04		KOMC
6	201230	12.24 00.0E	PCN 0		DWSP07		KOMC
7	201506	12.24 00.3E	PCN 0		DWSP04		KOMC
8	200130	12.24 00.1E	PCN 0		TIM004		FJBJ
9	200315	12.24 00.5E	PCN 5	71.5/1.5	DWSP04		KOMC
10	200027	11.00 00.7E	PCN 5	71.5/1.5 /50.0/27HR	DWSP04		KOMC
11	201210	11.00 00.0E	PCN 0		DWSP07		KOMC
12	201527	12.00 00.3E	PCN 0		DWSP04		KOMC
13	200230	12.00 00.0E	PCN 0		DWSP04		KOMC
14	210050	13.24 00.3E	PCN 5	72.0/2.0 /00.5/20HR	DWSP07		KOMC
15	210257	13.24 00.7E	PCN 5		DWSP04		KOMC
16	210000	13.24 00.1E	PCN 5		DWSP04		KOMC
17	210000	12.00 00.5E	PCN 0		TIM004		FJBJ
18	211339	13.24 00.7E	PCN 5		DWSP07		KOMC
19	010030	12.30 01.0E	PCN 5	70.5/2.5 /00.5/20HR	DWSP07		KOMC
20	010530	12.24 00.0E	PCN 5		DWSP04		KOMC
21	011310	12.24 70.0E	PCN 0		DWSP07		KOMC
22	011630	11.24 70.0E	PCN 0		DWSP04		KOMC

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SATELLITE PAGES

FIA NO.	TIME (Z)	FIX POSITION	ACQRY	DUPLICATE CODE	SATellite	COMMENTS	SITE
1	100502	11.24 72.2E	PCN 0	70.4	DWSP04	INIT J05	KOMC
2	101017	10.24 70.1E	PCN 0		DWSP07		KOMC
3	101040	11.00 00.0E	PCN 5		DWSP04		KOMC
4	100110	12.00 00.5E	PCN 5		DWSP04		KOMC
5	100200	12.00 00.7E	PCN 5	70.5/0.5 /50.0/20HR	DWSP04		KOMC
6	101705	14.00 00.5E	PCN 0		DWSP07		KOMC
7	100005	13.14 70.0E	PCN 5	70.5/0.5 /50.0/20HR	DWSP04	EXP00 ULFC	KOMC
8	101330	10.00 00.0E	PCN 0		DWSP07		KOMC
9	101705	14.00 00.7E	PCN 0		DWSP04		KOMC
10	100210	10.24 00.5E	PCN 0		DWSP07		KOMC
11	100000	10.24 00.7E	PCN 5	71.5/1.5 /01.0/20HR	DWSP04	EXP00 ULFC	KOMC
12	101057	10.24 70.1E	PCN 0		DWSP07		KOMC
13	101000	17.24 70.0E	PCN 0		DWSP04		KOMC
14	170130	17.00 71.1E	PCN 5		DWSP07		KOMC
15	170527	10.24 00.0E	PCN 5	71.0/1.5 /00.5/20HR	DWSP04		KOMC
16	171030	10.00 70.1E	PCN 5		DWSP07		KOMC
17	171020	10.00 70.2E	PCN 0		DWSP04		KOMC

TC 26-79

SATELLITE PAGES

FIA NO.	TIME (Z)	FIX POSITION	ACQRY	DUPLICATE CODE	SATellite	COMMENTS	SITE
1	201000	0.00 00.0E			DWSP04	UPR LVL RTR	KOMC
2	210033	0.00 00.0E			DWSP04	UPR LVL RTR	KOMC
3	210000	10.00 00.0E			DWSP04		KOMC
4	211314	10.24 01.0E	PCN 5		DWSP07	INIT J05	KOMC
5	211000	10.00 01.0E	PCN 0		DWSP04		KOMC
6	211010	7.24 01.0E	PCN 0		DWSP04		KOMC
7	200013	10.00 01.0E	PCN 0		DWSP07	ULAC	KOMC
8	201203	10.00 00.0E	PCN 0		DWSP07	ULAC	KOMC
9	201031	10.00 00.7E	PCN 0	70.0/0.5	DWSP04	INIT J05	KOMC
10	200203	10.24 00.1E	PCN 0		DWSP07	ULAC	KOMC
11	200203	10.24 00.2E	PCN 0		DWSP07		KOMC
12	200330	10.00 00.0E	PCN 5	70.5/0.5 /50.0/20HR	DWSP04		KOMC
13	200331	10.00 07.0E	PCN 5	70.0/0.0	DWSP04	INIT J05	KOMC
14	201223	12.00 00.3E	PCN 5		DWSP07		KOMC
15	201010	10.24 00.0E	PCN 5		DWSP04	LLCC	KOMC
16	200003	10.24 00.7E	PCN 5	70.0/2.0 /02.0/20HR	DWSP04	LLCC	KOMC
17	201003	13.00 00.1E	PCN 0		DWSP07		KOMC
18	200002	12.00 70.0E	PCN 0		DWSP07	ULAC	KOMC
19	200043	13.10 00.0E	PCN 5	71.0/2.0 /01.0/20HR	DWSP04	LLCC	KOMC
20	201031	10.24 77.0E	PCN 5		DWSP04		KOMC

APPENDIX

1. CONTRACTIONS

AC&W	Aircraft Control and Warning System	ICAO	International Civil Aviation Organization
ACCRY	Accuracy	IR	Infrared
ACFT	Aircraft	KM	Kilometer(s)
AIREP	Aircraft Weather Report(s) (Commerical and Military)	KT	Knot(s)
ANT	Antenna	LLCC	Low Level Circulation Center
APT	Automatic Picture Transmission	LVL	Level
ARMO	Aerial Reconnaissance Weather Officer	M	Meter(s)
ATT	Attenuation	M/SEC	Meters per Second
AVG	Average	MAX	Maximum
AWN	Automated Weather Network	MB	Millibar(s)
BRG	Bearing	MET	Meteorological
CDO	Central Dense Overcast	MIN	Minimum
CI	Current Intensity	MOHATT	Modified Hatrack
CLD	Cloud	MSN	Mission
CLSD	Closed	NAV	Navigational
CNTR	Center	NAVPGSCOL	Naval Postgraduate School
CONF	Confidence (number)	NEDN	Naval Environmental Data Network
CPA	Closest Point of Approach	NEDS	Naval Environmental Display Station
DEG	Degree(s)	NEPRF	Naval Environmental Prediction Research Facility
DIAM	Diameter	NESS	National Environmental Satellite Service
DIR	Direction	NET	Near Equatorial Trough
DMSP	Defense Meteorological Satellite Program	NM	Nautical Mile(s)
EASTPAC	Eastern Pacific	NOAA	National Oceanic and Atmospheric Administration
ELEV	Elevation	NRL	Naval Research Laboratory
FLT	Flight	NTCC	Naval Telecommunications Center
GOES	Geostationary Operational Environmental Satellite	OBS	Observation(s)
HATRACK	Hurricane and Typhoon Tracking (numerical forecast)	PCN	Position Code Number
HGT	Height	PE	Primitive Equation
HPAC	Mean of XTRP and Climatology	PSBL	Possible
HU	Hurricane	PTLY	Partly
HR	Hour(s)	QUAD	Quadrant
HVY	Heavy	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.

FUJIWARA 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 cumuli-form 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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